

# SPERM WHALE - 1 WELL COMPLETION REPORT

PERMIT Vic/P11 1982



# OIL and GAS DIVISION

1 4 APR 1983

SPERM WHALE No.1

WELL COMPLETION REPORT

Authors:

M.A. Battrick, GEOLOGIST.

A. Eisenbarth, SNR. DRILLING ENGINEER.

Supervised By:

E.M.L. Tucker, CHIEF GEOLOGIST.

Hudbay Oil (Australia) Ltd.

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WELL HISTORY

1.

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## SPERM WHALE - 1.

1 WELL HISTORY

#### 1.1 General Data

1.1.1 Name and Address of Operator

Hudbay Oil (Australia) Ltd., 256 Adelaide Terrace, PERTH W.A. 6000

1.1.2 Participants

Beach Petroleum N.L., 32nd Floor, 360 Collins Street, MELBOURNE VIC. 3000 Hudbay Oil (Australia) Ltd., 256 Adelaide Terrace, PERTH W.A. 6000 Gas & Fuel Exploration N.L., 151 Flinders Street, MELBOURNE VIC. 3000

1.1.3 Petroleum Title

Vic/P11, Victoria

- 1.1.4 <u>District</u>: Melbourne, 1:1,000,000 block No. 1781 SP 130, Line GB81-26 (proposed)
- 1.1.5 Location Ref. Figure No. 1

Latitude : 38° 03' 25.86"S Longitude : 148° 21' 51.64"E

AMG Co-ordinates:

N 5786947 E 619696 AMG Zone 55

Rotary Table (R.T.) - 9.45 metres above Mean Spring Low water. All depths for this report are referred to Rotary Table unless otherwise indicated.

1.1.6 <u>Water Depth</u> - 54.5 metres

Total Depth - 1417 metres

<u>Spud Date</u> - 26th December, 1981 Rig Released - 22nd January, 1982

1.1.7 Status

Plugged and Abandoned, Gas well.

#### 1.2 Drilling Summary

The drillship "Petromar North Sea" was sailed from the Whale No 1 location and arrived at the Sperm Whale No 1 location at 0600 hours December 25th, 1981. Anchors were run and soaked, the vessel was positioned over the location, and the TGB was set on the seabed.

A 36" bottom hole assembly (BHA) was made up and run to spud the well at 0100 hours December 26th 1981. The 36" hole was drilled to 72m, the 36" BHA was pulled, a 26" BHA was run, and the hole was deepened to 208m. A 20" casing string complete with 20-3/4" wellhead, permanent guide base and 30" conductor pile was run and landed at 196m. The string was cemented in place with 855 sacks cement plus 2.5 percent prehydrated gel lead and 300 sacks cement plus 2 percent CaCl<sub>2</sub> tail slurry. The 20-3/4" stack was run and the casing was pressure tested to 500 psi. A test plug was run to pressure test the stack and the choke manifold.

A  $17\frac{1}{2}$ " BHA was made up to drill out the 20" shoe plus 4m of new hole. A pressure integrity test to a 2.16 SG equivalent was conducted and the  $17\frac{1}{2}$ " hole was drilled to 720m. Electric wireline logs were run over the  $17\frac{1}{2}$ " open hole section. A string of 13-3/8" casing was run and cemented in place at 710m with 818 sacks cement plus 2.5 percent prehydrated gel lead and 202 sacks neat tail cement slurry. The 13-5/8" stack was skidded over the moonpool and hung off due to inclement weather. After the seas had calmed, the stack was landed and the casing was pressure tested to 2000 psi. The test plug was then run to pressure test the ram and annular preventors.

A  $12\frac{1}{4}$ " BHA was made up and run to drill out the shoe plus an additional 3m of new hole. A pressure integrity test was conducted to a 1.87 SG equivalent and then the drilling fluid was displaced to a Bara-carb brine system. The  $12\frac{1}{4}$ " hole was drilled to 1417m and then was conditioned for logging. Electric logs and RFT's were run and evaluated prior to plugging back the  $12\frac{1}{4}$ " hole.

Drill pipe was run to plug back the well to 925m. A string of 9-5/8" casing was run and landed at 919m. The casing was cemented in place with 396 sacks of neat cement. A 9-5/8" seal assembly was run and pressure tested to 2200 psi. The stack was pulled, the rams were changed out to  $3\frac{1}{2}$ ", the stack was rerun, and then was pressure tested. Excess cement was drilled out to 894m with an  $8\frac{1}{2}$ " BHA.

Electric wireline was rigged up and a cement bond log was run. The interval 839 - 848m was then perforated for a DST. The first attempt at a DST was a misrun due to the inability to latch the surface pressure readout connector and sand plugging in the test tools. An  $8\frac{1}{2}$ " bit and 9-5/8" scraper were run to condition the well prior to the attempt at DST #1A. This test was also a misrun due to failure of the PCT to operate. DST #1B was then run and was operationally successful, although flow was not sufficient to unload the diesel cushion. The well was then conditioned after an  $8\frac{1}{2}$ " BHA had been run.

A bridge plug was set at 837m on electric wireline and pressure tested to 2200 psi. The interval 832 - 834m was perforated and preparations were made to conduct DST #2. DST #2 was completed with a final flowrate of dry gas of approximately 4 mmscf/d with  $\rm H_2S$  at 200 ppm. The well was circulated free of hydrocarbons and plugged back to 830m with a wireline set bridge plug.

The interval 819 - 826m was perforated and DST #3 was conducted. This test flowed dry gas at 5.4 mmscf/d with H<sub>2</sub>S at 200 ppm. A bridge plug was set at 817m on electric wireline and a cement plug was pumped and balanced over the interval 817 - 787m. A second cement plug was placed over the interval 165 - 100m. the 9-5/8" seal assembly was recovered, the stack was pulled and secured, and a cutting assemly was made up. The 9-5/8" casing was eventually cut at 78m after a few problems with the mechanical cutter. The 9-5/8" stub was retrieved and the 13-3/8" casing was then cut at 76m and retrieved. Attempts to recover the 20" stub and subsea equipment were unsuccessful and it was considered prudent to recover this equipment at a later date using diver placed explosives. The anchors were pulled and the rig was released at 0600 hours on January 22nd, 1982.

An attempt to remove the subsea wellhead by using divers to place an explosive charge was unsuccessful due to strong water currents and poor weather conditions. Hence, the rig was moved back to the Sperm Whale No 1 location for the wellhead recovery prior to departing the area for the Northwest coast of Australia. Four anchors were run out and the rig was positioned over the wellhead. An explosive charge was placed in the wellhead and lowered below the 30" conductor pile. The rig was moved off location, the charge was detonated, and the rig was repositioned over the wellhead. The 20" stub plus the subsea equipment was successfully recovered. The anchors were pulled and the rig departed for the Northwest Shelf at 2230 hours 19th February, 1982.

#### 1.3 Geological Summary (Enclosure E1)

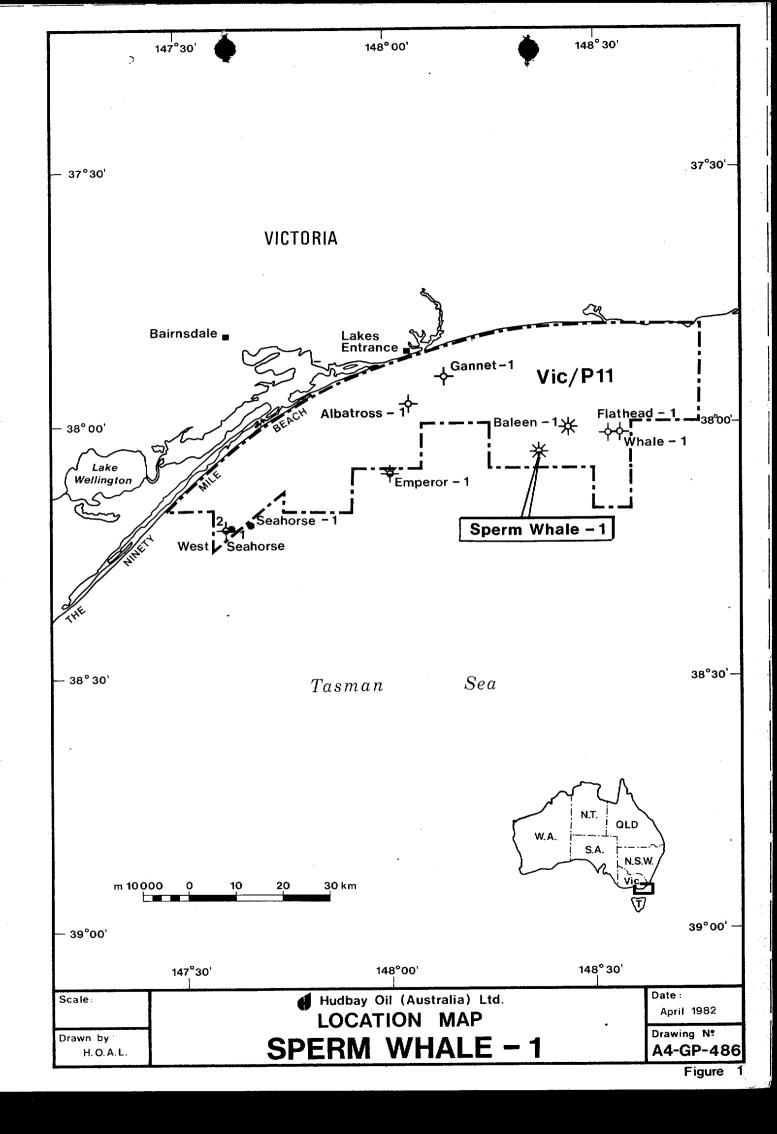
The Sperm Whale No.1 well was drilled into an asymmetric anticline, formed by arching into a major east-west, reverse fault, upthrown to the south. Closure was mapped at two horizons, designated "Top Latrobe" and "Top Strzelecki" (Figure 13). Formation sampling commenced after drilling out the 20 inch casing shoe, set at 196 metres.

The interval 196-805 metres consisted of skeletal calcarenites, calcisiltites and calcilutites, with marls and calcareous claystones predominantly below 400 metres. There was an overall decrease in grain size with depth and the formation became recrystallized in part below 720 metres. This interval ranged from Upper Eocene to Mid Pliocene in age. The underlying section, from 805-947 metres consisted of 142 metres of non-marine sandstones and claystones with minor siltstones and coals throughout. This section ranged in age from Palaeocene to Eocene with possible Upper Cretaceous affinities at the base. This interval represented the Latrobe Group.

There is a minor increase in acoustic impedence and gamma ray response, with a marked decrease in S.P. response and density below 947 metres. The sequence from 947 metres to T.D. at 1417 metres consisted dominantly of arenaceous claystones and argillaceous sandstones with minor interbeds of clean sandstone and claystone. Thin silicified bands occurred in the sequence and lithic fragments were noted throughout the more coarse lithologies. This interval is placed in the Lower Cretaceous period with Albian age affinities above 1253 metres.

Movable hydrocarbons were encountered within the upper section of the Latrobe Group, and the well flowed dry gas at rates of up to 5.4 MMcf/d during a DST over the interval 819-826 metres. Degraded oil was recovered during the RFT programme from a thin oil leg over the interval 831.5-833.5 metres.

The well bottomed in sediments of Lower Cretaceous age.



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DRILLING

(Pages 6-19)

2.

2.0 DRILLING

2.1 Drilling General

2.1.1 Drilling Data Summary

Drilling Contractor:

Petromarine Drilling Aust. Pty Ltd

Office Suite 1-5

1st Floor, Stratham House

49 Melvil<sup>1</sup>e Parade SOUTH PERTH WA 6151

Drawworks:

National 1625 powered by two 752 GE

Traction motors

Blow Out Preventor

Equipment

. Two stack system

20-3/4" x 2000 psi - Hydril MSP

Cameron double gate

Type U

13-5/8" x 5000 psi - Hyd

Hydril GL

Cameron triple gate

Type U

Elevation:

RT to MSL - 9.45m Water Depth - 54.5m

Water Depth - 5 Datum - r

rotary table

(63.95m above seabed)

Pumps:

Two National 12-P-160 Triplex driven by two GE 752 motors

2.1.2 General Well Data

Location:

Latitude 38<sup>0</sup> 03' 25.863" S Longitude 148<sup>0</sup> 21' 51.644" E

0430 hrs December 25th 1981 -

Rig released from Whale No 1

0600 hrs December 25th 1981 -

arrived at location

0100 hrs December 26th 1981 -

spudded

2100 hrs January 6th 1982 -

TD reached

0600 hrs January 22nd 1982 -

Rig released

Days to total depth - 12 days

2100 hrs February 17th 1982 -

Return to location to recover

SS equipment

2230 hrs February 19th 1982 -

Left location

#### Hole and Casing Details:

<u>Hole Size</u>	Depth	Shoe Depth	<u>Casing</u>
36"	72m	<b>7</b> 0m	30" Grade B 310#
26"	208m	196m	20" X52 94# Cameron CC connectors
17½"	720m	710m	13-3/8" K55 61# BTC
12¼"	1417m	919m	9-5/8" K55 40# BTC

#### 2.2 <u>Daily Operation Record</u>

#### 2.2.1 <u>Daily Drilling Operation Summary</u>

See attached Figure 2.

#### 2.2.2 Bottom Hole Assembly Record

26 December 1981 RR Bit No 1	Bit-Bit Sub-6x8" Drill Collars, Cross Over, 55.2 metres.
27 December 1981 Bit RR No 2	Bit-Bit Sub-12x8" Drill Collars, Cross Over, 8 Joint Heavy Wt Drill Pipe, 108 metres.
29 December 1981 RR Bit No 3	Bit-Bit Sub-12x8" Drill Collars, Cross Over, 1 Joint Heavy Wt, Jars, 11 Joint Heavy Wt, 102.7 metres.
30 December 1981 Bit No 4	Bit-Bit Sub-12x8" Drill Collars, Cross Over, 1 Joint, Heavy Wt Jars, 11 Joint Heavy Wt, 102.7 metres.
1 January 1982 RR Bit No 3	Bit-Bit Sub-12x8" Drill Collars, Cross Over, 1 Joint Heavy Wt, Jars, 8 Joint Heavy Wt, 79.4 metres.
3 January 1982 Bit No 5	Bit Junk Sub-Bit Sub-15x8" Drill Collars, Cross Over, 1 Joint Heavy Wt, Jars, 11 Joint Heavy Wt,135.4 metres.
4 January 1982 Bit No 6	Bit-Bit Sub-2x8" Drill Collars, 12½" Stab, 1x8" Drill Collar, 12½" Stab, 12x8" Drill Collars, Cross Over, 1 Joint Heavy Wt, Jars, 11 Joint Heavy Wt, 252.6 metres.
5 January 1982 Bit No 7	Bit-Bit Sub-2x8" Drill Collars, 12½" Stab, 1x8" Drill Collars, 12½" Stab, 12x8" Drill Collars, Cross Over, 1 Joint Heavy Wt, Jars, 11 Joint Heavy Wt, 252.6 metres.
6 January 1982	Bit-Bit Sub-2x8" Drill Collars, 12½" Stab, 1x8" Drill Collars, Cross Over, 1 Joint Heavy Wt, Jars, 11 Joint Heavy Wt, 252.6 metres.



## DAILY DRILLING OPERATIONS SUMMARY

WELL SPERM WHALE NO 1

DATE	DEPTH	OPERATION
25/12/81	NIL	Last anchor pulled on Whale No 1 at 0430 hours 25 December 1981. Underway to Sperm Whale No 1, arrived on location at 0600 hours.
26/12/81	75m	Ran anchors and moved onto location, and set temporary guide base. Spudded in at 0100 hours 26 December 1981. Drilled 36" hole from 64m to 72m. Laid out 36" hole opener and ran in hole with 26" bit. Drilled 26" hole from 72m to 75m.
27/12/81	208m	Continued drilling 26" hole from 75m to 208m. Conditioned mud and hole to run 20" casing. Hung permanent guide base in Moonpool and ran 10 joints of 20" casing. Landed casing and permanent guide base in temporary guide base.
28/12/81	208m	Circulated casing prior to cementing and cemented casing with 1155 sacks of cement. (See cementing and casing report for full details.) Ran in hole with Bull Nose and tagged top of cement at 140m. Removed rig floor and rigged up to run 20-3/4" BOP. Waited on weather 4½ hours. Ran 20-3/4" BOP stack.
29/12/81	343m	Finished running 20-3/4" BOP stack. Tested choke kill and manifold to Hudbay specification. Ran in hole with bit no 3, 17½" and drilled out cement and shoe. Displaced sea water with gel/polymer mud, and drilled from 208m to 212m. Performed leak off test equivalent to 18 ppg. Drilled from 212m to 343m. Surveyed at 227m, 1°. Slipped drilling line while pulling out of hole.
30/12/81	669m	Pulled out of hole with bit no 3 and retrieved survey 1 <sup>0</sup> at 343m. Ran in hole with bit no 4. Drilled 17½" hole from 343m to 669m. Note while drilling through Gumbo section worked kelly and circulated on each connection.
31/12/81	720m	Continued drilling 17½" hole 669m to 720ml3-3/8" casing point. Tripped to condition hole to log, - tight hole from 650m to 690m. Ran in hole, no fill on bottom. Circulated and conditoned mud and hole to log. Pulled out of hole to log. Ran logs: Run #1 DIT, BHGS,GR. Run #2 FDC, GR, CAL. Run #3 CST #1.
1/1/82	720m Float Collar @ 697.9m	Finished log no 3 CST no 1. Made up 13-5/8" well head equipment. Ran in hole and washed and reamed through tight spot from 673m to 699m and from 705m to 720m. Circulated and made wiper trip. Pulled out of hole and ran 54 joints of 13-3/8" casing. Landed casing with shoe at 709.7m. Tested cement line. Circulated casing volume and started mixing and pumping cement.
2/1/82	720m Float Collar @ 697.9m	Mixed and pumped 1043 sacks of cement. (See casing and cement report for details.) Backed out and pulled running tool. Pulled 20-3/4" BOP and rigged to run 13-5/8" BOP. Worked on blue and yellow pod, prepared to jump divers to check on obstruction in wellhead. Cancelled dive due to gale warning. Waited on weather and mixed bara-carb brine mud.
3/1/82	723m	Finished waiting on weather. Jumped divers and cleared obstruction from wellhead. Ran 13-5/8" BOP. Tested casing and BOP. (See BOP report for details.) Ran wear bushing and installed divertor. Ran in hole with bit no 5. Tagged cement at 677m. Drilled cement float collar and shoe. worked junk sub. Drilled 12½" hole from 720m to 723m. Circulated bottoms up and performed leak off test equivalent to 15.61 ppg.
4/1/82	848m	Finished performing leak off test. Circulated and displaced hole with bara-carb brine and cleaned active tanks. Drilled $12\frac{1}{4}$ " hole from 723m to 848m. Circulated bottoms up prior to making connections to prevent plugging bit jets. Dropped survey and pulled out of hole to 13-3/8" casing shoe at 709m. Retrieved survey $1\frac{1}{2}$ . Ran in hole. Hole free. Attempted to unplug jets with no success. Pulled out of hole with bit no 5 and recovered $\frac{1}{2}$ lb junk from junk sub. Ran in hole with bit no 6 to 832m.
5/1/82	1055m	Washed and reamed through tight spot from 832m to 848m. Circulated bottoms up to condition mud. Drilled ahead from 848m to 946m. Circulated bottoms up, o dropped survey and pulled out of hole to 13-3/8" shoe. Retrieved survey $1\frac{1}{2}$ . Ran in hole. Worked pipe and attempted to unplug jets with no success. Pulled out of hole. Ran in hole with bit no 7 to 926m. Washed and reamed through tight hole, 3m of fill. Drilled ahead from 946m to 1055m.
6/1/82	1292m	Continued drilling ahead from 1055m to 1292m. Circulated bottoms up. Dropped survey and pulled out of hole for bit change,- survey $\frac{1}{2}^0$ . Made up re-run bit no 6 and ran in hole.
7/1/82	1417m	Continued running in hole to 13-3/8" casing shoe, slipped 6.5m drill line and finished running in hole to 1199m. Washed and reamed from 1199m. Washed and reamed from 1199m to 1292m-1294m fill on bottom. Drilled ahead with Bit #6 from 1292m to 1417m (T.D.) circulated bottoms up, dropped survey. Pulled out of hole to 13-3/8" casing shoe, tight hole from 1312m to 1417m 9.1 tonne over pull.



# DAILY DRILLING OPERATIONS SUMMARY

WELL SPERM WHALE NO 1

DATE	DEPTH	OPERATION
7/1/82 Co	nt. 1417m .	Prepared 9-5/8" shoe and float collar. Ran in hole to 1321m - tight spot. Checked pumps, unable to get correct pump pressure.
8/1/82	1417m	Reamed and washed from 1321m to 1417m - 3 metre fill. Circulated
		greater - no correction). Rigged up Schlumberger and logged DLL-MSFL-GR - tool Run #2 - Ran BHCS-GR. Attempted to run FDC-CNL-GR-EPL-GR. Commenced Velocity
9/1/82	1417m	Finished running velocity survey. Ran HDT log. Ran RFT No 1 to 842m and collected samples. Ran RFT No 2 to 852m and collected samples. Ran RFT No 3 to 812m RR Bit #5 and ran in hole.
10/1/82	1417m	Finished running in hole to 1417m - hole free circulated. Conditioned mud and hole. Pulled out of hole to complete logging programme. Rigged up Schlumberger and collected samples from 836m - 850m - 859m. Ran RFT #8 Ran CST No 2 723m - 1411m. Rigged down Schlumberger and laid out 8" drill collars and stabilizers. Ran in hole with open end drill pipe.
11/1/82	Float Collar @ 894.5m	Finished running into hole with open end drill pipe. Circulated and conditioned mud. Set cement plug from 1080m to 930m, pulled back to 925m and reversed out, Pulled out of hole and pulled wear bushing. Rigged up and ran 72 joints 9-5/8" Tested cement line to 4000 psi. OK. Mixed and pumped 396 sacks cement (see Ran and set 9-5/8" seal assembly and attempted to test same with no success.
12/1/81	Float Collar @ 894.5m	Pulled 9-5/8" seal assembly, and ran in hole with open end drill pipe. Circulated and washed out well head. Ran new 9-5/8" seal assembly and tested same to 2200 psi. OK. Pulled BOP stack and changed top pipe rams to 3½" rams. Jumped divers to hook up TV guide line. Landed and latched BOP's.
13/1/82	894.5m	Ran in hole with test plug and tested lower rams to 2200 psi. OK. Ran and set wear bushing. Ran in hole with 8½" bit and casing scraper, tagged top of mud and pulled out cement from 883m to 894m. Circulated and conditioned from 839m to 848m with 4 shot per foot. Rigged up and ran perforating gun and perforated spacing. Made up DST #1 and ran in hole, unable to pass packer through well head.
14/1/82	894.5	Replaced packer rubbers. Ran in hole with DST #1 - Gator Hawked tubing to 9000 psi. Made up EZ tree function tested and landed same. Packer set at 832.8m. Rigged up surface equipment, and pressure tested separator lines to 600 psi and surface equipment lines to 3000 psi. Conducted DST #1, open for 1st flow 2025 hours. Moderate blow. Closed for 1st shut in 2032 hours. Open for 2nd at 0010 hours no blow, well dead at 2109 hours, closed tool for final shut in and pulled DST #1 - collected samples.
15/1/82	894.5m	Laid down test tools. Ran in hole with 8½" bit and casing scraper to 838m. Made repairs to rig SCR system. Finished running in hole to 894m and circulated bottoms up. Pulled out of hole and laid out casing scraper. Made up and ran Ran EZ tree. Hooked up surface equipment and pressure tested surface lines.
7/1/02	894.5	Finished pressure testing surface lines and set packer @ 832.5m. Attempted to SPRO, strand parted on monoconductor, repaired same and ran in hole with attempted to open PCT, no flow, SPRO indicated no opening. Reset packer, shut off point with no flow, ruptured pump out sub and reversed out diesel cushion aid out surface equipment and pulled out of hole. Laid out test tools. Sushion to EZ tree. Rigged up surface equipment and pressure tested surface lines.
	d t o	et packer at 832.8m, ran and latched SPRO, opened PCT and flowed well. Well ied without unloading diesel cushion. Ruptured pump out sub and reversed out of hole. Ran in hole with 8½" bit and casing scraper to 890m, circulated and onditioned mud. Pulled out of hole and rigged up Schlumberger. Ran and set -5/8" bridge plug @ 837m, tested casing to 2200 psi. OK. Ran perforating gun,



## DAILY DRILLING OPERATIONS SUMMARY

WELL SPERM WHALE NO 1

DATE	DEPTH	OPERATION
17/1/82 Cont	. 894.5m	and perforated from 832m - 834m with 4 shot per foot. Made up DST tools for test #2 and ran in hole with same, Gator Hawk Tested to 2500 psi. Ran diesel cushion to EZ tree.
18/1/82	830m	Made up EZ tree. Flow head and surface equipment, pressure tested surface lines. Set packer @ 815.2m, conducted DST #2, opened PCT with strong to medium blow, 0919 hours gas to surface, 0941 hours oil trace at surface, 1049 hours gas only, 1057 hours closed PCT for final build up. Ruptured pump out sub and reversed out tubing contents. Unseated packer and circulated out hydrocarbons, laid out surface equipment and pulled DST string. Made bit and casing scraper, run to 835m, circulated and conditioned mud. Pulled out of hole, rigged up Schlumberger and set 9-5/8" bridge plug @ 830m. Tested casing to 2200 psi. OK. Ran perforating guns and perforated 819m to 826m with 4 shot per foot. Rigged down Schlumberger tools. Made up DST #3 and ran into hole.
19/1/82	817m	Finished running into hole with DST #3 with diesel cushion to EZ tree. Made up EZ tree - flow head and surface equipment, pressure tested surface equipment and set packer at 803m. Conducted DST #3. Opened for 1st flow @ 1327 hours ¼" choke, final well head pressure 250 psi. At 1334 hours closed for 1st shut in, ISIP 1193.4 psi. At 1405 hours opened for 2nd flow, FWHP 855 psi on ½" choke. At 1545 hours closed for final shut in 1206.7 psi. Ruptured pump out subs and reversed out tubing contents. Unseated packer and circulated annulus free of hydrocarbons. Rigged down surface equipment and pulled out of hole laying down tubing. Collected samples and laid out test tools. Rigged up Schlumberger and set bridge plug @ 817m.
20/1/82	100m	Rigged down Schlumberger, ran in hole with open end drill pipe to 817m. Mixed and pumped 36 sacks cement plug from 817m to 787m. Pulled 3 stands and reversed out. Pulled out of hole to 165m, mixed and pumped 72 sacks cement, plug from 165m to 100m. Pulled 3 stands and reversed out. Pulled wear bushing, attempted to pull 9-5/8" seal assembly - no success. Made tool joints up dry, ran in hole and pulled seal assembly. Nippled down and pulled BOP stack. Made up 9-5/8" casing cutter - unable to stab into well head. Rigged up guide rope below marine swivel and stabbed into well head. Attempted to cut 9-5/8" casing, tool did not open. Repaired casing cutter, attempted to cut casing 78m, tool malfunction - lost all pump pressure. Pulled casing cutter out of hole.
21/1/82	100m	Ran into hole with 9-5/8" running tool and attempted to pull 9-5/8" casing - no success. Ran in hole with 9-5/8" casing cutter, tool still would not function. Laid out casing cutter and picked up new hydraulic casing cutter, cut off 9-5/8" casing and well head. Ran 13-3/8" casing cutter. Cut 13-3/8" casing at 76.4m, attempted to pull 13-3/8" casing - no success. Redressed 13-3/8" casing cutter and recut 13-3/8" casing @ 76.4m, attempted to pull same. Worked jars and attempted to circulate - no success. Pulled casing cutter, and ran in hole with 13-3/8" running tool and jars, attempted to jar casing loose - no success. Pulled running tool, redressed casing cutter - new cutter blades would not pass through well head. Redressed casing cutter with used blades and cut 13-3/8" casing @ 71.2m.
22/1/82	100m	Finished cutting 13-3/8" casing @ 71.2m, ran into hole with running tool and pulled 13-5/8" well head. Made up 20" casing cutter and cut casing @ 71m. Attempted to pull same with maximum over pull 181 tonnes and 3000 psi - no success. Jumped diver and secured pennant wire to permanent guide base for marker buoy. Pulled anchors and retrieved pigtail with divers, last anchor pulled and secured at 0600 hours 22/1/82. Underway to West Seahorse #2 location.
18/2/82	100m	At 1430 hours underway to Sperm Whale #1 to retrieve well head. Arrived on location at 2100 hours, 17/2/82. Set 4 anchors, attempted to position rig over well head - no success. Reset #3 anchor.
19/2/82	100m	Finished resetting #3 anchor, positioned rig over well head. Jumped divers to secure guide lines for TV camera. No 3 anchor dragging due to 40 knot wind and 4.3m seas, rig off location. Waited on weather.
20/2/82	100m	Finished waiting on weather. Jumped divers, placed charge in well head. Moved rig off location and blew wellhead. Re-positioned rig over location. Pulled 20" x 30" well head and permanent guide base. "J" into temporary guide base and pulled same. Pulled anchors and retrieved pigtails with divers. Loaded and secured workboats, pulled last anchor @ 2230 hours. Underway to WA-58P location @ 2230 hours 19/2/82.

13 January 1982

Bit-Casing Scraper-Bit Sub-12x6½"
Drill Collars, Cross Over, 112.4 metres.

15 January 1982

Bit-Casing Scraper-Bit Sub-12x6½" Drill Collars, 3x4-3/4" Drill Collars, Cross Over,

Tubing to Surface, 140.6 metres.

#### 2.2.2 Bit Record

See 'Bit Record' attached as Figure 3.

#### 2.2.4 Time Breakdown Survey

See 'Well Time Breakdown Analysis' as Figure 4.

#### 2.2.5 Well History Chart

See 'Well History Chart' as Figure 5.

#### 2.3 Casing Record

#### 2.3.1 Casing Details

See 'Casing and Tubing Tallies' as Figures 6.

#### 2.3.2 Cementation Details

See 'Casing Running Reports' as Figures 7.

#### 2.4 Mud System

#### 2.4.1 Mud Report Summary

#### 36"/26" Hole Section

The 36"/26" hole section was drilled from 64m to 208m in 12.5 hours, 20" casing was then run and cemented at 195.5m. Mud cost for this section was \$4,540.55

The well was spudded with a 26" bit and 36" hole opener and drilled from 64m to 72m; seawater was circulated with returns to the sea bed. After spotting 30 bbls of Gel Spud Mud, the bit and hole opener were pulled and laid down. A 26" bit was used to drill ahead, pumping seawater and spotting 20 bbls Gel Spud Mud prior to each connection. At 208m the hole was displaced with 360 bbls of Gel Spud Mud and a wiper trip made. A further 500 bbls of mud was pumped before pulling out and setting 20" casing at 195.5m.

	Drawn by: A.Clark	Įz	Scale: N.T.S.		PETROMAF	NORTH		CONTR			ARINE DE		AUST. P				PVS	R.		HIRE,	% MCELHINNEY	
	by: Clark	T.S.		DATE A	r TD: 6	JANUAR:	ine Bara	PUMP :	NO 1: N	208 MATIONAL Size -	m SUI 12-P-1 4 <sup>1</sup> 2"	RF. CSG:		: NATION	NTER. C VAL 12-1		PU		POW		INTER. CSG:	m
ľ		•	ヿ		COLLARS		<del>- Carb</del>			0.D	8"		I.D.		-7/8"	•			:h -			
				BIT NO.	SIZE	MAKE	TYPE	JETS	SERIAL NO.		DEPTH OUT (M)	M/HR	WT (TONNES	RPM	PUMP PR. (kPa)	PUMP VOL. (L/MIN)	T	В	G: O	ther	FORMATION/ REMARKS	
				IRR	36"	SEC	но	3x24	7850	64	72	3.2	4.5	60	1380	1770	2	1	ı			
				2	26" 26"	HTC HTC	OSC3AJ	3x24 3x18	RB267	72	208	13.6	6.8	60	5860	1770	2	1	I			
-	S			3RR	17½"	HTC	OSC3AJ	3x15	RX789	208	343	15.8	6.8	70	10000	2450	3	1				
	PE	BIT	Hudbay	4	17½"	HTC	OSC3AJ	3x15	AZ033	343	720	15.1		80/100	14500	3130	2	1	I			
ŀ	<b>B</b> .	-		RR3	1715"	HTC	OSC3AJ	3x15	RX789		REAM A	ND CON	DITION	HOLE		3320	1	4				
	<b>≥</b>	굕	의	5	121 "	HTC	JD3	3x13	нх208	720	848	17	18.2	70	12000	1960	2	2	I			
	Ŧ	Ö	Ã	6	12½"	HTC	J33	3x12	084BG	848	946	15	18.2	80	12400	1660	2	1	I			
١	PERM WHALE	RECORD	(Australia	7	124"	HTC	JD4	3x15	FV265	946	1292	13	18.2	90	12600	1560	5	2	1/16	5		
		Ö	$\smile$	RR5	12½"	HTC	JD3	2x15 Blank	нх208	1292	1417	11.3	20.5	90	12400	1560	4	4	1/8		•	
İ			Ltd.	8RR	812"	HTC	xv	Open	57062		DRILLIN	G OUT	CEMENT							-	er 2	
				RR8	813"	HTC	xv	Open	57062		CASING	SCRAPE	r run									-
					~																·	
l												·										
										1												
ŀ	A Cra	3	Date:		,				:								ļ			-	v.	
Figure	A4-DF	March	.							,											,	
re 3	A4-DR-466	1982		·																		

.

·	2 3	P	TIME ANALYSIS (Hours)	Moving/	36"/26"		SECTIO	N OF HOLE		
<u>₹</u> 6		thor	TIME ANALISIS (HOUIS)	Anchorin	g Hole	17½" Hole	12½"Hole 8½"Ho	Le 6"Hole Comp/Tes	t Total	8
March 1982	<u>.</u>	Author: A.I.	DRILLING:							<u> </u>
9	ark		Moving to/from Location	11/2	ļ			6	71/2	1.0
82	ŀ		Anchor nandring	161/2		1		33	491/2	6.8
			Drilling		1212	331/2	531/2		993	13.7
			Round Trips	1	413	63	2013		314	4.3
			Reaming, Cond. Hole, Cond. Trips		44	111/2	22		38	5.2
	<	<	Running, Pulling and Cementing Casing	<del>-</del>	1712	173	5	2013	6013	8.3
	VV III		Running, Pulling Subsea Equipment	1	13	211/2	<u>-</u>		3415	4.7
	Ë	<u>''</u>	Testing Wellhead and BOP's		31,	6			912	1.3
	Г		Plugging Back, Abandonment, Completion				9	76	85	11.7
		_	Curing Lost Circulation							ļ
		- 2	Fishing and Washouts							<u> </u>
	≦	₹ €	Well Control			1				
U	יו פ	" ₹	Surveys			142/	5		6 <sup>3</sup> 3	0.9
Ţ	20	Hudbay	Downtime: Weather		41/2	10		144	29	4.0
<u>''</u>		D §	Mechanical Surface	1		ļ				
	ŽŢ	Ω Ω	Mechanical Subsea							
	- 1 - 5		Others							
2	≧ (	€ €	,							_
WHALE	DEEM WHALE	(Australia)								
	- <del>-</del> -	alia	EVALUATION:							0.3
';	'' ∠ 		Circulating Samples				2		2	
_	<u> </u>	> =	Hole Cond, Trips for Coring, Logging, Testin	g		813	11		1915	2.7
	2	Z	Coring	,						
	]	<b>&gt;</b>	Electric Logging			13½	271/2		41	5.6
	<u>_</u>	_	Wireline Flow Testing				211/2		211/2	3.0
	C	ANIAI VSIS	Drill Stem and Production Testing					185 <sup>1</sup> <sub>2</sub>	185½	25.5
	ā	7	Downtime: Logging				31/2		3 <sup>1</sup> 2	0.5
		•	Flow Testing		-					
			Others		<del>                                     </del>					
			Others							
>	Dra	o ca	OTHERS			11/2	214		4	0.5
4	ewing	ē		13						
A4-DR-545	, ē	N.T.S.	Total Time	10	60	1314	183	3351/2	728	
54	1 · · ·			18	60			33,73	4.5	
Ġ	ח		% Downtime		7.5	7.6	1.9			

SPUD: 0100 hrs, 26/12/81 RR: 0600 hrs, 22/1/82 RETURN TO LOCATION TO RECOVER SS EQUIP: 2100 hrs, 17/2/82 LEAVE LOCATION: 2230 hrs, 19/2/82 0 Drill 36" & 26" hole -Set 20" csg at 196m, run 20<sup>3</sup>/4" stack Drill 17/2" hole to 720m 500 Log, set 133/8" csg at 710m, run 135/8" stack DST#2. DST#3 DEPTH DST's# I, IA, IB Recover Subsea Equipment 1000 Drill 8/2" hole to 1417m-Set 9<sup>5</sup>/8" csg at 919 Log, PB to 925m 1500 5 10 15 20 25 30 DAYS Author · K.Putnam Scale: Hudbay Oil (Australia) Ltd. Drawn: A. Clark N.T.S. SPERM WHALE-1 Drawing Nº **WELL HISTORY CHART** 

April 1982

A4-DR-497

## Pa

Page 1 of 1

# Casing and Tubing Tally (METRIC)

lell Nam	ne and No	SPERM WHALE NO	Ι	Di	ate 27 DECEMBER	1982	Casing Si	ze <u>20"</u>
Veight _	04 11 /	ft Grad			onnectionCIW 'C			
Joint No.	Length of (m) joint	Total in (m) Hole	Joint No.	Length of (m) Joint	Total in (m) Hole	Joint No.	Length of Joint	Total in Hole
	•							
	•		<del> </del>	d Forward			d Forward	
01	12 .55	Inc Shoe	41	•		81	•	
02	12 -51		42	•		82	•	
03 04	12 51		43	•		83 84		
05	12 <b>·</b> 53		45	•		85	•	
06	12 •51		46	•		86	•	
07	12 '52		47	•		87	•	
08	12 '51		48	•		88	•	
09	12 52		49	•		89	•	
10	12 51		50	•		90	*	
	125 19		Sub tot			Sub tot	•	<u> </u>
11	10 13	30" x 20" WH	51 52	•		91 92	•	
13	•		53			93	•	
14	•		54	•		94	•	
15	•		55	•		95	•	
16	•		56	•		96	•	
17	•		57			97	•	
18	•		58	•		98	•	
19	•		59			99	•	
20	•		60	•		100 Sub tot		
ub tot 21	•		Sub tot	•	***************************************	Sub tot		<u></u>
22	•		62	•			TALLY S	UMMARY .
23	. •		63	•		Grou	p No.	Length
24	•		64	•			ding	(Forward)
25	•		65	•		10		125.19
26	•	•	66			20		10.13
27	•		67	•		30		•
28	•		68	•		40	_	•
29	•		69 70	•		50 60		• .
30 ub tot			Sub tot		· · · · · · · · · · · · · · · · · · ·	70		•
31	•		71	•		80		•
32	•		72	•		90		•
33		A STATE OF THE STA	73	•		100		•
34	•		74	•		TOTA		135.22
35	•		75	•		Tally		
36	•		76	•		Check	ked By	
37	•		77	•		<u> </u>		
38	•		78	•				
			79 80	•		1		
39	•					1		
39 40	•		-	•		<b>!</b>		
39 40 ub tot	.  KS_Rotar (i.e.	Seabed = 64m R	Sub tot of 30" I less	x 20" W	ellhead Housing W/H to seabed of	3.771	n)	
39 40 ub tot	KS Rotar	Seabed = 64m R' h of 20" Casing	Sub tot of 30" I less String	x 20" W	ellhead Housing W/H to seabed of	3.771	n)	.32m
39 40 ub tot	KS Rotar	Seabed = 64m R	Sub tot of 30" I less String	x 20" W	ellhead Housing W/H to seabed of	3.771	n) 135	.32m
39 40 ab tot	KS Rotar	Seabed = 64m R' h of 20" Casing	Sub tot of 30" I less String	x 20" W	ellhead Housing W/H to seabed of	3.77	n) 135	.32m
39 40 ib tot	KS Rotar	Seabed = 64m R' h of 20" Casing	Sub tot of 30" I less String	x 20" W	ellhead Housing W/H to seabed of	3.771	n) 135	.32m
39 40 b tot	KS Rotar	Seabed = 64m R' h of 20" Casing	Sub tot of 30" I less String	x 20" W	ellhead Housing W/H to seabed of	3.771	n) 135	.32m

# Casing and Tubing Tally (METRIC)

lell Nam	e and No	SPERM WHALE NO	1	D:	ete 30 DECEMBE	ER 1981	Casing Si	ze <u>13-3/8"</u>
Weight		Grad	e	Cc	onnection		Joints Ru	ın n
Joint	Length	Total	Joint	Length of (m)	Total in (m)	Joint	Length of	Total in
No.	of (m) joint	in (m) Hole	No.	Joint	Hole	No.	Joint	Hole
01	11.84	Centralizer	Carrie	d Forward		Carrie	d Forward	
		Collar	41	11.81		81	•	
02		Centralizer	42	11.94		82	•	
03	11. 93		43	12 08		83	•	
04		Centralizer	44	11. 98		84		
05	11. 91		45	12.02		85	•	
06	11. 82		46	11• 56		86	•	
07	11. 28		47	12.09		87	•	
08	11.91		48	12 09		88		
09	12.04		49	11• 96		89	•	
10	12.09		50	11.82		90		
Sub tot	119•61	Inc Shoe & Collar	Sub tot	119.35		Sub tot		
11	11. 99		51	11.86		91	•	
12	11. 96		52	12.08		92	•	
13	12.00		53	12.09	· · · · · · · · · · · · · · · · · · ·	93	•	
14	11•87		54	11. 95		94	•	
15	11-97		55	<b>4</b> ⋅ 37	WH Hanger	95	•	
16	11.87		56	•		96	•	
17	12-08		57			97	•	<u> </u>
18	11.90		58	•		98		
19	11.81		59			99	•	
20	12.05		60			100	•	
Sub tot	119.50		Sub tot	52• 35		Sub tot	•	
21	11.98		61	•		_	<b>TALLY</b> (	CLIAARAA IDAZ
22	11.98		62	•				SUMMARY
23	12.00		63	•			p No. ding	Length (Forward)
24	11.82		64	•		_ ===	_	119 • 61
25	11.84		65	•				119 •50
26	12:00		66	•		$-\frac{20}{30}$		119 •75
27	12.06		67			40		119 •32
28	12.08	<del> </del>	68			50		119 •35
29	12.05		69 70			60		52 •35
30	11.94			•		70		• .
	119.75		Sub tot			80		•
31	11·95 11·87		71	ļ		90		•
32			73			100		
33	12.09 11.70			•		TOTA		649 88
34	11.70		74			Tally		
35	12.08		76				ked By	
36	11.88		77			$\dashv$		
37	11.93		78	•				
38 39	12.07		79					
40	119.32		80	•				
Sub tot			Sub tot	•				
REMAR	Shoe Tota Ther	Top of 13-5/8" @ 709.77m BRT ( ll of 63 joints c efore 9 left on	TD 17	rd on compl				
	Leng	th 13-3/8" R/T =	· U.441	m .				

#### DBAY OIL (AUSTRALIA) LIMITED

#### Casing and Tubing Tally

(METRIC)

Date 4 JANUARY 1982 SPERM WHALE NO 1 \_ Casing Size \_\_\_9-5/8" Well Name and No. 40 lb/ft K 55 BTC Joints Run Connection Weight Length of (m) joint Total in (m) Hole Length of (m) Joint Total in (m) Hole Length of Joint Joint No. Joint Hole No. FS 0 .51 11.76 01 Carried Forward Centralizer Carried Forward 02 11.79 11. 41 81 11.69 0.44 FC 42 11.98 82 11.88 03 11.90 Centralizer 43 11.87 83 11.86 11.49 44 11.64 84 11.71 04 11 .89 12.08 85 12.08 Centralizer 45 05 12.08 11.81 11.97 46 86 06 11.81 11.08 11 •76 87 07 47 11.79 12 08 11.81 08 Centralizer 48 88 11.78 11.79 09 11 ·73 49 89 11 •95 12 04 50 11.97 90 10 Centralizer 119 41 118:31 Sub tot 117.65 Marker Jt Sub tot Sub tot 11.87 91 11.80 11 12 .08 796.55 51 11.77 92 11 .75 52 12 11 .97 11.85 93 12 .06 53 11 .73 13 11.93 12 .06 54 94 11 93 14 11.85 95 11 .77 11 •92 15 55 96 11.80 11.85 16 11 .78 11.66 97 12 .09 11 .78 57 17 11.57 11.89 11 .74 98 58 18 11.84 11 .80 11 .74 59 19 11.76 12 •06 12 07 100 60 20 Sub tot 117 • 90 Sub tot 119 •28 118 59 Sub tot 11.93 61 21 11 '68 11.79 11 •94 TALLY SUMMARY 62 22 11.71 11 .75 63 Group No. Length 23 (Forward) 11.96 64 11 .86 24 11.87 65 10 119.47 11 .71 25 11 . 87 66 20 118 •59 26 11 .64 11.72 30 11 .76 67 117 -68 27 11.70 68 40 118 .63 11 69 28 11 .71 11 95 50 118 •31 29 69 11 .62 117 -90 11.70 70 30 117 68 Sub tot 117 •88 70 117 •88 Sub tot 11 .81 80 118 42 71 31 11.80 11 .80 3.01 Pup Jt. 90 117 65 72 12 .08 32 119 28 73 0.33 Hanger 11 -86 11 .86 100 33 1065.91 12 .08 11 .70 64.04 L/S TOTAL 34 74 11 .76 75 11 .72 Tally By 415.48 35 11 .99 12 .02 Checked By 1481.39 76 36 11 .75 77 11 -81 37 11 98 11 67 78 38 11 82 11 91 39 11 82 11 81 40 Sub tot 118 .63 Sub tot 118 42 REMARKS TOTAL JOINTS - 135 Plus 4 Pup Joints A 3.56 - B 3.84 - C 3.01 - D 3.01

Page.

#### HUDBAY OIL (AUSTRALIA) LIMITED

#### Casing, Running Report

Well Name and No.	SPERM WHALE	NQ. 1	Date 27 Decei	nber 1981	Casing Size 2	:O"
HOLE	Size	36"	26"			
	Depth (m)	72m	208m			
CASING	Size	30"	20"		-	
	Depth (m)	70.36m	195.55		L	
MUD: Type <u>Spuc</u> Power Tong Torque Fill up Points <b>E</b> &	e Maximi	s.g. <u>1.0</u> um <u>C.I.W.</u> '(	4 ∨is. <u>9:</u> CC' Con ft/lbs. r	3 YP Minimum	ft/lb	WL
Calc Displ (m <sup>3</sup> )	OP and Casing	144.8	Pump Strokes	By H.O.W	.c.o.	
- Conc. 213p1. 1111 7 =	250	psi	Max	1100	psi	
CASING INFORMA					m	m
TD .						208.00
OFF BOTTOM					12.45	
Shoe (make and typ	e)			Landed at		195.55
Length Shoe					12.55	183.00
Total 10 Jo	oints. Grade X52	wt. 94	b/ft ID. 19.124 ins	•	112.64	70.36
Landing Collar (mal	ce and type)					
<u> </u>						
Hanger or Suspensio	n joint (make and typ	De) C.I.W. 30	"x20" W/H		10.13	60.23
Top Hanger or Susp			**			<u> </u>
Landing String		Running_I	00]		.31	<u>59.92</u>
		Pup Jt &	HWT DP		- 63.69	3.//
metres above R.T. a	t Zero Tide					3.77
Less tide of		No Correc	tion			
metres up from R.T						3.77
DETAILED CASIN	G AND CEMENTING	REPORT		II -+ CO OO		105 EE
Kan a tota	of 10 Jts a	ing landed s	ame top of 20	at ou.230	n dnu snoe (	raccura tacta
compant lin	<u>total volume</u>	+0 2000 ~	in surface les	prior io CE ke vieshle	Pumpad 10	Pressure teste Dibbl preflush
Mived load	e anu varves.	330 sacks 1	G' cement wit	h 220 hhle	fresh water	with 2.5%
nel avera	ge slurry with	13 nna	G CEMENT WILL	11 220 0013	TICOLI WULCE	49 1 511 14 0 570
Followed w	ith tail mix	and pumped	300 sacks cla	ss 'G' ceme	ent mixed w	ith 37 bbls
coawator w	ith 2% CaCl	Ile angrava	irry wt 15 6 n	na		
Started di	splacing at C	845 with se	awater. Disp i. Increased	laced 85 bl	ols, pressu	re increased
immediatel	y from 250 ps	i to 900 ps	<u>i. Increased</u>	pressure 1	o 1100 psi	and pressure
tell to la	O psi immedia	itely. Cont	inuea aisbiac	ing aggitic	mai to bui	s. Good Cemen
<u>returns at</u>	sea bed. Ch	ecked float	shoe, not ho	iaing. Sui	rged Tioat -	- STILL WOULD
not hold.	Stopped disp	placing 45 b	bls short due	to sudden	pressure 10	nent. Tagged
top of com	ont at 16/m	V 910N III III	101' cement	left in cas	ina	icire ragged
cop or ceill	CIIL QL 104II.	A LULAI UI	TOT CEMELLE	icie in cas	9+	
	··					
***************************************						
	· · · · · · · · · · · · · · · · · · ·			. и сит	DF	
			Operators Representa	tive II. SIII	· ·	

#### HUDBAY OIL (AUSTRALIA) LIMITED

#### Casing, Running Report

Well Name and No.	SPERM WHAL	E NO. 1	Date 2 Janu	ary 1982	Casing Size	13-3/8"
HOLE	Size	36"	26"	17½"		
	Depth (m)	72m	208m	720m	<u> </u>	
CASING	Size	30"	20"	13-3/8"	<u> </u>	
CASING	Depth (m)	70.36m	195.55m	709.77m		
MUD: Type SW	/Gel/Poly	s.g1.1	9 vis. 4	3 YP	17	WL 19.6
Power Tong Torque		num 10,000		Minimum 7,	000 ft	/lbs.
Fill up Points E						
Calc Displ (m3)	WDP 1.7 bb1	casing 318	bbls Pump Strok	<sub>as</sub> Displaced	with H.O	.W.C.O. unit
oute. Otspit (iii ) =	250	psi Initial	timp on on	550	psi Fi	nal
CACING INFORMA		. psi Ilii Ciai				
CASING INFORMA	TION				Lgth m	m B.R.T.
TD				<u> </u>		720
OFF BOTTOM					10.23	709.77
Shoe (make and typ	e) With Lamb	float shoe		Landed at		709.77
Length Shoe	·				0.60	709.17
1 Jo	oints. Grade K <b>5</b>	5 wt. 61 It	/ft ID. 12.515	ins.	11.84	697.33
Landing Collar (mak	ke and type) With	Lamb baffle	collar		0.43	696.90
	53 .1+c 12.	-3/8" K55 61	#/ft casing		632.64	64.26
			#1-1 granina		002101	<u> </u>
*	N. IV. A. V. IV. IV. IV. IV. IV. IV. IV. IV. IV.					
Hannar or Surponeio	n joint Imaka and ty	(c) CIW 13-5/	8" WH for 20	"x13-5/8" W	4.37	
Top Hanger or Susp	ension joint COM	plete with l	anding 1t			59.89
		ning Tool	unu mg o c		0.44	59.45
Landing String		ts HWDP			64.26	
	/ XU	LS NWDP			04.20	
						- 4.81
metres above R.T. a						- 7.01
	Correction					- 4.81
metres up from R.T						- 4.01
	G AND CEMENTIN					
a) Ran a to	otal of 54 J	ts of 13-3/8	" casing. ]	hread locked	l 1st two	connection,
float sl	noe and baff	le collar, a	nd also Jt b	elow WH land	ling Jt.	
b) Ran cent	tralizers on	Jt 1, Jt 2	and Jt 4.			
c) Broke c	irculation p	rior to runn	ing out of 2	0" shoe.		
d) On land	ing took 20.	000 lbs over	pull to conf	irm latch in	to 20".	
	-					
Cemented Ca	asing as fol	Tows:-				
			g + DP nrion	to cementin		
	1 40 117 00	O	1			
	TIO DOIS 63	ed and number	d 22/ hhla a	f 2 5% nra h	+ fen by	0.75% CFR2 mixed sacks Class 'G'
	oturry: MIX	eu_anu_pumpe or with 211	u ZZ4 DDIS (	iss B compr	t and 202	sacks Class G
	wat	ont at an au	ONSUL CITIERS	Wt of 1.62	SE (13 E	nna)
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		rse thread c	onnections 1	ight.	04 = 11 =	<u> </u>
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	<u>via</u>	H.O.W.C.O u	nit. Returr	is and pressu	<u>ire increa</u>	sed throughout
	ioh					
	No	flow back on	release of	pressure.		
			Operators Represen	tative B. McEL	HINNEY	
	•		Speciators (12h1292)			

#### HUDBAY OIL (AUSTRALIA) LIMITED

#### Casing, Running Report

ASING INFORMATION  Definition of the form of the foliation of the foliatio	Well Name and No.	SPERM WHALE	NQ. 1	Date 10 Jan	uary 1982	Casing Size 9	·5/8 <b>"</b>
CASING   Size   30"   20"   13-3/6"   9-5/6"   19-5/6"	HOLE	Size					<u> </u>
MUDICATION   Topic		†					
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Now round 7000	MUD: Type Ran:	h				4 77	<u> </u>
By H.O.W.C.O.   By H.O.W.C.O.   By H.O.W.C.O.   By H.O.W.C.O.   By H.O.W.C.O.   Psi   Decision   Psi   Dec				-			10.7
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# 17년" Hole Section The $17\frac{1}{2}$ hole was drilled from 208m to 720m in 33.5 hours, at a mud cost of \$7,416.30. The 13-3/8" casing was set at 709.8m. No major problems were encountered. After some delay, due to bad weather, the 20" BOP and marine riser were run and latched. The BOP's were tested and then a while drilling out the cement and casing shoe. The seawater was then displaced with Seawater/Gel/Polymer mud, new hole drilled to 212m and a leak off test performed (equivalent to an SG of 2.16). Drilling was then resumed and continued down to 550m without any difficulties. Below 550m some problems were encountered with gumbo plugging the flowline and shaker possum belly; this involved some loss of mud over the bell

17½" bit was run in, tagging cement at 164m. Seawater was used nipple and from the possum belly while cleaning out the gumbo. To help minimize this gumbo problem the hole was circulated and reamed prior to each connection. TD for the  $17\frac{1}{2}$  hole phase was reached at 720m and after circulating bottoms up a wiper trip was made to the 20" casing shoe; tight hole was encountered from 650 - 690m and this section was reamed, there was no fill on bottom. After circulating to condition the hole and mud, the Schlumberger logs were run.

After logging, a 17½" bit was run and reamed tight spots from 673-699m and 705 - 720m. After circulating, a wiper trip was made, the hole was again circulated and conditioned, and then 13-3/8" casing was run and cemented at 709.8m.

The claystones and marls drilled were highly dispersible and this, combined with the high penetration rates, necessitated heavy dilution and treatments with Q-Broxin to maintain the rheological properties; Condet was also used. To help control weight and keep solids content as low as possible, the desilter was run continuously, the desander was also run when the other centrifugal pump was not required for the mixing hopper. Dextrid was used to reduce the water loss to about 15 ml/30 min by casing depth.

#### 124" Hole Section

The 12½" hole phase was drilled from 720m to 1417m in 51.5 hours. A low solids Baracarb-Brine mud was used to minimize formation damage in the objective zone, this resulted in a relatively high mud cost of \$68,249.56. After running Schlumberger logs, 9-5/8" casing was set at 919m in preparation for testing the well.

Once again bad weather delayed the landing of the BOP stack, however, this time was utilized to mix the Baracarb-Brine for the 12½" hole phase. After landing and testing the BOP's a 12½" bit was run in and cement tagged at 677m. Seawater/ Gel/Polymer mud was circulated while drilling out the cement and shoe, and then making new hole to 723m; a leak off test was then conducted (equivalent to 1.87 SG). The hole was then displaced with Baracarb-Brine mud and the active tanks were dumped, cleaned and filled with the remaining Baracarb-Brine; due to lack of chemicals it was not possible to prepare enough mud to fill all of the active tanks. Drilling of 12½" hole continued to 848m, circulating bottoms up before each connection to collect cuttings samples (drilling objective zone). After taking a survey at 848m the bit jets (3 x 13/32") were found to be plugged and a wet trip had to be made; approximately 90 bbls of mud was lost. Plugging of the bit jets (this time 3 x 12/32") occurred again while taking a survey at 946m; approximately 55 bbls of mud was lost this trip. For the remainder of the well, bits were run with 2 x 15/32" and the third jet blanked off; no further plugging occurred. When tripping at 1293m for a new bit, tight hole was encountered at 1199m and it was necessary to wash and ream back to 1293m; the old bit was graded 1/16" undergauge. Drilling continued to TD at 1417m, bottoms up was circulated and a wiper trip made to the 13-3/8" casing shoe. Overpull of 15 - 20,000 lbs occurred when pulling out and when running back in, it was necessary to wash and ream from 1321m back to TD. After circulating to condition the mud and hole, Schlumberger logs were run.

A conditioning trip was made reaming 1407 - 1414m with no fill, circulated, pulled out and continued running RFT's and CST's.

When logging was completed, a  $12\frac{1}{4}$ " bit was run to bottom and the hole circulated to ensure that the mud weight was consistent throughout the system. A balanced cement plug was then set from 1080-930m. Cement and contaminated mud was reversed out, then the hole was circulated and conditioned for casing. The 9-5/8" casing was run and cemented at 919m.

Baracarb-Brine was utilized to provide an inhibitive weighted fluid with a minimum solids content; an SG of 1.25 was obtained using KC1,  $CaCl_2$  and  $CaCO_3$  - the KC1 and  $CaCl_2$  also had an inhibiting affect on drilled clays. Due to a lack of sufficient KCl and CaCl<sub>2</sub> it was not possible to build enough mud volume to completely fill the active mud tanks, this meant that the available solids control equipment could not be utilized. Also the lack of materials meant that the concentration of KCl could only be maintained between 57.0 and 63.5 kg/m<sup>3</sup> and this may have limited the inhibitive quality of the mud. The lack of pit volume also affected the size of shale shaker screens used, until the polymers in the fluid had shear thinned it was not possible to use screens finer than 40 mesh as mud would be lost off the ends of the screens. By the time additional chemicals were received and extra volume could be built, the drill solids content had risen and the mud weight increased to 1.31 - 1.32 SG. Dilution, fitting finer shaker screens and running the desilter/mud cleaner enabled the weight to be controlled at 1.28 - 1.29 SG but no further reduction was possible without drastic dilution. Large additions of Dextrid were necessary to control the API filtrate less than 12 ml/30 mins. Rheological properties were maintained with additions of HEC and XC-Polymer. The increase in drill solids content appears to have had little affect.

#### Testing

Three drill stem tests were conducted, with perforations at 848 - 839m, 834 - 832m and 826 - 819m. Additional materials to maintain optimum rheology and mud weight were required during this phase, with testing being completed on January 18. The well was plugged and abandoned on January 19, 1982.

#### 2.4.2 Mud Engineering

Mud engineering services and mud materials were supplied by Baroid Australia Pty Ltd. The engineers at the wellsite were: Dann Quinn, Alan Searle and Peter Ledden.

#### 2.4.3 Mud Record

See attached Mud Properties form per Figure 8.

#### 2.4.4 Materials Consumption and Costs

Materials	Unit	Cost Unit	Quantity	Cost
36" and 26" Hole	- Interval 64	-208m		
Gel	100 1b	15.50	275	4262.50
Caustic	23 kg	17.70	8	142.00
Lime	25 kg	6.75	13	87.75
Q-Broxin	25 kg	24.15	2	48.30
	ТОТА	L COST FOR 36"/2	26" HOLE	\$4540.55

#### 17½" Hole - Interval 208-720m

Ge1	100	1b	15.50	90	1395.00
Baradefoam	5	gal	98.00	3	294.00
Caustic	23	kg	17.75	40	710.00
Coat 888	50	kg	23.20	4	92.80
Condet	55	gal	395.00	. 3	1186.50
Dextrid	50	<b>1</b> b	51.60	35	1806.00
Q-Broxin	25	ka	24.15	80	1932.00

#### HUDBAY OIL (AUSTRALIA) LIMITED **Mud Properties**

WELL SPERM WHALE NO. 1

MUD COMPANY: BAROID

1. Specific gravity

2. Viscosity (sec)
3. A.P.I. Water Loss (ml)
4. CaCO3 ppb
5. A.P.I. Cake (millimetre)

6. Sand (%) 7. Chloride (ppm x 1000) 8. pH 10. Plastic Viscosity (cp @ 50°C)
11. Yield Point (lb/100ft.²)
12. Gels (lb/100ft.² 10 sec/10 min)

13. Total Hardness (epm)

14.

Pf CaCl<sub>2</sub> ppb 15.

16. KCL ppb 17. Other salts ppb

				pn Solids (9	%)							17. O	ther a	salts	gpb	•			
Date	Depth 0600 hrs (metres)	1	2	3	4	5	6	7	8	9	10	11	. 12	13	14	15	16	17	18
Dec 2		1.04	100+													<b>†</b>			
2		1.04	T																
2	8 227	1.09	41	NC			Tr	10	9.3	5	6	12	5/9	40	.1				43
2	9 482	1.14	56	20.6		- 3	Tr	13	9	7	10	15	3/5	44	.06				57
3	1	1.17		25.7		3	.1	15	9	8	8	16	5/7	44	.05				64
3	1	1.19	43	19.6		3	.1	15	8.5	10	10	17	9/15		.01				71
	1	L		MI	XING	BRIN	E BAF	ACARI	SYST	EM									
	2	<u>.</u>				BRIN	E BAR	ACARE	SYST	EM									
	3 720	1.24	50		22.5	1		158	9.3	10	15	22	3/5		.08	58.1	23	7.7	0
	4 880	1.29			43	1		142	8.7	12	13	16	1/2		.02	51.8	20.9	11.8	14
	5 1004	1.29			44.5	1		138	8.4	15	15	17	2/3					19.4	
	5 1293	1.28			31.5	<del>                                     </del>	+	120	8.6	16	12	14	1/3		.02		23.0	14.1	34
	7 1417	1.31	50		31.5	1		123	8.4	18	19	19	2/6		.01	42	22	10.2	
	3 1417	1.31	50		31.5	1		123	8.4	18	19	19	2/6		.01	42	22	10.2	1
-	1417	1.32	52		33	1.5		116.5	8.3	18	21	22	4/7		Į.	42.2	ł	1	
1(		1.32	52		36	3		111	8.5	19	24	20_	3/13			39.7			1
12		1.32		17.4		3		111	8.5	19	24	20_	3/13			39.7			
13		1.32			33.5	2		111	9.7	18	19	21	3/7			1	18.3	10.6	
14		1.32	55	18.6 12	32	3	1.5	95	9.7	18	12	14	2/4		.16	<u> </u>	=	-	36
15		1.32	50 40		30.4	2		111 109	9.5	15	13	16	2/5			32.8	9		37
16		1.32	55		29.5	2		144	9	12 15	8 17	10	1/3 2/4		Tr Tr	41.8 36.5			37 37
17		1.32	56	9.2		2	<del> </del>	128	8.5	20	24	24	3/7					10.4	
18		1.32	56	9.2	<del></del>	2		128	8.5	20	24	24	3/7					10.4	
	1 333			7.2		-	-	20	0.5	20	24	24	3/1		1,5	55.7	33.0	J.U. 4	1
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7.	1		<u> </u>												· · · · · · · · · · · · · · · · · · ·				

Materials	Unit	Cost Unit	Quantity	Cost						
12¼" Hole - Interval 720-1417m										
Baracarb (C)	40 kg	8.93	370	3304.10						
Baracarb (F)	25 kg	5.58	490	2734.20						
Barade foam	5 gal	98.00	9	882.00						
CaCl <sub>2</sub>	25 kg	12.75	2170	27667.00						
Dextrid	50 lb	51.60	85	4386.00						
Mg O	25 kg	12.00	112	1344.00						
KC1	50 kg	26.70	297	7929.00						
KC1	83 kg	44.33	112	4964.96						
XC-Polymer	50 kg	335.00	32	10720.00						
HEC	25 kg	149.00	28	4172.00						
Q-Broxin	25 kg	24.15	6.	144.90						
	TOTAL COST FOR 12½" HOLE \$68249.56									

### Drill Stem Testing

CaCl <sub>2</sub>	25 kg	12.75	264	3366.00				
Baracarb (F)	25 kg	5.58	82	457.56				
Baracarb (C)	40 kg	8.93	53	473.29				
Dextrid	50 1b	51.60	3	154.80				
XC-Polymer	50 lb	335.00	3	1005.00				
KC1	50 kg	26.70	41	1094.70				
KC1	83 kg	44.33	47	2083.51				
HEC	25 kg	149.00	5	745.00				
Mg 0	25 kg	12.00	5	60.00				
TOTAL COST FOR TESTING PHASE \$9439.86								

Materials	Unit	Cost Unit	Quanti ty	Cost

#### Consumption for 36", 26", $12\frac{1}{4}$ " and Testing

Ge1	100	1b	15.50	365	5657.50
Baracarb (C)	40	kg	8.93	423	3777.39
Baracarb (F)	25	kg	5.58	572	3191.75
Baradefoam	5	ga 1	98.00	12	1176.00
CaCl <sub>2</sub>	25	<b>k</b> g	12.75	2434	31033.55
Caustic	23	kg	17.75	48	852.00
Coat 888	50	1b	23.20	4	92.80
Condet	55	gal	395.50	3	1186.50
Dextrid	50	1b	51.60	123	6346.80
Lime	25	kg	6.75	13	87.75
Mg 0	25	kg	12.00	117	1404.00
KC1	50	kg	26.70	338	9024.60
KC1	83	kg	44.33	159	7048.47
Q-Broxin	25	kg	24.15	88	2125.20
XC-Polymer	50	<b>1</b> b	335.00	35	11725.00
HEC	25	kg	149.00	33	4917.00

TOTAL COST FOR DRILLING AND TESTING \$89646.26

#### 2.4.5 Mud Equipment Description

- 1. Reserve mud storage tanks 4 x 500 bbls.
- 2. Active mud storage 400 bbls complete with 150 bbl settling tank and 85 bbl pill tank.
- 3. Brandt Dual Tandem shaker.
- 4. Demco Desander, 6 cone x 6 inch rated at 1050 gpm with Mission 6 inch x 8 inch centrifuged pump and 75 HP electric motor.
- 5. Demco Desilter, 12 cone x 4 inch rated at 1080 gpm with Ingersoll-Rand centrifuged pump and 75 HP electric motor.
- 6. Pioneer Mud Cleaner, 16 cone x 4 inch rated at 800 gpm with 75 psi head.

7. Degasser 8. Pit Volume Totalizer. 9. Mud Mixer, Lightning mixers 2 ea x 25 HP in active tanks, 4 ea x 25 HP in reserve tanks. 10. Pioneer Sidewinder Mud Mixing Hopper. 11. Mud Mixing Pumps, Ingersoll-Rand MIR 150 with 75 HP electric motors, two on active tank, two on reserve tanks. 12. Mud/Gas separator with vent to Crown block. Swaco super adjustable choke 10,000 psi with control panel. 13. 14. Trip tank - 25 bbls with high-low level switch activated motor for transfer pump to annulus. - 15 -

#### 2.5 Flow Testing

#### 2.5.1 Flow Testing Summary

Three drillstem tests were run on this well and are summarized in detail in Appendix D1 which is attached to this report.

#### 2.5.2 Flow Data

The flow data as reported by Flopetrol is attached as Appendix D2 to this report.

#### 2.5.3 Pressure Data

The pressure data as reported by Dowell Schlumberger is attached as Appendix D3 to this report.

#### 2.5.4 Interpretation and Analysis

The interpretation and analysis of the flow testing on this well is summarized below:

#### DST No. 1: Interval 839 - 848m RT

- Recovered 15 bbls of formation water and sand with no trace of oil.
- Preliminary field analysis of the formation water indicates a chloride content of 5500 ppm.
- Due to the suspected plugging of the PCT by sand, the test was rerun.

#### DST No. 1(a): Interval 839 - 848m RT

- Non conclusive test due to a failure of the PCT tool.

#### DST No. 1(b): Interval 839 - 848m RT

- Recovered 17 barrels of formation water and a trace of oil from the PCT chamber.
- Preliminary field analysis of formation water indicates a chloride content of 11500 ppm.
- Pressure data indicates a very high permeability formation.

Interpretation and Analysis (Continued) DST No. 2: Interval 832 - 834m RT - Recovered gas at rates up to 4 MMcf/D on a ½ inch choke at wellhead flowing pressure of 1005 psi. - Due to the presence of up to 200 ppm  ${\rm H}_2{\rm S}$ , the test was shortened considerably. - Approximately 500 ml of oil was recovered from the manifold. - The Oil leg in this well is very thin and/or the gas coned down from the upper gas zone during this DST. - The pressure data indicates a very high permeability formation. DST No.3: Interval 819 - 826m RT - Recovered dry gas at rates up to 5.4 MMcf/D on a  $\frac{1}{2}$  inch choke at a wellhead flowing pressure of 855 psig. - The relatively small drawdown and rapid buildup both indicate a very high permeability formation with little or no skin damage. - Due to the presence of up to 200 ppm  $\mathrm{H}_2\mathrm{S}$ , the test was shortened considerably. - The produced gas was very dry and no liquids were recovered from the separator. - 17 -

### 2.6 <u>General Data</u>

#### 2.6.1 Positioning Report

See attached Positioning Report per Figure 9 and Appendix D4.

## 2.6.2 <u>Downhole Surveys</u>

Depth	<u>Drift</u>
85m	10
227m	10
343m	10
720m	1-3/4 <sup>0</sup>
848m	1120
946m	1120
1292m	<sub>12</sub> 0
1408m	10

### 2.6.3 Plug Back and Squeeze Cementation Record

The well was plugged back from 1417m to 925m on January 10th, 1982. Prior to running 9-5/8" casing and conducting DST's, open ended drill pipe was run to 1080m. A 344 sack cement plus was mixed to 15.8 ppg and was pumped and balanced. The DP was pulled to 925m, and the string was reversed clean.

21' 51.644" E

Distance and Bearing from Proposed to Actual:

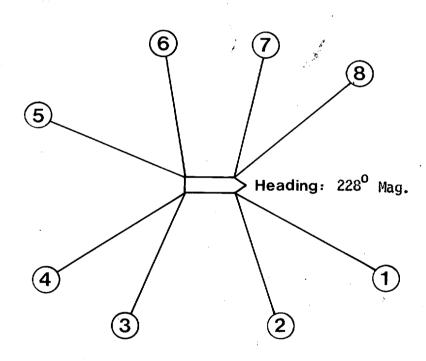
36m @ 74<sup>0</sup> T.

Survey Method: Trisponder System

Checked By: JMR-4 Satellite observations

148<sup>0</sup>

Anchor Pattern:



Remarks No anchoring problems were experienced during deployment or recovery of the anchors and all anchors held securely during the drilling operations.

Author: A.Eisenbarth

Drawn by: H.O.A.L. Hudbay Oil (Australia) Ltd.

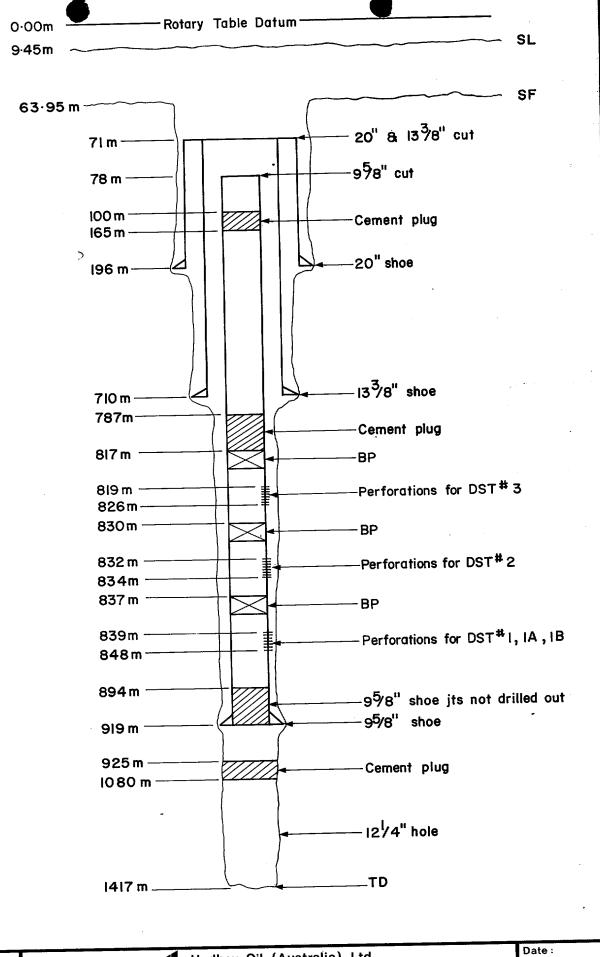
POSITIONING SPERM WHALE - 1 Date:

Longitude:

May, 1982

Drawing Nº A4-DR-517

2.6.4 Fishing Operations None performed. 2.6.5 Side Tracked Hole None performed. 2.7 Abandonment Report Sperm Whale No 1 was abandoned on January 19th, 1982 although the subsea equipment was not recovered until February 19th, 1982. A wireline set bridge plug was set at 817m and pressure tested to 2000 psi. Open ended drillpipe was run to 817m and a 36 sack cement plus was mixed to 15.8 ppg pumped, and balanced over the interval 817 - 787m. A second plug of 72 sacks was mixed to 15.8 ppg and placed over the interval 165 - 100m. The 9-5/8" seal assembly was recovered, and the 9-5/8" and 13-3/8" casing stub were mechanically cut and recovered; but the 20" casing, the 20-3/4" wellhead, and the permanent and temporary guide bases could not be worked free. After West Seahorse No 2 was abandoned, the rig was moved back to the Sperm Whale location and an explosive charge was utilized to loosen the remaining subsea equipment. After the charge was detonated, the rig was repositioned over the well to recover the 20-3/4" WH, 20" casing stub, 30" conductor, permanent guide base, and the temporary guide base. See attached schematic for downhole plug placement, (Figure 10). 2.8 Recommendations for Future Drilling Programmes Sperm Whale No 1 was reasonably successful from a drilling point of view and it probably would be difficult to substantially improve the performance using the same rig and equipment. There were no hole problems of any significance so it would appear as if the mud systems that were utilized are satisfactory. The problems that were encountered were of a nature that is more or less out of the realm of control of the operator such as downtime due to weather, questionable DST tool servicing, and firmly cemented subsea equipment. - 19 -



Author:
K.Putnam

Drawn by:
A. Clark

Hudbay Oil (Australia) Ltd.

SPERM WHALE - 1

AS ABANDONED

April 1982

Drawing Nº A4-DR-498

Figure 10

APPENDIX D1

D.S.T. RESULTS

HUDBAY OIL (AUST) LTD

SPERM WHALE NO. 1

DST RESULTS

FEBRUARY 1982

# SPERM WHALE NO. 1

# SUMMARY OF DST NO. 1

Perforated Interval: 839 - 848m

# Sequence of Events on 13/14.01.82

19:35	Set Packer at 832.84m
20:23	Open PCT for 7 minutes initial flow. Medium to strong blow at surface.
20:30	Close PCT for 28 minute initial shut-in.
20:58	Open PCT for final flow. Medium to strong blow at surface.
21:07	Blow abruptly decreased to zero - suspected tool plugging. Well almost dead. Attempt to run in SPRO unit but got stuck at 680m.
00:10	Close PCT tool
00:26	Unseat packer and pull string out of hole wet.

# SPERM WHALE NO. 1 - DST NO. 1 SAMPLE RECOVERIES AND PRELIMINARY ANALYSIS

<u>Sample</u>	<u>c1</u>	Comments
1. 120m 2. 253m		Gas cut mud - no oil or H <sub>2</sub> S Water diluted gas cut mud
3. 442m		Water diluted gas cut mud
4. 556m	9500	Water diluted gas cut mud - mainly water
5. 580m		Sand only - clear to white, occasionally frosted. Unconsolidated very fine to medium grained, dominantly fine, subangular to rounded, well sorted, no visible matrix on cement. Trace pale yellow - white fluorescence. Trace claystone, medium grey, firm - hard, as discrete chips.
6. 594m	7000	Mud coloured water
7. 725m	7000	Mud coloured water
8. 820m	5500	Sample from PCT chamber - no oil indication, small amount of gas (not measureable) Resistivity 0.65 at 68 <sup>0</sup> F Appears to be a representative sample of formation water.

# Gas Analysis from top of liquid samples:

Sample No.	1	2
$c_1$	5130 ppm	7300 ppm
c <sub>2</sub>	76	100
C3	12	16
iC4	Tr	Tr
nC4	Tr	-
nC <sub>4</sub> C <sub>5</sub>	-	-

#### DST NO. 1

#### PRESSURE TRANSIENT ANALYSIS

DST No. 1 was run without a cushion. The bottomhole pressures for the test as measured by J1630 gauge at 840.5m are tabulated on the following page. The pressures during the initial 7 minute flow period built up rapidly to 1116 psig. Within four minutes of the initial shut-in, the pressure had essentially stabilized at 1230 psi. This rapid buildup is indicative of an extremely high permeability formation.

Upon opening the PCT for the final flow, the pressure dropped immediately to 1191 psi and then built up to 1232 psi within 8 minutes and eventually stabilized at 1234 psi after 194 minutes. The PCT tool is thought to have been plugged by sand 9 minutes into the second flow period. This was evidenced at the surface by a strong to medium blow which ceased abruptly. The pressure during the final flow period increased immediately from 1234 psi to 1238 psi and then remained unchanged.

A repeat formation tester run on this same zone resulted in a small quantity of oil recovery. Since DST No. 1 did not result in any oil recovery and since the tool was thought to have been plugged by sand, the decision was made to rerun the test.

## SPERM WHALE NO. 1 - DST NO. 1

## PRESSURE DATA FOR RECORDER : J 1630 at Depth : 840.5m RT

$\Delta$ T (mins)	PRESSURE (PSI)	LOG ((t+Dt)/Dt)	COMMENTS
	1581		Initial Hydrostatic
0	749		Initial Flow
2	861		
4	988	•	
7	1116		
0	1116		Initial Shut-in
2	1228	0.65	
4	1230	0.44	T = 7
6	1230	0.34	
8	1230	0.27	
10	1231	0.23	
15	1231	0.17	
20	1231	0.13	
28	1231	0.10	
0	1192		Final Flow
2	1213		
4	1226		
6	1230	•	
8	1232		
10	1232		
20	1233		
40	1233		•
60	1233		·
80	1234		
100	1234		
150	1234		
194	1234		
0	1234		Final Shut-in
2	1238	2.01	T = 201
4	1238	1.71	
6	1238	1.54	
8	1238	1.42	
10	1238	1.32	
14	1238	1.19	
	1573	•	Final Hydrostatic

# SPERM WHALE NO. 1

# SUMMARY OF DST NO. 1(a)

Perforated Interval: 839 - 848m RT

Sequence	of	Events	on	15.	01.	.82

06:10	Set Packer at 832.9m RT and run in diesel cushion to subsea test tree.
08:02	Latch SPRO - Initial pressure 1179 psig at 119.4°F.
08:08	Attempt to open SPRO - unsuccessful
08:28	Unseat packer
08:34	Reseat packer
08:45	Attempt to open SPRO, unsuccessful. Pressure up and bleed off test string. SPRO pressure remained unchanged indicating PCT closed.
09:18	Bleed off annulus and repressure to 2000 psi. Tool did not open.
09:31	Begin procedures to reverse out and rerun test.

### SPERM WHALE NO. 1

### SUMMARY OF DST NO. 1(b)

Perforated Interval: 839 - 848 m RT. All pressures as measured by the J1630 recorder at 840.5 m.

### Sequence of Events on 16.01.82

06:53	Set Packer at 832.5m RT and run in diesel cushion to subsea test tree.
07:09	Open PCT tool - initial buildup to strong blow.
07:11	Open flow to burner through 7/16" choke. Switch flow to gauging tank.
07:13	Increase choke size to ½".
07:18	Wellhead flowing pressure 51 psig.
07:26	Wellhead flowing pressure 24 psig.
07:30	Wellhead flowing pressure 20 psig.
07:39	Wellhead flowing pressure 7 psig.
08:55	Bleed pressure from annulus to close PCT.
08:57	Begin to reverse out.

### SPERM WHALE NO. 1 - DST NO. 1(b)

# SAMPLE RECOVERIES AND PRELIMINARY ANALYSIS

Sample	<u>C1</u>	Comments
1. 72m		Diesel, trace mud
2. 179m		Diesel, trace mud
3. 333m	36,000	Water, mud contaminated
4. 461m	36,000	Water, mud contaminated
5. 512m		Water, mud contaminated
6. 564m		Water, mud contaminated
7. 640m		Water, mud contaminated
8.		Mud after displacing drill string
9.	82,000	Mud after displacing drill string
10. 816m	11,500	
11. 820m	11,500	
12. 821m	11,500	PCT chamber - SG 1.018 About 50 cc of oil - water emulsion
		Obtained gas sample with following analysis:
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$

## COMMENTS

The last three samples appear to be representative of the formation fluid.

#### DST NO. 1(b)

#### PRESSURE TRANSIENT ANALYSIS

DST No. 1(b) was run with a full diesel cushion to minimize the pressure drawdown when the tool was initially opened. The test was also run with only one flowing period to minimize the possibility of sand settling in the drillpipe during the initial shut-in, thus plugging the PCT tool. The pressure built up to 1236 psig after 102 minutes and remained at that level even after the PCT tool was closed. The formation fluid did not flow to surface and the samples indicate that the formation contains essentially water. Some oil-water emulsion was however recovered from the PCT chamber, thus confirming the RFT recovery.

The bottomhole pressures for the test as measured by the J1630 gauge at 840.5m are tabulated on the following page. The rapid increase in pressure is indicative of a high permeability formation.

# SPERM WHALE NO. 1 - DST NO. 1(b)

# PRESSURE DATA FOR RECORDER : J 1630 at Depth : 840.5m RT

△ T (mins)	PRESSURE (PSI)	COMMENTS
	1535	Initial Hydrostatic
0	1034	Initial Flow
2	1203	
4	1221	
6	1219	•
8	1213	•
10	1213	
20	1214	
40	1219	
60	1222	
80	1225	·
101	1225	
102	1236	·
111	1236	
121	1236	
131	1236	
136	1236	
	1537	Final Hydrostatic

## SPERM WHALE NO. 1

# SUMMARY OF DST NO. 2

Perforated Interval: 832 - 834m RT

# Sequence of Events on 17.01.82

08:32	Set packer at 815m RT and run in diesel cushion to subsea test tree.
09:09	Open PCT for initial flow period. Strong to medium blow and diesel flowback.
09:18	Gas to surface on ½" choke. Wellhead flowing pressure 640 psi.
09:25	Wellhead flowing pressure 750 psi. H <sub>2</sub> S - 30 ppm. Gas and mud flow.
09:30	H <sub>2</sub> S increasing to 100 ppm.
09:41	Reduce choke to $\frac{1}{4}$ " as flare would not burn. Oil trace to surface recovered about 500 ml. Wellhead flowing pressure 1080 psig. H <sub>2</sub> S 150 ppm.
10:15	Wellhead flowing pressure 1065 psig. H <sub>2</sub> S 150 ppm.
10:23	Sampled gas at choke manifold.
10:49	Increase choke size to $\frac{1}{2}$ ". Wellhead flowing pressure 1005 psi. H <sub>2</sub> S 200 ppm.
10:57	Close PCT for build-up.
12:06	Begin procedures to reverse out of hole.

#### DST NO. 2

#### PRESSURE TRANSIENT ANALYSIS AND INTERPRETATION

The bottomhole pressures for the test as measured by the J1630 recorder at 824m are tabulated on the following page.

A full diesel cushion was run to minimize the initial drawdown and possible sand production. During the initial flow period however, the SPRO unit indicated pressure fluctuations which were interpreted as sand plugging the tool. The decision was made to run a single flow period and shut-in. The initial flow lasted for 110 minutes and the final shut-in period was 84 minutes.

The zone of interest produced oil on the RFT but produced mainly gas on the DST. The resulting interpretation is that the oil leg is very thin and/or the gas coned down from the gas zone above. A small amount of oil was recovered from the choke manifold thus confirming the presence of oil in the zone. The cement bond log indicated a reasonably good cement bond over the zone.

The presence of up to 200 ppm H<sub>2</sub>S resulted in the test being shortened considerably since some of the surface equipment was not rated for sour service. The gas flow rate did not stabilize and was not switched through the separator. The flow rate was however estimated to be 2-3 MMcf/D on a  $\frac{1}{4}$ " choke at a wellhead pressure of 1065 psi and a flowing bottomhole pressure of 1222 psi. A short 8 minute flow on a  $\frac{1}{4}$ " choke resulted in 3-4 MMcf/D at a wellhead pressure of 1005 psi and a flowing bottomhole pressure of 1199 psi. After the well was shut-in, the pressure built up immediately to 1224 psi and stabilized at 1229 psi after 84 minutes. The pressure data indicates an extremely high permeability formation.

SPERM WHALE NO. 1 - DST NO. 2

# PRESSURE DATA FOR RECORDER : J 1630 at Depth : 824m RT

∆T (mins)	PRESSURE (PSI)	LOG ((t+Dt)/Dt)	COMMENTS
	1538		Initial Hydrostatic
0	1146		Initial Flow
5	1209		
10	1193		
20	1171		
30	1155		
40	1222		•
50	1222		
70	1222		
90	1222		
110	1199		
0	1199		Start Shut-in
1	1224	2.05	T = 100
2	1224	1.75	
3	1224	1.58	
5	1224	1.36	
10	1224	1.08	
20	1225	0.81	
40	1226	0.57	•
60	1226	0.45	
84	1229	0.36	
	1538		Final Hydrostatic

## SPERM WHALE NO. 1

# SUMMARY OF DST NO. 3

Perforated Interval: 819 - 826m RT

	_			10 01 00	
Sequence	nτ	EVents	กท	18.01.82	
Jegachee	0.	- T C11 00	V	20102102	_

13:04	Set packer at 803.6m and run in diesel cushion to top of subsea test tree.
13:27	Open PCT on ¼" choke - strong surface blow.
13:28	Diesel flow to surface.
13:29	Wellhead flowing pressure 250 psig.
13:31	Choke plugging - increase to ½".
13:34	Close PCT for initial buildup.
14:05	Open PCT for second flow period - gas at surface.
14:07	Wellhead flowing pressure 760 psig - trace H <sub>2</sub> S.
14:11	Mud to surface.
14:25	Wellhead flowing pressure 840 psig - gas and trace mud.
14:40	H <sub>2</sub> S 200 ppm.
14:50	Switch flow through separator. Calculated flow rate 5.4 MMcf/D at flowing wellhead pressure of 855 psig and temperature of $25^{\circ}$ C. Gas gravity = 0.605, no liquids from separator.
15:45	Close PCT for final shut-in.
18:13	Begin procedures to reverse out of hole.

#### DST NO. 3

#### PRESSURE TRANSIENT ANALYSIS AND INTERPRETATION

The bottomhole pressures for the test as recorded by the J1630 recorder are tabulated on the following page.

This zone produced dry gas with a gravity of 0.60. The gas flow was switched through the separator during the second flow period and no liquids were observed. The well produced gas at rates up to 5.4 MMcf/D on a  $\frac{1}{2}$  inch choke at a wellhead pressure of 855 psig and a flowing bottomhole pressure of 1219 psig. The well built up immediately after the second shut-in to 1233 psig. The relatively small (14 psi) drawdown and rapid (less than 2 minutes) buildup both indicate an extremely high permeability formation. The DST had to be shortened due to the presence of up to 200 ppm H<sub>2</sub>S in the gas.

SPERM WHALE NO. 1 - DST NO. 3

### PRESSURE DATA FOR RECORDER : J 1630 at Depth : 813m RT

$\Delta$ T (mins)	PRESSURE (PSI)	LOG ((t+Dt)/Dt)	COMMENTS
	1522		Initial Hydrostatic
0	1152		Initial Flow
2	1217		
4	1217		
7	1217		
0	1217		Start Shut-in
2	1223	0.65	T = 7
4	1223	0.44	
6	1223	0.34	
8	1223	0.27	
10	1223	0.23	
15	1223	0.17	
20	1223	0.13	
31	1223	0.09	•
0	1183		Final Flow
10	1218		
20	1218		
40	1219		
60	1219		•
80	1219		
101	1219		
0.	1219 <sup>-</sup>		Start Shut-in
2	1233	1.74	T = 108
4	1233	1.45	
6	1233	1.28	
8	1233	1.16	
10	1233	1.07	
20	1233	0.81	
40	1233	0.57	
60	1233	0.45	
80	1233	0.37	
100	1233	0.32	
150	1233	0.24	
180	1233	0.20	·
	1497		Final Hydrostatic

WELL TESTING

APPENDIX D2

REPORT NO.

10018200182

# FLOPETROL

DIVISION : NTD

BASE : PERTH - AUSTRALIA.

REPORT N°: 100182200182

# Well Testing Report

Client:

HUDBAY OIL (AUSTRALIA) LTD.

Field:

WILDCAT

Well:

SPERM WHALE NO. 1

Zone:

Date:

FROM 10.01.82 TO 20.01.82

FLOPETROL

Base:

PERTH

Client =\_

HUDBAY OIL

Field :\_ Well :\_

WILDCAT
SPERM WHALE # 1.

Section

: INDEX

Page : 01 Report N° 10108220018

INDEX

- ▼ 1 \_ TEST PROCEDURE \_
- 2\_ MAIN RESULTS \_
- ☑ 3\_OPERATING AND MEASURING CONDITIONS \_
- $\blacksquare$   $4_{\text{-}}$  SURFACE EQUIPMENT DATA  $\_$
- □ 5\_WELL COMPLETION DATA \_
- □ 7\_ WELL TESTING DATA \_

Flopetrol chief operator Name: M. LEFRANCOIS

Client

representative

Name:

B. McERLHINNY

DOP 101

Client:

Well

HUDBAY OIL

Section

Base:

PERTH

WILDCAT Field:

SPERM WHALE #

Page Report N°: 1001822001 2

02

#### \_ TEST PROCEDURE \_

D.S.T. tests were carried out on Sperm Whale # 1. from January 10th to January 20th, 1982, using DOWELL P.C.T. tool together with posi-test packer.

A S.P.R.O. Gauge was used during those tests for a pressure and temperature survey.

#### D.S.T. 1 January, 13th, 1982

PERFORATION DEPTH

839 - 848 M.

DEPTH OF PACKER

832.84 M.

S.P.R.O. GAUGE DEPTH

817.99 M.

- A) First opening of downhole tool duration: 7min. Observation of Flow through a  $\mbox{$\frac{1}{4}$}"$   $\mbox{$\emptyset$}$  hose at choke manifold.
- B) First shut-in. Duration: 30 min.
- Second opening.

During this period the S.P.R.O. Gauge which could not have been run in before the first opening due to a Wireline cable failure was run in but got stuck at 680M before reaching the latching depth. At the same time we were unable to get any flow at surface. Then the testing string was probably plugged the S.P.R.O. Gauge was pulled out of hole.

D) Shut in, packer unset, testing string pulled out of hole.

END OF D.S.T. NO. 1

Client : HUDBAY OIL

Section

Base:

WILDCAT Field: Well

SPERM WHALE # 1

03 Page Report Nº: 100182200182

#### \_ TEST PROCEDURE \_

D.S.T. 1A

January, 15th, 1982

PERFORATION DEPTH:

839 - 848 M.

DEPTH OF PACKER:

832 M.

DIESEL CUSHION HEIGHT:

800 M.

- A) After the Packer was set and the S.P.R.O. Gauge latched on the well was opened up for a 12 min duration. No indication of blow at choke manifold.
- B) First shut-in. Duration: 2min. No indication of build up at S.P.R.O. Computer.
- C) Second opening of P.C.T. Tool. Duration: 10 min. No indication of blow.
- D) Second shut-in. During this period the packer was unset then reset.
- Third attempt to open the P.C.T. Tool. No flow.
- After 29 min observation, annulus pressure bled off and P.C.T. tool closed.
- G) Fourth attempt to open the P.C.T. Tool. No Flow. 11 min observation. No indication on S.P.R.O. Computer.
- Final shut-in, packer unset, testing string pulled out of hole.

Non conclusive test due to a possible failure of the P.C.T. Tool.

# FLOPETR

Base:

Client : HUDBAY OIL

Field Well

WILDCAT SPERM WHALE # 1 Section

Page Report N° 10018220018

#### TEST PROCEDURE \_

D.S.T. NO. 1B

January 16th, 1982

PERFORATION DEPTH:

839 - 848 M.

PACKER DEPTH:

DIESEL CUSHION HEIGHT: 800 M.

A) After the packer was set and the S.P.R.O. Gauge latched on, the well was opened up for a unique flow period at first on 7/16"  $\emptyset$  choke, then  $\frac{1}{2}$ "  $\emptyset$ . Duration: 99 min.

B) Shut-in, observation of build up of downhole pressure, packer unset, testing string pulled out of hole.

Duration of shut in: 48 min.

#### END OF D.S.T. 1B

D.S.T. NO. 2

January 17th, 1982

PERFORATION DEPTH:

832 - 834 M.

PACKER DEPTH:

815 M.

SPRO GAUGE DEPTH:

800.1 M.

DIESEL CUSHION HEIGHT:

790 M.

- A) After the packer was set and the S.P.R.O. Gauge latched on, the well was opened up for a unique flow period, on at first 2" Ø choke, then 2" Ø and at last 3" Ø.
  - 2 samples were taken upstream the choke manifold during this period on ½" Ø in 20 litres GERZAT bottles.

Flow period duration: 110 min.

Presence of H2S in flowing gas was detected.

Shut-in, observation of downhole pressure build-up, packer unset, testing string pulled out of hole.

Duration of shut-in period: 85 min.

END OF D.S.T. 2

# FLOPETROL

Client:

HUDBAY OIL

Section

Base:

PERTH

Field: Well

WILDCAT SPERM WHALE # 1.

Page Report N: 100182200182

#### \_ TEST PROCEDURE \_

D.S.T. 3 January 18th, 1982

PERFORATION DEPTH:

819 - 926 M.

PACKER DEPTH:

803.56 M.

S.P.R.O. GAUGE DEPTH: 788.7 M.

DIESEL CUSHION HEIGHT: 780 M.

Initial Flow period.

After the packer was set and the S.P.R.O. gauge latched on, the well was opened up for an initial flow period on  $\frac{1}{4}$ "  $\emptyset$  choke, then  $\frac{1}{2}$ "  $\emptyset$  choke. Duration: 7 min.

Initial Shut-In.

Duration: 31 min.

Final flow period through ½" Ø choke.

Duration: 31 min.

Flow rate measurements and sample (1 x 20 Litres GERZAT bottle) taken at separator outlet.

Presence of H2S in flowing gas during both flow periods.

D) Final Shut-in.

Duration: Approximately 200 min.

Observation and recording of downhole pressure build up.

The packer was then unset and the testing string pulled out of hole.

END OF D.S.T. 3.

END OF THE SERIES.

#### HUDBAY OIL Section Client :\_\_\_ FLOPETROL 01 WILDCAT Page Field :\_ SPERM WHALE # I Report N°:100182200182 PERTH Well :\_ Base :\_ D.S.T. NO. 1 \_ MAIN RESULTS \_ 839 - 848 M Perforations:\_\_\_ Tested interval:\_\_ DURATION BOTTOM HOLE WELL HEAD G.O.R OIL PROD. RATE GAS PROD. RATE OPERATION PRESSURE MMSCFD BOPD PSIG **PSIG** MIN Units INITIAL STRONG BLOW WEAKENING VERY QUICKLY 7 FLOW ON 0 ½" HOSE INITIAL 0 30 SHUT IN FINAL FLOW TUBING STRING PLUGGED BY SAND 0 180 on ½" Ø UP TO 680M. FIXED CHOKE 0 SHORTENED DUE TO INCONCLUSIVE TEST FINAL 0 25 SHUT IN

Depth of bottom hole measurements:	Reference:
Temperature :at :depth	
Separator gas gravity (air:1) at choke size	•
STO gravity at choke size	:
BSW:Water	cut :

REMARKS AND OTHER OPERATIONS

DOP 103

Client :\_\_

HUDBAY OIL

Section

Base:\_

PERTH

Field : Well:

WILDCAT SPERM WHALE # 1

Page : 02 Report N°:1001822001

MAIN RESULTS \_

D.S.T. NO. 1A

Tested in	iterval:		F	Perforations:	839 -	848 м
OPERATION	DURATION	BOTTOM HOLE PRESSURE	WELL HEAD PRESSURE	OIL PROD BAT	E GAS PROD.RA	
Units	MIN	PSIG	PSIG	BOPD	MMSCFD	TE G.O.R
INITIAL FLOW ON ½" Ø CHOKE	12		0	0	0	
·			NO I	F <b>L</b> OW	1	
INITIAL SHUT	2		0			
SECOND FLOW	10		0	NO FLOW		
SECOND SHUT-	23		0			
THIRD FLOW	29		0	NO FLOW		
THIRD SHUT- IN	2		0			
FINAL FLOW	11		0	NO FLOW		
FINAL SHUT- IN	60		0			·
	<u>l</u>		<u>_</u> <u></u>			1

Depth of bottom hale many
Depth of bottom hole measurements: 817.99 M Reference: RT.
Temperature :at :depth
Separator gas gravity (air:1) at choke size:
STO gravity at choke size :
BSW : Water cut :
DEMARKS AND COURS

## REMARKS AND OTHER OPERATIONS

INCONCLUSIVE TEST DUE TO FAILURE ON P.C.T. TOOL OPENING. BOTTOM HOLE PRESSURE WAS RECORDED SEE DOWELL COMPUTER REPORT.

#### Client :\_\_\_ HUDBAY OIL Section FLOPETROL 03 WILDCAT Report N° 100182200182 Page Field: SPERM WHALE # 1 PERTH Base :\_ Well :\_ D.S.T. 1B MAIN RESULTS \_ \_\_\_\_\_ Perforations: \_\_\_\_\_\_ 839 - 848 M Tested interval:\_\_\_\_ DURATION BOTTOM HOLE WELL HEAD OIL PROD RATE GAS PROD RATE G.O.R **OPERATION PRESSURE** PRESSURE **PSIG PSIG** BOPD MMSCFD MIN Units INITIAL FLOW STRONG BLOW ON ½" HOSE INITIAL FLOW DIESEL CUSTION COMES TO SURFACE 1 130 SWITCHED TO 7/16" Ø CHOKE INITIAL FLOW 96 0 DIESEL CUSTION NOT COMPLETELY SWITCHED TO RECOVERED. ኔ" Ø CHOKE 0 48 FINAL FLOW Depth of bottom hole measurements: 818 M Reference: RT Temperature: \_\_\_\_at:\_\_\_\_depth Separator gas gravity (air:1) at choke size:

STO gravity at choke size BSW :\_\_\_\_\_ \_\_\_\_\_ Water cut :\_\_\_

REMARKS AND OTHER OPERATIONS

BOTTOM HOLE PRESSURE RECORDED ON DOWELL COMPUTER REPORT.

10; 0 Ω

# Client: HUDBAY OIL Section

	Field	WILDCAL	Page	- 04	
Base:PERTH	Well	SPERM WHALE # 1	Report	N°:1001822001	32
	<u> </u>		1		

_ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	_	MAIN	RESULTS	_
---	---	------	---------	---

D.S.T. NO. 2

Tostod	interval:	Perforations:	832 - 834 M
162160	mervar	Teliolations.	

OPERATION	DURATION	BOTTOM HOLE PRESSURE	WELL HEAD PRESSURE	OIL PROD: RATE	GAS PROD.RATE	G.O.R
Units	MIN	PSIG	PSIG	BOPD	MMSCFD	
INITIAL FLOW ON ½" Ø CHOKE	31		850	DIESEL THE	n GAS TO SUR	FACE.
INITIAL FLOW SWITCHED ON ½" Ø CHOKE	69		1065	0	2 to 3 * (2 SAMPLES	WERE TAKEN
INITIAL FLOW SWITCHED ON ½" Ø CHOKE	10		1005	SMALL AMOUNT OF OIL TO SURFACE	3 TO 4	
FINAL SHUT- IN	85		0			
* AS	SUMING CR	TICAL CONDI	IONS EXIST	AND FLOW OF	DRY GAS.	
* EST	IMATED WIT	HOUT ANY CAI	CULATION FR	OM SEPARATOR	GAS METER.	
			·			
	·	·				

Depth of bot	ttom hole measurements:	Reference:	R1
Temperature : Choke Manif	:at:dep	th	
	as gravity (air:1) at choke		『 え'' Ø CHOKE
STO gravity	y at choke size	•	•
BSW :	w	ater cut:	

#### REMARKS AND OTHER OPERATIONS

- D.S.T. SHORTENED BECAUSE OF HIGH PERCENTAGE OF H2S IN FLOWING GAS (UP TO 200 PPM).
- 2 GAS SAMPLES TAKEN FROM CHOKE MANIFOLD.

BOTTOM HOLE PRESSURE FROM DOWELL COMPUTER REPORT.

# FLOPETROL

Client :\_\_

HUDBAY OIL

Section

2

Base :\_

PERTH

Field: WILDCAT
Well: SPERM WI

SPERM WHALE # 1

Page : 05 Report N°: 1001822001

_	MAIN	RESULTS	_

D.S.T. NO 3.

Tested interval:			Pe	rforations:	819 - 826 M		
OPERATION	DURATION	BOTTOM HOLE PRESSURE	WELL HEAD PRESSURE	OIL PROD. RATE	GAS PROD.RATE	G.O.R	
Units	MIN	PSIG	PSIG	BOPD	MMSCFD		
INITIAL FLOW ON ½" Ø CHOKE	4		260	DIESEL	CUSHION COME	5 TO SURFACE	
INITIAL FLOW ON ½" Ø CHOKE	3		390	DIESEL CU	SHION COMES '	ro surface.	
INITIAL SHUT	31	·	20	GAS COMIN	G TO SURFACE		
FINAL FLOW ON ½" Ø CHOKE	100		855	0	5.4		
FINAL SHUT	APPROX. 200		0	-	-		
			·				

Depth of bottom hole measurements:	Reference :
Temperature:at:depth	
Separator gas gravity (air:1) at choke size	:
STO gravity at choke size	;
BSW : Water	cut :

#### REMARKS AND OTHER OPERATIONS

HIGH PERCENTAGE OF H2S IN FLOWING GAS (200 PPM) GAS SAMPLE TAKEN AT SEPARATOR OUTLET.
BOTTOM HOLE PRESSURE FROM DOWELL COMPUTER REPORT.

	Client	HIIDRAY O	_	Section		
FLOPETROL		HUDBAY O	<u>. L </u>			Signal
Base:	Field :_ Well :_	WILDCAT SPERM WHA	LE # 1	Page Report	. 01 N°=100182200	_ 18
_ OPERATING AND	MEASU	RING CC	NDITION	S _	A STATE OF THE PARTY AND A STATE OF THE STAT	
A _ TYPE OF G	AUGE _					
11633416 .	GAUGE 1	10000 PSIG	·			!
WELL HEAD :  Pressure : FOXBO  Temperature : THERN	ORO 5000 PS M. 100C /	SI / D.W 7 110°C	J.T. 5000 PS		OCK FAILURE (	NC
SEPARATOR:  Pressure: BARTO Temperature: THERM			PSIG / DIFF	'. 200 <sup>44</sup> wa	TER	
B _ PRODUCTION	RATE COND	NTIONS AND	SOURCES	<b>**</b>		
OIL PRODUCTION RATE  Tank Meter Dump Rotron		<u>e: condition</u> Separator Atmospheri pressure		□ W □ W	m <u>easurement</u> lith tank lith shrinkage ester	•
GAS PRODUCTION RATE  Orifice meter		Standard 60 <sup>0</sup> F	conditions 14.73 PSIA			
WATER_PRODUCTION_RATE    Tank   Meter						
C <u>- WELL DAT</u> WELL STATE DURING SURV						
Well producing through Main casing size 95 Tubing size 3½  Perforations: DST 1 Zone From DST 2 Zone From From	tul /8" set at set at set at m 839 m 832	834 M	Total well Packer From From	depth 12 RTTS set	815.0 M 803.56 M	-
WELL STATE BEFORE TEST:  Well closed since Well flowing since	· ··· · · · · · · · · · · · · · · · ·	Producing		· · · · · · · · · · · · · · · · · · ·		The second secon

N°: DOP 104

FLOPETROL

PERTH

Base:

Client : HUDBAY OIL

Field:

Well

WILDCAT

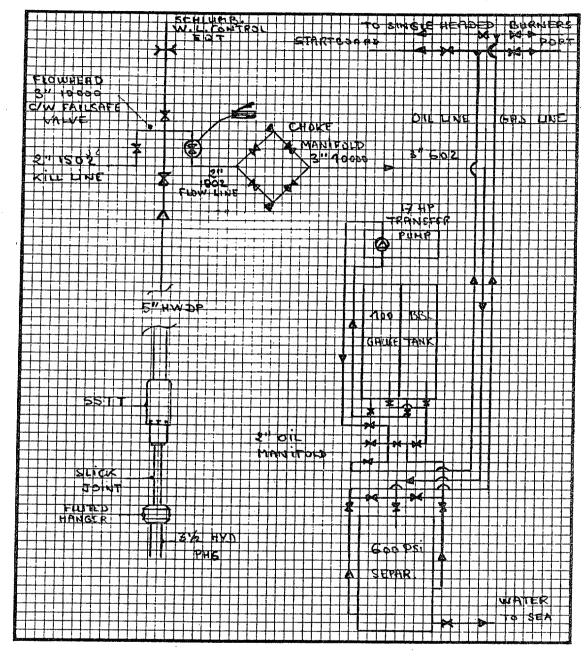
SPERM WHALE # 1

Section

4

Page : 01 Report N : 100182200182

### \_ SURFACE EQUIPMENT LAYOUT \_



REMARKS :

DOP 105

PERTH Base :\_

Client : HUDBAY OIL

WILDCAT

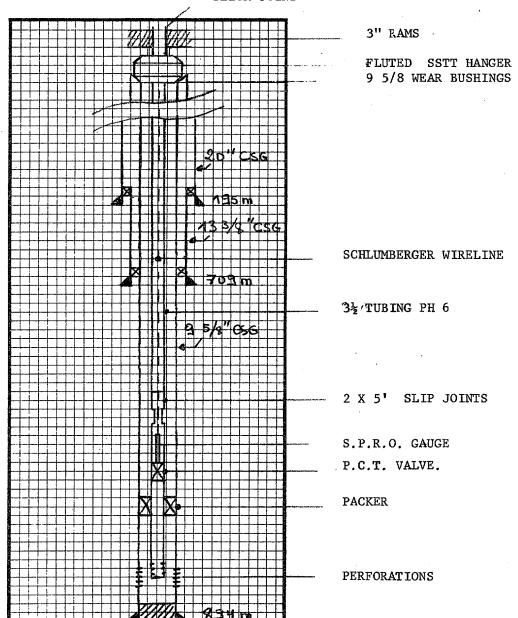
Field : SPERM WHALE # 1

Section

01

Report N: 100182200182

#### WELL COMPLETION DATA



**REMARKS**:

Client :\_\_\_

HUDBAY OIL

Section

Base :\_

PERTH

Field : WILDCAT
Well : SPERM WHALE NO. 1

Page : 01 Report N°:100182200132

#### SEQUENCE OF EVENTS \_

DATE	TIME	OPERATION
10.01.82		FLOPETROL CREW ARRIVES ON BOARD.
		PETROMAR NORTH SEA - CHECKING ON INVENTORY AND PERMANENT
		EQUIPMENT.
11.01.82		PREPARATION OF E.Z. TREE, SEPARATOR AND MISCELLANEOUS EQUIP.
12.01.82		RIG UP BURNERS.
13.01.82	01.30	DUMMY RUN E.Z. TREE - MAKE UP E.Z TREE. AND FLOWHEAD.
	08.00	START RUNNING IN TESTING STRING FOR D.S.T. NO. 1
		PREPARATION OF OIL SAMPLING BOTTLES.
	15.15	PICK UP E.Z. TREE ON MAIN DECK.
	16.15	R.I.H. E.Z. TREE.
***	17.15	PICK UP FLOWHEAD ON MAIN DECK.
	17.30	RIG UP FLOW HEAD AND SURFACE EQUIPMENT.
	18.30	RIG UP SCHLUMBERGER W.L. EQUIPMENT.
		FAIL ON CABLE. RIG DOWN W.L. EQUIPMENT.
	19.00	PRESSURE TEST FLOWHEAD AND SURFACE EQUIPMENT. 600 PSI UP TO
•		SEPARATOR.
		3,000 PSI ON DOWNSTREAM AND UPSTREAM C/M VALVES.
	·	INCONCLUSIVE.
	19.35	SET PACKER AT 832.84 M.
	19.40	PRESSURE TEST AGAIN - O.K.
	20.23	OPEN P.C.T. ON 같" BUBBLE HOSE (ANNULUS PRESSURE 1400 PSI).
	20.30	1ST SHUT IN (BLEED OFF ANNULUS PRESSURE).
	21.00	2ND OPENING OF P.C.T. ON ½'' Ø FIXED CHOKE
	21.08	CLOSE C/M - FLOW THROUGH BUBBLE HOSE.
	21.10	START RIG UP SCHLUMBERGER W.L. EQUIPMENT.
	21.30	START RUNNING IN S.P.R.O. LATCH
	21.45	S.P.R.O. LATCH STUCK AT 680 M ( TUBING PLUGGED.
	22.30	P.O.O.H. S.P.R.O. LATCH /RIG DOWN W.L.EQUIPMENT.

N. DOP 107

Section

6

Page : 02 Report N :100182200182

\_ SEQUENCE OF EVENTS \_(Continuation)

DATE	TIME	OPERATION :
13.01.8		FINAL SHUT IN.
14.01.82		UNSET PACKER.
	00.45	RIG DOWN FLOWHEAD AND SURFACE EQUIPMENT.
	01.15	START P.O.O.H. TESTING STRING.
	01.45	E.Z. TREE AT SURFACE.
	05.00	TESTING STRING OUT OF HOLE.
		END OF D.S.T. NO. 1
	18.30	START RUNNING IN TESTING STRING FOR D.S.T. 1A.
15.01.82	02.30	PICK UP E.Z. TREE ON MAIN DECK.
	03.00	R.I.H. E.Z. TREE.
	03.30	PICK UP FLOWHEAD ON MAIN DECK.
	03.45	RIG UP FLOWHEAD AND SURFACE EQUIPMENT.
	04.15	RIG UP SCHLUMBERGER W.L. EQUIPMENT.
	05.25	PRESSURE TEST SURFACE EQUIPMENT. (600 & 3000 PSI)
	05.46	SET PACKER AT 832 M.
	06.30	R.I.H. S.P.R.O. LATCH - FAIL ON CABLE.
	08.01	S.P.R.O. LATCHED.
	08.10	OPEN P.C.T. ON 戈'' Ø ADJ. CHOKE (ANNULUS PRESSURE 1400 PSI)
		NO FLOW.
	08.14	SHUT IN P.C.T. TOOL (BLEED OFF ANNULUS PRESSURE).
	08.16	SECOND ATTEMPT TO OPEN P.C.T.
	08.26	BLEED OFF ANNULUS PRESSURE.
	08.29	UNLATCH S.P.R.O. GAUGE.
	08.31	UNSET PACKER.
	08.34	RESET PACKER.
	08.36	RELATCH S.P.R.O. GAUGE.
	08.49	THIRD ATTEMPT TO OPEN P.C.T.
	09.04	PRESSURE UP TUBING.
	• • • •	PRESSURE AT CHOKE MANIFOLD 840 PSI.
		THE CALL THE

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Section

Page : 03 Report N: 100182200182

_ SE	QUENCE	OF EVENTS _(Continuation) Page : 03 Report N: 1001822001												
DATE	TIME	OPERATION												
15.01.82	09.10	PRESSURE AT CHOKE MANIFOLD 650 PSI.												
	09.14	BLEED OFF PRESSURE IN TUBING.												
	09.18	BLEED OFF ANNULUS PRESSURE.												
	09.20	FOURTH ATTEMPT TO OPEN P.C.T.												
	09.28	PRESSURE UP ANNULUS TO 2000 PSI.												
	09.31	BLEED OFF ANNULUS PRESSURE.												
	09.34	START REVERSE CIRCULATION TO GAUGE TANK.												
	0 <b>9.</b> 44	STOP REVERSE.												
	09.46	P.O.O.H. S.P.R.O. LATCH.												
	09.55	. RIG DOWN WIRELINE EQUIPMENT.												
	10.32	UNSET PACKER.												
	11.15	RIG DOWN FLOWHEAD - SURFACE EQUIPMENT.												
	11.45	P.O.O.H. TESTING STRING.												
	12.30	E.Z. TREE AT SURFACE.												
	13.00	BURN DIESEL CUSHION COLLECTED IN GAUGE TANK.												
	13.40	FINISH BURNING.												
	16.00	TESTING STRING OUT OF HOLE.												
		END OF D.S.T. 1A.												
15.01.82	18.00	START RUNNING IN TESTING STRING FOR D.S.T. 1B.												
16.01.82	01.00	PICK UP E.Z. TREE ON MAIN DECK.												
_	01.30	R.I.H. E.Z. TREE.												
	02.00	PICK UP FLOWHEAD ON MAIN DECK.												
	02.45	RIG UP FLOWHEAD AND SURFACE EQUIPMENT.												
	04.00	PRESSURE TEST 600 PSI TO SEPARATOR.												
	04.15	RIG UP SCHLUMBERGER W.L. EQUIPMENT.												
	05.00	PRESSURE TEST 3000 PSI - FAIL ON OPERATING FAIL SAFE VALVE												
		ON FLOW HEAD.												
		· · · · · · · · · · · · · · · · · · ·												

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Section

\_ SEQUENCE OF EVENTS \_(Continuation)

Page :<u>04</u> Report N:<u>1001822001</u>2

		Theport N: 100182200											
DATE	TIME	OPERATION											
16.01.82	06.00	PRESSURE TEST AT 3000 PSI O.K.											
	06.53	SET PACKER AT 832 M.											
	06.57	R.I.H. S.P.R.O. LATCH.											
	07.09	S.P.R.O. LATCHED.											
•	07.11	OPEN P.C.T. (1400 PSI ON ANNULUS PRESSURE) ON 社" Ø											
		BUBBLE HOSE.											
	07.13	FLOW DIESEL CUSHION THROUGH 7/16" ADJ. CHOKE.											
	07.14	SWIT CH FLOW THROUGH ½'' Ø ADJ. CHOKE.											
	08.50	CLOSE IN (BLEED OFF ANNULUS PRESSURE).											
	08.57	REVERSE OUT TO GAUGE TANK.											
	09.20	UNLATCH S.P.R.O. GAUGE - P.O.O.H. S.P.R.O. LATCH.											
	09.38	UNSET PACKER.											
	09.40	RIG DOWN W.L. EQUIPMENT.											
	10.15	RIG DOWN SURFACE EQUIPMENT.											
	10.35	P.O.O.H. TESTING STRING.											
•	11.15	E.Z. TREE AT SURFACE.											
	11.45	BURN REMAINING DIESEL CUSHION RECOVERED FROM REVERSE.											
	12.00	FINISH BURNING.											
	14.30	TESTING STRIN OUT OF HOLE.											
		END OF D.S.T. 1B.											
	23.00	START RUNNING IN TESTING STRING FOR D.S.T. 2.											
17.01.82	05.45	PICK UP E.Z. TREE ON MAIN DECK.											
	06.10	R.I.H. E.Z. TREE.											
	06.30	PICK UP FLOWHEAD ON MAIN DECK.											
	06.45	RIG UP FLOWHEAD AND SURFACE EQUIPMENT.											
	07.15	RIG UP SCHLUMBERGER W.L. EQUIPMENT.											
	07.40	PRESSURE TEST SURFACE EQUIPMENT (600 & 3000 PSI).											
	08.25	END OF PRESSURE TEST.											
	08.32	SET PACKER AT 815 M.											
	08.35	R.I.H. S.P.R.O. LATCH.											

Section

6

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		Section :											
	SEQUENC	CE OF EVENTS _(Continuation) Page : 05 Report N:1001812											
DAT		OPERATION											
17.0	1.82 09.08	S.P.R.O. LATCHED.											
· ·	09.10	OPEN P.C.T. (1400 PSI ON ANNULUS PRESSURE) ON ½" Ø FIXED											
		CHOKE.											
	09.11	DIESEL TO SURFACE.											
	09.13	START BURNING DIESEL.											
	09.17	GAS TO SURFACE - H2S DETECTED.											
	09.41	SWITCH FLOW THROUGH 눝'' Ø ADJ. CHOKE.											
	10.08	TAKE MUD SAMPLES AT C.M.											
	10.23	START 1ST GAS SAMPLING AT C.M.											
	10.27	FINISH GAS SAMPLING.											
	10.35	START 2ND GAS SAMPLING AT C.M.											
	10.40	FINISH GAS SAMPLING.											
	10.49	SWITCH FLOW THROUGH 2" Ø FIXED CHOKE.											
·	10.50	TRACE OF OIL AT SURFACE.											
	10.59	SHUT IN (BLEED OFF ANNULUS PRESSURE).											
	12.02	REVERSE OUT TO TANK.											
	12.10	UNLATCH S.P.R.O P.O.O.H. S.P.R.O. GAUGE.											
·	12.24	UNSET PACKER.											
	12.26	START CIRCULATING.											
	14.20	FLUSH LINES.											
	14.25	RIG DOWN W.L. EQUIPMENT / SURFACE EQUIPMENT.											
	14.45	P.O.O.H. TESTING STRING.											
	15.30	E.Z. TREE AT SURFACE.											
	19.00	TESTING STRING OUT OF HOLE.											
	22.00	END OF D.S.T. NO. 2											
	22.00	START ON TRANSFERRING P.C.T. SAMPLE (D.S.T. 2) INTO 628 CC											
8.01.82	04.00	OIL BOTTLES.											
	10.30	START RUNNING IN FOOTING STRING FOR D.S.T. 3											
	10.45	PICK UP E.Z. TREE ON MAIN DECK. R.I.H. E.Z. TREE.											
		u,u, IREE.											

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6

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_ SE	QUENCE	OF EVENTS _(Continuation) Page : 06 Report N°: 1001822											
DATE	TIME	OPERATION											
18.01.82	11.00	PICK UP FLOWHEAD ON MAIN DECK.											
	11.15	RIG UP FLOWHEAD AND SURFACE EQUIPMENT.											
	11.55	RIG UP SCHLUMBERGER WIRELINE EQUIPMENT.											
	12.40	PRESSURE TEST SURFACE EQUIPMENT 600 & 3000 PSI.											
	13.00	FINISH PRESSURE TESTING.											
	13.06	SET PACKER AT 803.56 M.											
	13.10	R.I.H. S.P.R.O. LATCH.											
	13.25	S.P.R.O. LATCHED.											
	13.26	OPEN WELL ON 文'' Ø ADJ. CHOKE (1400 PSI ON ANNULUS											
		. PRESSURE).											
	13.27	DIESEL TO SURFACE / START BURNING.											
	13.30	SWITCH FLOW THROUGH ½" Ø ADJ. CHOKE.											
	13.33	1ST RUN IN (BLEED OFF ANNULUS PRESSURE).											
	13.38	GAS TO SURFACE / STRAIGHT TO STARBOARD BURNER.											
	14.04	2ND OPENING ON 2" OF IXED CHOKE.											
	14.13	H2S DETECTED.											
	14.50	SWITCH FLOW THROUGH SEPARATOR.											
	15.15	LOWER 2.5" ORIFICE PLATE - START READING FOR GAS FLOW RATE											
		MEASUREMENT.											
	15.43	START TAKING 1 GAS SAMPLE AT SEPARATOR.											
	15,44	LAST SHUT IN.											
	15.45	FINISH SAMPLING.											
1	15.46	BY PASS SEPARATOR.											
1	.8.15	START REVERSE CIRCULATING.											
1	9.45	UNLATCH S.P.R.O P.O.O.H. S.P.R.O. GAUGE.											
2	0.05	UNSET PACKER.											
2	0.08	START CIRCULATING.											
2	1.30	RIG DOWN WIRELINE EQUIPMENT / SURFACE EQUIPMENT.											
22	2.15	P.O.O.H. TESTING STRING.											
23	3.00	E.Z. TREE AT SURFACE.											

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Section

6

S (Continuation)

Page : 07
Report N°:100182200182

JOENCE	OF EVENTS _(Continuation)		Report N° 10018220018										
TIME	OPERAT	ION											
23.00	END OF D.S.T. 3.												
	BREAK E.Z. TREE ON RIG FLOOR FOR	PACKIN	G UP.										
24.00	FINISH P.C.T. SAMPLE (D.S.T. 2)	TRANSFE	R.										
05.00	FINISH PACKING UP TO E.Z. TREE E	ND FLOW	HEAD.										
06.00	START ON TRANSFERRING RFT SAMPLE	. INTO	OIL SAMPLING										
	BOTTLES.												
08.00	FINISH TRANSFER.												
10.00	2 CREW MEMBERS LEAVE THE RIG.												
16.00	FINISH PACKING UP.												
07.07	· LEAVE THE RIG.												
	END OF JOB.		,										
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		<del> </del>											
	TIME  23.00  24.00  05.00  06.00  08.00  10.00  16.00	TIME OPERAT  23.00 END OF D.S.T. 3.  BREAK E.Z. TREE ON RIG FLOOR FOR  24.00 FINISH P.C.T. SAMPLE (D.S.T. 2)  05.00 FINISH PACKING UP TO E.Z. TREE B  06.00 START ON TRANSFERRING RFT SAMPLE  BOTTLES.  08.00 FINISH TRANSFER.  10.00 2 CREW MEMBERS LEAVE THE RIG.  16.00 FINISH PACKING UP.  07.07 LEAVE THE RIG.	23.00 END OF D.S.T. 3.  BREAK E.Z. TREE ON RIG FLOOR FOR PACKING 24.00  FINISH P.C.T. SAMPLE (D.S.T. 2) TRANSFER O5.00  FINISH PACKING UP TO E.Z. TREE END FLOW BOTTLES.  08.00  FINISH TRANSFER.  10.00  2 CREW MEMBERS LEAVE THE RIG.  16.00  FINISH PACKING UP.										

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Base	. F	ERTH		F	ield :_	WILDCA' SPERM	T	<i>/</i> L 1	_ <u>- w</u>	/ELL	TEST	ING DA	TA SH	IEET -	Page	÷	1
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				C	PSIG	PSIG							Air = 1				Units
			D S.T.	1 - J	ANUARY 1	3TH, 19	<u>32</u>										
19.35			SET PA	CKER		0	-				·						·
20.23			OPEN W	ELL ON	支" BUBE	LE HOSE	- STR	NG BL	w.								
20.25			VERY W	EAK BL	OW	1400										-	·
20.25					0	1400											
20.30			FIRST	SHUT I	N												
20.30					0	. 0											
21.00			SECOND	OPENI	NG ON ½"	Ø FIXE	снокі										
21.00					0	1400											•
21.08			OPEN O	NLY ON	え" BUBE	LE HOSE								вотт	OM HOLE P	RESSURE /	
21.10					0	1400								TEME	ERATURE N	OT RECORD	ED BY
22.30	-		TUBING	APPEA	RS TO BE	PLUGGE!	)							S.P.	R.O. GAUG	E DUE TO	
24.00			CLOSE	IN	0	0									SSIBLE LA		
00.25			UNSET	PACKER	/	END OF	D.S.T.	1						SEE	OTHER REC	ORDERS (D	OWELL).
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DATE -	TIME		SSURE A		MPERATI	JRE MEA	SUREM	NTS	PROD. R	ATES /	ND FLU	ID PROPE	RTIES	GOR			
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05.46			SET PA	CKER													
08.10			OPEN W	ELL ON	½" Ø A	рј. Снок	<b>≟ -</b> NO	INDIC	ATION ON FI	OW							1
08.10					0	1400											•
08.14			SHUT I	N WELL													
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08.16			SECOND	ATTEM	PT TO O	EN - NO	FLOW										
					0	1400											
08 <b>.2</b> 6			SHUT I	N - BL	EED OFF	ANNULUS	PRESS	JRE				*****					
					0	0			TOTAL PARTY OF THE								
08.31			UNSET	PACKER													
08.34			RESET	PACKER													
08.49			THIRD	ATTEMP	TO OPI	N - NO	IND ICA'	CION O	F FLOW.								
08.49					0	1400											
09.04			PRESSU	RE UP	TUBING S	TRING.			-								
					840	1400				***********							
09.10				Allege to great and a	650	1400											

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	T	BOTT	OM HOLE	M	/FII HE	AD	SEPA	RATOR	PROD. R			<del></del>	GAS	GOR			
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09.18			BLEED	OFF AN	NULUS PI	ESSURE				<u> </u>							
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09.20			FOURTH	ATTEM	PT TO OI	EN - NO	INDIC	ATION	F FLOW							·	
		· · · · · · · · · · · · · · · · · · ·			0	1400											
09.28			PRESSU	RE UP	- ANNUL	S PRESS	JRE										
					0	2000											<b> </b>
09.31			BLEED	OFF AN	NULUS PF	ESSURE											<del>                                     </del>
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10.32			UNSET	DACKED											W. M		
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			* BOTT	OM HOL	E PRESSU	RE WAS	RECORD	ED BY	OWELL S.P	R.O. (	OMPUTER	₹,					
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Time	Cuṁul		OM HOLE Pressure		ELL HEATG. press.		SEPAI	RATOR Press.	<del></del>	ONDEN: Gravity			G A ate	S Gravity				
		TOTALD.	71033410	C	PSIG	PSIG	remp.	11635.	nate	Gravity	BSVV	-	ate	Air=1				Units
			D.S.T.	NO. 1	В - J.	ANUARY 1	6TH 19	82 (	SAME TESTE	INTE	VAL AS	D.5	S.T. NO	. 1)			,	
06.53			SET PA	CKER									<del></del>					
07. <b>1</b> 1		<u> </u>	OPEN W	ELL ON	<u>दे</u> '' Ø B	UBBLE HO	SE - S	TRONG	BLOW.	 								
					0	1400										• • • • • • • • • • • • • • • • • • • •		·
07.13			SWITCH	FLOW	THROUGH	7/16" ₡	ADJ.	СНОКЕ	- DIESEL C	USHION	TO SUR	FACI	ī.					
				16	130	1400			·									
07.14			CHANGE	СНОКЕ	Ø ТО ½	'Ø ADJ.												
07.15				22	65	1400	ļ						7.7					
07.20				23	35	1400							•					
07.25				23	27	1400												
07.30				23	22	1400												
07.35				23	11	1400												
07.40				23	6	1400												
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08.00				23	3	1400												

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08.50			SHUT	N BY B	LEEDING	OFF ANN	ULUS P	RESSUR	£								
				23	0	0											
09.38			UNSET	PACKER	•												
			END OF	D.S.T	. NO. 1	В											
			* BOTT	ом ног	E PRESS	URE RECO	RDED B	Y DOWE	LL COMPUTEI	١,							
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·····																		
			D.S.T.	NO. 2	- JANU	ARY 17TH	1982	(TE	STED INTERV	AL 8:	2 - 83	4 M)	).					
08.32			SET PA	CKER														
09.10			OPEN W	ELL ON	½" Ø F	EXED CHO	KE - S	TRONG	BLOW.									
				26	140	1400												
09.11			DIESEI	. CUSHI	on to s	JRFACE.												
				26	280	1400												
09.12				26	310	1400												
09.13				26	400	1400												
09.14				25	450	1400							•	<u> </u>				
09.15				25	550	1400												
09.16				25	680	1400												
09.17				25	690	1400												
09.18				25	640	1400	-	GAS	TO SURFAC									
09.19				25	570	1400												
09.20				25	660	1400												
09.25				25	750	1400												
09.27				25	<b>7</b> 50	1400		H2S	30 PPM.									

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DATE -	- TIME	PR	ESSURF		-VVEL	L TEST	ING [	DATA	SHEET_	(Con	inua	tion)	Pag	ge	•	07			
Time		BUIL	OM HOLE		WELL	HEAD	-70005	INIENIS	PROD.	RATI	C AR	ID FLUID	Re	ge port N	<b>10</b> 018	220018	_ Sec	tion	:
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				C	PSI	G PSIC		5. 1165	s. Rate	Gra	vity	BSW F	Rate	GAS Gravi	tv	$\neg$			
09.30				25	750							M	MSCFD	Air=	1			+-	
09.35				<del> </del>	750	140	0	1.	H2S	100 P	PM								Un
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09.45				28	1075	1400	+	<del> </del>	<b> </b>							$\dashv$		+	
9.50				28	1070	+	<del> </del>	<del> </del>	H2S	200 P	PM			1	<del> </del>	- -		<del> </del>	
9.55				28	ļ	1400								-					
0.00		1			1060	1400			H2S 17	5 PPM	1			<del> </del>					
0.05	_	_		27	1060	1400				+-	+								
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.15			MUD SAM	PLES	AKEN A	СНОКЕ	MANIFOI	,D	1125 201	PPM	-			I		1			+
				27	1069	1400				<del> </del>		_				+		<u> </u>	-
.23			1ST GAS	SAMEL	ING AT								1		··· <u>·</u>	+			
					1065		NIFOLD	·				1	$\dashv$			<del> </del>			
35		_			1	1400		ĺ											
1		+-	2ND GAS		ING AT C	HOKE MAI	VIFOLD					+	1	612					<del> </del>
	+		2	7 1	065	1400											+		<del> </del>
19			HANGE CI	IOKE T	0 ½" 6 ]	ETVD		-				EST IMA 2 TO		612		1	+		<u> </u>
50	l		27		010	FIXED.				- 1			+	V14		<del> </del>			

THE RESIDENCE OF THE	the territorial of the control	Company of the Party of the Par	and the state of t	TO ANNUAL PROPERTY.	Specifical Adjust to the Section 2 dec	CONTRACTOR STATE	NO DECOMES CONTROL BOOM		HEET_( Co	ntinu	ation)	Page Repo	rt N° 1	08 0018220018	Section	on :	7
DATE -	TIME	<u> </u>	ESSURE A									IID PROPER	TIES	GOR			
Time	C. T. I		OM HOLE	w	ELL HE	AD	SEPA	RATOR	OIL OR C	ONDEN	SATE		AS				T
Time	Cumul	Temp.	Pressure	I Ig. temp	ig. press. PSIG	Cg. press. PS IG	Temp.	Press.	Rate	Gravity	BSW	Rate MMSCFD	Gravity	<b></b>			
<del></del>												FRIDOLD	Air=1				Units
10.50			TRACE	OF OIL	AT SUR	ACE											
10.57				27	1005	1400			H2S 200	PPM		ESTIMATED 3 TO 4					
10.59			SHUT	N BY B	LEEDING	OFF ANN	ULUS P	RESSUR	₫,								
				27	1005	0											
11.01				27	340	0											
12.24			UNSET	PACKER	•												
<del></del>			END OF	D.S.T	. NO. 2												
<del>"</del>							***************************************				-						
			*BOTTO	M PRES	SURE REC	ORDED B	Y DOWE	LL COM	PUTER.			•					
- 1																	
						-									· · · · · · · · · · · · · · · · · · ·		
															···		
			!													<del></del>	
			ene socialis energia de españo a ric														1

	OF	ET	RO		WELL 7	restin(	G DA	TA SI	HEET_(Co	ntinua	ation)		Page Repo	rt N°:_	09 10018220	Sec	ction	•	7
DATE -	TIME		SSURE A						PROD. R			ID PR			GOR				
Time	Cumul		OM HOLE Pressure		ELL HE	AD Cg. press.	SEPAI Temp.	RATOR Press.		ONDE N Gravity		Rat	G A	\S Gravity					<b>—</b>
				°c		PSIG								Air=1					Units
			D.S.T.	NO. 3	JANUA	RY 18TH	1982	(TEST	ED INTERVA	819	- 826	M)							
13.06	ļ		SET PA	CKER															
13.26			open v	ELL DO	WNHOLE	FLOW I	HROUGH	½''Ø A	рј. Сноке										
				24	100	1400			STRONG B	LOW AT	BUBBLE	HOSE	]						<u> </u>
13.27			DIESEI	cush1	ON TO S	JRFACE -	STRON	G FLOW	•										
				24	130	1400													
13.28				24	250 <sub>.</sub>	1400													
13.29				24	260	1400	-												
13.30			CHANGE	СНОКЕ	TO ½" (	Ø ADJ.							•						
13.30				24	250	1400													
13.31				24	320	1400					٠.							·	
13.32				24	390	1400													
13.33			1ST SE	UT IN								,							
				24	390	0													
13.38				24	310	0			GAS TO SI	JRFACE.								- Miles and a state of the stat	
13.39				24	260	0												<u> </u>	
13.40				24	200	0												· · · · · · · · · · · · · · · · · · ·	

FL	OF		PO		WELL T	ESTING	G DA	TA SI	HEET_( Co	ntinua	ation)		Page Repo	rt N°±	10 0018220018	Secti	on:	7
DATE -	TIME		SSURE A						PROD. R			ID PI			GOR			
Time	Cumul		OM HOLE Pressure		Tg. press.		SEPAI Temp.	RATOR Press.	OIL OR C	Gravity		Ra	G A	AS Gravity				<del> </del>
				оC	PSIG	PSIG								Air=1				Units
10 /1				0.4	1/0													
13.41				24	140	0							<del></del>					
13.42				24	100	0			,									•
13.45				24	20	0												
13.50				24	0	0												
14.04			FINAL	FLOW -	THROUG	I ½" Ø F	IXED C	HOKE.										
14.05				25	300	1400												
14.06				25	650	1400												
14.07				25	900	1400							Tv.T					
14.08				25	930	1400							•			<u> </u>		
14.09				25	900	1400		·										
14.10		·		25	890	1400												
14.13				25	870	1400			H2S 19	PPM								
14.15				25	880	1400												
14.30				25	810	1400												
14.35				25	800	1400			H2S 2	<b>0</b> 0 PPM			•					
14.45				25	820	1400												
14.50			SWITCH	FLOW	THROUGH	SEPARAT	OR											

	OP		RO	_\	WELL T	ESTING	G DA	TA SI	HEET_(Co	ntinua	ation)	Page Repo	rt N°.	11 0018 <b>2</b> 20108	Section	on :	7
DATE -	TIME		SSURE A									JID PROPERT		GOR			
Time	Cumul		M HOLE Pressure		ELL HEA	AD Cg. press.		RATOR Press.	OIL OR CO	ONDEN: Gravity		G /	AS Gravity				
	- Carrier	101110		OC.	PSIG	PSIG	ОС	PSIG	Hate	Ordanty	5011	MMSCFD	Air=1				Units
14.50			,	25	820	1400									H2S 2	00 PPM	
14.55	·			25	830	1400	:										
15.00				25	832	1400	15	130					.605				
15.15			LOWER	ORIFIC	E PLATE	Ø 2.5"											
15.15				25	845	1400	8	135				5.2	.605				
15.30				25	855	1400	8	135				5.4	.605		H <b>2</b> S	200 PPM	
15.43	,		GAS SA	MPLING	AT SEP	RATOR											
				25	855	1400	8	135					.605				
15.45				25	855	1400	8	138		:		5.4	.605				
15.45			FINAL	SHUT I	N												
			·	25	855	0	8	138					.605				
15.46			BY PAS	S SEPA	RATOR				·								
15.40				25	350	0											
20.05			UNSET	PACKER													
			END OF	D.S.T	. NO. 3				* BOTTON	1 PRES	URE RI	CORDED BY	DOWELL	COMPUTER			·
								·									

DIVISION : N.T.D.

BASE = PERTH

REPORT N°=

### Well Testing Report Annexes \_\_

Client : HUDBAY OIL (AUSTRALIA) LTD.

Field : WILDCAT Well : SPERM WHALE NO. 1

Zone = Date = FROM 10.01.82 TO 20.01.82

Client: HUDBAY OIL Section: ANNEX

Field: WILDCAT Page: 01

Well: SPERM WHALE Report N: 1010822001 2

#### INDEX of ANNEXES

	·
	1 _ BOTTOM HOLE PRESSURE AND TEMPERATURE
	MEASUREMENT _
	☐ 1.1 - B.H. gauge calibration -
	1.2 B.H. pressure calculation -
	1.3. B.H. temperature calculation.
X	2_LIQUID PRODUCTION RATE MEASUREMENT _
	2.1    Measurements with tank
	2.2 Measurements with meter -
X	3. GAS PRODUCTION RATE MEASUREMENT.
X	4_ SAMPLING SHEETS _
	4.1 Bottom hole sampling -
	X 4.2 - Surface sampling - + TRANSFERS
X	5_CHARTS AND MISCELLANEOUS_
	X BARTON CHART D.S.T. NO. 3

N\*: DOP 112

Base = PERTH

Client : HUDBAY OIL

Field : WILDCAT

Well : SPERM WHALE 1

Section:ANNEX

Page : 02 Report N°:1001822001

#### \_ LIQUID PRODUCTION RATE MEASUREMENT \_

#### 2.1\_ MEASUREMENT WITH TANK -

$$V_0 = V_x K_x (1 - BSW)$$

Vo: Net oil volume at 60°F and atmospheric pressure.

V: Gross oil volume measured by tank gauging.

K: Volume correction factor to be applied between the tank

temperature during gauging and 60°F.

BSW: Basic sediments and water.

#### 2.2 MEASUREMENT WITH METER -

a) Shrinkage factor is measured by shrinkage tester.

$$V_0 = V_S \times f \times (1 - Shr) \times K \times (1 - BSW)$$

Vo: Net oil volume at 60°F and atmospheric pressure.

Vs: Gross oil volume measured by meter under separator conditions.

f : Meter correction factor = Volume measured in tank
Volume measured by meter

Shr: Percentage of oil volume reduction between separator and tank conditions, reported to oil volume at separator conditions.

K: Volume correction factor to be applied between the final temperature during shrinkage measurement and 60°F.

BSW = Basic sediments and water.

b) Shrinkage factor is measured with tank.

$$V_0 = V_S \times (1 - Shr') \times K \times (1 - BSW)$$

 $V_0$  ,  $V_S$  , K and BSW = Same meaning as in a) . (1 – Shr') = Shrinkage factor including meter correction factor .

FLC		rro	Client Field		BAY OIL		1			TION RAT		Section: ANN	and the same of the control of the same of
Base :_	PER	СН	Well	SPER	M WHALE	NO. 1	1010	ASUNEIVI	ENI V	ITH TANK		Page :_ Report N : 1	0018220018
DATE -		Gauge	TANK VO		<u> </u>	GRAVI		К	BSW	Net volume	Net STO	Cumulative	
Time	Interval	graduation CM	Volume V BBL	Temp.	Gravity	Temp.	Grav. 60°F		%	of STO Vo	product rate /day	production	Units
		D.S.T.	1 B.	JANUARY	<b>16</b> TH, 1	982							
							<del> </del>						
		RECOVE	RY OF DIESEL	CUSHIC	N								
													<u> </u>
							<del></del>						
07.11	<u> </u>	OPEN W	ell on ½" Ø	BUBBLE	HOSE.		· · · · · · · · · · · · · · · · · · ·						
07.13	<u> </u>	DIESEL	CUSHION TO	SURFACE	- FLOW	THROUGH	7/16" Ø	ADJ. CHOKI					
07.14		СНОКЕ	ð ½" ADJ.	<u></u>									
07.14		0	· · · · · · · · · · · · · · · · · · ·										
08.50		SHUT I	1		·								
08.50		56	14.8										
	-												
	<u></u>			<u> </u>		<u> </u>				<u> </u>			
					**To depuis o discount discount			TESTED IN PERFORATION					

Base :

Client : HUDBAY OIL

WILDCAT Field:

SPERM WHALE #

Section:ANNEX

Page Report N°: 100182200 82

#### \_ GAS PRODUCTION RATE MEASUREMENT by orifice meter \_

Reference is made to the rules and coefficients given in AGA gas measurement Comittee Report No.3 for orifice metering.

#### a) EQUATIONS \_

#### $Q = C \sqrt{hw \times Pf'}$

Well

Q: Production rate at reference conditions.

C : Orifice flow coefficient.

hw: Differential pressure in inches of water.

Pf: Flowing pressure in psia.

 $C = F_u \times F_b \times F_g \times Y \times F_{tf} \times F_{pv}$ 

Fu: Unit conversion factor in desired reference conditions.

Fb: Basic orifice factor (Q in Cu.ft / hour).

Fg: Specific gravity factor.
Y: Expension factor

Ftf: Flowing temperature factor.

Fpv: Supercompressibility factor (estimated).

#### Remarks

Fm: Manometer factor is equal one since only bellows type meters are used.

Fr: Reynolds factor is considered to be one.

	TABLE O	F Fu FACT	OR	
		REFERENCE	CONDITIONS	
UNITS	60°F	0°C	15°C	15°C
	14.73 psia	760mmHg*	760mmHg *	750mmHg *
Cu-ft / hour	1	0.9483	1.0004	1.0137
Cu-ft / day	24	22.760	24.009	24.329
m3 / hour	0.02832	0.02685	0.02833	0.02870
m3 / day	0.6796	0.6445	0.6799	0.6889

\* Mercury at 32°F

b) METER DATA DANIEL ORIFICE Flow recorder type: BARTON	Flange taps - Pf taker ID of meter tube :	
c) SPECIFIC GRAVITY SOURCE _ Sampling point : SEPARATOR OUTLET	Gravitometer type:	KIMRAY

d) SUPERCOMPRESSIBILITY FACTOR Fpv -

All coefficients are taken from AGA NX 19 manual for natural gas free of air, CO2 and H2S. More accurate values could only be determined by laboratory measurement.

FL	DP		'RC		Client :				t alle the state of the state o							ANNEX 3
Base	:	PERTH			Field :_ Well :_	WILDCAT SPERM W		1	- GAS	PRODU	CT. RAT	E MEAS	SUREMENT	Γ-	Page Report N	: <u>02</u> :100182200183
1	- TIME Interval	•	absolute	<u> </u>	$\sqrt{h_w \times P_f}$	Orifice diameter	Gas gravity	F <sub>b</sub>	F <sub>g</sub>	Υ	F <sub>tf</sub>	$F_pv$	. C	ra	production ate : <b>Q</b>	Cumulative Production
-		C	psia	"of wat.		Inches	(air=1 )								MSCFD	
			D.S	.T. NO	. 3 JANUA	RY 18TH	1982	TESTED	INTERVAL	819 -	826 M)					
13.26			OPE	n WELL												
13.33			1st	SHUT	IN											
13.38			GAS	TO SU	RFACE											
14.04			FIN	AL FLO	w - choke ¢	½" Ø I	IXED.									
14.50			SWI	TCH FL	OW TO SEPAR	ATOR										
15.15			LOW	ER 2.5	Ø ORIFICE	PLATE										
15.15		8	150	35	119.37	2.5	.605	1387.2	1.2856	1	1.0137	1.013	43951.6	5	5.2	
15.30		8	150	100	122.47 .	2.5	.605	1387.2	1.2856	1	1.0137	1.013	43951.6	5	.4	
15.44		8	153	100	123.69	2.5	.605	1387.2	1.2856	1	1.0137	1.014	43995.0	5	5.4	
15.45			FINAL	SHUT	IN											
15.46		ву в	ASS SE	PARATO	R.											
		·														
		<u> </u>						<u> </u>								
Fu =		24	Reco h <sub>w</sub> =	rder ran	ges: P <sub>f</sub> = 200" W	Temp. <b>=</b> _	1000	PSI		TED INT	rerval : NS :	819	826 M			

FLO	PETA	Client :	HUDBAY O			ANNEX 🚄 🖃
	ERTH	Field :	WILDCAT SPERM WHA		Page	N°: 1001822001
Dasc		vven •	SPERM WHA	ALE	report	14
Date of sam Sample natu	pling:17.6	SURFACE S  1.82 GAS Service or	der:	Samr	oling No.: E MANIF	1 OLD INLET
Producing	A _ RES	ERVOIR AND WEL 2Perforation	L CHARACTERIS	STICS _ 1 Sampling	g interval	ī
Depth origi Surface ele	n :1417 vation:	Tubing Dia	:3½"	Casing Shoe	Dia.:	9 5/8 894 M
Bottom hole static conditions	Latest pressure	measured :	at depti	n:	date	:
Time at whic	B = MEA th sample was tak	ASUREMENT AND S	SAMPLING CO Time elapse	NDITIONS _ d since stabilis	ation:	· · · · · · · · · · · · · · · · · · ·
Bottom hole dynamic conditions	Bottom hole pres	since:	at depth:	··	_date:	· · · · · · · · · · · · · · · · · · ·
Flow measur Values used t	ement of sampled or calculations :	gas _ Gravity(air:1):	.612	_Factor Fpv = -	1 VZ:	
Separator	Pressure: Temp :	PSIG <u>Rates</u> _ Gas *F Oil (separator	: cond.):	SCFD BOPD	GOR B (sep	arator cond.)
<u>Stock</u> <u>tank</u>	Atmosphere Tank temperature	:mmHg		I at 60 °F:		_BOPD A[B]C[a]b
BSW:	% WI	.R:c	%o			
Transfering fl	uid :		Transfer dura	ation:		
Final condition Pressure: _1	ons of the shipping 065 PSIG Ter	p bottle: np: 27°C				
Shipping bot	ttle No.: A 497	NTIFICATION OF TH 4sent on: 20.01 RTH	E SAMPLE _ 82 by: HU	DBAY Sh	ipping ord	der No.:
Coupled with	·	LIQUID			GAS .	
Bottom ho	le samples No.	TRANSFER FROM PCT D.S.T. 2	TRANSFER FROM EQT.			
Surface sa	imples No.	A 7387 15089/5 230-97	9024-25 15089/17 2226 -115	A 4926 A 12042		
Measuremen A Tank .		B_ Meter	tester. <b>b</b> . C	C_ orrected with	Dump . tank .	
	D _ REM	MARKS _			Visa	Chief Operator

HUDBAY OIL

Section:ANNEX

WILDCAT

Base :	PERTH	Well :_	SPERM WHALE	Report N°: 1001822	2001		
_SURFACE SAMPLING _							
Date of samp Sample natu	pling: 1/.01.82 ure : GAS	_ Service orde	er: _ Sampling point:	Sampling No.: 2 CHOKE MANIFOLD INLET			
	A_RESERVOIR AND WELL CHARACTERISTICS _  Producing zone: DST NO. 2 Perforations: 832 - 834 Sampling interval:						
Depth origing Surface ele	Depth origin :						
Bottom hole static				date :			
conditions	Temperature		at depth:	date:			
Time at whic			MPLING CONDIT Time elapsed sine	IONS _ ce stabilisation:			
Bottom hole dynamic	Choke size:sir	nce:	Well head pressure:	Well head temp.: date :			
conditions	Bottom hole temp.		_ at depth:	date:			
Flow measur Values used f	rement of sampled gas - Gr for calculations :	ravity(air:1):	.612 Fac	for Fpv = $\frac{1}{VZ}$ :			
<u>Separator</u>	Pressure: PSIG F	Rates - Gas Dil (separator co	:	SCFD GOR: BOPD B (separator cond.)			
Stock tank	Atmosphere :	mmHg	F Oil at 6	60 °F :BOPD	alb		
	Tank temperature:			Violei			
	Tank temperature:			[Clain]			
BSW:		%					
BSW:	% WLR:	%					
BSW: Transfering fl Final condition Pressure:	ons of the shipping bottle:  1065 PSIG Temp:  C_ IDENTIFICAT  ttle No: A 4926 sent	27 <sup>o</sup> c	Transfer duration				
BSW:Transfering fl Final condition Pressure: Shipping both	O/O WLR:	27 <sup>o</sup> c	Transfer duration				
BSW:Transfering fl Final condition Pressure: Shipping book Addressee: Coupled with	O/O WLR:	27°C TION OF THE: t on:20.01.8	Transfer duration	Shipping order No.:			
BSW:Transfering fl Final condition Pressure: Shipping book Addressee: Coupled with	ons of the shipping bottle:  1065 PSIG Temp:  C_ IDENTIFICAT ttle No.: A 4926 sent PERTH  ble samples No.	27°C TION OF THE: t on:20.01.8	Transfer duration  SAMPLE = 32 by: HUDBAY	Shipping order No.:			
BSW:Transfering fl Final condition Pressure: Shipping book Addressee: Coupled with Bottom ho	ons of the shipping bottle:  1065 PSIG Temp:  C_ IDENTIFICAT ttle No.: A 4926 sent PERTH  ble samples No.	27°C  TION OF THE : t on :20.01.8	Transfer duration  SAMPLE = 32 by: HUDBAY	Shipping order No.:			
BSW:  Transfering fl  Final condition Pressure:  Shipping book Addressee:  Coupled with  Bottom ho	ons of the shipping bottle:  1065 PSIG Temp:  C_IDENTIFICAT ttle No.: A 4926 sent PERTH  h ble samples No.  SEE	27°C  ION OF THE: t on:20.01.8  LIQUID  PAGE 01 AN	Transfer duration  SAMPLE _ 32 by: HUDBAY	Shipping order No.: GAS  C Dump -			
BSW:  Transfering fl  Final condition Pressure:  Shipping book Addressee:  Coupled with  Bottom how  Surface sa	O/O WLR:  Ons of the shipping bottle:  1065 PSTG Temp:  C_IDENTIFICAT  ttle No.: A 4926 sent  PERTH  h  ole samples No.  SEE  amples No.	27°C TON OF THE: t on:20.01.8  LIQUID E PAGE 01 AN	Transfer duration  SAMPLE _ 32 by: HUDBAY	Shipping order No.: GAS  C Dump -			

FLOK	PETRO	Client :_	HUDBAY OIL	Section:ANNEX		
		Field :	WILDCAT	Page : 03 Report N°:1001822001		
Base :	PERTH	vven =_	SPERM WHALE #1	Weborr 14 - Tootroop		
_SURFACE SAMPLING _						
Date of sampling: 18.01.82 Service order: Sampling No.: 1  Sample nature: GAS Sampling point: SEPARATOR OUTLET						
4	one: D.S.T.	NO. 3 Perforations		ampling interval:		
Depth origin Surface elev	n : <u>1417 M</u> vation:	Shoe	: 5	Sasing Dia : 9 5/8 Shoe : 894 M		
Bottom hole static conditions	Initial pressure Latest pressure m Temperature	easured:	at depth:	date : date : date :		
Time at whic	h sample was take	n: <u>15.43</u>		stabilisation:		
Bottom hole dynamic conditions	Rottom hale press	tre:	at depth:	Well head temp.: date : date :		
Values used f	or calculations:			r Fpv = 1 :		
<u>Separator</u>	Pressure: 135 Temp.: 77	PSIG Rates - Gas Oil (separator	: <u>5.4 MM</u> cond.):	SCFD GOR:		
Stock tank	Tank temperature:		*F	) °F :BOPD  A B C a b		
ą.		٩:°	· '			
Transfering fl	luid :		Transfer duration:_			
	ons of the shipping 135 PSIG Tem	bottle:				
Shipping bo Addressee:	C_IDEN ttle No: A1204	TIFICATION OF TH 2 sent on: 20.0: PERTH	E SAMPLE 1.82 by: HUDBAY	Shipping order No:		
Coupled wit	h [	LIQUID		GAS		
Bottom ho	Bottom hole samples No.					
Surface s	SEE PAGE 01 ANNEX 4.2  Surface samples No.					
Measurement conditions.  A_ Tank .  B_ Meter .  C_ Dump .  a_ Corrected with shrinkage tester.  b_ Corrected with tank .						
	D _ REN	MARKS -		Visa Chief Operator		
/71		·				

## Client: HUDBAY OIL Section: ANNEX Field: WILDCAT Page: 04 Report N°: 10018

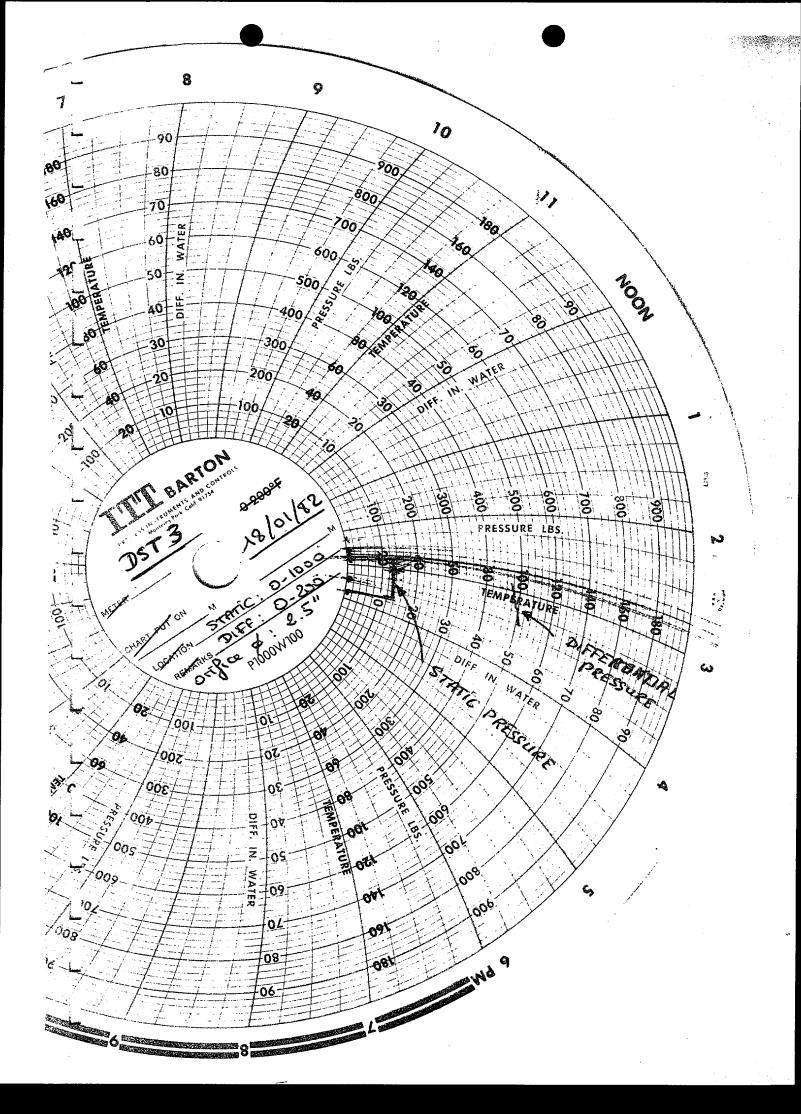
Base :	PERTH		Well :		SPERM WH	ALE#	1	Repo	ort	N°: 10	00182200 82
Date of same	ANSFER <b>២៥៣ភ្ន:</b> <u>17+18</u> ire :	01.82	Service o	orde	MPLING		Sa	P.C.T.	No.: _		
Producing a	A_RES	ERVOIR A	ND WEL	LL C	HARACTI 832 8	RISTI 34 M	<u>CS –</u> Sampl	ing inte	erval :		
Depth original Surface ele	n : 1417 vation:	T	ubing Dia Shoe	a. : _ -	J-2		Casin Shoe	g Dia.:	<del>- 8</del>	94M	
Bottom hole static conditions	Initial pressure Latest pressure Temperature	measured :	<b>:</b>		at de	epth:			date :		
Time at which	B = ME/ ch sample was tal	ASUREMEN ken:	IT AND	SAN	MPLING Time ela	COND psed s	ITIONS ince stab	<del>=</del> ilisation	:		
Bottom hole dynamic conditions	Bottom hole pres Bottom hole tem	sure:			at depth: .			date date	e:		
Flow measur Values used	ement of sampled for calculations :	gas _ Grav	rity (air: 1)	:		F	actor Fpv	= <u>1</u> :			
<u>Separator</u>	Pressure: Temp. :	PSIG Rat °F Oil	t <u>es</u> <b>_</b> Gas (separato	r co	: nd.):		SC BO	FD B	GOR: (sepa	rator c	ond.)
<u>Stock</u> tank	Atmosphere Tank temperature	:	mmHg _		<b>:</b> F	Oil a	t 60 °F :			BOPD A	B C a b
BSW:	o/o WI	.R:		%						- 11	
Transfering f	uid :				Transfer	duratio	n :		4 HO	URS	
Final condition	Final conditions of the shipping bottle:  Pressure: 880 PSIG Temp:  TRANSFERRING PRESSURE 900 PSIG INITIAL PCT PRESSURE 880 PSIG										
C_ IDENTIFICATION OF THE SAMPLE _  xShippingx bottlex No: sent on : by: Bhipping order No: Addressee :											
Coupled witl	<b>n</b>		LIQUID					GA	S		
	ole samples No.	BOT1 A 7387 15089/5 230-97		GAS	S CAP 30 S CAP 60 S CAP 60	cc					
Measurement conditions.  A. Tank.  B. Meter.  C. Dump.  a. Corrected with shrinkage tester.  b. Corrected with tank.											
-	D _ RE	MARKS _							Visa	Chief	Operator
TRANSFER BY MERCURY DISPLACEMENT ALL SAMPLES NOT TOTALLY RECOVERED AS ASSUMED 1500 cc PCT CAPACITY SEEMS TO HAVE BEEN											
underestimated.											

#### HUDBAY OIL Client :\_\_\_\_ Section:ANNEX 🚄 FLOPETROL WILDCAT Field :\_\_\_ Page Well SPERM WHALE NO. 1 Report N: 100182200182 PERTH Base :\_\_\_\_ \_SURFACE SAMPLING \_ RFT TRANSFER TRANSFER Date of Sampling: 19.01.82 Service order: Sampling No.: Sampling point: A\_RESERVOIR AND WELL CHARACTERISTICS \_ \_\_\_\_\_\_Perforations:\_\_\_\_\_\_Sampling interval:\_\_\_\_\_ Producing zone:\_\_\_\_ Depth origin : 1417M Tubing Dia : Casing Dia : Shoe : Shoe : Shoe B- MEASUREMENT AND SAMPLING CONDITIONS -Time at which sample was taken: \_\_\_\_\_ Time elapsed since stabilisation:\_\_\_\_\_ Bottom hole dynamic conditions Choke size: since: Well head pressure: Well head temp.: Bottom hole pressure: at depth: date: at depth: date: Flow measurement of sampled gas = Gravity (air:1): Factor Fpv = $\frac{1}{\sqrt{7}}$ : Values used for calculations: Pressure: \_\_\_\_\_PSIG Rates \_ Gas : \_\_\_\_\_SCFD GOR: \_\_\_\_\_ \_\_\_\_\_ Temp. : \_\_\_\_\_\_\*F Oil (separator cond.): \_\_\_\_\_\_\_BOPD B (separator cond.) Separator Atmosphere : \_\_\_\_mmHg - \_\_\_\_\*F Oil at 60 °F : \_\_\_\_\_BOPD Stock A B C a b Tank temperature: \_\_\_\_ <u>tank</u> \_\_\_\_\_% \_\_\_\_\_% WLR:\_\_\_ \_\_\_\_ Transfer duration: 2 HOURS Transfering fluid:\_\_\_\_ Final conditions of the shipping bottle: Pressure:\_\_\_\_\_Temp:\_ C\_IDENTIFICATION OF THE SAMPLE \_ SNIPSTRYX HOUNEX XXXXX \_\_\_\_\_ sent on : \_\_\_\_\_\_ Shipping order No.:\_\_\_\_ Addressee: PERTH Coupled with LIQUID GAS BOTTLE NO. Bottom hole samples No. 9024-25 40 cc GAS CAP 15083/17 65 cc GAS CAP Surface samples No. 22226/115 65 cc GAS CAP

iviea	<u>surement co</u>	naitions.						
A-	Tank.		B - Meter	· <u>-</u>			<u>C</u> _	Dum
		a Corrected w	ith shrinkage	tester.	b _	Corrected	with	tank

D _	RE	MΑ	RKS	

TRANSFER BY MERCURY DISPLACEMENT TRANSFERRING PRESSURE 2000 PSIG 1000 PSIG INITIAL RFT PRESSURE



APPENDIX D3 DOWELL - SCHLUMBERGER

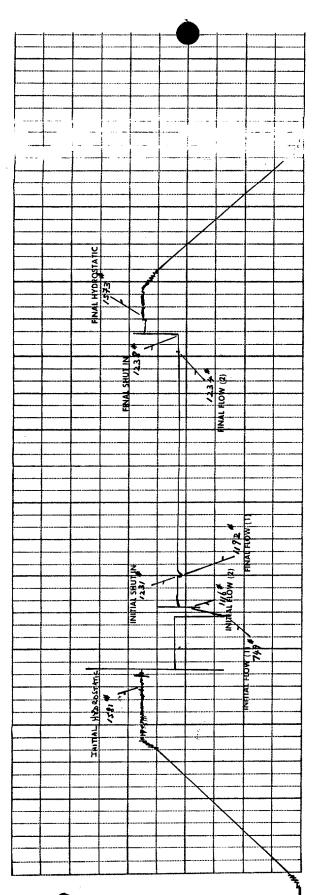
TECHNICAL REPORTS

## Schlumberger

### PRESSURE LOG\*

Fred Report No. F62008
Insprument: T1630
Capacity 2800 p.s.i.
Depth 840.52 H.M.

contaminate tracing of the original char

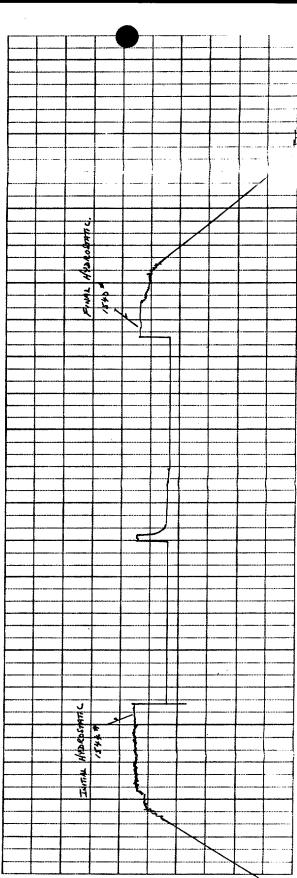


# **DOWELL**Schlumberger

## PRESSURE LOG\*

Field Report No. F \$2009 Instrument: 7/630 Number: 7/630 Capacity 2.800 Depth 840.52 H.M.

To commissions trading of the original chart



## **DOWELL** Schlumberger

## PRESSURE LOG\*

Field Report No. F820/D
Instrument:
Number 21630
Capacity 2800 p.s.i.
Depth 840.524 AE

a continuous tracing of the original chart

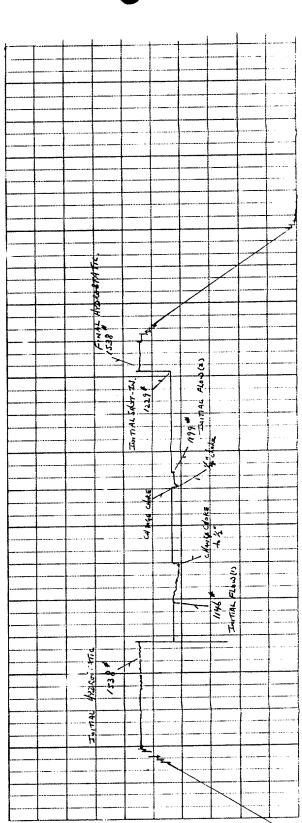


# DOWELL Schlumberger

### PRESSURE LOG\*

Field Report No. £820//
Instrument: 7,63 o
Number 7,63 o
Capacity 2800 p.s.i.
Depth ft.

'a continuous traving of the original chart

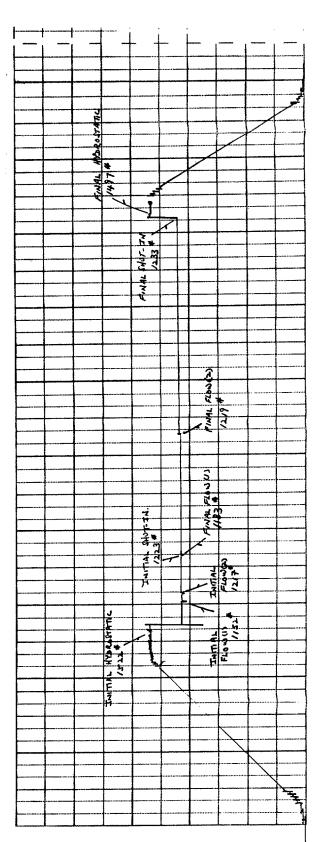


**DOWELL** Schlumberger

### PRESSURE LOG\*

Field Report No. F 826/2.
Instrument: 7/630
Capacity 2800 p.s.i.
Depth 8/3.044 A.

\*a continuous tracing of the original chart



REPORT Nº	F 82008
JOB Nº	
INVOICE/SIR.	
DATE	FEBRUARY 2, 198

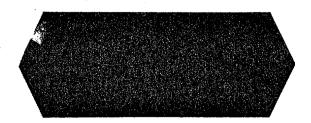
TEST Nº

COUNTRY\_

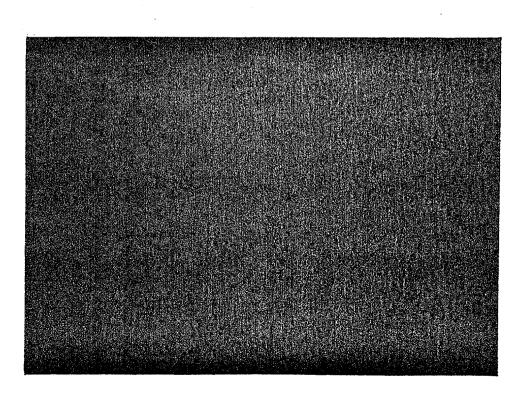
WELL SPERM WHALE 1

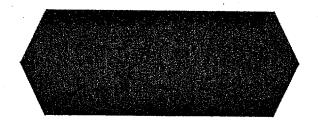
- FIELD GIPPSLAND BASIN

COMPANY HUDBAY OIL



## TECHNICAL REPORT





# CONFIRMATION OF REPORT DISTRIBUTION

TO		HUDBAY (	711	· · · · · · · · · · · · · · · · · · ·	
·		•			. •
WELL SPERM WHA	ALE 1	FIELD GIPPSI	ANI	BASIN	TEST Nº
COUNTRY	AUSTRALIA	DAT	E	FEBRUARY	2, 1982
Dowell Schlumber Reports. This distr	rger has been requ ibution of Technica	ested to furnis I Reports will b	sh tl e us	ne following ed for :	companies with Te
	Ε	☐ All tests on th	nis w	vell,	
		☐ This one test	t onl	у,	
inless otherwise no	otified.				. *
TECHNICA	L REPORT (S)			TEC	HNICAI REDODT (6
TECHNICA	L REPORT (S)	·		TEC	HNICAL REPORT (S
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TECHNICA	L REPORT (S)			TECI	
TECHNICA	L REPORT (S)			TECI	HNICAL REPORT (S



#### Dowell Schlumberger

Cables: "Bigerange"
Telex: Orange RS 23005
Telephone: 2351022
2351287

FEBRUARY 2, 1982

REPORT NO: F 82008

GENTLEMEN,

The enclosed test appears to be a good drill stem test during which the tools did function properly.

A review of the test datas indicate high permeability.

Jan 800

FRANCIS SOO RESERVOIR EVALUATION DEPARTMENT

FS/rs



CAPACITY : 2800 PSI

DEPTH : 827.11 M

OPENING : INSIDE

TEMPERATURES : 130 DEG F

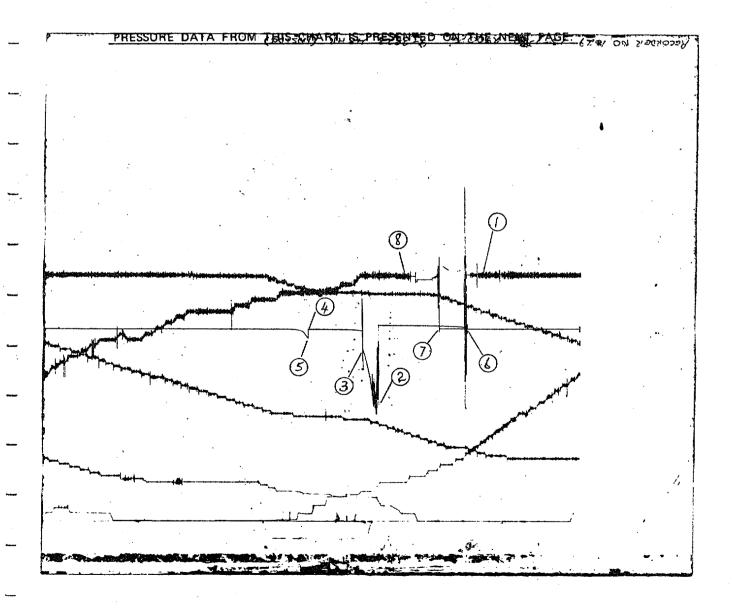
CLOCK Nº : 9-3823 CAP: 48 HRS CLOCK TRAVEL : 0.020905 in/min

CALIBRATION DATA AT

556,84032

1.28894

PRESSURE (PSI) = DEFLECTION (INS) X M ± A





PRESSURE DATA FOR RECORDER: J 1629

DESCRIPTION		LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
•					
INITIAL HYDROSTATIC		1	1519		
INITIAL FLOW (1)		2	731		
INITIAL FLOW (2)		3	1056	7	8
INITIAL SHUT-IN		4	1189	28	28
SECOND FLOW (1)					
SECOND FLOW (2)					
SECOND SHUT-IN	e.				
THIRD FLOW (1)		,	G <sub>is</sub>	•	
THIRD FLOW (2)		•			•
THIRD SHUT-IN	•	••			
FINAL FLOW (1)		5	1133	0	0
FINAL FLOW (2)	•	6	1188	192	193
FINAL SHUT-IN		7	1190	16	15
FINAL HYDROSTATIC		8	1516		

REMARK :



CAPACITY : 2800 PSI

DEPTH : 840.52 M

OPENING : OUTSIDE

TEMPERATURES : 130 DEG F

CLOCK Nº : 9-1437 CAP: 48 HRS CLOCK TRAVEL : 0.020778 in/min

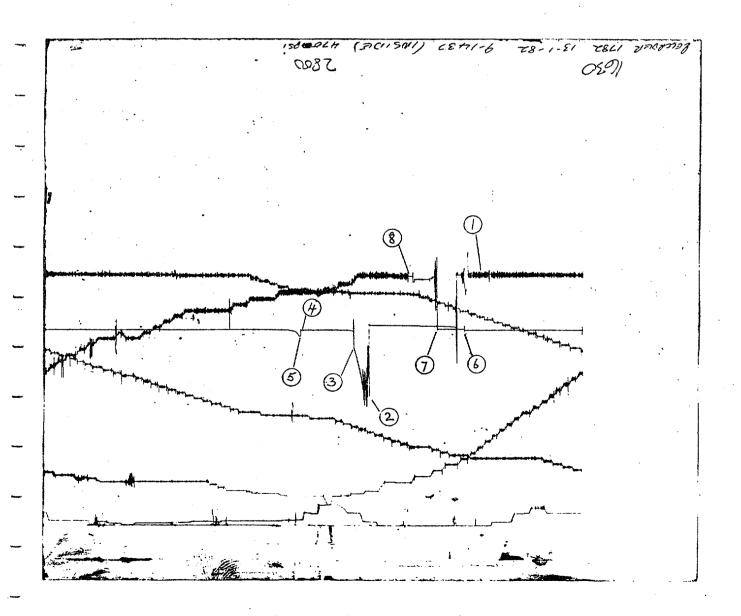
CALIBRATION DATA AT

M = 564.5074

5.357018

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER : J 1630

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
INITIAL HYDROSTATIC	1	1581		
INITIAL FLOW (1)	2	749		
INITIAL FLOW (2)	3	1116	7	7
INITIAL SHUT-IN	4	1231	28	28
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				· .
THIRD FLOW (1) THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	1192	o	0
FINAL FLOW (2)	6	1234	192	194
FINAL SHUT-IN	7	1238	16	14
FINAL HYDROSTATIC	8	1573	•	

REMARK :



PRESSURE DATA FOR RECORDER : J 1630

LABEL POINT	ΔT (mins)	PRESSURE (PSI)	$\frac{T + \Delta T}{\Delta T}$	LOG	Pw — Pf (PSI)	COMMENTS
1		1581				INITIAL HYDROSTATIC
.2	0	749				INITIAL FLOW (1)
	2	861	•			
	. 4	988				
3	7	1116				
3	0	1116				INITIAL FLOW (2)
	2	1228	4.50	0.65	112	START SHUT-IN
	4	1230	2.75	0.44	114	T = 7
	6 .	1230	2.17	0.34	114	
	8	1230	1.88	0.27	114	
	10	1231	1.70	0.23	114	
	15	1231	1.47	0.17	114	
	20	1231	1.35	0.13	114	
4	28	1231	1,25	0.10	114	INITIAL SHUT-IN
5	0	1192				FINAL FLOW (1)
•	2	1213				
	4	1226		•		
	6	1230				
	8	1232	•			
	10	1232				
	20	1233				
	<b>4</b> 0	1233				
	60	1233				
	80	1234				
	100	1234				
	150	1234				
6	194	1234				FINAL FLOW (2)
6	0	1234			•	START SHUT-IN
	2	1238	101.50	2.01	4	T = 201
	4	1238	51.25	1.71	4	
	6	1238	34.50	1.54	4	,
	8	1238	26.13	1.42	4	
	10	1238	21.10	1.32	4	
7	14	1238	15.36	1.19	4	FINAL SHUT-IN
8		1573				FINAL HYDROSTATIC

# Formation Testing Field Report

	·		керо	ort No. F 82008
	WELL IDENT	TIFICATION		
Company: HUDBAY OIL Field: GIPPSIAND BASIN Lo	Well	No: SPERM WHALL	E 1 Test No.:_	_ 1
Field: GIPPSLAND BASIN Lo	cation: <u>OFFSHORE</u>	BAIRNSDALE Cou	intry: <u>AUSTRALI</u>	A
lested Interval: From 839 M	P4X to 848 M	<b>*</b>		
Co-ordinates :	-			
Co-ordinates:	☐ Conventional ☐	Straddle ; Land	d rig□ Jack-up□ with Packer⊠	Floater 🖺
Tarve IIII E TOTE OF TOE	Other.	······································	with Packer	RetainerL
Geologic Level: UPPER CRETACION Net Productive Interval: 8 M Total Depth: 894.53 M XX De	HOLE	DATA		
Geologic Level : UPPER CRETACION	<u> </u>	Description :		
Net Productive Interval: 8 M	XK E	Estimated Porosity	:25.30	<del></del> %
Open Hole Size : in	Hat Hole Siz	:e:	in from	_ ft
Casing Size : 9-5/8 in. 4	Olbs/ft. Liner	Size : in.	- lbs/ft	from – ft
Before test : Caliper Yes ☐ No ☐	Scraper Yes□	No⊠ Circulatio	n Yes⊠ for 2	P hrs; No□
Mud Type : BARACARB BRINE Viscosity : 50 Water Lo	MUD D	ATA		
Mud Type : BARACARB BRINE			Weight: 1.32	≥ SG
Viscosity: 50 Water Lo	sscc	Mud Resistivity_	at	°F
Filtrate Resistivity:at	°F; Chloride	opm:111,000	)	
December 11	INSTRUMENT AN			
Recorder No.	J 1629	J 1630	J 1782	
Capacity (psig)	2800	2800	4700	
Depth	827.11	840.52	842.32	
Inside/Outside	INSIDE	OUTSIDE	INSIDE	
Above/Below valve	BELOW	BELOW	BELOW	
Clock No.	9-3823	9-1437	9-3813	
Capacity (hrs.)	48 HRS	48 HRS	48 HRS	
Temperature	130 DEG F	130 DEG F	130 DEG F	
Initial Hydrostatic Pressure	1524	1577	1	
Pre-flow (1) Start Pressure	776	806		
(2) Finish Pressure	1055	1113		
Initial Shut-in Pressure	1192	1231		
Second Flow (1) Start Pressure	1136	1192	E.S.	
(2) Finish Pressure	1189	1228	BE	
Second Shut-in Pressure	1109		<del>                                     </del>	
Final Flow (1) Start Pressure		_	EADA	
(2) Finish Pressure		_	H H	
Final Shut-in Pressure	1200	1994	<del>- 3</del>	
· ····································	1200	1234		
Final Hydrostatic Pressure	1513	1565		
Left Station at 10 : 55 on 9.	OPERATIONS S		00	
Left Station at 10 : 55 on 9.	0n   0n	Location at 13 :	<u> </u>	1.82
Started Operations at <u>02 : 30 o</u> Off Location at:on	n <u>10.1.04</u> Fini	sned Operations a	t_=:on_	
On LOCATION ALOn	neturn Station	at0	nMileage	
Comments: FIRST TEST OF SERII	S. THREE ZONE	S TO TEST TOOLS	AND TUBING PL	UGGED WITH SAND
FORMATION FLUID STO	DPPED APPROXIMA	TELY 100M FROM	SURFACE, SAND	WAS FOUND IN
THE TUBING 100M ABO	OVE TOOLS. STR	ING PLUGGED IN	THE SECOND FLO	Y PERIOD LATCH
FOR SPRO COULD NOT	BE ATTACHED DU	E TO SAND IN TH	E TUBING. DID	NOT REVERSE
OUT SO SAMPLE COULT	BE TAKEN FROM	THE STRING.		
TOOLS IN HOLE 06.30	) 13/1 TO 0800	14/1		
Notice ATT	DM		343.00	
	R No. :61979		Date: 14.1.82	
Customer Purchase Order	Tester	Custo	mer	TTT TO TO TO

Comments:

#### Surface Data

Report No. F 82008 Test No.

- [	Customer: HUDBAY		Well No :	SPERM	WHALE 1		Te	est N	o. j	<i>F</i> 82008 L
		TEST SE	QUENCE AND	LOW RAT	TE DATA					
[		escription and Flow Rat	es		Date	4	ime mins	· ·	ressure psig	Surface Choke
	Packer Depth: 832.84 Opened Tool:	M XX	3.436	Set at:	13.1.82					-
-	Opened Tool:	(Annuiu	s pressure 1400	) psi)	!1	20	23	-	-	_
	MODERATE TO STRONG	BLOW UPON TOOL	OPENING							<del> </del>
_	SHUT-IN TOOL				13.1.82	20	30	-	0	
	ODITATION MICON								<u> </u>	<b>†</b>
ŀ	OPENED TOOL	1400 ANN PRESS E TO STRONG BLO	SURE		11	20	58			-
-	BUT REDUCE RAPIDLY	TO A MINIMAL RI	OW AGAIN				<del> </del>	<del> </del>		
	AT 21.07. TOOLS A	ND TUBING PLUGO		ND	<del> </del>		+	-		
_ [	COMING FROM THE FOR	MATION					<del> </del>	+	*****	<b>!</b>
-	CLOSED TOOL		<del></del>	·	7.4.7.00					
<b>-</b>	CLOSED TOOL				14.1.82	00	10	<del> </del> -	0	
- [	UNSET PACKER AND PU	ILED LOOSE			11	00	26	+	0	
						1	1	†	<u> </u>	
-										
<b>-</b>		· · · · · · · · · · · · · · · · · · ·				<del> </del>	<u> </u>	<del></del>		
						+	<del> </del>	╁		
-										
` <b> </b>	•					<b> </b>				
H						<del> </del>	ļ			<del></del>
- [						<del> </del> -	-	+		
_										
$\vdash$						ļ		<u> </u>		
<u>-</u>  -						-		<del> </del> -		<del></del>
								<del> </del> -		
. L,	5	1 (5								
	Reverse Circulation Starte Reverse Circulation Finish		e psig	)	NONE	ļ	: 	ļ		
	Pulled Packer Loose/Pulled				14.1.82	00	26	<del>                                     </del>		
$\cdot \lceil \cdot \rceil$	Cushion Type: NONE	Amount	hhlo i l on					Boti	om	
L	odamon type. NONE	Amount	bbls ; Len	gui	ft ; Pressu	ire	psi	Cho	ke	1"
. [			RECOVERY D	ATA					<del></del>	
		Recovery Description	) ·		Feet	Bbis		6/ /a	%	%
1	WATER AND SOLIDS							Dil	Water	Other
2	17 <b>- 1</b> - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1						<del> </del>		<del></del>	
3										1
5										
6							-			· · · · · · · · · · · · · · · · · · ·
		Can Canada	000							
1	Oil-API Gravity  ° at °F	Gas Gravity	G.O.R.		at	°F	·		hlorides	
2	° at °F				at	°F				ppm ppm
3					at	°F				ppm
5					at at	°F				ppm

THE AMOUNT OF SAND RECOVERED INDICATES THAT THE FORMATION HAS AN EXTREMELY HIGH OR ALMOST INFINITE PERMEABILITY.



#### **Equipment Data**

Customer: HUDBAY OIL		No.: SPERM		· · · · · · · · · · · · · · · · · · ·	Test No. :	1
0	SAMPLE CHAMBI	·		intivity.	Chlori	d== /====
Sampler Drained On Location [ૐ	Gas NO	very NE_cu ft.	Hes Water	istivity		
Elsewhere ]	Oil NO	NE c.c.	Mud			
Name :	Water	300 c.c.	Mud Filtrate			
Address :	MudNO	NE_c.c.	Pit Mud		at	
	°/	API°F	Pit Mud Filt	rate	at	<u> </u>
Gas/Oil Ratio cu ft./bl	bl Sample Chaml	ber Pressure	!	NEGLIGIE	LE	psi.
•		IT SEQUENC	<del> </del>	_		
Components (including D.P. a	and D.C.)	Type	O.D. (in)	I.D. (in)	Length	Depth
BULL NOSE		TOTO	43	21	0.25	844.
RECORDER CARRIER J 1782 RECORDER CARRIER J 1630		JOTO	) 4-7/8	13	1.80	844. 842.
PERF, ANCHOR	· · · · · · · · · · · · · · · · · · ·		43	21	1.80 6.10	840.
X/O 3½ EUE BOX x 3½ FH PIL			11	2-5/16		834.
9-5/8 POSITEST PACKER	1	JOTO	) 9-5/8	3	0.05	832.
			40		0.66	
X/O 3½ FH BOX x 3½ EUE PIN			43	2-5/16		832.
SAFETY JOINT		BOWEN		2-7/16	0.60	831.
TR 63 HYDRAULIC JAR		JOIOC		13	2.35	831.
RECORDER CARRIER J 1629		- "	11	11	1.80	828.9
MFE/HRT		11	5	1-3/8	2.90	827.
PCT	· · · · · · · · · · · · · · · · · · ·	11	43	1	4.66	824.4
SPRO CONVERSION	<u> </u>	11	11	21/2	2.69	819.
X/O 4" IF BOX x 3½" FH PIN	<u> </u>		6	2-7/8	0.32	816.8
1 STD 6½ D.C. 2 PUMP OUT SUBS		JOTO	6 <del>1</del> 6 <del>1</del>	2-7/8 2³	27.11 0.71	816.3 789.4
2 STDS 61 D.C.		- JOHA	6 <del>1</del>	2-7/8	54.48	788.
X/O 3½ IF BOX x 4" IF PIN			$\frac{G_2}{6^{\frac{1}{2}}}$	2-11/16	0.96	734
2 SLIP JOINIS		COTOL	55	2.25		733.9
1 STD 43 D.C.			43		28.29	717.4
X/O 3½ PH6 BOX x 3½ IF PIN					0.21	709.
3½ PH 6 TUBING 12.9 LB/FT					628,36	688.9
X/O SUB 4½ ACME PIN x 3½ P	H 6 PIN				0.20	60.5
FLUTTED HANGER		FLOPETRO	)나	ļ	0.27	60.
SLKK JOINT		·   ''			1.80	60.
E-Z TREE SAVER SUB		- 11			2.44	58.
X/O 4½ IF BOX x 4½ ACME PI	N	<del>.   :</del>			0.25	55.8 55.6
5" H.W. DP	43		5	5	61.05	
X/O 6½ ACME PIN x 4½ IF PI	N				0.32	5.′
FLOW HEAD						- 6.0
otal XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	···				628.36	
otal Drill Collar		1			109.88	





### Formation Evaluation Data

Major Mine Minor Mine Stringers o	ted interval :	Sand- stone	Lime- stone	Chalk	Clay	Shale	Other (please spe
Minor Minor Stringers of String	eral Species or Lenses  ted interval :			Oligik	Clay	Shale	
Is the test	or Lenses ted interval :		Open Hole :				
Is the test	ted interval :		Open Hole :			-	
Open Hol	e Interval :		Open Hole :				
Perforate	e interval : (T		In Casing :	I.D.	in V	Vt : #	?] I.D.
	d Intervals :	otal Depth)		(Foo	ot of Casing)		
In the tes	sted interval how r	nany producti	ve zones do	logs show:			
What is th	io avarago novenito	and along the second	1	2	3	more	
	ie average porosity erval homogeneous		l ?			<del></del>	%
	on consolidation:	<b>5</b> f		<u></u>	Yes	No No	
	•			Good	Mod	Low	
	e clay content :			% or High	Mod	Low	
is the for	mation fractured			Heavily	Mod	Little	,
In this inte	erval, is there exped	cted near the v	vellbore :				
Ged	ological fault?				Yes	No	
Inte	rval thickness chai	nge ?			Yes	No	
Flui	d phase contact?				Yes [	No	
If	yes :	. 0	il-Water	) (	as-Water		
During drill	ling of the interval,		· · · · · · · · · · · · · · · · · · ·		aus-water [	Oil-G	as
	t circulation ?	was there:			r-		<b></b>
					Yes	No	
	d production?				Yes	No	
Othe	er (please specify):	·		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
Before testi	ng was there a :			•			
Scra	per run ?				Yes	No	
Calip	er run ?		•		Yes	No	
Mud	circulation to botto	om ?			Yes	No	H
—If y	/es :—		for h	now long	-, <u>-</u>	how long sinc	_   =



#### SYMBOLS USED

△T - INCREMENT OF TIME (MINUTES)

 $\frac{T + \triangle T}{\triangle T}$  — DIMENSIONLESS TIME CONSTANT USED FOR THE HORNER PLOT

 $\Delta\,\text{T}$  is the increment of shut-in time (minutes)

T IS TOTAL FLOW TIME PRECEDING SHUT-IN (MINUTES)

LOG - LOGARITHM TO BASE 10 OF  $\frac{\Upsilon + \triangle T}{\triangle T}$ 

Pw - Pf - PRESSURE BUILD-UP ABOVE FINAL FLOWING PRESSURE PRECEDING THE BUILD UP WHICH IS USED FOR THE MCKINLEY PLOT.

REPORT Nº	F 82009
JOB N°	
INVOICE/SIR.	
DATE	FEBRUARY 2, 198

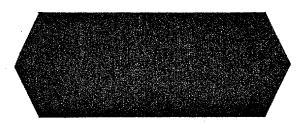
COMPANY HUBAY OIL

WELL -

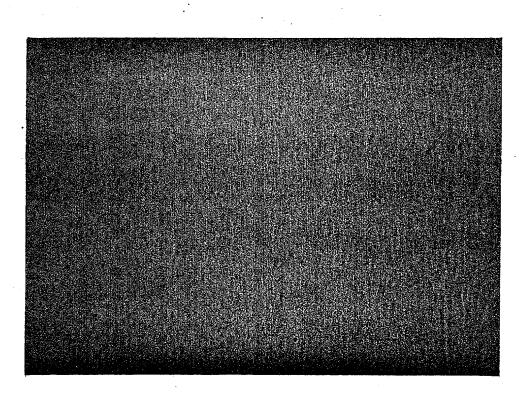
SPIRM WHALE 1

FIELD GIPPSLAND BASIN

COUNTRY AUSTRALIA



# TECHNICAL REPORT





# CONFIRMATION OF REPORT DISTRIBUTION

TOOT	·
WELL SPERM WHALE 1 FIEL	D GIPPSLAND BASIN TEST Nº 1/
COUNTRY AUSTRALIA	DATE FEBRUARY 2, 1982
Dowell Schlumberger has been requeste Reports. This distribution of Technical Re	d to furnish the following companies with Tec ports will be used for :
	I tests on this well,
T	his one test only,
inless otherwise notified.	
inless otherwise notified.	
TECHNICAL REPORT (S)	TECHNICAL REPORT (S)
TECHNICAL REPORT (S)	
TECHNICAL REPORT (S)	
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TECHNICAL REPORT (S)  TECHNICAL REPORT (S)	TECHNICAL REPORT (S)
TECHNICAL REPORT (S)  TECHNICAL REPORT (S)	



#### Dowell Schlumberger

Cables: "Bigorange"
Telex: Orange RS 23005
Telephone: 2351022
2351287

FEBRUARY 2, 1982

REPORT NO: F 82009

GENTLEMEN,

Because of Mechanical problem (Tool was plugged), no reservoir parameters could be calculated on this test.

FRANCIS SOO RESERVOIR EVALUATION DEPARTMENT

fs/rs



CAPACITY : 4700 PSI

DEPTH : 842.32 M

OPENING : INSIDE

TEMPERATURES : 130 DEG F

CLOCK Nº : 9-3823 CAP: 48 HRS CLOCK TRAVEL :

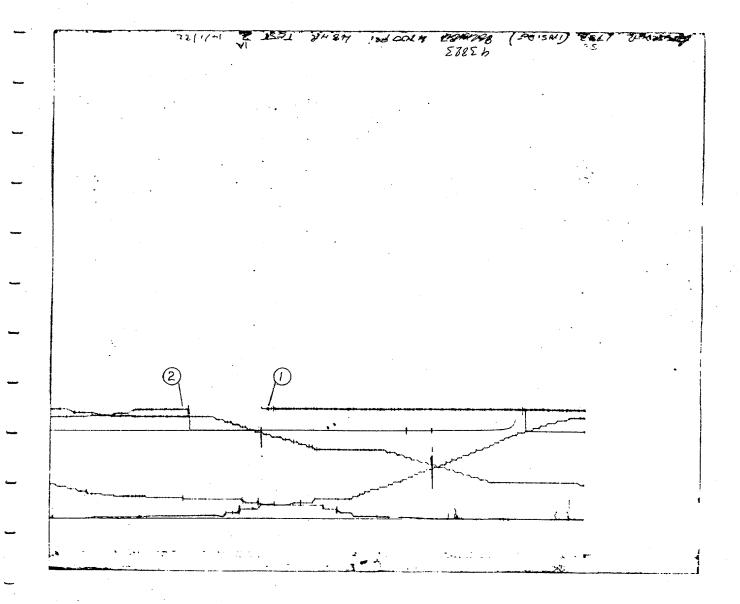
CALIBRATION DATA AT

1270.0054

A = -9.654845

PRESSURE (PSI) = DEFLECTION (INS)  $\times$  M  $\pm$  A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER : J 1758

	DESCRIPTION		LABEL		RESSURE (PSI)	TIME GIVEN	TIME COMPUTED
	•						
	INITIAL HYDROSTATIC		1		1528		
	INITIAL FLOW (1)						
	INITIAL FLOW (2)						
	INITIAL SHUT-IN						
•	SECOND FLOW (1)						
	SECOND FLOW (2)						
	SECOND SHUT-IN		•		***		-
	THIRD FLOW (1)	••	•	•	<del>"</del>	•	
	THIRD FLOW (2)			•	'	<b></b>	
	THIRD SHUT-IN						
	FINAL FLOW (1)						
	FINAL FLOW (2)						
	FINAL SHUT-IN						
	FINAL HYDROSTATIC		2		1530		

REMARK : TEST UNRELIABLE AS TOOL WAS PLUGGED.



CAPACITY : 2800 PSI

DEPTH : 827.11 M

OPENING : INSIDE

TEMPERATURES : 130 DEG F

CLOCK Nº : 9-1437 CAP: 48 HRS CLOCK TRAVEL :

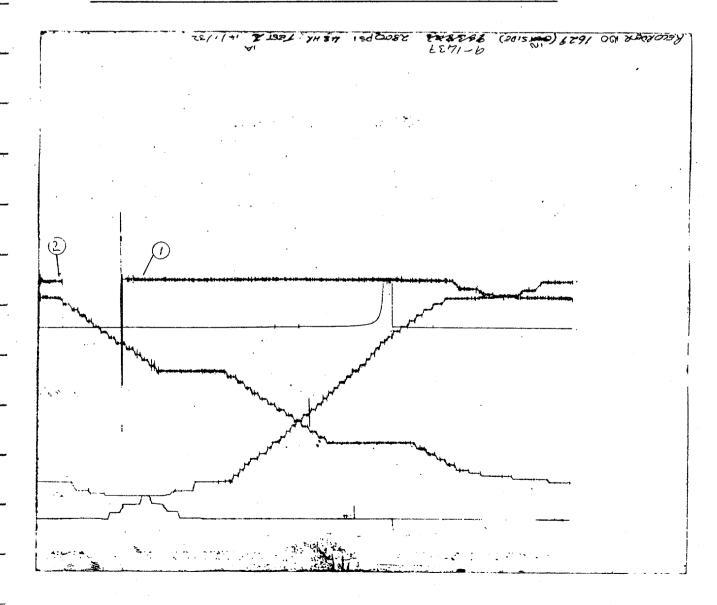
CALIBRATION DATA AT

M = 556.84032

A = -1.28894

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER : J 1629

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
•				,
INITIAL HYDROSTATIC	1	1489		
INITIAL FLOW (1)				
INITIAL FLOW (2)				
INITIAL SHUT-IN				
SECOND FLOW (1)				
SECOND FLOW (2)				٠
SECOND SHUT-IN				·
THIRD FLOW (1)		•		•
THIRD FLOW (2)			•	
THIRD SHUT-IN				
FINAL FLOW (1)				
FINAL FLOW (2)				
FINAL SHUT-IN				
FINAL HYDROSTATIC	2	1473		

REMARK : TEST UNRELIABLE AS TOOL WAS PLUGGED.



CAPACITY: 2800 PSI

DEPTH : 840.52 M

OPENING : OUTSIDE

TEMPERATURES : 130 DEG F

CLOCK Nº : 9-3813 CAP: 48 HRS CLOCK TRAVEL :

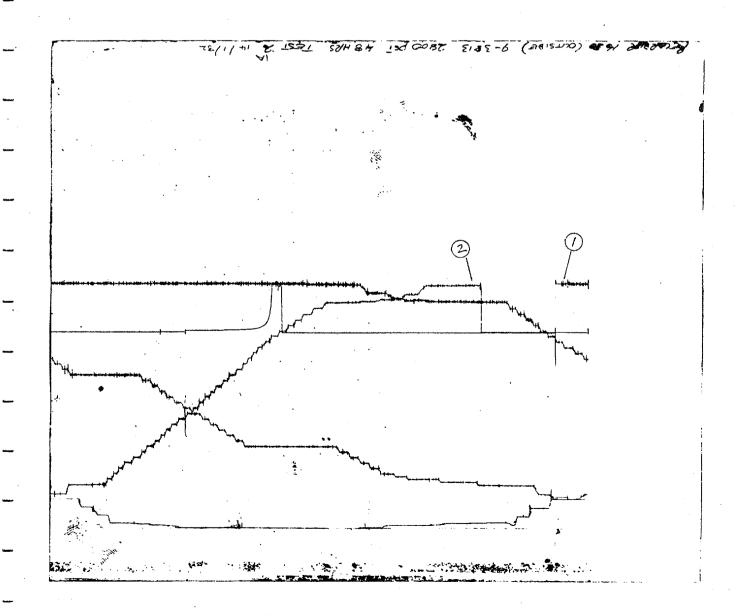
CALIBRATION DATA AT

564.5074

A = -5.357018

PRESSURE (PSI) = DEFLECTION (INS)  $X M \pm A$ 

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER : J 1630

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME
•				
INITIAL HYDROSTATIC	1	1544		
INITIAL FLOW (1)				
INITIAL FLOW (2)				
INITIAL SHUT-IN	· .			
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)	•			
THIRD SHUT-IN				
FINAL FLOW (1)				
FINAL FLOW (2)		•		
FINAL SHUT-IN				
FINAL HYDROSTATIC	2	1540		
		•		

REMARK : TEST UNRELIABLE AS TOOL WAS PLUGGED.

## Formation Testing Field Report

Report No. F 82009

	WELL IDEN	TIFICATION	<del></del>	······································
Company: HUDBAY OIL Field: GIPPSLAND BASIN Loc	Well	No : SPERM WHAL	E I Test No ·	1A
Field : GIPPSLAND BASIN Lo	ration · CFFSHORE	BAIRNSDALE CO	untry: AUSTRA	T.TA
Tested Interval: From 839 M	<b>E</b> K to 848	M XX	unitry	
Co-ordinates:		<u> </u>		
Type Test : Open Hole ☐ Casing ;[	X Conventional X	Straddle : 1 an	d ria Dank up D	] Floator [X]
Valve: MFE□ PCT□ SPRO 🖾	Other:	Straudie, Lan	Ung Jack-up	☐ Retainer☐
VAIVE. WILL FOLLS SPROW	Other.		with Packert	ਹ Hetainer∟i
	HOLE	DATA		
Coologie Lovel : TDDER CRETACIO	TOLE I	DATA	:	
Geologic Level : <u>UPPER CRETACIO</u> Net Productive Interval : 8 M	//V	Jeschphon :	25 20	
Net Productive Interval: 8 M Total Depth: 894.53 M XX De	mthe measured from	בsimaled Porosity		25 M 37%
Open Hele Circ	pins measured from	u: <u>rivd</u>	Elevation :9	. 30 M AN.
Open Hole Size : in	Hat Hole Siz	ze:	in., from	ft.
Casing Size : 9-5/8 in.	40 los/it. Liner	Size:in	.,lbs/ft.	fromft
Before test: Caliper Yes□ No□	Scraper Yes	No & Circulation	on YesLXI for	2 hrs; No∐
	MUD D			
- Mud Type : BARACARB BRINE			Weight: 1.3	2 SG
Viscosity: 50 Water Lo	ss12cc	Mud Resistivity_	at	°F
Filtrate Resistivity:at	·°F; Chloride	ppm: <u>111,000</u>		
	<b>INSTRUMENT AN</b>	D CHART DATA		
Recorder No.	J 1629	J 1630	J 1758	
Capacity (psig)	2800	2800	4700	<del> </del>
Depth	827.11	840.52	842.32	
Inside/Outside	INSIDE	OUTSIDE	INSIDE	
Above/Below valve	BELOW	BELOW	BELOW	
Clock No.	9-1437	9-3813	9-3823	•
Capacity (hrs.)	48 HRS	48 HRS	48 HRS	
Temperature	130 DEG F	130 DEG F	130 DEG F	
Initial Hydrostatic Pressure	130 DEG F	130 DEG F	130 DEG F	
Pre-flow (1) Start Pressure		<del> </del>		
(2) Finish Pressure		<del> </del>		
Initial Shut-in Pressure				<u> </u>
Second Flow (1) Start Pressure	ļ			
(2) Finish Pressure		<del> </del>		
Second Shut-in Pressure				
- Final Flow (1) Start Pressure				
(2) Finish Pressure				
Final Shut-in Pressure			<del></del>	
Final Shut-in Flessure		ļ	<del> </del>	
Circle Industrial Burns		ļ		
Final Hydrostatic Pressure				
	<b>AB B B B B B B B B B </b>			
	OPERATIONS		· · · · · · · · · · · · · · · · · · ·	
		Location at 13		0.1.82
Started Operations at:c				
Off Location at:on	Return Station	n at:	onMileage	·
Comments: SAME ZONE TESTED M	AIN. DIESEL CU	SHION RUN TO S	URFACE CHARTS	INDICATE
HRT METERED CLOSED	ROL BCL DID MC	JI OPEN WHEN AN	INULUS WAS PRESS	SURED UP.
THERE WAS NO INDIC		OL OPENING ON	THE SPRO COMPUT	ER OR AT
THE BUBBLE BUCKET.	•		<u> </u>	
de the state of th	YOUNTON TOTAL			
			NCTION PROPERLY	BUT PLUGGED
SAMPLE CHAMBER MAD	E FLOW IMPOSSIE	LE.		
		· · · · · · · · · · · · · · · · · · ·		
			· · · · · · · · · · · · · · · · · · ·	
		···		
Station: AUS S	IR No. :616	16	Date: JANUARY	15, 1982
Customer	Tester J PARTRI	DGE Cust	omer B MC ELHIN	INY
Purchase Order		Renr	esentative	

DOWELL Schlumberger

#### Surface Data

	Customer: HUDBAY OIL Well No: SPER	A TITYYAY T			ort No.	F 8200
_	Customer: HUDBAY OIL Well No: SPER	1 WHALE	1	Tes	No. 1A	
	TEST SEQUENCE AND FLOW RA	TE DATA	······································			
	Description and Flow Rates	Date	1	Time mins	Pressure psig	Surfac Choke
	Packer Depth: 832,84 M ftx Set at: Opened Tool: (Annulus pressure psi)	15,1.8	2 06	10	_	_
-	PRESSURED UP TO 1600 PSI TOOL DID NOT OPEN BLED OF	2 11		1.0		
Ì	PRESSURE. PICKED UP STRIJG TO OPEN HRT. RESET PAC		<u>  08</u>   08			
1	PRESSURED UP ANNULUS 1600 PSI	11	08			
-	TOTAL TO DIAM DOWN D. D. TO CAN THE COMPANY					<del></del>
ŀ	TRIED TO PUMP DOWN D.P TO SEE IF STRING WAS PLUGGED - HELD PRESSURE : TOOL CLOSED	11	09	04	-	
	1200card - Imad Fierdore , 1001 Chorn			++		
_	INCREASED ANNULUS PRESSURE 1800 PSI	11	09	20		
_	INCREASED ANNULUS PRESSURE 2000 PSI	11	09	29		
-	BLED OFF ANNULUS PRESSURE	-				
	THE PARTY OF THE POLICE OF THE PARTY OF THE	<del> </del> -	+			
-				1		
-						
F		<del></del>				
- t				-		
		<del> </del>		+		
			<u> </u>	!		
- -						
<b> </b>		<del> </del>				
_ [			<del> </del>			· · · · · · · · · · · · · · · · · · ·
		<del> </del>	+	<del>  -</del>		
F						<del></del>
-  -						
			+			
- [	Reverse Circulation Started (Pump pressure 1500 psig)	15.1.82	09	33	<del></del>	
-  -	Reverse Circulation Finished	11	09	50	_	<del>-</del>
	Pulled Packer Loose/Pulled Out of Retainer	11	11	25		
-   •	Cushion Type: DIESEL Amount _ bbls; Length	URFACE II; Press	ure -		ottom	1"
				. 10	hoke	
_	RECOVERY DATA					
	Recovery Description	Feet	Bbls	0/	%	2/6
1	NONE		2013	Oil	Water	Other
- 2		<del> </del>		+		-
3		1		<del>                                     </del>		<del> </del>
4						<del>                                     </del>
. <u>5</u>						
F		<u> </u>	<del></del>	1		<u> </u>
.	Oil-API Gravity Gas Gravity G.O.R.	esistivity			Chlorides	
	° at °F .	at	°F			ppm
2		at	°F			ppm
3		at	°F			ppm
5	° at °F ° at °F	at	°F			ppm
6	° at °F	at	°F °F			ppm
		aı		·		ppm



#### **Equipment Data**

SAMPLE CHAMBER RECOVERY DATA	Customer: HUDBAY OIL	Well	Vo.: SPERM	WHALE 1	<u>_</u>	Report No. :	OF 82009
Sampler Drained On Location   State   Sampler Drained   Coll						Test No. :	LA
On Location ⊠	Sampler Drained					**************************************	
Stewhere		Heco	very	Res	sistivity	Chlor	ides (ppm
Name	Isewhere	Oil -	Cu it.	water		at°F	
Mud _ APL _ cF   Pit Mud _ at _ cF   Pit Mud _ at _ cF   Pit Mud Filtrate _ at _ cF   Pit Mud Filtrat	ame :	Water 100	00 G.C	Mud Filtrat	Δ	ai	'F
County   C	dress:	Mud	c.c.	Pit Mud	C	aı	`F
SOUTH Ratio   Cut It./bbl   Sample Chamber Pressure   So   Desire		°A	PI°F	Pit Mud Fill	rate	at	r
Components (including D.P. and D.C.)   Type	s/Oil Ratio - cu ft./bbl Si						
Type		FOURDMEN	TOFOUENC	\			
BUIL NOSE RECORDER CARRIER J 1758  BUCKO 4-7/8 1 1 1.80 344  RECORDER CARRIER J 1630  " 4-7/8 1 1 1.80 344  RECORDER CARRIER J 1630  " 4-7/8 1 1 1.80 344  RECORDER CARRIER J 1630  " 4-7/8 1 1 1.80 344  RECORDER CARRIER J 1630  " 4-7/8 1 1 1.80 344  RECORDER CARRIER J 1630  " 4-7/8 1 1 1.80 344  RECORDER CARRIER J 1630  " 4-7/8 1 1 1.80 344  RECORDER CARRIER J 1630  " 4-7/8 1 1 2.5/16 0.63 834  RECORDER CARRIER J 1630  " 2-5/16 0.63 834  RECORDER CARRIER J 1630  " 4-7/8 1 1 2.5/16 0.63 834  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " " " " " " " " 1.80 828  RECORDER CARRIER J 1629  " " " " " " " " " " " " " " " " " " "	Components (including D.P. and D.C	.)	· · · · · · · · · · · · · · · · · · ·	<del></del>	ID (in)	Longth	D
RECORDER CARRIER J 1758  SOTO 4-7/8 1½ 1.80 842.  PRIF ANCHOR  " 4½ 2½ 6.10 840.  " 2-5/16 0.63 834.  30.95 832.  X/O 3½ EUE BOX x 3½ FH PIN (1)  " 2-5/16 0.63 834.  40 0.66  SAFETY JOINT  BOWEN 4-5/8 2-7/16 0.63 832.  X/O 3½ PH BOX x 3½ EUE PIN (2)  \$4½ 2-5/16 0.33 832.  \$45 2-7/16 0.63 832.  \$45 2-7/16 0.60 831.  \$45 2	BULL NOSE						
## 1.80 842 ### 1.80 844 ### 1.80 842 ### 1.80 842 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 842 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.80 844 ### 1.			JOTO		11/2		844.1
1	CORDER CARRIER J 1630		17				842.3
1/2 3   EUE BOX X 3   FH PIN (1)	ERF ANCHOR		11				840.5
STITE OF PASTERS   JOICO   9-5/8   3   0.95   832	/O 3½ EUE BOX x 3½ FH PIN (1)						834.42
A0   AFERTY JOINT	-5/8 POSITEST PACKER		JOTCO	9-5/8			832.84
A	10.00				1		004,0
BOWEN 4-5/8 2-7/16 0.60 831.  ### 63 HYDRAULIC JARS  ### JOINO 4-7/8 1½ 2.35 831.  ### BOWEN 4-7/8 1½ 2.60 831.  ### BOWEN 4-7/8 1½ 2.20 827.  ### BOWEN 4-7/8 12 2.20 827.  ### BOWEN 4-7	/O 3½ FH BOX x 3½ EUE PIN (2)				2-5/16		832.18
CORDER CARRIER J 1629	AFEIY JOINT			4-5/8	$\frac{5/10}{2-7/16}$		831.86
			10100	4-7/8		<u> </u>	831.26
			11	17	11	+	
			† I	5	1-3/8		
## CONVERSION			51				
C 4 1 F BOX 73 FH PIN (3)   6 2-7/8 0.32 816.			71				
PUMP OUT SUBS   JOTCO	$O 4 IF BOX /3\frac{1}{2} FH PIN $ (3)			6			
During Out Subs   Store   St	STD 6½ DC						
SIDS 63 DC O 33 IF BOX x 4 IF PIN (4) SLIP JOINTS SID 43 DC O 34 PHG BOX / 33 IF PIN PHG TUBING 12,9 IB/FT O 43 PHG BOX UTED HANGER ICK JOINT THE O 24 P / 43 PHG BOX O 35 PHG P / 43 IF B O 25 SSB O 44 ACME P / 43 IF B O 25 SSB O 45 ACME PIN / 43 IF PIN O 25 SSB O 46 ACME PIN / 43 IF PIN O 25 SSB O 47 ACME PIN / 43 IF PIN O 25 SSB O 48 ACME PIN / 43 IF PIN O 25 SSB O 48 ACME PIN / 43 IF PIN O 25 SSB O 48 ACME PIN / 43 IF PIN O 25 SSB O 48 ACME PIN / 43 IF PIN O 25 SSB O 68 ACME PIN / 43 IF PIN O 25 SSB O 68 ACME PIN / 43 IF PIN O 26 ACME PIN / 43 IF PIN O 32 SSB O 68 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 62 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACME PIN / 43 IF PIN O 32 SSB O 70 ACM			COTOIL		23		
STEP			00200				
SLIP JOINIS   JOTOO   5   21   15.84   733.5     STD 4½ DC	$0.3\frac{1}{2} \text{ IF BOX } \times 4 \text{ IF PIN} \qquad (4)$		1				
STD 4½ DC       32       15,84       733.         O 3½ PHG BOX / 3½ IF PIN       0,21       689.1         PHG TUBING 12.9 IB/FT       628,36       688.5         O 4½ ACME P/ 3½ PHG BOX       0,20       60.5         UTED HANGER       FIOPETROL       0,27       60.5         ICK JOINT       "       1,80       60.1         2 TREE       "       2,24       58.3         VER SUB       "       0,25       55.8         O 4½ ACME P/ 4½ IF B       0,33       55.6         H.W.D.P       5       61.05       55.2         DW HEAD       5       61.05       55.2         OW HEAD       628,36       61.05         Drill Pipe       61.05       61.05         Drill Collar       109,88	SLIP JOINTS	······································	CYINI,				
0 3½ PHG BOX / 3½ IF PIN PHG TUBING 12.9 LB/FT 0.21 689.1 0.21 689.1 0.22 689.2 0.24 ACME P/ 3½ PHG BOX UTED HANGER ICK JOINT I'' 1.80 60.1 0.25 55.8 0.4½ ACME P/ 4½ IF B 0.25 55.8 0.33 55.6 1.W.D.P 0.6½ ACME PIN/ 4½ IF PIN 0.32 - 5.7 0W HEAD  PLOY HEAD  PLOY HEAD  GENERAL TUBING Drill Pipe Drill Collar  10.21 689.2 11.80 0.20 60.5 1.80 0.27 60.5 1.80 0.31 55.6 1.80 0.33 55.6 61.05 55.2 0.32 - 5.7	STD 43 DC		1010		43		
PHG TUBING 12.9 LB/FT O 4½ ACME P/ 3½ PHG BOX O .20 60.5  UTED HANGER FIOPETROL O .27 60.3  ICK JOINT O .27 60.3  2 TREE O .24 58.3  VER SUB O .24 ACME P/ 4½ IF B O .25 55.8  H.W.D.P O 6½ ACME PIN/ 4½ IF PIN O .32 - 5.7  OW HEAD  CAL TUBING Drill Pipe Drill Collar  Drill Collar  O .20 60.5  FIOPETROL O .20 60.5  O .20 60.5  O .20 60.5  O .27 60.3  III 1.80 60.1  O .25 55.8  O .23 55.6  O .24 60.5  O .25 55.8  O .26 61.05 55.2  O .27 60.3  O .28 61.05 55.2  O .29 60.3  O .20 60.5  O	O 3½ PHG BOX / 3½ IF PIN	<del></del>		74			717.44
O 4½ ACME P/ 3½ PHG BCK  UTED HANGER  ICK JOINT  1	PHG TUBING 12.9 LB/FT	· · · · · · · · · · · · · · · · · · ·		<del>                                     </del>			
DTED HANGER	O 41 ACME P/ 31 PHG BOX						
LICK JOINT  -2 TREE  -2 TREE  -3 TREE  -4 TREE  -4 TREE  -5 TREE  -6 TREE  -7 TREE  -7 TREE  -8 TREE  -8 TREE  -9 TREE  -9 TREE  -1 TREE	LUTED HANGER		FT OPETEOT	.			60.58
AVER SUB AVER SUB O .25 55.8 O .25 55.8 H.W.D.P O .63 ACME PIN / 43 IF PIN OW HEAD  TAL. TUBING ID Drill Pipe II Drill Collar II 2.44 58.3 O.25 55.8 O.25 55.8 O.33 55.6 O.32 - 5.7 O.32 - 5.7 O.32 - 6.0 I Drill Collar I 109.88	LICK JOINT	<del></del>		<del>'</del>			60.38
TAL TUBING  IT Drill Collar    10.25   55.8			11	1			
H.W.D.P			11	1			
H.W.D.P  /O 6½ ACME PIN/ 4½ IF PIN  .OW HEAD  TAL TUBING II Drill Pipe II Drill Collar  10.33   55.6  61.05   55.2  - 6.0  628.36  109.88	O 43 ACME P/ 43 IF B			1			
TAL TUBING ID Drill Collar  TO 63 ACME PIN/ 43 IF PIN  O.32 - 5.7  - 6.0  CO HEAD  O.32 - 5.7  - 6.0	H,W,D,P			5			55.62
OW HEAD	O 63 ACME PIN/ 43 IF PIN			-			55.29
TAL TUBING   Drill Pipe   628.36   61.05   109.88	OW HEAD			1		U.32	
TAL, TUBING   Drill Pipe   628.36     Drill Collar   109.88				1			<u>- 6.08</u>
TAL, TUBING    Drill Pipe   628.36     Drill Collar   109.88				+			
TAL TUBING   Drill Pipe   628.36     Drill Collar   109.88							
AL TUBING 628.36  Drill Pipe 61.05  Drill Collar 109.88				+			
TAL, TUBING   Drill Pipe   628.36     Drill Collar   109.88							
Drill Pipe   628,36				+			
61.05 at Drill Collar 109.88						628,36	
109.88	<del></del>			<u> </u>		61.05	
pents:	a Dilli Collai						
ents:	•	·		1			
	nents:		······································				



Formation Evaluation Data Page 4 of 4 To be completed by Customer Representative Report No. F 82009 **Customer:** HUDBAY OIL Well No.: SPERM WHALE 1 Test No. : Sand-Lime-Other Tested Interval Chalk Clay Shale stone stone (please specify) Major Mineral Species Minor Mineral Species Stringers or Lenses Open Hole: I.D. in Is the tested interval: ib. ft. I.D. In Casing: O.D. in. Wt: Open Hole Interval: (Total Depth) (Foot of Casing). Perforated Intervals: In the tested interval how many productive zones do logs show: more What is the average porosity of the interval? Is the interval homogeneous? Yes No Is formation consolidation: Good Mod Low What is the clay content: % or High Mod Low is the formation fractured Heavily Mod Little In this interval, is there expected near the wellbore: Geological fault? Yes No Interval thickness change? Yes No Fluid phase contact? Yes No Oil-Water --- If yes :---Gas-Water Oil-Gas During drilling of the interval, was there: Lost circulation? Yes No Sand production? Yes No Other (please specify)\_ Before testing was there a: Scraper run? Yes No Caliper run? Yes No Mud circulation to bottom? Yes No -If yes :for how long If no, how long since Additional Comments: \_\_\_\_

Customer Representative : \_\_



#### SYMBOLS USED

△T - INCREMENT OF TIME (MINUTES)

 $\frac{T + \triangle T}{\triangle T}$  — DIMENSIONLESS TIME CONSTANT USED FOR THE HORNER PLOT

 $\Delta$  T IS THE INCREMENT OF SHUT-IN TIME (MINUTES)

T IS TOTAL FLOW TIME PRECEDING SHUT-IN (MINUTES)

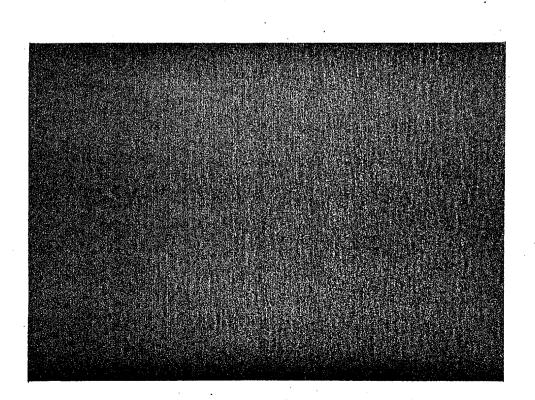
LOG - LOGARITHM TO BASE 10 OF  $\frac{T + \triangle T}{\triangle T}$ 

Pw - Pf - PRESSURE BUILD-UP ABOVE FINAL FLOWING PRESSURE PRECEDING THE BUILD UP WHICH IS USED FOR THE MCKINLEY PLOT.

REPORT Nº	F 82010
JOB Nº	
INVOICE/SIR.	
DATE	FEBRUARY 3, 198



# TECHNICAL REPORT

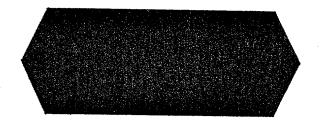


COMPANY HUDBAY OIL

WELL SPERM WHALE 1

COUNTRY AUSTRALIA

FIELD GIPPSLAND BASIN



# CONFIRMATION OF REPORT DISTRIBUTION

то	· HUDBAY OIL
WELL SPERM WHALE 1	FIELD GIPPSLAND BASIN TEST Nº 1B
COUNTRYAUSTRALIA	DATE FEBRUARY 3, 1982
	ested to furnish the following companies with Technic Reports will be used for:  All tests on this well,
	☐ This one test only,
unless otherwise notified.	
	·
TECHNICAL REPORT (S)	TECHNICAL REPORT (S)
TECHNICAL REPORT (S)	TECHNICAL REPORT (S)
TECHNICAL REPORT (S)	TECHNICAL REPORT (S)



#### **Dowell Schlumberger**

Cables: "Bigorange"
Telex: Orange RS 23005
Telephone: 2351022
2351287

FEBRUARY 3, 1982

REPORT NO: F 82010

GENILEMEN,

In the enclosed test, the tools did function properly.

A review of the test datas indicate good permeability. Test indicate that this is essentially a water zone.

FRANCIS SOO

RESERVOIR EVALUATION DEPARTMENT

FS/rs



CAPACITY : 4700 PSI

DEPTH 842.32 M

OPENING : INSIDE

TEMPERATURES : 130 DEG F

CLOCK Nº : 9-3823 CAP: 48 HRS CLOCK TRAVEL : 0.022074 in/min

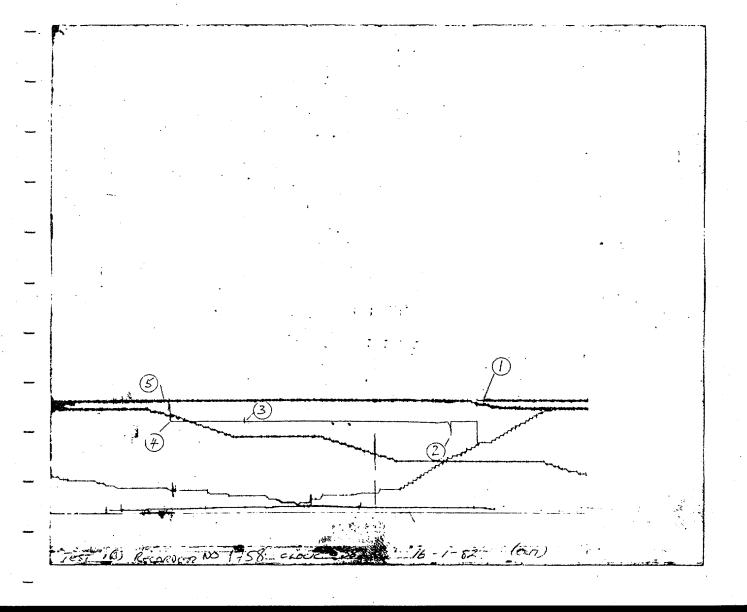
CALIBRATION DATA AT

1270.0054

9,654845

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.



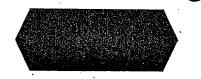


PRESSURE DATA FOR RECORDER :

J 1758

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME	TIME
•	FORT	(PSI)	GIVEN	COMPUTED
	• •			
INITIAL HYDROSTATIC	. 1	1569		
INITIAL FLOW (1)	2	1102		
INITIAL FLOW (2)	3	1269	106	100
INITIAL SHUT-IN	4	1271	30	36
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)	. •			
THIRD FLOW (2)			•	
THIRD SHUT-IN				
FINAL FLOW (1)	·			
FINAL FLOW (2)		•		
FINAL SHUT-IN				
FINAL HYDROSTATIC	5	1572		

REMARK :



CAPACITY : 2800 PSI

DEPTH : 827.11 M

OPENING : INSIDE

TEMPERATURES : 130 DEG F

CLOCK  $N^0$  : 9-1437 CAP: 48 HRS CLOCK TRAVEL : 0.021941 in/min

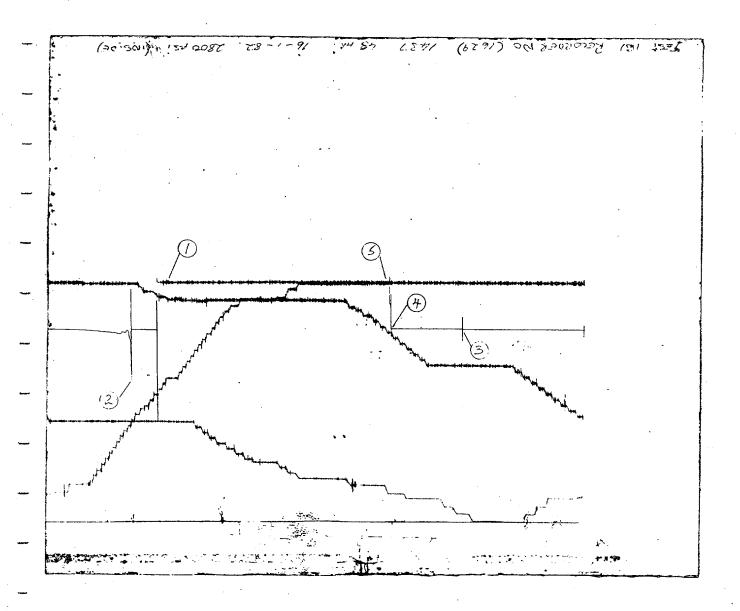
CALIBRATION DATA AT

556.84032

- 1.28894

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER : J 1629

DESCRIPTION	•	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
					•
INITIAL HYDROSTATIC		1	1479		
INITIAL FLOW (1)		2	879		
INITIAL FLOW (2)		3	1188	106	101
INITIAL SHUT-IN		4	1189	30	35
SECOND FLOW (1)					
SECOND FLOW (2)			•		
SECOND SHUT-IN		•			
THIRD FLOW (1)					
THIRD FLOW (2)	• *				
THIRD SHUT-IN					•
FINAL FLOW (1)					
FINAL FLOW (2)					
FINAL SHUT-IN					
FINAL HYDROSTATIC		5	1475		

REMARK :



CAPACITY: 2800 PSI DEPTH 840.52 M

OPENING : OUTSIDE

TEMPERATURES : 130 DEG F

CLOCK No : 9-3823 CAP: 48 HRS CLOCK TRAVEL : 0.02214 in/min

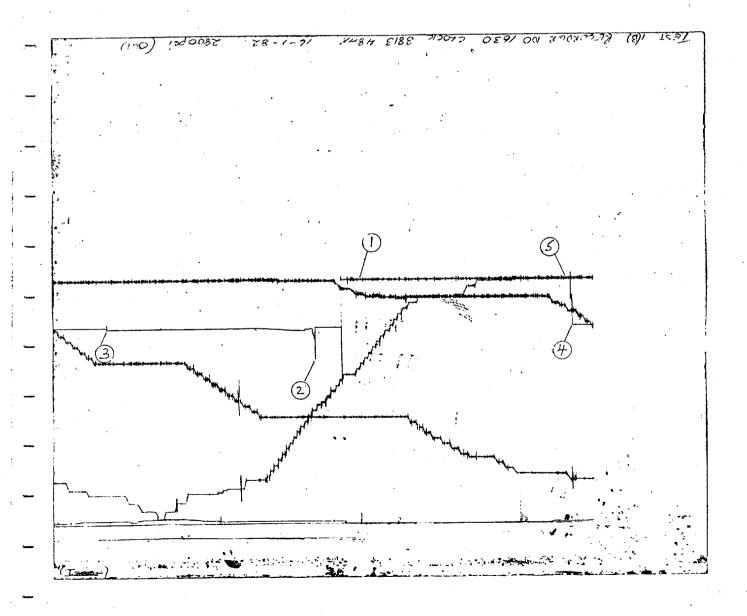
CALIBRATION DATA AT

564.5074

5.357018

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

#### PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER : J 1630

INITIAL HYDROSTATIC	TED
INITIAL FLOW (1) 2 1034 INITIAL FLOW (2) 3 1225 106 103 INITIAL SHUT-IN 4 1236 30 35 SECOND FLOW (1) SECOND FLOW (2) SECOND SHUT-IN THIRD FLOW (1)	
INITIAL FLOW (1) 2 1034 INITIAL FLOW (2) 3 1225 106 103 INITIAL SHUT-IN 4 1236 30 35 SECOND FLOW (1) SECOND FLOW (2) SECOND SHUT-IN THIRD FLOW (1)	
INITIAL FLOW (2) 3 1225 106 100 INITIAL SHUT-IN 4 1236 30 35 SECOND FLOW (1) SECOND FLOW (2) SECOND SHUT-IN THIRD FLOW (1)	
INITIAL SHUT-IN 4 1236 30 35 SECOND FLOW (1) SECOND FLOW (2) SECOND SHUT-IN THIRD FLOW (1)	
SECOND FLOW (1) SECOND FLOW (2) SECOND SHUT-IN THIRD FLOW (1)	
SECOND FLOW (2)  SECOND SHUT-IN  THIRD FLOW (1)	ı
SECOND SHUT-IN THIRD FLOW (1)	
THIRD FLOW (1)	
THIRD FLOW (2)	
	• •
THIRD SHUT-IN	
FINAL FLOW (1)	
FINAL FLOW (2)	
FINAL SHUT-IN	
FINAL HYDROSTATIC 5 1537	

REMARK:



PRESSURE DATA FOR RECORDER: J 1630

LABEL POINT	ΔT (mins)	PRESSURE (PSI)	$\frac{T + \Delta T}{\Delta T}$	LOG	Pw - Pf (PSI)	COMMENTS
1		1535				INITIAL HYDROSTATIC
. 2	0	1034				INITIAL FLOW (1)
	2	1203				•
	4	1221				•
	6	1219				
	8	1213			•	
	10	1213				
	20	1214				
	40	1219				•
	60	1222				·
	80	1225				INITIAL FLOW (2)
3	101	1225				START SHUT-IN
3	0	1225				T = 101
	1	1236	102.00	2.01	11	
	2	1236	51.50	1.71	11	
	3	1236	34.67	1.54	11	
	4	1236 ·	26.25	1.42	11	
	5.	1236	21.20	1.33	11	•
	10	1236	11.10	1.05	11	
	20	1236	6.05	0.78	11	
•	30	1236	4.37	0.64	11	
4	35	1236	3.89	0.59	11	INITIAL SHUT-IN
5		1537				FINAL HYDROSTATIC



#### Formation Testing Field Report

	WELL IDENT	IFICATION	
Company: HUDBAY OIL Field: GIPPSLAND BASIN Loc	Well t	No: SPERM WHAL	E_I Test No. :IB
Field: GIPPSLAND BASIN Low	cation: OFFSHORE	-VICTORIA CO	untry : AUSTRALIA
Tested Interval: From 839 M	<b>XX</b> to 848 M	KK	
Co-ordinates :			,
Type Test : Open Hole ☐ Casing ;	X Conventional X	Straddle · 🗆 Lan	drig lack-up Floater X
Valve: MFE□ PCT♥ SPRO♥	Other:	Onaddie , Lan	with Packer A Retainer
valve : III ZE	Other .		Will tacker and Retailer
	HOLE	ATA	:
Geologic Level : UPPER CRETATION Net Productive Interval : 8 M	US [	Description :	_
Net Productive Interval: 8 M	XXX F	stimated Porosity	25 - 30
Total Depth: 894.53 M XX De	oths measured from	n: RTKB	Flevation 9.35 M
Open Hole Size : - in.	- Rat Hole Siz	e : -	in from —
Open Hole Size : in Casing Size :9-5/8 in40	D lbs/ft Liner	Size - in	- lhs/ft from -
Before test : Caliper Yes □ No ☑	Scraper Yes X	No ☐ Circulation	on Yeski for 2 hrs: Not
Doloro toot. Campor tool.		11023 0.100.00.	70 - 10 - 113, 140L
	MUD D	ATA	
Mud Type : BARACARB BRINE Viscosity : 50 Water Lo			Weight: 1.32 S G
Viscosity: 50 Water Lo	ss12cc	Mud Resistivity	– at – °F
Filtrate Resistivity :at	- °F : Chloride	opm: 111.000	***************************************
Timate Head States			
	INSTRUMENT AN	D CHART DATA	
Recorder No.	J 1629	J 1630	J 1758
Capacity (psig)	2800	2800	4700
Depth	827.11	840.52	842.32
Inside/Outside	INSIDE	OUTSIDE	INSIDE
Above/Below valve	BELOW	BELOW	BELOW
Clock No.	9-1437	9-3813	9–3823
Capacity (hrs.)	48 HRS	48 HRS	48 HRS
Temperature	130 DFG F	130 DEG F	130 DEG F
Initial Hydrostatic Pressure	1485	1536	1538
Pre-flow (1) Start Pressure	865	1026	1025
(2) Finish Pressure	1198	1225	1222
Initial Shut-in Pressure	1205	1241	1246
Second Flow (1) Start Pressure	1205	1.741	1.246
(2) Finish Pressure	1		
Second Shut-in Pressure		<u> </u>	
Final Flow (1) Start Pressure			
(2) Finish Pressure			
Final Shut-in Pressure			
Final Hydrostatic Pressure	1485	1536	1540
	1100	1 1000	1 1010
	OPERATIONS S	SUMMARY	
Left Station at 10 : 55 on 9.	1.82 On	Location at 13	: 00 on 10.1.82
Started Operations at:c	onFini	ished Operations	at:on
	Return Station		
			,
Comments: SAME ZONE TESTED		TIONED PROPERI	Y
ONLY HAD PREFLOW			
		STRONG BLOW I	DECREASING TO NOTHING
WHEN TOOL WAS OPE	NED.		
·		···	
		<del></del>	
<del></del>			
Station: AUS S	ID N	0.E	70.7.00
	IR No.: 620 Tester J PARTR	US -	Date: 16.1.82
Customer Purchase Order	Tester_ J PARIR		omer B MC ELHINNEY



Comments:

#### Surface Data

Customer:	HUDBAY	OIL	Well No :	SPERM '	WHALE 1		Te	st No. 1	В
		TEST SI	EQUENCE AND F	LOW RAT	E DATA	<del></del>			
		escription and Flow Ra	tes		Date	1	me mins	Pressure psig	Surface Choke
Packer Dep	h: 832.84	ft.	S	et at:	16.1.82	1	53		
Opened Too	:	(Annulu	s pressure 1400	psi)	11	07		100	7/16
STAR	ED WEAK B	UT QUICKLY INCH	REASED TO A ST	RONG		07	30	17	111
BLOW									
BLOW	EVENTUALI	Y DECREASED TO	NOIHING			07	51	4	111
<del></del> , ,,			*			08	00	3	1,11
GT 001	T. 07007								2
CLOSI	D TOOL					08	55	_	_
	<del></del>					-			
<del></del> .	<del></del>								
			· · · · · · · · · · · · · · · · · · ·			-	ļ		
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						-			
<del></del> -									
Reverse Circ	ulation Star	ted (Pump pressur	re 600 psig)		16.1.82	08	57		
Reverse Circ	ulation Finis	hed			11	09	20	·	<del>                                     </del>
Pulled Packe	r Loose/Pul	lled Out of Retainer			11	09		_	_
Cushion Typ	: DIESEI	ر Amount و	TO SURFACEbls ; Leng	ith	ft ; Pressu		psi	Bottom Choke	1"
·		•	RECOVERY DA	ATA					
		Recovery Description			Feet	Bbis		% %.	%
WATER		Trouble Trouble			1 001		0	il Wate	r Other
2						17	+		
3							†		
<u>.                                    </u>			···				Ţ		
<u> </u>						<del></del>	<del> </del>		
	I Gravity	Gas Gravity	- G.O.R.	D	esistivity		<u> </u>	Chlorida	
i	at °F	- Cas Gravity		rie	at	°F		Chloride	ppm
۰	at °F				at	°F			ppm
۰					at	°F			ppm
۰						°F			ppm
0		<del> </del>				°F			ppm
•	.t°⊏	1	1 1		at	°E.			nnm



#### **Equipment Data**

					Tropost T Omoro
-	Customer: HUDBAY O	IL	Well No.: SPE	RM WHALE 1	Test No.: 1B
		SA	MPLE CHAMBER RECOVE	RY DATA	
	Sampler Drained		Recovery	Resistivity	Chlorides (ppm)
	On Location X		Gascu ft.	Water	at°F
	Elsewhere 🗌		Oilc.c.	Mud	at°F
	Name :		Water_500 c.c.		at°F
	Address :		Mudc.c.	Pit Mud	at°F
			°API°F	Pit Mud Filtrate	at°F
	Gas/Oil Ratio	cu ft./bbl	Sample Chamber Pressure	e 120	psi.

	EQUIPI	MENT SEQUENCE				•
	Components (including D.P. and D.C.)	Туре	O.D. (in)	1.D. (in)	Length	Depth
_ [	BULL NOSE		43	21/4	0.25	844.3
	RECORDER CARRIER J 1758	JOTOO	4-7/8	11/2	1.80	844.12
	RECORDER CARRIER J 1630	11	11	11	1.80	842.32
<b>-</b> [	PERF ANCHOR	11	43	$2\frac{1}{4}$	6.10	840.32
Γ	$X/O$ $3\frac{1}{2}$ EUE BOX x $3\frac{1}{2}$ FH PIN (1)		11	2-5/16	0.63	834.42
1	9-5/8 POSITEST PACKER	J0100	9-5/8	3	0.95	832.84
_			40		0.66	
	X/O 3½ EUE PIN x 3½ FH BOX (2)		43	2-5/16	0.32	832.18
	SAFETY JOINT	BOWEI		2-7/16	0.60	831.86
	TR 63 HYDRAULIC JARS	JOTOO	4-7/8	$1\frac{1}{2}$	2.35	831,26
_  -	RECORDER CARRIER J 1629	JOTOO	4-7/8	11/2	1.80	838.91
-	MFE HRT	11	5	1-3/8	2.90	827.11
F	PCT	11	43/4	1-3/6	4,66	824.21
<u>-</u>  -	SPRO CONVERSION	11	11	2 <del>1</del>	2.69	819.55
 	X/O 4 IF BOX / 3½ FH PIN (3)		6	2-7/8	0.32	816.86
  -	3 STDS 6½ D.C.		$\frac{6}{2}$	2-7/8	81.59	816,54
⊢	X/O 4 IF PIN / 3½ IF BOX (4)			2-11/16	0.96	734.95
- <u> -</u>	2 SLIP JOINIS	JOTO	5			
. Ի	1 STD 43 D.C.	30100	<u>3</u>	21	15.84	733.99
-	1 PUMP OUT SUB	TOTO	43		28.29	718.15
-  -		JOTCO			0.36	689.86
-	X/O 3½ PHG BOX / 3½ IF PIN	10 OID 777			0.21	689.50
-	3½ PHG TUBING 12.9 LB/FT	12.9LB/FT			628.36	689.29
_	X/O 4½ ACME PIN / 3½ PHG BOX				0.20	60.93
$\vdash$	FLUTED HANGER	FLOPETROL			0.27	60.73
.  -	SLICK JOINT	11			1.80	60.46
-	E-Z TRFE				2.44	58.66
- ├-	SAVER SUB				0.25	56.22
-	X/O 4½ ACME P / 4½ IF BOX				0.33	55.97
-	5" HWDP	5			61.05	55.64
-  -	X/O 63 ACME PIN / 43 IF PIN				6.32	- 5.41
-	FLOW HEAD	FLOPETROL				- 5.73
-  -	-					
$\vdash$				<del></del>		······································
<u>- [</u>						
-	· · · · · · · · · · · · · · · · · · ·		·			
-						
. [	TOODAT CITIOTAN					
<u> </u>	TOTAL TUBING				628.36	
	Total Drill Pipe Total Drill Collar				61.05	
		1 1			109.88	

 Comments :



#### Formation Evaluation Data

Page 4 of 4

To be completed by Customer Representative Report No. F 82010 Customer: HUDBAY OIL Well No.: SPERM WHALE 1 Test No.: 1B Sand-Lime-Tested Interval Other Chalk Clay Shale stone stone (please specify) Major Mineral Species Minor Mineral Species Stringers or Lenses Open Hole: I.D. in Is the tested interval: In Casing: 1b. ft. 1.D. O.D. in. Wt: Open Hole Interval: (Total Depth)\_ (Foot of Casing). Perforated Intervals: In the tested interval how many productive zones do logs show: more What is the average porosity of the interval? Is the interval homogeneous? Yes No Is formation consolidation: Good Mod Low What is the clay content: % or High Mod Low Is the formation fractured Heavily Mod Little In this interval, is there expected near the wellbore: Geological fault? Yes No Interval thickness change? Yes Nρ Fluid phase contact? Yes No ---If yes :---Oil-Water Gas-Water Oil-Gas During drilling of the interval, was there: Lost circulation? Yes No Sand production? Yes No Other (please specify)\_ Before testing was there a: Scraper run? Yes No Caliper run? Yes No Mud circulation to bottom? Yes No --- If yes :--for how long If no, how long since Additional Comments: \_\_ Customer Representative : \_



#### SYMBOLS USED

△T - INCREMENT OF TIME (MINUTES)

 $\frac{T + \triangle T}{\triangle T}$  — DIMENSIONLESS TIME CONSTANT USED FOR THE HORNER PLOT

 $\triangle$  T IS THE INCREMENT OF SHUT-IN TIME (MINUTES)

T IS TOTAL FLOW TIME PRECEDING SHUT-IN (MINUTES)

LOG - LOGARITHM TO BASE 10 OF  $\frac{T + \triangle T}{\triangle T}$ 

Pw - Pf - PRESSURE BUILD-UP ABOVE FINAL FLOWING PRESSURE PRECEDING THE BUILD UP WHICH IS USED FOR THE MCKINLEY PLOT.

REPORT Nº	F 82011
JOB N°	
INVOICE/SIR.	
DATE	FEBRUARY 5, 198

COMPANY

TIO AVECTIH

WELL SPERM WHALE 1

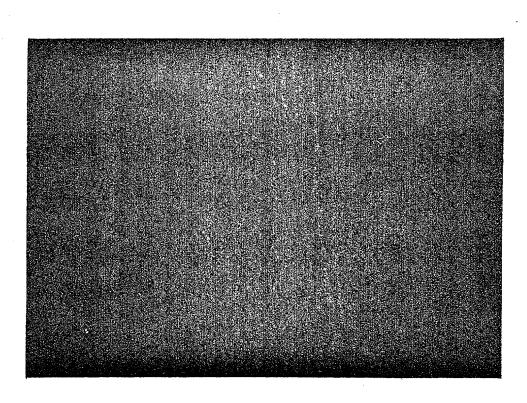
GIPPSLAND BASIN

COUNTRY\_

AUSTRALIA



# TECHNICAL REPORT





# CONFIRMATION OF REPORT DISTRIBUTION

то	HUDBA	YOIL			
WELL SPERM WHALE 1	_FIELD	GIPPSLA	ND BASIN	TEST Nº	2
COUNTRYAUSTRALIA		_DATE	FEBRUARY 5,	1982	<del></del>
Dowell Schlumberger has been re Reports. This distribution of Techni unless otherwise notified.	Cal Report	s will be use is on this wone test only	ed for : ell,		
TECHNICAL REPORT (S)					
			TECHNI	CAL REPORT	(S)
TECHNICAL REPORT (S)				CAL REPORT	
TECHNICAL REPORT (S)			TECHNI		(S)



#### Dowell Schlumberger

Cables: "Bigorange"
Telex: Orange RS 23005
Telephone: 2351022
2351287

FEBRUARY 5, 1982

REPORT NO : F 82011

GENTLEMEN,

The enclosed test appears to be a good drill stem test during which the tool did function properly.

It is essentially a gas zone.

A review of the test datas indicate high permeability.

FRANCIS SOO

RESERVOIR EVALUATION DEPARTMENT

FS/rs



RECORDER Nº : J 1782

CAPACITY: 4700 PSI

DEPTH :

OPENING : OUTSIDE

TEMPERATURES :

CLOCK  $N^0$ : 9-3823 CAP: 48 HRS CLOCK TRAVEL: 0.021273 in/min

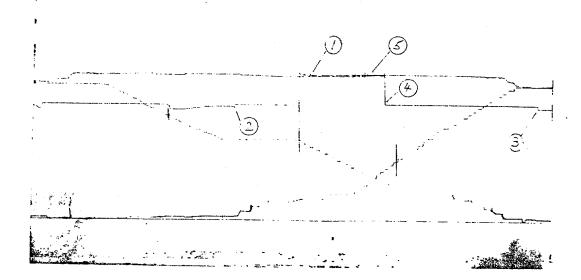
CALIBRATION DATA AT

936.001

1.10

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER : J 1782

REMARK :

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
INITIAL HYDROSTATIC	1	1516		• .
INITIAL FLOW (1)	2	1163		
INITIAL FLOW (2)	3	1171	110	110
INITIAL SHUT-IN	4	1202	84	84
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)				
FINAL FLOW (2)				
FINAL SHUT-IN				
FINAL HYDROSTATIC	5	1514		



RECORDER Nº : J 1629

CAPACITY: 2800 PSI

DEPTH :

OPENING : INSIDE

TEMPERATURES : 126 DEG F

CLOCK No : 9-1436 CAP: 48 HRS CLOCK TRAVEL : 0.020778 in/min

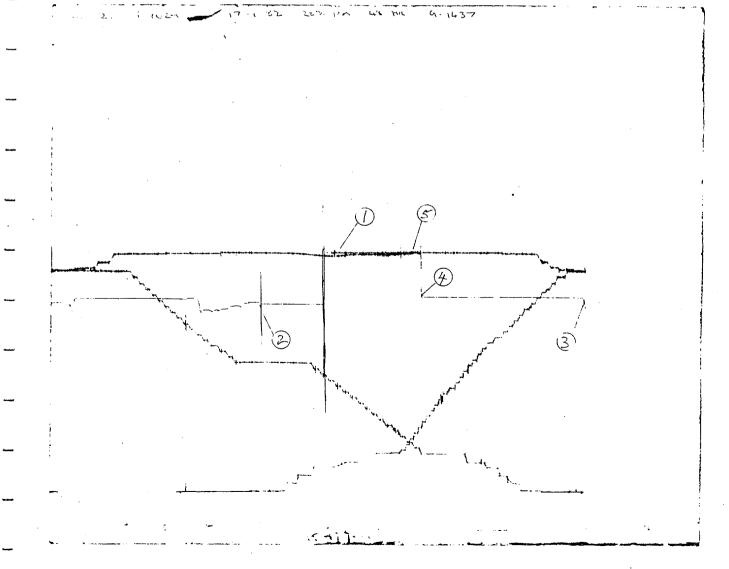
CALIBRATION DATA AT

557.0221

1.1097

PRESSURE (PSI) = DEFLECTION (INS)  $X M \pm A$ 

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER :

J 1629

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
•				
INITIAL HYDROSTATIC	1	1474		
INITIAL FLOW (1)	2	1113		
INITIAL FLOW (2)	3	1170	110	109
INITIAL SHUT-IN	4	1196	84	85
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN	·			·
THIRD FLOW (1)				
THIRD FLOW (2)	·			
THIRD SHUT-IN			·	
FINAL FLOW (1)				
FINAL FLOW (2)				
FINAL SHUT-IN				
FINAL HYDROSTATIC	5	1474		

REMARK :



RECORDER Nº : J 1630

CAPACITY :2800 PSI

DEPTH

OPENING : OUTSIDE

TEMPERATURES : 126 DEG F

CLOCK No : 9-3813 CAP:48 HRS CLOCK TRAVEL : 0.021258 in/min

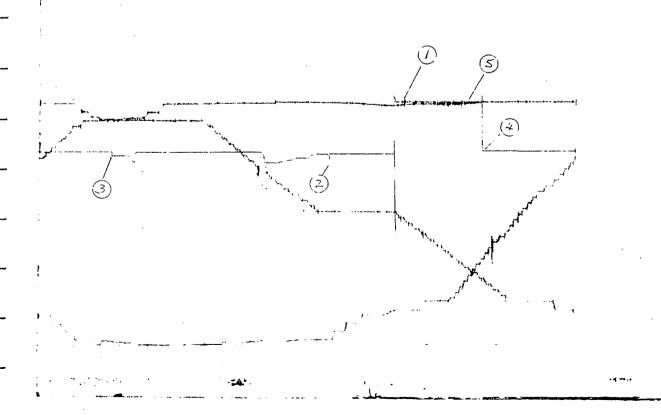
CALIBRATION DATA AT

564.96988

5.357018

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER :

J 1630

	DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
	•				
	INITIAL HYDROSTATIC	1	1538		
	INITIAL FLOW (1)	2	1146		
	INITIAL FLOW (2)	3	1199	110	110
	INITIAL SHUT-IN	4	1229	84	84
	SECOND FLOW (1)				
	SECOND FLOW (2)				
	SECOND SHUT-IN				
•	THIRD FLOW (1)				
	THIRD FLOW (2)				
	THIRD SHUT-IN				•
	FINAL FLOW (1)				
	FINAL FLOW (2)				
	FINAL SHUT-IN		·	·	
	FINAL HYDROSTATIC	5	1538		
				•	

REMARK :



PRESSURE DATA FOR RECORDER : J 1630

LABEL POINT	ΔT (mins)	PRESSURE (PSI)	$\frac{T + \Delta T}{\Delta T}$	LOG	Pw — Pf (PSI)	COMMENTS
1		1538				INITIAL HYDROSTATIC
. 2	0	1146				INITIAL FLOW (1)
	5	1209				
	10	1193				
	20	1171				
	30	1155				
	40	1222				÷
	50	1222				
	70	1222				
	90	1222				
3	110	1199				INITIAL FLOW (2)
3	0	1199				START SHUT-IN
	1	1224	111.00	2.05	25	T = 110
	2	1224	56.00	1.75	25	
	3	1224	37.67	1.58	25	
	5	1224	23.00	1.36	<b>2</b> 5	
	10	1224	12.00	1.08	25	
	. 20	1225	6.50	0.81	26	
	40	1226	3.75	0.57	27	
	60	1226	2.83	0.45	27	
4	84	1229	2.31	0.36	30	INITIAL SHUT-IN
5		1538				FINAL HYDROSTATIC

## Schlumberger Formation Testing Field Report

Company: HUDBAY OIL	WELL IDEN	TIFICATION No · SPERM WHAT	E I Test No :	2
Company: <u>HUDBAY OIL</u> Field: <u>GIPPSLAND BASIN</u> Loc	cation : OFFSHOR	E- VICTORIA COL	Intry: AUSTRALIA	<u> </u>
Tested Interval: From 832 M	XEX to 834 M	XK		
Co-ordinates:				*
Type Test : Open Hole Casing :	XI Conventional X	Straddle · 🗍 Lan	dirio Di Jackeun D	Floater [X]
Valve: MFE□ PCT \ SPRO\		Otraudie , Earl	with Packer 🖾	
	HOLE	DATA		
Geologic Level : <u>UPPER CRETATIO</u> Net Productive Interval : 8 M	US	Description :		
Net Productive Interval : 8 M		Estimated Porosity	: <u>25 - 30</u>	
Total Depth: ft. De	pths measured fro	m:KIKB	Elevation: S	9.35 M
Open Hole Size : in	Rat Hole Si	ze :	in., from	
Open Hole Size : in. Casing Size : 9-5/8 in. 4	<u>0                                    </u>	r Size : in.	,lbs/ft. f	rom
Before test : Caliper Yes ☐ No ☐	Í Scraper Yes⊠	No□ Circulatio	on Yes 🖾 for	hrs; No□
	MUD I			
Mud Type: BARACARB BRINE	1001	701A	Wajaht: 1.32	2 S G
Vice a situal 50 Water Le	ss 12 ss	Mud Dogiotivity	vveigitt:	or
VISCOSITY: VValer LO	°E : Chlorido	nnm. 111 000	aı	r
Mud Type: BARACARB BRINE Viscosity: 50 Water Lo Filtrate Resistivity: at	F; Chloride	ppm:		
	INSTRUMENT AN			
Recorder No.	J 1629	J 1630	J 1782	
Capacity (psig)	2800	2800	4700	<b></b>
Depth	1	1		
Inside/Outside	INSIDE	OUTSIDE	OUTSIDE	
Above/Below valve	BELOW	BELOW	BELOW	
Clock No.	9-1437	9-3813	9-3823	
Capacity (hrs.)	48 HRS	48 HRS	48 HRS	
Temperature	126 DEG F	126 DEG F	126 DEG F	
Initial Hydrostatic Pressure	1488	1532	1539	
Pre-flow (1) Start Pressure	899	1136	1154	
(2) Finish Pressure	1172	1194	1187	
Initial Shut-in Pressure	1208	1222	1220	
Second Flow (1) Start Pressure	1-20	1001	1320	
(2) Finish Pressure				
Second Shut-in Pressure				
Final Flow (1) Start Pressure		* * * * * * * * * * * * * * * * * * * *		······································
(2) Finish Pressure				***
Final Shut-in Pressure				
Final Hydrostatic Pressure	1488	1529	1535	
	OPERATIONS			
Left Station at 10 : 55 on 9		Location at 13		1.82
Started Operations at:				
Off Location at:on	Return Statio	n at:	onMileage	
MOOTO THURSDAY	ODTTO ** ** **	NEW CO.	7711 111 711 711 711 711	~
Comments: TOOLS FUNCTIONED PI			PEN HIGH PRESSUR	E
GAS WELL. SLIGHT A	AMOUNT OF OIL I	KESENI.		·
				· · · · · · · · · · · · · · · · · · ·
			······	
		· · · · · · · · · · · · · · · · · · ·		
Station: AUS S	SIR No. :61978	<b>3</b>	Date: 17.1.8	2
Customer	Tester P O'LOM		omer B MC ELH	
Purchase Order	, 00.01 0		esentative	

#### Surface Data

Report No. F 82011

Well No: SPERM WHALE 1 Test No. 2

TEST SEQUENCE AND FLOW RAT	TE DATA				******************
. Description and Flow Rates	Date	Tıı hrs	me mins	Pressure psig	Surface Choke
Packer Depth: 815 M 11X Set at:	17.1.82	08	30	1 -	
Opened Tool: (Annulus pressure 1400 psi)	11	09	09	140	111
STARTED WITH A STRONG BLOW	71	09	14	400	1/2
	. 11	09	18	670	3
PRESSURE BUILDING UP	11	09	32	820	1/2
CHANGED TO 11' CHOKE	11	09	41	1080	1
CIMIOD TO 4 CIOID	11	09	50	1120	<u>1</u>
CHANGED TO ½" CHOKE	,,	10	46	850	1/3
CHANGED TO 2 CHOKE	11	10	56	1080	<u> </u>
H <sub>o</sub> S DETECTED 200 PPM - SOME OIL + IN VERY	11	10	58	1080	<u>}</u>
SMALL AMOUNIS					
SHUT IN	11	10	59		
	-			ļ	
					· · · · · · · · · · · · · · · · · · ·
RUPTURE DISC BLEW AT 1800 PSI PUMP				·	· · · · · · · · · · · · · · · · · · ·
PRESSURE				ļ	
Reverse Circulation Started (Pump pressure 600 psig)	17.1.82	_12	_06_	<b> </b>	
Reverse Circulation Finished Pulled Packer Loose/Pulled Out of Retainer	11	_12	_20_	l	
TO TO	ft ; Pressur	12	_23_	Bottom	
Cushion Type: DIESEL AmountSURFACEbls; Length	n, Fressul	E	psi	Choke	1"

	RECOVERY DATA									
Feet	Bbls	% Oil	% Water	% Other						
				i						
	Feet	Feet Bbls	Foot Phile '0	Foot Phile 10 /0						

	Oil-API Grav	vity	Gas Gravity	G.O.R.	Resistivity	,	Chlorides
1	° at	°F			at	۰F	ppm
2	° at	٥F			at	°F	ppm
3	° at	٥F			at	°F	ppm
4	° at	°F			at	°F	ppm
5	° at	°F			at	°F	ppm
6	° at	°F			at	°F	ppm

Comments :	
	•



#### Equipment Data

			100 1 82011
Customer: HUDBAY OIL	Well No.: SPER	M WHALE 1	Test No.: 2
S	AMPLE CHAMBER RECOVE	ERY DATA	
Sampler Drained	Recovery	Resistivity	Chlorides (ppm)
On Location X BY FLOPETROL	Gascu ft.	Water	at°F
Elsewhere	Oilc.c.	Mud	at°F
Name :	_ Waterc.c.	Mud Filtrate	at°F
Address:	_ Mudc.c.	Pit Mud	at°F
<u> </u>	°API°F	Pit Mud Filtrate	at°F
Gas/Oil Ratio cu ft./bbl	Sample Chamber Pressur	e	psi.

	MENT SEQUENCE				
Components (including D.P. and D.C.)	Type	O.D. (in)	I.D. (in)	Length	Depth
BULL NOSE		43	21/4	0.25	826.5
RECORDER CARRIER J 1782	JOTOO	4-7/8	$1\frac{1}{2}$	1.80	826.2
RECORDER CARRIER J 1630	11	11	1½	1.80	824.4
PERF ANCHOR	11	43	21/2	6.10	822.6
X/O 3½ EUE BOX x 3½ FH PIN (1)	_	11	2-5/16	0.63	816.5
9-5/8 POSITEST PACKER	JOTOO	9-5/8	3	0.95	813.0
		40LB/FT		0.66	
X/O 3½ EUE PIN x 3½ FH BOX (2)	_	$4\frac{3}{4}$	2-5/16	0.32	814.3
SAFETY JOINT	BOWEN		2-7/16	0.60	814.0
TR 63 HYDRAULIC JAR	JOTOO	4-7/8	13	2.35	813.4
RECORDER CARRIER	JOTOO	11	17	1.80	811.0
MFE/HRT	11	5	1-3/8	2.90	809.2
PCT	7.1	43	1	4.66	806.3
SPRO CONVERSION	r t	11	21/2	2.69	801.
X/O 4" IF BOX / 33 FH PIN (3)	_	6	2-7/8	0.32	799.0
3 STDS 61 D.C.	···········	6}	11	81.59	798.
X/O 4" IF PIN / 3½ IF BOX (4)		$\frac{6\frac{1}{4}}{}$	2-11/16		717.
2 SLIP JOINIS	JOIOO	5	$\frac{2-11/10}{2^{\frac{1}{3}}}$	15.84	716.
1 STD 43 D.C:	00100	43	21	28.29	700.
2 PUMP OUT SUB	JOTOO	11		0.36	672.0
X/O 3½ PH BOX - 3½ IF PIN	80100			0.30	671.9
X/O 3½ PHG TBG - 12.9 LB/FT				610.72	671.4
X/O 4½ ACME PIN / 3½ PHG BOX				0.20	60.
FLUTED HANGER	FLOPETROL			0.27	60.5
SLICK JT	110/251005	· · · · · · · · · · · · · · · · · · ·		1.80	60.2
F-2 TREE	11			2 44	58.4
SAVER SUB	11			0.25	56.0
X/O 43 ACME PIN / 43 IF BOX				0.23	
5" HWDP .					55.7
				61.05	55.4
X/O 6½ ACME PIN / 4½ IF PIN	TT ODYTTOOT			6.32	5.6
FLOW HEAD	FLOPETROL				- 11.9
					······································
				<del></del>	<del></del>
				+	······································
			<del></del>		
			<del></del>		
TOTAL BUTING				610,72	
Total Drill Pipe				61.05	
Total Drill Collar				109.88	

-	Comments :	



#### Formation Evaluation Data

Page 4 of 4

Major Mineral Species Minor Mineral Species Stringers or Lenses  Open Hole: i.D. in Is the tested interval: In Casing: O.D. in, Wt: ib, I.D. Open Hole Interval: (Total Depth) (Foot of Casing) Perforated Intervals:  In the tested interval how many productive zones do logs show:  In the tested interval how many productive zones do logs show:  What is the average porosity of the interval? Is the interval homogeneous?  What is the clay content: Good Mod Low What is the clay content: Ye or High Mod Low Is the formation fractured Heavily Mod Little  In this interval, is there expected near the wellbore:  Geological fault? Interval thickness change?  Fluid phase contact?  —If yes:— Oil-Water Gas-Water Oil-Gas  During drilling of the interval, was there:  Lost circulation?  Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?							
Tested Interval	Tested Interval	Sand-	l ime-		<u> </u>		Other
Minor Mineral Species Stringers or Lenses  Open Hole: I.D. in			1	Chalk	Clay	Shale	(please speci
Stringers or Lenses  Open Hole: I.D. in  Is the tested interval: In Casing: O.D. in. Wt: Ib. I.D.  Open Hole Interval: (Total Depth) (Foot of Casing)  Perforated Intervals:  In the tested interval how many productive zones do logs show:  In the tested interval how many productive zones do logs show:  In the tested interval homogeneous?  Is the interval homogeneous?  Is the interval homogeneous?  Is the interval homogeneous?  Is the clay content: % or High Mod Low  What is the clay content: % or High Mod Little  In this interval, is there expected near the wellbore:  Geological fault?  Interval thickness change?  Fluid phase contact?  —If yes:— Oil-Water Gas-Water Oil-Gas  During drilling of the interval, was there:  Lost circulation?  Sand production?  Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?							
Open Hole: I.D. in  Is the tested interval: In Casing: O.D. in. Wt: It. I.D.  Open Hole Interval: (Total Depth) (Foot of Casing)  Perforated Intervals: (Total Depth) (Foot of Casing)  In the tested interval how many productive zones do logs show:  I		<del></del>	-	<del></del>			
Is the tested interval:    In Casing :	offingers of Lenses 1		ـــــــــــــــــــــــــــــــــــــ			1	
Open Hole Interval:  Perforated Interval:  (Total Depth)		,	Open Hole :	i.D	ìn		
Open Hole Interval: Perforated Intervals:  In the tested interval how many productive zones do logs show:  1	is the tested interval:		In Cosing :			A/+	1b.
What is the average porosity of the interval?  Is the interval homogeneous?  Is formation consolidation:  What is the clay content:  What is the clay content:  What is the clay content:  Good Mod Low  What is the clay content:  What is the clay content:  Good Mod Low  What is the clay content:  What is the interval, was there case of the interval was there case of the interval was there case of the interval was there as the interval was the						<del></del>	
Is the interval homogeneous?  Is formation consolidation:  What is the clay content:  Is the formation fractured  In this interval, is there expected near the wellbore:  Geological fault?  Interval thickness change?  Fluid phase contact?  —If yes:—  During drilling of the interval, was there:  Lost circulation?  Sand production?  Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?  Yes No  No  No  No  Yes No  No  No  No  Yes No	In the tested interval how man	y producti	ve zones do l	¬ ,		mo	<u></u>
Is formation consolidation:  What is the clay content:  Is the formation fractured  In this interval, is there expected near the wellbore:  Geological fault?  Interval thickness change?  Fluid phase contact?  —If yes:  Coil-Water  During drilling of the interval, was there:  Lost circulation?  Sand production?  Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?  Yes   No	What is the average porosity of	the interva	1?				%
What is the clay content: % or High Mod Low Is the formation fractured Heavily Mod Little  In this interval, is there expected near the wellbore:  Geological fault? Yes No Interval thickness change?	Is the interval homogeneous?				Yes	No.	o
Is the formation fractured	Is formation consolidation:			Good	Mod	j L	ow
Is the formation fractured	What is the clay content:			% or High	Mod	ı 📗 Lı	ow
In this interval, is there expected near the wellbore:  Geological fault? Interval thickness change? Fluid phase contact? —If yes:— Oil-Water  During drilling of the interval, was there: Lost circulation? Sand production? Other (please specify)  Before testing was there a: Scraper run? Caliper run? Mud circulation to bottom?  Yes No Mo Mud circulation to bottom?  Yes No Mo Mud circulation to bottom?					Mod	ı 🗌 Li	ttle
Geological fault ?		d near the	wellhore ·				
Interval thickness change?  Fluid phase contact?  —If yes:—  Oil-Water  Oil-Water  Gas-Water  Oil-Gas  During drilling of the interval, was there:  Lost circulation?  Sand production?  Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?		a noar me	TONDOIG .	•	Vec	N N	
Fluid phase contact?  —If yes:— Oil-Water Gas-Water Oil-Gas During drilling of the interval, was there:  Lost circulation? Yes No Sand production? Yes No Sand production?  Other (please specify)  Before testing was there a:  Scraper run? Yes No Sand No Scraper run?  Caliper run? Yes No Sand No Scraper run?  Mud circulation to bottom?		. 0					<b></b>
		?				<del> </del>	<del></del>
During drilling of the interval, was there:  Lost circulation?  Sand production?  Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?  Yes No  Yes No  Yes No  Yes No	Fluid phase contact?			ר		<del>  </del>	<del></del>
Lost circulation?  Sand production?  Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?  Yes No  Yes No  Yes No  Yes No	—If yes :—	1	Oil-Water [	j	Gas-Water		II-Gas
Sand production?  Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?  Yes No  Yes No  Yes No  Yes No	During drilling of the interval, wa	as there :					
Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?  Yes No Mo	Lost circulation?				Yes	N	o
Other (please specify)  Before testing was there a:  Scraper run?  Caliper run?  Mud circulation to bottom?  Yes No Mo Mud Circulation to bottom?	Sand production?				Yes	N	o
Before testing was there a :  Scraper run ?  Caliper run ?  Mud circulation to bottom ?  Yes No Mo	·						
Scraper run?  Caliper run?  Mud circulation to bottom?  Yes No  Yes No  Yes No							
Caliper run?  Mud circulation to bottom?  Yes No	•				· Ves	□ N	
Mud circulation to bottom?  Yes No	·					<del></del>	<del>  </del>
NIGO SI GUILLION ES SENEN.	·					<del></del>	<b></b>
for how long I find how long since		1.?			<del></del>		
—if yes .—	If yes :		for	how long	lf n	o, how long	since



#### SYMBOLS USED

△T - INCREMENT OF TIME (MINUTES)

 $\frac{T + \triangle T}{\triangle T}$  — DIMENSIONLESS TIME CONSTANT USED FOR THE HORNER PLOT

△T IS THE INCREMENT OF SHUT-IN TIME (MINUTES)

T IS TOTAL FLOW TIME PRECEDING SHUT-IN (MINUTES)

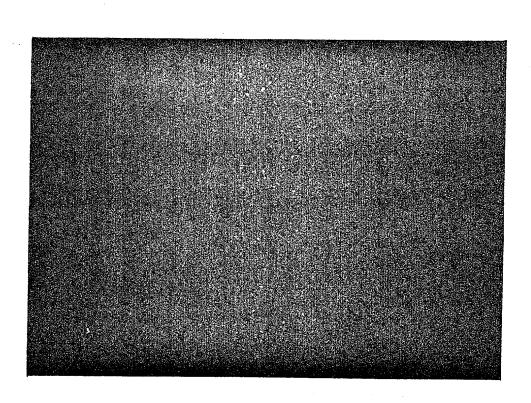
LOG - LOGARITHM TO BASE 10 OF  $\frac{T + \triangle T}{\triangle T}$ 

Pw - Pf - PRESSURE BUILD-UP ABOVE FINAL FLOWING PRESSURE PRECEDING THE BUILD UP WHICH IS USED FOR THE MCKINLEY PLOT.

REPORT Nº	F 82012
JOB N°	
INVOICE/SIR.	
DATE	FEBRUARY 5, 19



# TECHNICAL REPORT



COMPANY \_

HUDBAY OIL

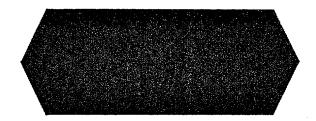
WELL.

COUNTRY\_

SPERM WHALE 1

FIELD.

GIPPSLAND BASIN



## CONFIRMATION OF REPORT DISTRIBUTION

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			·····		
	TTAT TO 3	CITTOI AND	DAGTM		
WELL SPERM W	FIELD	GIPPSLAND	BASIN	TEST Nº_	
COUNTRY	AUSTRALIA	DATE	FEBRUA	RY 5, 1982	
00011111	· · · · · · · · · · · · · · · · · · ·	DATE		·	
Dowell Schlumbe	erger has been requested	to furnish the	following	companies with	Te
Reports. This dist	ribution of Technical Repo	rts will be used	for:		
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	∏Thi	s one test only,			
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unless otherwise n	notified.				
unless otherwise n	notified.				
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#### **Dowell Schlumberger**

Cables: "Bigorange"
Telex: Orange RS 23005
Telephone: 2351022
2351287

FEBRUARY 5, 1982

REPORT NO: F 82012

GENILEMEN,

The enclosed test appears to be a good drill stem test during which the tools did function properly.

Test indicates it is essentially a gas zone. A review of the test datas indicate high permeability.

FRANCIS SOO

RESERVOIRE EVALUATION DEPARTMENT

FS/rs



RECORDER Nº : J 1782

CAPACITY : 4700 PSI

DEPTH : 814.84 M

OPENING : INSIDE

TEMPERATURES : 126 DEG F

CLOCK Nº :9-3823 CAP: 48 HRS CLOCK TRAVEL : 0.020138 in/min

CALIBRATION DATA AT

936.001

 $A = \cdots 1.10$ 

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.

DS7 3 DST 3 J 1782 4700 psi inside 18 1 82 9-3823 48 MR



PRESSURE DATA FOR RECORDER: J 1782

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
•				
INITIAL HYDROSTATIC	1	1496		
INITIAL FLOW (1)	2	1167		
INITIAL FLOW (2)	3	1194	7	7
INITIAL SHUT-IN	4	1204	31	31
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN		•		•
FINAL FLOW (1)	5	1187	0	0
FINAL FLOW (2)	6	1190	101	101
FINAL SHUT-IN	7	1216	180	180
FINAL HYDROSTATIC	8	1475		

REMARK :



RECORDER Nº : J 1629

CAPACITY : 2800 PSI

DEPTH : 799.63 M

OPENING : INSIDE

TEMPERATURES : 126 DEG F

CLOCK Nº : 9-1437 CAP: 48 HRS CLOCK TRAVEL : 0.020524 in/min

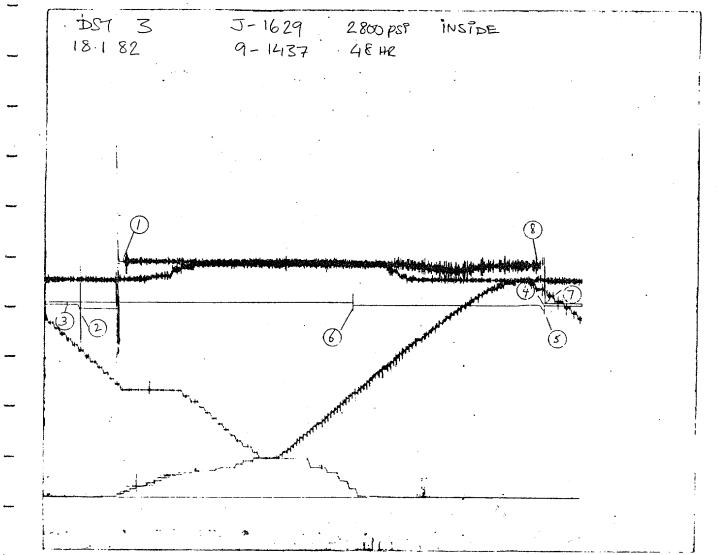
CALIBRATION DATA AT

557.0221

1.1097

PRESSURE (PSI) = DEFLECTION (INS)  $\times$  M  $\pm$  A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER :

J 1629

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
•				
INITIAL HYDROSTATIC	1	1461		
INITIAL FLOW (1)	· <b>2</b>	1145		•
INITIAL FLOW (2)	3	1178	7	7
INITIAL SHUT-IN	4	1183	31	31
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	1137	0	0
FINAL FLOW (2)	6	1179	101	101
FINAL SHUT-IN	7	1199	180	180
FINAL HYDROSTATIC	8	1445		

REMARK:



RECORDER Nº : J 1630

CAPACITY: 2800 PSI DEPTH: 813.04 M

OPÉNING : OUTSIDE

TEMPERATURES : 126 DEG F

CLOCK Nº : 9-3813 CAP: 48 HRS CLOCK TRAVEL : 0.021235 in/min

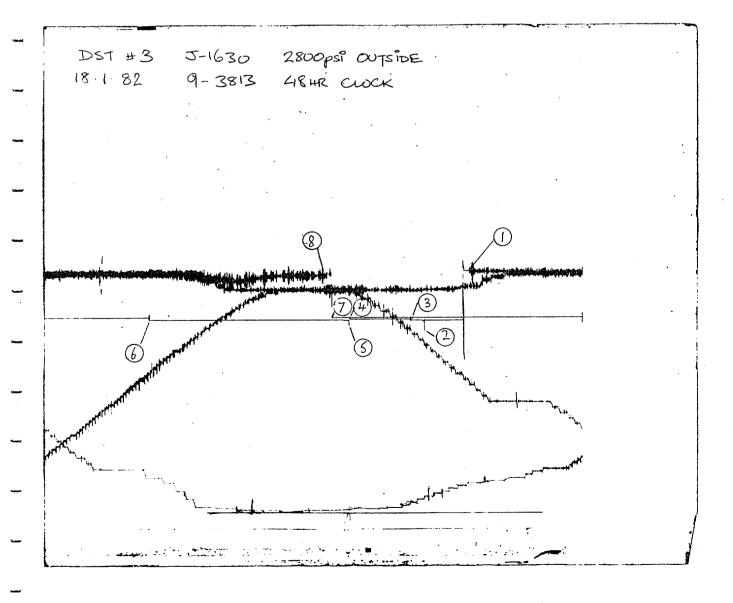
CALIBRATION DATA AT

M = 564.96988

5.357018

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER : J 1630

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
•				•
INITIAL HYDROSTATIC	1	1522		
INITIAL FLOW (1)	2	1152		
INITIAL FLOW (2)	3	1217	7	7
INITIAL SHUT-IN	4	1223	31	31
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	1183	0	0
FINAL FLOW (2)	6	1219	101	101
FINAL SHUT-IN	7	1233	180	180
FINAL HYDROSTATIC	8	1497	-	

REMARK :



PRESSURE DATA FOR RECORDER : J 1630

LABEL POINT	ΔT (mins)	PRESSURE (PSI)	$\frac{T + \Delta T}{\Delta T}$	LOG	Pw — Pf (PSI)	COMMENTS
1	•	1522			•	INITIAL HYDROSTATIC
2 .	. 0	1152				INITIAL FLOW (1)
•	2	1217		4		
	. 4	1217				
3	7	1217				INITIAL FLOW (2)
3	0	1217				START SHUT-IN
	2	1223	4.50	0.65	6	T = 7
	4	1223	2.75	0.44	6	•
	6	1223	2.17	0.34	6	•
	8	1223	1.88	0.27	6	
	10	1223	1.70	0.23	6	
	15	1223	1.47	0.17	6	
	20	1223	1.35	0.13	6	INITIAL SHUT-IN
4	31	1223	1.23	0.09	6	FINAL FLOW (1)
5	0	1183				
	10	1218				
	20	1218				
	40	1219				
	60	1219				
	80	1219				
6	101	1219				FINAL FLOW (2)
6	0	1219				START SHUT-IN
	2	1233	55.00	1.74	14	T =108
	4	1233	<b>28.0</b> 0	1.45	14	•
	6	1233	19.00	1.28	14	
	8	1233	14.50	1.16	14	
	10	1233	11.80	1.07	14	
	20	1233	6.40	0.81	14	
	40	1233	3.70	0.57	14	
	60	1233	2.80	0.45	14	
	.80	1233	2.35	0.37	14	
	100	1233	2.08	0.32	14	
_	150	1233	1.72	0.24	14	
7	180	1233	1.60	0.20	14	FINAL SHUT-IN
. 8		1497				FINAL HYDROSTATIC



#### Formation Testing Field Report

	WELL IDEN	TIFICATION		F 820
Company: HUDBAY OIL Field: GIPPSLAND BASIN Lo	Well I	No · SPERM WHAL	E Test No :	3
Field: GIPPSLAND BASIN LO	cation · OFFSHORE	- VICTORIA Co	ALISTRAL	JA
Tested Interval: From 819 M	354 to 826 M	EK.	unitry	JA 2 4
Type Test : Open Hole Casing ;	Y) Conventional [7]	Ctroddlo . D I or	ad ria D. Jack va E	) Flank-171
Valve : MFE □ PCT ☒ SPRO ☒	Other:	Straddle ; Lar	with Packer	Retainer 🗆
	HOLE	DATA		W
Geologic Level: UPPER CRETACTO Net Productive Interval: 8 M Total Depth: 894.53 M 深 De Open Hole Size: - in. Casing Size: 9-5/8 in. Before test: Caliper Yes Not	008 [	Description :		
Net Productive Interval : 8 M	X	Estimated Porosity	<u> 25 - 30 </u>	
Total Depth: 894.53 M XX De	oths measured from	n: RTKB	Elevation ·	9.35 M
Open Hole Size : in.	- Rat Hole Siz	7e : -	in from	ff
Casing Size: 9-5/8 in	40 lbs/ft Liner	Size - in	- lbs/ft	from - f
Before test: Caliner Ves No.	Scraper VesiXI	No Circulati	ion Vociti	2 brs: No
Before test. Camper Tes 1406	Scraper research	NO CIrculati	1011 162457 101	Z NIS; NOL
	MUD	ATA	·····	
Mud Type : BARACARB BRINE			Weight :1.32	SG
Viscosity: 50 Water Lo	ss12cc	Mud Resistivity.	at	°F
Filtrate Resistivity:at	°F; Chloride	ppm:111,0	000	
	INSTRUMENT AN	D CHART DATA		
Recorder No.	J 1629	J 1630	J 1782	
Capacity (psig)	2300	2800	4700	
Depth	799.63 M	313,04 M	814.84 M	
Inside/Outside	INSIDE	OUTSIDE	INSIDE	
Above/Below valve	BELOW	BELOW	BELOW	
Clock No.	9-1437	9-3813	9-3823	<del> </del>
Capacity (hrs.)				<del> </del>
Temperature	48 HRS	48 HRS	48 HRS	<del> </del>
	126 DEG F	126 DEG F	126 DEG F	<del></del>
Initial Hydrostatic Pressure	1468	1533	1526	<u> </u>
Pre-flow (1) Start Pressure	983	1155	1172	
(2) Finish Pressure	1194	1214	1199	
Initial Shut-in Pressure	1195	1232	1231	
Second Flow (1) Start Pressure	1144	1186	1197	
(2) Finish Pressure	1190	1229	1218	
Second Shut-in Pressure	1208	1244	1235	
Final Flow (1) Start Pressure		`		
(2) Finish Pressure	1			
Final Shut-in Pressure				
		<del>                                     </del>		<b>+</b>
				<u> </u>
Final Hydrostatic Pressure	1457	1516	1516	1
	OPERATIONS	CHAMADV		· · · · · · · · · · · · · · · · · · ·
Left Station at 10 : 55 on S		Location at 13	: 00on 10.	1.82
			at 03 : 00 on	
Off Location at:on		n at:		
			. Un wine age	· · · · · · · · · · · · · · · · · · ·
Comments: TOOLS AND TEST NO				٠
SAMPLE CHAMBER RE	TURNED TO PERTH	UN-DRAINED.		
ATIO	20000			00
	IR No.: 62006	TIVOE	Date: 18.1.	82 NNV
Customer	Tester_J PARTR	TUCHE Cus	tomerB NCELINE	1.11.17



#### Surface Data

Report No.

F 82012

Customer: HUDBAY OIL Well No: SPERM WHALE 1 Test No. 3

TEST SEQUENCE AND FLOW RA		T		7	
Description and Flow Rates	Date	Time hrs mins		Pressure is psig	Surfac Choke
Packer Depth: 803.56 M XX Set at:	18,1,82	13	04	-	<del>-</del>
Opened Tool: (Annulus pressure 1400 psi)	17	13	27	_	
STRONG BLOW IMMEDIATELY. DIESEL CUSHION RUN TO		ļ	<u> </u>		
WELL HEAD.					
DIECEL MO CURRACE	11				
DIEȘEL TO SURFACE	17	13 13	28	- SEC	
		13	29 30	250 260	<u>}</u>
		$\frac{13}{13}$	31	200	
		13	33	400	<u>2</u>
SHUT-IN TOOL	11	13	34	-	
OPENED TOOL, ANNULUS PRESSURE 1400 PSI	91	14	05	_	
		14	06	300	1,
		14	07	760	1/3
		14	08	960	1
		14	09	1000	<del></del>
II C AT 200 DDM	-i	14	19	900	
H <sub>2</sub> S AT 200 PPM H <sub>2</sub> S AT 200 ppm		14 15	_25_	840	<del>}</del>
		_15	31		
SHUT-IN TOOL	17	15	46		
Reverse Circulation Started (Pump pressure 500 psig)	18.1.82	18	16		
Reverse Circulation Finished Pulled Packer Loose/Pulled Out of Retainer	11	18	45		
	11	18	46		
Cushion Type: DIESEL Amount - bbls; Length $rac{ ext{TO}}{ ext{WELL}}$	, ft Pressur	e 97.	<sub>4</sub> psi	Bottom Choke	1''

	RECOVERY	DATA				
	Recovery Description	Feet	Bbis	% Oil	% Water	ç. Other
1						
2						
3						·····
4						
5						
6						

	Oil-API Grav	vity	Gas Gravity	G.O.R.	Resistivity	,	Chlorides
1	°at	°F			at	°F	ppm
2	° at	°F			at	°F	ppm
3	<u>° at</u>	°F			at	°F	ppm
4	° at	۰F			at	°F	ppm
5	° at	°F			at	°F	ppm
6	° at	°F	·		at	°F	ppm

Comments :



#### Equipment Data

			Transfer I	02012
Customer: HUDBAY OIL	Well No. :	SPERM WHALE 1	Test No.: 3	}

SAM	PLE CHAMBER RECOVE	RY DATA	
Sampler Drained RETURNED TO DS On Location OFFICE PERTH FOR Elsewhere DRAINING Name: Address: 8 KINGSCOLE ST KENDALE	Recovery   Gas cu ft.   Oil c.c.   Water c.c.   Mud c.c.  °F	Mud	
Gas/Oil Ratio cu ft./bbl S	ample Chamber Pressure	e ·	psi.

Type JOTOO	O.D. (in) 4 <sup>3</sup> / <sub>4</sub>	I.D. (in)	Length	Depth
	43	21		
		44	0.25	815.09
	4-7/8	$1\frac{1}{2}$	1.80	814.84
† †	11	12	1.80	813.04
11	43	21/4	6.10	811.24
_	11	2-5/16	0.63	805.11
JOTOO	9-5/8			803.56
_				802.90
BOWEIN				802.58
				801.98
- 11	11	111		799.63
11	5	1-3/8		797.83
11		+		794.93
††	11			790.27
	6			787.58
		11		787.26
		2-11/16		705.67
TOTTO				705.31
100100		24		689.47
TOTTO				661.18
30100				
<del>-</del>				660.46
				660.25
Tel ODERUOOT				60.97
				60.77
				60.50
1				58.70
				56.26
				56.01
-				55.68
			0.32	<u>- 5.37</u>
<del>-</del>				- 5.69
		<u> </u>		· · · · · · · · · · · · · · · · · · ·
		<del></del>		
<del>                                     </del>				
<b> </b>				
<b>-</b>				
	·		109.88	
	11	40 lb/F   4\frac{3}{4}     BOWEN   4-5/8     JOTCO   4-7/8     ''	JOTOO 9-5/8 3  40 1b/FT  - 4\frac{3}{4} 2-5/16  BOWEN 4-5/8 2-7/16  JOTOO 4-7/8 1\frac{1}{2}  "" " " ""  " 5 1-3/8  "" 4\frac{3}{4} 1  "" " 2\frac{1}{4}  - 6 2-7/8  6\frac{1}{2} ""  - 6\frac{1}{4} 2-11/16  JOTOO 5 2\frac{1}{4}  JOTOO ""  - FIOPETROL  "" " " " " " " " " " " " " " " " " "	JOTCO 9-5/8 3 0.95  40 lb/FT 0.66  - 4\frac{3}{4} 2-5/16 0.32  BOWEN 4-5/8 2-7/16 0.60  JOTCO 4-7/8 1\frac{1}{2} 2.35  " " " " 1.80  " 5 1-3/8 2.90  " 4\frac{3}{4} 1 4.66  " " 2\frac{1}{4} 2.69  - 6 2-7/8 0.32  - 6\frac{1}{2} " 81.59  - 6\frac{1}{2} 2-11/16 0.36  JOTCO 5 2\frac{1}{4} 15.84  - 4\frac{3}{4} 28.29  JOTCO " 0.72  - 0.21  - 0.20  FIOPETROL 0.27  " 1.80  " 2.44  " 0.25  " 0.33  61.05

_	Comments:



To be completed by Customer Representative

Customer: HUDBAY OIL	·	Well No.	: SPERM	WHALE 1	Tes	t No.: 3
Tested Interval	Sand-	Lime-	Chalk	Clay	Shale	Other (please specify
Major Mineral Species	stone	stone		,		(please specify
Minor Mineral Species						
Stringers or Lenses						
	C	pen Hole :	1.D.	in		
Is the tested interval:						Ib.)
Open Hole Interval : (**Perforated Intervals :	Fotal Depth)	In Casing :	O.D(Foo		Vt :	lb. ft. I.D.
In the tested interval how	many productiv	e zones do	logs show :			
		1	2		mor	e
What is the average porosit	y of the interval	?				<b>%</b>
Is the interval homogeneou				Yes	No.	,
Is formation consolidation:			Good	Mod	L.	ow 🗍
What is the clay content:			% or High	Mod		
Is the formation fractured			Heavily	Mod		ttle
In this interval, is there expe	ected near the v	vellbore :				
Geological fault?				Yes	N.	
Interval thickness cha	ange ?			Yes	M N	<del> </del>
Fluid phase contact ?				Yes	No.	<del></del>
—If yes :—		il-Water	7	Gas-Water	<del></del>	I-Gas
•			_i			. • • • • • • • • • • • • • • • • • • •
During drilling of the interva	ii, was triere .			Yes	□ No	
Lost circulation?				Yes	No.	
Sand production?				163		,
Other (please specify	/)					·
Before testing was there a:						
Scraper run?				Yes	No.	·
Caliper run?				Yes	No.	·
Mud circulation to bo	ttom?		_	Yes	No	,
			how long		o, how long :	1 1



#### SYMBOLS USED

△T - INCREMENT OF TIME (MINUTES)

 $\frac{T + \triangle T}{\triangle T}$  — DIMENSIONLESS TIME CONSTANT USED FOR THE HORNER PLOT

△T IS THE INCREMENT OF SHUT-IN TIME (MINUTES)

T IS TOTAL FLOW TIME PRECEDING SHUT-IN (MINUTES)

LOG - LOGARITHM TO BASE 10 OF  $\frac{T + \triangle T}{\triangle T}$ 

Pw - Pf - PRESSURE BUILD-UP ABOVE FINAL FLOWING PRESSURE PRECEDING

THE BUILD UP WHICH IS USED FOR THE MCKINLEY PLOT.

APPENDIX D4

P 0 S 1 T 1 0 N 1 N G

REPORT

# SPERM WHALE-1

RIG POSITIONING REPORT

Submitted By: K.H. Sit, SENIOR GEOPHYSICIST

Supervised By: A.J. Ferworn, CHIEF GEOPHYSICIST

#### INTRODUCTION

The Sperm Whale-1 positioning survey was conducted between 21st and 26th December, 1981.

The survey consisted of:-

- 1. Setting up the Trisponder Survey net.
- 2. Checking the survey systems.
- 3. Positioning and setting the anchor buoys.
- 4. Determining the final rig position.

Decca Survey (Australia) Ltd. supplied both personnel and survey equipment.

The equipment used to conduct the survey consisted of:-

- 1. Two Trisponder Receivers.
- 2. One JMR-4 Satellite Receiver.
- 3. Four onshore Trisponder base stations.

The Trisponder was the primary navigation system used to position the rig with the Satellite navigation system as an independent check and a 100% backup.

A HOAL Geophysicist was on board to supervise the survey.

An independent report will be submitted by Decca Survey.

### ANCHOR PATTERN AND BUOYS

Using the given bow heading of  $230^{\circ}$ , anchor line bearings, and anchor cable and chain length of 557 metres, its positions of the anchor buoys were determined geometrically.

The following table lists the positions:

Anchor Buoy No.	Bearing	<u>Easting</u>	Northing
1	260	619069	5786803
2	290	619094	5787091
3	350	619068	5787523
4	20	619896	5787497
5	80	620254	5787071
6	110	620228	5786784
7	170	619714	5786355
8	200	619427	5786377
Bow Heading	230 <sup>0</sup>		

The anchor buoys consisted of a 51 mm pipe approximately 5.5 metres long with a Norwegian buoy at the centre. A 0.6 metre section of chain was attached to the bottom and a colourpennant was attached to the top. They were anchored by two 1 metre steel rails weighing approximately 112 kg (180 kg for the Moonpool buoy). Three concrete cylinders were also attached to the base of each buoy to keep the pipe vertical. 60 metres of rope were used at each anchor to allow a maximum swing of approximately 26 metres.

#### SURVEY NET VERIFICATION AND SURVEY CHECKS

The seabed topographic features on line GB81-40 were run on Monday 21st, December 1981 at 0900 hours to verify the survey net to make sure that the survey net used to position the rig matched that used in the seismic recording. The attempt to re-occupy the line proved to be very satisfactory.

The anchor buoys were layed at the Sperm Whale-1 location on Tuesday 22nd December, 1981 between the hourse 0910 and 1020. The co-ordinates of the buoys were checked soon after the last buoy was down between 1025 and 1050 the same day. All buoys were within 20 metres of their proposed locations.

On Thursday 24th December, 1981 the buoys were checked again between the hours 0817 and 0840. All buoys were found to be within 20 metres of their proposed locations.

## PROPOSED LOCATION

The proposed location for Sperm Whale-1 was shotpoint 130, Line GB81-26.

The co-ordinates for the position were:-

Latitude 038<sup>0</sup> 03' 26.21" S Longitude 148<sup>0</sup> 21' 50.23" E

UTM Co-ordinates from Central Meridian 147°

0619661 metres east 5786937 metres north

The following base stations were used for the survey:-

	Easting	<u>Northing</u>
Mt. Cann	674471.0	5831344.0
Raymond	640921.4	5824777.0
Jemmys	584670.0	5806793.0
Nowa Nowa	596071.5	5827552.2

The distances to the proposed Sperm Whale-1 well from the Base stations were:-

Mt. Cann	70556	ma+1444
nt. Cann	70556	metres
Raymond	43414	metres
Jemmys	40243	metres
Nowa Nowa	46984	metres

## FINAL POSITIONING

The 'Petromar North Sea' departed the 'Whale' location at 0440 hours, Friday 25th December, 1981. It arrived on 'Sperm Whale' location at 0530 and the first anchor, No.5 was dropped at 0558, last anchor down at 1630. Trisponder signals were extremely good throughout.

At 2200 tensioning up was completed. The preliminary position of the 'Sperm Whale-1' well, as follows:-

Latitude :  $038^{0}$  03' 26.09" Longitude :  $148^{0}$  21' 51.57"

UTM Co-ordinates from 147° Central Meridian:

Northing : 5786940 metres Easting : 0619694 metres

The stern is 33 metres at a bearing of  $85^{\circ}$  from the proposed location.

## FINAL POSITION

The final position of the 'Sperm Whale-1' well is:-

Latitude 038<sup>0</sup> 03' 25.863" Longitude 148<sup>0</sup> 21' 51.644"

UTM Co-ordinates from the 147° Central Meridian:-

Northing 5786947 metres Easting 619696 metres

The stern is 36 metres at a bearing of  $74^{0}$  from the proposed location.

Final distances to the 'Sperm Whale-1' well from base stations are:-

Mt. Cann 70487 metres Raymond 43356 metres Jemmys 40276 metres Mt. Nowa Nowa 46987 metres

The JMR-4 Satellite Doppler observations were taken on board the rig to have independent checking on Sperm Whale-1 location established by the Trisponder observations. The Satellite gave the 'Sperm Whale-1' location after 4 passes is:

Latitude 038<sup>0</sup> 03' 25.450" Longitude 148<sup>0</sup> 21' 51.565"

#### DAILY LOG

## Sunday 20th December, 1981

2300 hrs.

H. Sit departed Perth.

Arrived at Bairnsdale.

Arrived Melbourne airport.

#### Monday 21st December, 1981

0515 est.

0640 hrs.

0710 hrs.

0900 hrs.

Tuesday 22nd December, 1981

0900 hrs.

0910 hrs.

1020 hrs.

1025 hrs.

1050 hrs.

Arrived on Sperm Whale-1 location.

Arrived on rig "Petromar North Sea"

Checking Fathometer on line GB81-40.

Moonpool buoy down.

Last buoy down.

Checking Moonpool buoy and eight anchor

buoys position.

Finished first check, all within 20 metres

of their proposed locations.

Wednesday 23rd December, 1981

Anchored within markers buoy pattern.

#### Thursday 24th December, 1981

0820 hrs.

Rechecked buoy locations (all within 20 metres of proposed locations)

#### Friday 25th December, 1981

0440 hrs.

'Petromar North Sea' left 'Whale-1' for 'Sperm Whale-1'

0530 hrs.

Arrived on 'Sperm Whale-1' location.

0558 hrs.

1630 hrs.

1900 hrs.

First anchor (no.5) dropped.

Last anchor (no.2) dropped.

Phoned Al Ferworn, Perth, rig location

accepted.

2200 hrs. Commenced tensioning up anchors.

#### Saturday 26th December, 1981

0330 hrs.

Well spudded in.

1330 hrs.

H. Sit departed rig by helicopter for

Bairnsdale.

1350 hrs.

Driving to Melbourne.

1410 hrs. 1740 hrs.

Arrived Melbourne airport.

2000 hrs.

Departed Melbourne.

Arrived Bairnsdale.

2030 (Perth time)

Arrived Perth.

# OIL and GAS DIVISION

1 4 APR 1983

GEOLOGY

(Pages 20 - 37)

3.

#### 3. GEOLOGY

## 3.1 <u>Summary of Previous Investigations</u>

Gippsland Basin exploration commenced in 1924 with the reported discovery of oil and gas in a water bore drilled onshore near Lakes Entrance. To date, over 125 wells have been drilled in the onshore part of the basin but only minor hydrocarbon accumulations have been encountered.

Initial exploration in the offshore Gippsland Basin was conducted by the Bureau of Mineral Resources when they undertook a regional gravity and aeromagnetic survey between 1951 and 1956. The first permits, covering a large part of the offshore Gippsland Basin, were taken up by BHP Co. Ltd. (later Hematite Petroleum Pty. Ltd.) in 1960. Esso joined the original permittee in 1964 and the first offshore well, Barracouta No.1, was drilled in 1965. Over eighty offshore wells have now been drilled in the basin resulting in the discovery of recoverable reserves approximately 3 billion barrels  $(0.466 \times 10^{12} \text{ m}^3)$  of oil and 8 trillion cubic feet  $(220.4 \times 10^{12} \text{ m}^3)$  of gas.

A summary of early contributions to the understanding of the geology and hydrocarbon potential of the Gippsland Basin was presented by W.F. Threlfall and others in 1974. Esso-BHP have published several papers on basinal stratigraphy and geological evolution during their exploration and development of the basin, and papers dealing with the geology of individual fields have been published as the fields were developed.

Exploration Permit Vic/P-11 consists of 51 blocks which previously formed parts of the Exploration Permits Vic/P-1 and Vic/P-8, held by Esso-BHP and a consortium headed by BOC Australia respectively. The area now covered by Vic/P-11 was gazetted in December 1976. The permit was granted to Gas and Fuel Corporation of Victoria on August 8, 1978, and Beach Petroleum subsequently became joint Permittee and Operator.

Hudbay Oil (Australia) Ltd. farmed into the Permit in December, 1980, and in February 1981 shot the GB81 Seismic Survey, consisting of 359 line kilometres of 36-fold seismic survey. Detailed mapping, incorporating data from the GB81 survey, Beach Petroleum's GB79 Seismic Survey and trade data from Esso's G80A Seismic Survey, defined five drillable prospects. Sperm Whale-1 was the fourth and final well of a four exploration well programme.

3.2 <u>Geological Setting</u>

#### 3.2.1 Regional Setting

The Sperm Whale structure lies towards the northern margin of the Gippsland Basin, which is situated in south-eastern Australia and is bounded to the north and south by the Victorian Highlands and Bassian Rise respectively (Enclosure E2). The western limit of the basin is taken as the Mornington Peninsula and to the east the basin opens to the Tasman Sea. The Gippsland Basin covers approximately  $50,000~\rm{km}^2$  and is filled with up to  $10,000~\rm{metres}$  of Lower Cretaceous to Recent sediments.

#### 3.2.2 Tectonic Elements (Enclosure E2)

The offshore Gippsland Basin is separated by fault complexes into three major divisions: The North Platform, or Lakes Entrance Platform; the graben-like Central Deep or Strzelecki Basin; and the South Platform (Hocking & Taylor, 1964; James and Evans, 1971; Hocking, 1972).

The stable platforms to the north and south are areas where the Tertiary sequence unconformably overlies Palaeozoic basement. In these areas the structures within the Tertiary section consist simply of small-scale drapes over palaeotopographic ridges and small fault scarps.

The Southern Platform is separated from the Central Deep Basin by a major fault complex, the South Bounding Fault. This is an offshore extension of the Foster Fault System and consists of a system of down-to-basin normal faults arranged en echelon. The northern boundary of the Central Deep is less well defined.

Major fault trends within the central part of the basin are offshore extensions of the southeast-northeast trending Foster Fault and the antithetic, east-west trending Rosedale Fault System. The latter is known to be a reverse fault superimposed upon an older normal fault within the Lower Cretaceous, and to have a throw of up to 160 metres in the West Seahorse area. Reverse movement along the fault system is believed to have occurred as a result of the same stresses

that led to the development of the major anticlines in the central basin during the Upper Eocene to Lower Oligocene.

Numerous northwest-southeast, basin-forming normal faults have been recognized within the Central Deep.

The major hydrocarbon-bearing anticline structures in the central basin are elongate, with a dominant southwest-northeast axial trend. They were formed by right-lateral, convergent shearing brought about by the movement of continental plates, as will be discussed in Section 3.2.3. The main hydrocarbon traps in the Vic/P-11 Permit were formed as a result of the same shearing stress, resulting in arching associated with reverse movement superimposed upon older normal faults.

## 3.2.3 Geological Evolution and Regional Stratigraphy (Figure 11)

During the Lower to Middle Palaeozoic a series of major orogenies occurred within the Tasman Geosyncline. This resulted in a dominantly north-south structural grain within the tightly folded and faulted Palaeozoic metamorphics. These geosynclinal sediments were subsequently intruded by Lower Devonian granitic rocks. A major rift formed across southern Australia during the Jurassic due to the operation of the Antarctic and Australian cratons. The rift valley formed over the entire length of the present southern coast. of Australia. Into this major depositional axis a typical sequence of rift valley sediments was rapidly deposited, as clastics were stripped from the adjacent Palaeozoic highlands. The initial deposits of the Upper Jurassic to Lower Neocomian consists of conglomeratic wedges and alluvial fan detritus, commonly of a quartzose sandstone nature. Jurassic intrusives and Lower Cretaceous extrusives. both associated with rifting, provided a major provenance for the 3,500 metres of Lower Cretaceous Strzelecki Group sediments.

During Lower Cretaceous times, the Gippsland Basin formed a half graben with the major subsidence along the southern Foster Fault system. The Strzelecki Group sediments are texturally mature but mineralogically immature, being felspathic and chloritic. They consist of a monotonous,

cyclic sequence of interbedded sands, silts and muds deposited on a subsiding fluvial plain. A large east-west rift developed, separating sediments of the Tasman Geosyncline. The eastern end of this rift is believed to have terminated in a triple junction formed by the Australian, Antarctic and Lord Howe Rise plates. The western arm of the triple junction was coincident with the ancestral Otway and Gippsland Basins and, as this arm of the triple junction failed during the Turonian, the Lord Howe Rise plate moved eastwards away from the Australian-Antarctic plate. This resulted in the rifting of the eastern portion of the Antarctic and Australian plates along a line parallel to, and off the west coast of, Tasmania. Therefore the Tasmanian craton remained attached to the Australian plate but was separated from it by an east-west, aborted, rift valley basin.

The Lower Cretaceous Strzelecki Group sediments are unconformably overlain by up to 5,000 metres of fluviatile and lacustrine Latrobe Group sediments. Upper Cretaceous sedimentation tended to be superimposed on the underlying Strzelecki Group with the deposition of shales, minor coals and poorly sorted sandstones in a fluviatile environment. In the Upper Senonian, approximately 85 million years B.P., the Lord Howe Rise Plate moved away, resulting in the deposition of a complex system of fluvial and deltaic plain sediments sourced from the northwest and north. Growth and movement on the basin-forming normal faults resulting in continued subsidence of the basin during the Palaeocene and Eocene.

The northern part of the basin was uplifted as fault movement elsewhere in the basin lessened during the Eocene. A period of submarine and subaerial channel-cutting occurred during the Middle to Upper Eocene in the Tuna-Flounder area. The channel-cutting preceded the onset of a marine transgression from the southeast during the uppermost Eocene to Lower Oligocene, a period of instability and basin tilting. The en echelon disposition of the fold trends and fault systems is most likely the result of Upper Eocene east-west, right lateral, convergent shear deformation. The crestal areas of the folds were subsequently eroded during an associated

period of relative sea level drop, while the deeper parts of the basin continued to receive sediments. The compressional regime reactivated the severe channeling and the Marlin Channel was formed as subaerial and submarine drainage systems were laterally restricted.

The transgression continued into the Lower Oligocene with the deposition of the shallow water glauconitic sands and silts of the Gurnard Formation. Around the margins of the basin, sand buildups occurred as the transgression reached its maximum extent. During the uppermost Eocene to Lower Oligocene, a marked change in sediment type occurred: the fluvial and deltaic coarse grained clastics were replaced by fine grained, calcareous shales and marls. The change in sediment type may be due, in part, to a change in provenance related to the widespread deposition onshore of volcanics during the Upper Eocene wrenching episode.

Sea level fluctuations during the Miocene produced a complex system of interfingering and overlapping channels, which cut into the soft limestones and marls of the Lakes Entrance Formation and Gippsland Limestone. A linear, submarine slump zone of over 125 kilometres in length has been observed along the major south-bounding fault system. A wedge of sediment moved towards the centre of the basin as a result of reactivation of this fault system during the Miocene, and a major cratonic uplift, the Kosciusko Uplift, was initiated in the Miocene and culminated during the Upper Pliocene and Lower Pleistocene. The Victorian Highlands were uplifted and provided a renewed clastic provenance, while faults and associated structures around the northern margins of the basin were rejuvenated. Extensive erosion is currently occurring in the Strzelecki Hills and a relatively thin veneer of Quarternary sediments is being deposited across the southeastern Gippsland coastal plain.

	MULION	4		bSINAL	STRATIGRAPHY
	MILLION YEARS	AGE	FORMATION / SEISMIC EVENT	PLANKTONIC FORAMINIFERAL	PALYNOLOGICAL (SPORE - POLLEN)
				ZONATION	ZONATION
	_	·	SEA LEVEL	(TAYLOR,1981)	(PARTRIDGE, 1976)
	0 -		SEA FLOOR -		
	2 .	PLEISTOCENE LATE/MID	- <b> </b>	A1/A2 A3	`
	4 -	PLIOCENE		A3	. :
	6 -	EARLY PLIOCENE	Д	Bl	1
	8 -	LATE MIOCENE	N N		
	10 -		H O	B2	
	12 -		N N	С	. **
	14 -	MID	<u>а</u> ы	D1	•
ľ		MIOCENE	H	D2 E	$\begin{bmatrix} 1 \\ 2 \end{bmatrix}$
	16 -		M G H	F	-2
	18 -	EARLY MIOCENE	o \		
	20 -	MIOCEME	Z	G	
	22 -		A Z	HL	
ĺ	24 –		- H O	H2 -	
	26 -		N H	Il	·
	28 -	LATE	K.	r	·
	30 -	OLIGOCENE	E A	12	
	32 -		₩ 0	Jl	
ı	34 -	EARLY	4 4	0.2	P. TUBERCULATUS
١	36 -	OLIGOCENE	L	J2	
	38 -	LATE	"TRANSITION ZONE" OR GURNARD FORMATION	K	UPPER
	40 -	EOCENE	POTONIA LOWERTION		N. ASPERUS
ı	42 -		<u>.</u>		A
	44 -	MID	Ď	И	MIDDLE N. ASPERUS
1	46 -	EOCENE	O #		LOWER
١			ט	0	nothofagidites Asþerus
ı	48 -			P	PROTEACIDITES ASPEROPOLUS
	50	EARLY	(Base of Gippsland Foram sequence)		U. M. DIVERSUS
	52 - 54 -	EOCENE			LOWER MALVACIPOLLIS
		LATE		į	DIVERSUS
	56 -	PALEOCENE			UPPER L. BALMEI
	58 –	MIDDLE	M M		LOWER
	60 -	PALEOCENE	0		LYGISTEPOLLENITES
	62 _	EARLY	α E+		BALMEI
	64 -	PALEOCENE	4 L		
	66 -	EARLY EARLY	Ħ		TRICOLPITES
	68 -	MAASTR MAASTR ICHTIAN TATE			LONGUS
	70 -	CRETACEOUS NAAASTR- ICHTIAN SENONIAN SENONIAN			T. LILLIEI
7	uthor:		Hudbay Oil (Australia)	1+4	N SENECTUS Scale:
F	B.Butcher rawn:		SHORE GIPPSLAND	•	
<u> </u>	A. Clark ate:				Drawing Nº
L	April 1982	THEGIONAL	STATIGRAPH	IC COL	UIVIN   A4-GL-490

3.3 Stratigraphy A sedimentary section ranging from Lower Cretaceous to Recent was penetrated in the Sperm Whale No.1 well (Figure 12). Age determinations are based on the Palaeontological and Palynological studies of sidewall cores (Appendix G1 and G2). The age boundaries were selected with reference to this and other data, including lithology data from drilling cuttings and sidewall cores, and wireline log interpretations. Time divisions were placed midway between sidewall core points unless more accurate subdivisions were possible from log response or cuttings lithology. Due to the standard drilling practice of by-passing the shakers until the installation of the 20" casing, no samples were recovered above 196 metres. Lower Cretaceous (1417 - 947 metres) The Strzelecki Group is represented by a monotonous sequence of arenaceous claystones and argillaceous sandstones, interbedded with cleaner sands and clays. Accessories within the sandstones include lithic fragments and silica cement. High

The Strzelecki Group is represented by a monotonous sequence of arenaceous claystones and argillaceous sandstones, interbedded with cleaner sands and clays. Accessories within the sandstones include lithic fragments and silica cement. High resistivity peaks indicate silicified bands throughout the interval. Precise subdivisions within the Lower Cretaceous period are not possible but the evidence of Coptospora paradoxa suggests an Albian age above 1253 metres. An unconformity is placed at 947 metres based on the character changes of the Gamma Ray and Denisty Logs.

# Palaeocene to Eocene (Undifferentiated) (947 - 805 metres)

Precise age datings over this interval have not been possible due to unfavourable lithologies and the poor diversity of spore/pollen assemblages. Lower Eocene and Palaeocene ages are inferred from the existence of M.diversus and L.balmei assemblages respectively. This evidence also confirms the presence of non-marine Latrobe Group sediments throughout the interval. There is palaeontological evidence to suggest a transitional environment at the top and directly overlying the Latrobe Group.

It is therefore possible to have Middle to Upper Eocene rocks within the Latrobe Group. Sidewall cores taken below 851 metres were considered barren of spore/pollen assemblages so Upper Cretaceous age sediments may well be present below 851 metres.

Lithologically this sequence consists of non-marine sandstones, claystones and thin coals. The sandstone units are often greater than 50 metres thick and have excellent porosities and permeabilities. The coal seams are generally less than 1 metre thick.

## Late Eocene (805-800 Metres)

Planktonic foraminifera of zone k were described in a sidewall core at 803.9 metres hence a late Eocene age is given for this interval. Glauconitic calcarenites and calcisiltites typify this section, which was deposited in an estuarine environment. The top of this unit is marked by an unconformity as rocks of Oligocene age are absent in this well.

# Lower to Middle Miocene (800-713 Metres)

This interval consists of calcilutites and calcisiltites which are recrystallized, wholly or in part, and are glauconitic at the base. Rapid transgression occurred during the Lower Miocene and a mid shelf environment dominated the Middle Miocene, with water depths of 40-100 metres.

## Latest Middle Miocene (713-650 Metres)

Calcareous claystones and minor calcilutite characterize a shelf-slope environment, (approximately 200 metres water depth), over this interval. Unconformities are interpreted from palaeontological study, at the top and bottom of this section.

				****		r
STRATIGRAPHY	PLANKTONIC FORAM ZONE	ZONES	DEPTH R.T. metres	DEPTH SUBSEA metres	EVENT	PALAEO- DEPOSITIONAL ENVIRONMENT
	-		9.45	0 -	SEA LEVEL -	
			64.0		- SEA FLOOR -	
RECENT TO PLIOCENE	A-3 TO A-4	a.h.		420.5-	TRANSITIONAL	INNER SHELF 10-40 metres
PLIOCENE TO UPPER MIOCENE	B-1	* LE fue			UNCONFORMITY	MID SHELF CANYON 40-100 metres
MIDDLE MIOCENE	C D-2 TO				UNCONFORMITY	SHELF EDGE CANYON 100-200 metres
LOWER MIOCENE	E-1 E-2 TO				UNCONFORMITY	MID SHELF 40-100 metres
UPPER EOCENE	K	human	800	+ 700 F-	UNCONFORMITY	ESTUARINE 10 metres
? ?	-??-	?? 	805 · - 806 ·	795.5- 796.5-		
EOCENE TO .		L. BALMEI	1	827.5- 841.5-	ATF	NON-MARINE
PALEOCENE		BARREN				
	<b></b>	INDETERMINATE		I.	UNCONFORMITY	
			- 969 -	959 <b>.5-</b>		
ous Albian		COPTOSPORA PARADOXA			GROUP	
LOWER CRETACEOUS    AL	-		- 1253 -	1243.5-	STRZELECKI GROUP	NON-MARINE
LOW		INDETERMINATE	- 1417 -	1407.5-	TOTAL DEPTH	
Author:  M.Battrick  Drawn by: P. Murrowood	I	Hudbay Oil SPERM STRATIGRAF	WHALE	-1		Date: February, 1983 Drawing № A4-GL-690

#### PE904240

This is an enclosure indicator page.
The enclosure PE904240 is enclosed within the container PE902673 at this location in this document.

The enclosure PE904240 has the following characteristics:

 $ITEM\_BARCODE = PE904240$ 

CONTAINER\_BARCODE = PE902673

NAME = Predicted v Actual Section

BASIN = GIPPSLAND PERMIT = VIC/P11

TYPE = WELL

SUBTYPE = STRAT\_COLUMN

 ${\tt DESCRIPTION = Predicted \ v \ Actual \ Stratigraphic}$ 

Section for Sperm Whale-1

REMARKS =

 $DATE\_CREATED = 31/05/82$ 

DATE\_RECEIVED = 14/04/83

 $W_NO = W762$ 

WELL\_NAME = SPERM WHALE-1

CONTRACTOR =

CLIENT\_OP\_CO = HUDBAY OIL (AUSTRALIA) LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

## Upper Miocene (650-450 Metres)

The Upper Miocene section is represented by calcilutite/calcisiltite with rare dolomitization. The carbonates are replaced by calcareous claystones below 630 metres. This interval was interpreted as an outer shelf-canyon environment with water depths of 100-200 metres. A minor period of inner shelf deposition occurs at the top.

## Upper Miocene to Pliocene (450-200 Metres)

A coarsening upward carbonate sequence occurs over this interval with calcilutites grading through calcisiltites to skeletal calcarenites. Minor claystones and marIs are evident below 400 metres. Faunal types include bryozoans, pelecypods, ostracods, echinoids and forams. The sequence was deposited in an inner shelf-canyon head environment, during a regressive phase, with water depths from 100 metres to less than 40 metres at the top.

## 3.4 Structure

The Sperm Whale No.1 well was drilled to the south of a major east-west, high angle reverse fault, upthrown to the south. The fault is part of a pre-existing, normal fault trend (Enclosure E2). Closure was formed by arching into the fault which resulted from reverse movement, associated with wrenching along the fault trend.

The regional fault trend formed during the Upper Jurassic to Lower Cretaceous times, with minor growth along the faults continuing through the Upper Cretaceous to the Lower Oligocene. Reverse movement occurred between Lower Oligocene and Upper Eocene times with associated wrenching, tilting and sub-aerial exposure. Within the Sperm Whale/Whale area continued movement occurred into the Lower Miocene. The Sperm Whale structure is an east-north-east trending, asymmetric anticline, covering approximately 3.75 km<sup>2</sup>. Closure was mapped at two horizons, designated "Top Latrobe" and "Top Strzelecki".

A high resolution dipmeter log was run from 1415-709 metres and interpretation of the data was enhanced by the use of Cyberdip and Geodip. Geodip was run from 975-775 metres, with a structural dip component of 11° to the NE removed. The dipmeter data can be subdivided into several intervals based on magnitude and orientation of recorded dips, viz:

Above	775	m	:	Dips are very low, 0-10 <sup>0</sup> ;
				generally north-north-easterly.
775 -	780	m ,	:	23-31 <sup>0</sup> ; north-easterly.
780 -	790	m	:	No apparent dips.
790 -	800	m ·	:	Generally 16-25 <sup>0</sup> to the south-
				east, with $35^{0}$ to the north-west
				at 793 m.
800 -	810	m	:	7-26 <sup>0</sup> ; random orientation.
810 -	814	m	:	No apparent dips.
814 -	818	m	:	9-13 <sup>0</sup> ; easterly.

818 - 950 m

: 10-20° to the north-east with random dips from 7-40°; generally east to north-east.

950 - 1415 m

: Generally  $10-30^{\circ}$  from east-south-east to south-east.

- 30 -

## 3.5 <u>Predicted and Actual Depth to Seismic Markers</u>

The depths to the main seismic events recognized in Sperm Whale No.1 are listed in the following table. Further details can be found in Enclosures E3 and E4, and Figure 13.

## <u>Horizon Identification - Sperm Whale No.1</u>

Location: Line GB81-26 Shot Point 130

<u>Horizon</u>	Predicted Depth*	Actual Depth*	Recorded 2-way Time (sec)
Sea Floor	-56 m	-54.53 m	0.072
Top Latrobe	-790 m	-795 m	0.741
Top Strzelecki	-915 m	-937 m	0.849
Total Depth	-1400 m	-1407 m	1.170

<sup>\*</sup> Note: Depths quoted in this table are subsea. R.T. depth is +9.45 m.

# 3.6 <u>Porosities and Permeabilities</u>

Porosities for Sperm Whale No. 1 have been estimated from wireline log interpretations and microscopic examination. A more detailed discussion of the porous zones can be found in the Wireline Log Interpretation section of this report (Appendix G3).

Sandstone layers in the uppermost section of the Latrobe Group sediments, 805-830 metres, have average sonic-derived porosities of 28.5%. Sandstones obtained in sidewall cores over this interval exhibited excellent porosities. The clay fraction noted in the descriptions may be related to invasion by filtrate.

Several zones between 830-845.5 metres showed porosities of 20-28% with 28% recorded between 831.5-833.5 metres. The remaining Latrobe Group section between 845-947 metres had interpreted porosities from 12-25%, with the values decreasing with depth. The decrease in porosity is due largely to an increase in clay and cementation by silica and carbonate. Within the Strzelecki Group, below 947 metres, clay minerals and silica cement fill pore spaces, reducing porosities even further.

Based on data obtained from D.S.T.'s over the interval 819-848 metres, formation permeabilities were considered very high.

3.7 <u>Hydrocarbon Indications</u>

#### 3.7.1 Summary

Wireline log interpretations from Sperm Whale No.1 indicated a gross hydrocarbon column from 805-845.5 metres. Subsequent testing confirmed the presence of a clean gas-oil contact at 831.5 metres; an oil zone from 831.5-833.5 metres, and a transitional oil-water zone below 833.5 metres.

DST No.1 (b) recovered 17 barrels of formation water with a trace of oil over the interval 839-848 metres. DST No.2 flowed gas at rates up to 4 MMcf/d on a half inch choke over the interval 832-834 metres. The test is not considered representative due to the failure of the annulus and subsequent gas flow into the oil zone. This test also recovered 500 ml of oil. DST No.3, in the gas zone, flowed gas at rates up to 5.4 MMcf/d on a half inch choke over the interval 819-828 metres. Refer to Appendix G4 for compositional analyses of gas and oil samples recovered.

## 3.7.2 During Drilling

#### Continuous Gas Monitoring

A continuous record of gas levels in the drilling mud was maintained by Exploration Logging Inc., using a total gas analyser and a gas chromatograph. Monitoring commenced at 208 metres in the 17-1/2 inch hole, continuing to the total depth at 1417 metres.

Table 1 on the following page, summarizes the gas readings.

#### Fluorescence from Drill Cuttings

Examination of the drill cuttings showed only a trace of sample fluorescence between 845 and 860 metres. This was described as being pinpricks of bright yellow colour which exhibited slow, pale, white solvent fluorescence. Blocked jets in the bit and the subsequent trip may have flushed or diluted any liquid hydrocarbons present in cuttings above this interval. A minor trace of dull yellow-gold fluorescence was described at 795 metres. Traces of mineral fluorescence were encountered in the deeper sections of the hole.

#### RANGE OF GAS READINGS

	DEPTH (m)	TOTAL GAS	PET. VAP.	<u></u>	<u>_c</u>	<u>_C</u> 3_	<u>iC</u> 4_	<u>nC</u> 4_	_c <sub>5</sub> _
	208-445	0-Tr	0	0-30	0-3	0	0	0	0
	445-790	Tr-12	0-Tr	10-937	0-30	0-7	0	0	0
	790-805	12-88	Tr-3	1562-12387	56-225	Tr-45	0-40	0-12	0-15
	805-830	12-500+	1-14	4129-25110+	105-2250	11-226	10-273	6-60	0-60
	830-900	1-8	Tr	68-803	0-7	0	0	0	0
	900-950	1-13	0-2	218-1836	0-7	0	0	0	0
	950-1100	0-2	0	65-294	0	0	0	0	0
1	100-1417	1/2-6	0-Tr	65-1320	0-10	0	0	0	0
	T.D.								

Notes: 1) "Petroleum Vapours" includes  ${\rm C_2}$  and higher hydrocarbons.

- 2) Total Gas and Petroleum Vapours are given in units, where 1 unit = 200 ppm (methane equivalent).
- 3)  $C_1 C_5$  are given in ppm.

## Oil Staining/Free Oil

No oil staining or free oil were observed in the cuttings or in the mud pits.

#### 3.7.3 <u>Sidewall Cores and Conventional Cores</u>

Bright lemon-white sample fluorescence was observed in the sidewall core at 833 metres. This covered 50-70% of the freshly cut surface of the core and showed instant streaming and blooming blue-white solvent fluorescence. A dull yellow solvent "cut" was also described.

Traces of slow blooming lemon to milky-white solvent fluor-escence were described in sidewall cores between 812 and 825 metres, at 859 metres, and at 948 metres, with little or no sample fluorescence.

For further details, refer to the sidewall core descriptions in Appendix G5.

# 3.7.4 <u>Further Indications</u>

Section 2.5 of this report summarizes the DST results. The RFT Programme is summarized in Section 4.3.2 and discussed further in Appendix  ${\sf G3}$ .

3.8 Contributions to Geological Knowledge Based on palaeontological data, the Sperm Whale No.1 well penetrated a thick marine sequence of Miocene to Pliocene age, underlain by a thin layer of Eocene sediments. The absence of Oligocene sediments in this section is contrary to that found in nearby wells (Appendix G1). 2. The well intersected 142 metres of non-marine Latrobe Group sediments, the top of which was encountered within 10 metres of the predicted depth. This section is downdip and 8.5 kilometres from the Baleen-Flathead-Whale trend, where no Latrobe Group sediments were identified. The zero edge must therefore lie somewhere between these two areas. 3. The Sperm Whale No.1 well confirmed the presence of excellent reservoir rocks within the Latrobe Group. Formation porosities averaged 28% between 805-830 metres and decreased to 12% at 947 metres. 4. Movable hydrocarbons were discovered within the zone 805-845 metres. Gas flowed at rates up to 5.4 MMcf/d during production tests. A thin oil leg between 831.5-833.5 metres was indicated on wireline logs. This was confirmed by the RFT programme with a 22.5 litre sample of oil recovered at 832 metres. 5. Although porosities are high throughout the interval 833.5-845 metres, both the log interpretation and the RFT results indicate the strong possibility of a transitionary zone below the oil leg. Both oil and water were recovered from RFT sample points indicating significant oil saturation within the zone. One possible explanation for the oil saturation is a variation in permeability. 6. Gas samples analysed contained less than 5%  $C_2^+$  components and were therefore considered representative of a dry gas. Geochemical evaluation of the oil samples showed that the Sperm Whale No.1 oil is biodegraded. - 36 -

7. Reservoir potential of the basal Latrobe Group/Top Strzelecki sections have been downgraded as a result of the Sperm Whale No.1 well. Wireline log interpretations, formation tests and microscopic examinations indicated poor porosity and permeability values below 947 metres. The amplitude anomaly defined on the seismic section through the Sperm Whale structure appears to correspond to the gas-oil interface at approximately 830 metres. - 37 -

4. <u>WELL DATA</u>

(Pages 38 - 41)

4. WELL DATA 4.1 Formation Sampling A standard "Alpha" unit from Exploration Logging Australia Inc. was used for acquiring drilling and formation data from the well. Exlog personnel provided continuous monitoring of ditch gas and mud pit levels, and recorded the following parameters every 5 metres: (i) ditch gas (ii) gas chromatography (iii) calcimetry (iv) blender gas analyses (v) mud weight in and out Corrected drilling exponent calculations were also performed every 5 metres but were not considered reliable due to a faulty motion compensator on the drilling vessel. Washed and dried cuttings samples were collected in 5 metre compilations from below the base of the 20" casing shoe, at 196 metres, to total depth at 1417 m. Hudbay and Exlog geologists maintained separate lithological logs (see Enclosures E5 and E6) and also Appendix G6. 400 gm. unwashed, 15m composite samples were bagged below the 20" casing shoe, and 100 gm. unwashed, 15 m composite samples were taken from below the 13-3/8" casing shoe at 710 m. The former were bagged awaiting palynological study; the latter were sealed, with preservatives, in cans and stored, awaiting submission for geochemical analysis. - 38 -

## 4.2 Coring Programme

## 4.2.1 Conventional Cores

No conventional cores were cut at Sperm Whale No.1

#### 4.2.2 Sidewall Cores

Summary

Suite 1 (30/12/81)

Interval cored : 195.5 - 712.0 metres

Shots attempted : 30
Cores recovered : 28
Bullets empty : 1
Bullets misfired : nil

Bullets lost : 1

Suite 2 (09/01/82)

Interval cored : 723.0 - 1411.1 metres Shots attempted :  $81 (2 \times 30, 1 \times 21)$ 

Cores recovered : 81
Bullets empty : nil
Bullets misfired : nil
Bullets lost : nil

Total: 111 shots 109 recovered

Refer to Appendix G5 for Sidewall Core Description sheets.

Paltech Pty. Ltd. received 43 sidewall cores for palaeontological examination (Appendix G1).

Wayne Harris of Western Mining Corporation, South Australia received 66 sidewall cores, over the interval 806.0 - 1411.1 metres for palynological examination (Appendix G2).

## 4.3 <u>Wireline Logging and Testing</u>

Schlumberger Seaco ran the following wireline logs and Repeat Formation Tests in Sperm Whale No.1:

<u>Suite</u>	<u>Date</u>	Logs	Interval	Remarks
1	30/12/81	DIT-BHC-GR (1:200 & 1:500)	195.5 - 717 m	
1	31/12/81	FDC-GR (1:200 & 1:500)	195.5 - 718 m	
1	31/12/81	CST (1:200)	195.5 - 712 m	Very difficult to cor- relate with other logs due to lack of highly contrasted gamma ray.
2	07/01/82	BHC-GR (1:200 & 1:500)	709 - 1413 m	
2	07/01/82	LDL-CNL-GR (1:200 & 1:500)	709 - 1415 m	
2	08/01/82	DLL-MSFL-GR (1:200 & 1:500)	709 - 1410.5 m	
2	08/01/82	LDL-CNL-PCL-EPL-GR (1:200 & 1:500)	709 – 1415 m	
2	08/01/82	HDT (1:200)	709 - 1415 m	
2	08/01/82	RFT	709 - 1360 m	
2	09/01/82	CST (1:200)	723 - 1411.1 m	
2	13/01/82	Perforation Record	819 - 848 m	

# Additional Services

<u>Date</u>	Logs	<u>Interval</u>
08/01/82	Geodip (1:200 & 1:40)	775 - 975 m
08/01/82	Cyberdip (1:200)	709 - 1415 m
08/01/82	Cyberlook (1:200)	760 - 1000 m
12/01/82	CBL-VDL-GR (1:200)	709 - 889 m
10/01/82	Delta-T & Denisty vs 2-way Time (3.75"/sec)	200 - 1410 m
19/01/82	Bridge Plug Setting (1:200)	817, 830, 837 m

Log interpretations and further details of the logging programme are provided in Appendix G3.

A Velocity Survey was conducted by Seismic Services Limited (Enclosures E3 and E4).

#### Repeat Formation Tests (RFT)

A total of 24 tests were carried out during the RFT programme in Sperm Whale No.1. The following table summarizes the testing programme conducted on the 9th, 10th January, 1982:-

Interval (m)	Pressure Tests	Sampling Attempts	<u>Total</u>
812 - 869 m	8	11	19
923 - 946 m	2	nil	2
1135 -1360 m	3	nil	. 3
•	13	11	24

The RFT programme indicated the following:-

- a) Gas samples greater than 15 Cu. ft. were obtained from tests at 812, 828 and 832 metres.
- b) A clean gas-oil contact occurs at 831.5 m.
- c) A 22.5 litre oil sample was obtained from the test at 832 metres with only traces recovered from tests at 836.7 and 842 metres.
- d) An oil-water contact occurs at 833.5 m. and appears to be transitional from 833.5 m to 845.5 m.

Details of the RFT programme at Sperm Whale No.1 are given in Appendix G3.

### 5. REFERENCES

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- Threlfall, W.F., Brown, B.R., and Griffith, B.R., 1976: Petroleum Geology of the Offshore Gippsland Basin, <u>in</u> Economic Geology of Australia and Papua New Guinea. 3 Petroleum Australia Inst. Min. Metall.

APPENDIX G1

PALAEONTOLOGY

REPORT

# FORAMINIFERAL SEQUENCE IN SPERM WHALE # 1

For: HUDBAY OIL (AUSTRALIA) LTD.

March 8th, 1982.

Paltech Report 1982/07



PALTECH [#]

MARINE MICROPALEONTOLOGISTS
SYDNEY NEW SOUTH WALES
MIDLAND WESTERN AUSTRALIA

# THE FORAMINIFERAL SEQUENCE in SPERM WHALE # 1

Forty three sidewall cores from SPERM WHALE # 1 were examined for foraminiferal content. On the basis of that examination, the following breakdown of the sequence was noted.

Sidewall Cores Depth (m)	Approx E-log Unit Boundary	Age	Zone*	Paleoenvironment <sup>¶</sup>
217.0 to 384.0	2	Pliocene	A-3 to _A-4	Inner shelf ( $^40$ m) Mid shelf canyon ( $^40$ - $^100$ m)
405.0 to	;	Early Pliocene to	B-1	Inner shelf (~40m) Outer shelf canyon (100-200m)
662.0 to	~~~ 3 ~~~~~	Mid Miocene	C	Shelf/slope break (~200m)
~~712.0 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	vv 713 vvvvv	^^^^	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
727.0 to 799.0	001	Mid to Early Miocene	D-2 to G	Mid shelf canyon (40-100m) to inner shelf (10-40m)
803.9	- 801	Late Eocene	ĸ	Estuarine (<10m)
806.0		?	N.F.F.	Deltaic

<sup>\*</sup> Planktonic foraminiferal zonation after Taylor (in prep.).

A list of sidewall cores studied is shown on Tables 1 & 2. The deepest sidewall core from 806.0m contained no foraminifera; otherwise all samples contained both planktonic and benthonic foraminifera, although poor preservation, due to carbonate diagenesis, made identification difficult in some samples.

Tables 1 & 2 (herein) detail the record summarised on page 1. These tables are compilations of both planktonic and benthonic foraminiferal distribution, as well as the lithological characteristics of the residue grains. The micro-paleontological data sheet shows the interpreted reliability of the planktonic zone determinations.

<sup>¶</sup> Paleobathymetric range in parentheses.

## COMMENT ON CANYON-FILL SEQUENCE IN SPERM WHALE # 1.

The sequence demonstrates fluctuations in both canyon cutting and filling from early Miocene to Pliocene. Two disconformities are recognised; one in the mid Miocene between Zones D-2 and C (at ∿713m) and the other in late Miocene between Zones C and B-1. The first event at 713m is evidenced by a disjunct environmental sequence from mid canyon fill at top of D-2 and shelf/slope deposition of the Zone C sample immediately above the biostratigraphic break.

A report correlating the foraminiferal sequences in wells drilled in the eastern portion of Vic/Pll is being prepared. However, a brief comment is warranted here, in that the SPERM WHALE canyon fill sequence appears to represent part of a major anastomosing sequence intersected in sections further seaward, rather than being related to the BALEEN, WHALE and FLATHEAD Miocene canyon system.

BASIN: GIPPSLAND ELEVATION: KB: 9.6m GL: -54.6m WELL NAME: SPERM WHALE # 1 TOTAL DEPTH: HIGHEST DATA LOWEST DATA FORAM. Preferred Two Way Alternate Preferred **Alternate** Two Way AGE ZONULES Rtg Rtg Depth Depth Time Depth Rtg Rtg Depth Time PLEIS-TOCENE A<sub>1</sub>  $\overline{A}_2$ A<sub>3</sub> 217 PLIO A<sub>4</sub> 237 2 384 1 B<sub>1</sub> 2 405 638 B<sub>2</sub> C 662 1 712  $\overline{D}_1$ M 闰 щ  $\overline{D}_2$ z Д 727 750 M Ē<sub>1</sub> Д 768 0 768 0 O Ē<sub>2</sub> 0 773 2 Σ 773 н 2 F 782 787 1 Σ 799 G 799 1 H<sub>1</sub> H<sub>2</sub> [1] Ĩ<sub>1</sub> OLIGOCENE Ħ ī<sub>2</sub> <sup>J</sup>2 K 803.9 803.9 ENE Pre-K COMMENTS: Disconformity between D-2 and C at ~713m marked by frequent reworked D-2 planktonic faunas in basal C assemblage; as well as displaced benthonic elements. Probable disconformity between C and B-1 on biostratigraphic disjunction. CONFIDENCE 0: SWC or Core - Complete assemblage (very high confidence). RATING: 1: SWC or Core - Almost complete assemblage (high confidence). 2: SWC or Core - Close to zonule change but able to interpret (low confidence). 3: Cuttings - Complete assemblage (low confidence). 4: Cuttings - Incomplete assemblage, next to uninterpretable or SWC with depth suspicion (very low confidence). NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible

DATA RECORDED BY: PALTECH PTY. LTD.

DATE: March 1st, 1982.

DATA REVISED BY:

DATE:

limit will appear in one zone and the lowest possible limit in another.

							PLA	NKT	'ON	IC	FOR	AM)	NI	FEF	ŁΑ			-				T			
CORE metres	angiporoides linaperta indet	llobus i connecta	dehiscens (S.S.)	praescitula zealandica S.S.	io io tr	s bispnericus siakensis/mayeri	trilobus (elong) glomerosus Gp.	turalis peripheronda	continuosa	ena oides	ciperoensis nversa	praemenardii	bra	ispira ica	miotumida S.S.	is subdehiscens	conomiozea	sphericonomiozea acostaensis	aequilateralis	falconensis miocenica	puncticulata humerosa crassaformis	lata	FORAMI	KTONIC NIFERAL MBLAGE	AGE
SIDEWALL Depth in	G'ina angip G'ina linap G'ina indet	as a	G'quad dehi		G'alia nana G'alia indet	G'alia siakensis/ma	ides	Orb suturalis G'alia periph			G'ina cipero Orb universa	G'alia pra		G'quad altisp G'alía conica		Sph'opsis	G'alia con	alia	G'ella aeg	G'ina raic G'alia mio	G'alia pun G'alia hum G'alia cra	a11a	ZONE	SWC Depth at Base	
217.0→										×	٥				х		۰			x	°°x	٠,	A-3	217.0	
237.0, 251.0, 276.0, 301.0, 328.0, 346.0, 384.0,	ם ם									X D a	×	- 0		• • •	0			٥	•	•	• ?		A-4	384.0	PLIOCENE
405.0→ 425.0→										x					۰		۰			0		Г			* * -
436.0.	İ		•								×	۰			·					۰		-			
467.0	ם										×									·					1
500.0	,	•				•				٥		۰			0		•	۰		۰ ه		1			
518.0.	D																					1			LATE
534.0 <sub>→</sub>	ם	,								۰	۰	۰			۰	۰	١.					1	B-1		
570.0.	x '										x	,					۰	0		•		ı			MIOCENE
587.0.	, ,									x	۰	۰						٥		۰		1			
604.0.	x °	,								x	٥	٥			0		٥					1			
621.0										x	0	0			۰	0	x					1			
638.0 <sub>→</sub>		,								D	۰	_				_	•	0 0	0 (	•		L	لمحمما	638.0	
672.0.	Ì	•					۰			x	x			,	°×	, °						ſ			
682.0	۰	,			F	ž.	R			x	٥	·			°×	-						1	с		I
692.0	ם											۰			٠-							1	Ŭ		urn I
702.0 <sub>→</sub>	D			_							۰													777 -	MID
712.0 <sub>→</sub> 723.0 <sub>→</sub>	D °	' 3		R		0		R			x				хх							h	~? <u>~</u> ?~~	712.0	1
727.0	_	,			х		2				v	x x		•								H	'		MIOCENE
734.0+	D ?				-		-				7		•									1	1		
741.0	×					•	?			X	х			•								1	D-2	750 0	1
750.0 <sub>+</sub>	×			:	×		6	• •		٥	x	хх	• •	•							•	1		750.0	1
762.0	D?				?																	ı	?		ł
768.0→	Д.		: х	ه ه	×		×			, x	σ											H	- <u>e</u> -i - 1	768.0	ì
773.0	х	: ж			х		0 0															H	E-2	773.0	
782.0→	х				х		×															Г			EARLY
- 787.0→ 792.0→	х О	: х х	× °	0 0	. х	•																L	F	787.0	MIOGENE
799.0	_	. x x			, ж																	┢	-:	799.0	MIOCENE
803.9	ر م ہ ہ		-																			r	~~~/	803.9	~~~~~
806.0→	no pla	nkto	nics	foun	d																	_	7		LATE EOCENE
	KEY+ o						D ~											-							

KEY: ° <20 specimens R recycled early/mid Miocene specimens x >20 specimens 7 identification doubtful due to preservation.

D Dominant >60% of assemblage

TABLE 1:- PLANKTONIC FORAMINIFERAL DISTRIBUTION - SPERM WHALE # 1 PALTECH REPORT 1982/07

	BENTHONIC F	FORAMS. in E	NVIRONMENTAL GROU	PS	RES1	DUE LITHOLOGY		ENVIRONMENT				
	INNER SHELF SEAWEED ZONE	MID SHELF	OUTER SHELF & SHELF/SLOPE BREAK	CANYON	MAJOR COMPONENTS	MINOR COMPONENTS	Foram	1-200m				
Core metres.		a spp. (smooth) spp. (retic) na spp. ferina spp. ferina spp.	icides submidingeri icides submidingeri karreriformis madiocris lostomella sp. lonformia sp. cammina sp.	a laevigata— lids ides Robulus	b=bryozoa debris f=foraminifera sp=sponge spicules	eags. cryx & aggs. pellets qtz. dtz. lifrags. od frags. d spines da spines bes	Freq- uency	UDARINE <10m < <40m > ~40m > ~40m SHELF 40-100m SHELF A0-100m With CANYON 1-200m ERREAK ~200m	og Change	FORAMI	KTONIC NIFERAL MBLAGE	AGE
Sidewall Depth in	20 2 K 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	extulari olivina olivina nuvigeri iphouvig	Libicides subh C. karreriform C. mediocris Globobulimina Chilostomella Nonionella sp. Discammina sp.	Cassidulina J Worn miliolic Worn Cibicide		rock frags. pyrite-cryx quant quant quant quant pyrite - bid r ang qtz r ang qtz r yozcal fr pelecypod f echinoid sp ostracods worm tubes sponge spicu	Count % planktonic	DELTAIC-ESTUARINE TURER SHEIF <60m CANYON HEAD ~40m CANYON-WID SHELF 4( OUTER SHELF WITH C! SHELF/SLOPE BREAK ^	MAJOR E-LOG CHARACTER CH	ZONE	SWC Depth at Base	
217.0, 237.0, 251.0, 276.0, 301.0, 328.0, 346.0, 384.0, 405.0,	R R D D x ° x :	R R R X X X X X X		° x D X D	b b b b b b b ff ff b b b b b b ff ff b b b b b b b ff ff	rr A cc AA AA AAAA	1000 10 500 10 7 ? 1000 ? 500 10 7 ? 1000 ? 7 ? 1000 ? 7 ? 1000 ? 7 ? 1000			A-3 A-4	217.0	PLIOCENE
425.0. 436.0. 467.0. 500.0. 518.0. 534.0. 554.0. 570.0. 587.0. 604.0. 621.0.	Dxx ° xxx x °	3 0	a	( D ( D ( X D	iff X X X X X X fffff fff X X X X X X X	C r A r r C A A r r C C C A C A C A C A	1000   20 500   10 200   ? 100   20 ?   ? 1500   50 2000   60 ?   ? 750   40 ?300   20			B-1		LATE MIOCENE
638.0, 662.0, 672.0, 682.0, 692.0, 702.0,	R ° ° ° R	* * * * * * * * * * * * * * * * * * *	0000	x x D x D x D °	F F F F F S S S S S S F F F F F F F F F	C Cr C  A A C Cr  ArrcrrA	1000   50 500   60 2000   20 500   40 300   20 100   ? 100   ?		689	<b>~</b> ~~	638.0	MID
712.0 + 723.0 + 727.0 + 734.0 + 741.0 + 750.0 + 756.0 +	D x x D x x D x x D x x RR R indet	R X	- C X C C C C C	x x D x	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		500 50 300 20 750 40 ? ? 500 20 2000 40	~	713	~? <del>~</del> ?~~ D-2	712.0 750.0	MIOCENE
792.0	Indet RR RRR RRR RR			D * * * * * D *	b b b b b fift b b b b b fift b b b b b b fift b b b b b fift b b b b b fift b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b fift b b b b b b b fift b b b b b b b fift b b b b b b b fift b b b b b b b fift b b b b b b b b b b b b b b b b b b b	C C A A r A CCTT A C	7 ? 1000 40 200 20 300 30 1000 20 7 ?		-	? E-1 E-2 F	768_0 773_0 787_0	EARLY MIOCENE
803.9,	x D x x x x x No foraminifera	x x a found			xxxxxxxxx qqqqqqqqqqqqqqqqqqqqqqqqqqqq	r rArr	L000 5 50 50 nil nil		901	~&~~ ?	799.0 803.9	LATE EOCENE

KEY: ° <20 specimens

R recycled or displaced indet indeterminate due to preservation. x >20 specimens indet in D Dominant >60% of assemblage

APPENDIX G2

PALYNOLOGY

REPORT

# SPERM WHALE NO. 1 WELL

# **GIPPSLAND BASIN**

Palynological Examination and Kerogen Typing of Sidewall Cores

bу

W.K. Harris & C.B. Foster

# PALYNOLOGICAL REPORT

Client:

Hudbay Oil (Australia) Limited

Study

Sperm Whale No. 1 Well, Gippsland Basin

Aims

Determination of age and distribution of kerogen types

and spore colour.

### INTRODUCTION

Sixty six sidewall cores from Sperm Whale No. 1 Well drilled in the Gippsland Basin at Lat. 38°03'44"S, Long. 140°56'19"E in Vic. P-11 were processed by normal palynological procedures.

The basis for the biostratigraphy and consequent age determinations are based on Stover & Partridge (1973) and Partridge (1976) for the Tertiary sediments; and principally on Dettmann (1963), Dettmann & Playford (1969), with the modifications of Dettmann & Douglas (1976) and Burger (1973), for the Early Cretaceous sequence.

## **OBSERVATIONS AND INTERPRETATION**

## A. <u>Biostratigraphy</u>

Table I summarises the biostratigraphy and age determinations for the samples studied. Tables II and III indicate the distribution of species encountered in the Early Cretaceous and Tertiary sequences, respectively. Table II list samples between 958 and 1377.1m where significant assemblages have been recorded.

Many samples from this well are barren of plant microfossils and this is mostly due to unfavourable lithologies. These are dominated by light grey to white argillaceous sandstone and claystones generally representing oxidising environments of deposition.

Where plant microfossils have been recovered they range from well preserved to very poor, but assemblages were not very diverse limiting the biostratigraphic precision. Assemblages yielding only three or four specimens have been logged as barren. These species recorded are all long ranging forms.

### 1. Early Cretaceous: 958 to 1302.1m

Assemblages from this section of the well were generally poorly preserved and many samples yielded only very sparse or poorly diversified assemblages. Between 1261m and 1302.1m there is little diversity in the assemblages and nothing in particular that can be used for precise biostrtigraphic assignment. The species recorded are consistent with an Early Cretaceous age but their range is often much greater.

An assemblage at 1252.9m yielded the first record of <u>Coptospora paradoxa</u> marking the base of the zone of <u>Coptospora paradoxa</u> in this well.

Assemblages above this depth are poorly diversified and contain no

TABLE I SPERM WHALE NO. 1

# SUMMARY OF PALYNOLOGICAL DATA

						•
DEPTH	SWC	PRESERVATION	DIVERSITY	SPORE/POLLEN ZONE	CONFIDENCE LEVEL	ENRIVONMENT
806	67	good	v. low	?M. diversus	3	?Non-marine
812	66	fair	v. low	?M. diversus	3	
817	65	fair	v. low	?M. diversus	3	?Non-marine
821	64	barren	V • 10 VV .	: IVI - GIVETSUS	,	?Non-marine
825	63	barren	_	-	-	-
828	62	barren	<del></del>		<del>"</del>	-
843	60	barren	•	<b>-</b> .	-	-
846	59	good	la	-	-	-
851	58	good fair	low	L. balmei	4	
859	57	-	low	L. balmei	4	
869	56	barren	-	-	•	-
877	55		-	-	-	-
885	54	"	-	•	-	-
896	53		-	-	-	-
904		"	-	-	-	-
	52	**	-	-	-	_
917	51	•	-	-	=	-
923	50	Ħ	•	-	•	-
932	49	11	•	••	••	-
940	48	11	-	_ <b>-</b>	-	-
948	47	19	-	•	· •	_
958	46	fair	v. low	E. Cretaceous undiff.	•	-
964	45	barren	-	•	_	_
969	44	fair	v. low	?C. paradoxa	3	non marine
977	43	v. poor	v. low	?C. paradoxa	3	non marine
989	42	fair	v. low	?C. paradoxa	3	non marine
998	41	11	000		_	
1010	40	19		_	_	<del></del>
1020	39	41	_	_	_	-
1031	38	98	_	_	<del>-</del>	-
1041.9	37	11		-	•••	-
1050	36	<b>\$</b> 9	<del></del>		-	•
1060	35	barren		-	-	-
		OGI I GI I	-	-	-	-

DEPTH	SWC	PRESERVATION	DIVERSITY	SPORE/POLLEN ZONE	CONFIDENCE LEVEL	ENVIRONMENT
1072	34	poor	v. low	?C. paradoxa	3	non marine
1080	33	poor to v. poor	11	" paradoxa	3	H HOLLINGTENE
1090	32	barren	-	-	-	
1110	30	fair	v. low	?C. paradoxa	3	non marine
1120	29	barren	-	- Grandoxa	-	HOLL HIGH THE
1131	28	11	-	_	_	_
1142	27	Ħ	<u>.</u> .	_		•
1157	26	. 11	_	_	_	•
1160	31	11	-	_	_	_
1162	25	11	_	_		-
1177	24	Ħ	-	_	_	_
1181.9	23	11		_	<u>-</u>	-
1191.9	22	11		_	<del>-</del> .	-
1207	21	v. poor	v. low	?C. paradoxa	3	non marine
1217.9	20	barren	~	- Paradoxa	-	non marne
1228	19	11	•	_	_	<u>-</u>
1238.1	18	ti	_	_	_	- -
1244.9	17	11	_	_		
1252.9	16	fair	v. low	C. paradoxa	- /ı	non marine
1261	15	poor	v. low	E. Cretaceous undiff.	<b>-</b>	non marine
1272.9	14	barren	-	- Cretaceoda dilatri:		non marne
1282.9	13	v. poor	v. low	E. Cretaceous undiff.	_	non marine
1292.9	12	barren	** 10**	L. Cretaceous unuiti.	<u>-</u>	non marne
1302.1	11	fair	v. low	E. Cretaceous undiff.	_	non marine
1315	10	barren	~	- Orotacoods dridiff:		HOLL BLOTTING
1325	9	11	_	_		
1335	8	11	-	_		_
1345	7	#	_		_ _	_
1355	6	11	-	<u>.</u>	· · · · · · · · · · · · · · · · · · ·	_
1365	5	FF	•	_	<del>-</del> .	_
1377.1	4	11	_		<del>-</del>	_
1386.1	3	77	_	_		_
1400	2	11	<u></u>		<del>-</del>	_
1411.1	1	11	-	-	-	<b>-</b>
Confidence	e Levels:	1 Cuttings	samnla, low diver	rsity + contaminants	•	•
			emple, and esse			·

<sup>2</sup> cuttings sample, good assemblage
3 core or sidewall core, low diversity + contaminants
4 core or sidewall core, low diversity
5 core or sidewall core, good assemblage

diagnostic species. For this reason the assemblages are tentatively equated with the C. paradoxa zone.

All of the Cretaceous assemblages are of non-marine aspect.

## 2. Early Tertiary

Although assemblages from this section of the well were moderately well preserved the samples yielded low quantities of organic matter and assemblages of very low diversity. Nevertheless two distinct units can be recognised.

### a. Lygistepollenites balmei zone: 846-851m

Two samples are correlated with this zone and assemblages are characterised by <u>L. balmei</u>, <u>G. edwardsii</u>, <u>H. harrisii</u>, <u>P. reticulosaccatus</u> and <u>N. flemingii</u>. The presence of the latter species suggests that the assemblage is to be correlated with the Upper <u>L. balmei</u> zone, however the poor diversity precludes a firm assignment to this sub-zone.

Marine dinoflagellates were recorded at 846m and indicate deposition in a marginal marine environment.

## b. ?Malvacipollis diversus zone: 806-817m

Assemblages from the three productive samples from this zone again are poorly diversified but do contain  $\underline{\mathsf{M.}}$  diversus and in the youngest sample  $\underline{\mathsf{C.}}$  orthoteichus.

The sample at 806m is certainly no older than the M. diversus zone provided that none of the samples have been contaminated by drilling mud.

No marine dinoflagellates were recorded and a non-marine environment of deposition is inferred.

### B. Kerogen Types and Spore Colouration

During routine palynological processing of sidewall cores an unoxidised kerogen sample was taken and the nature of the kerogens and spore colouration are documented in Table V. Only those samples which yielded spore/pollen assemblages have been examined. Spore colour is expressed as the "Thermal Alteration Index" (TAI) of Staplin (1969) according to the scale in Table IV.

#### **TABLE IV**

Thermal	- Alteration Index	Organic matter/spore colour
1	none	fresh, yellow
2	slight	brownish yellow
3	moderate	brown
4	strong	black
5	severe	black and evidence of rock metamorphism.

TABLE V SPERM WHALE NO. 1

# **SUMMARY OF MATURATION AND KEROGEN DATA**

DEPTH	TOM	SWC NO.	PHY.	AMORPHO	HYLOGEN	MELANO	TAI
806	v. low	67	tr.	-	tr.	100	ND
812	v. low	66	5	-	-	95	-
817	v. low	65	10	-	tr	90	ND
821	barren	64	-	-	<del>.</del>	_	_
825	barren	63	_	-	-	-	-
828	v. low	62	_	100	_	_	-
843	low	60	30	40	20	10	ND
846	· low	59	10	80	tr.	10	1+
851	v. low	58	70		10	20	ND
859	barren	57	_	=	_	-	
869	11	56	_	-	_	_	-
877	*1	55	_	_	_	_	_
885	11	54	_	_	_	_	_
896	*1	53		_	_	_	
904	71	52	_	_	_	_	_
917	tt	51	-	_	<del>-</del>	_	_
923	tt	50		_	<b>-</b>	<u>-</u>	-
932	71	49	_	-	<b>-</b>	-	-
940	11	48	-	-	-	-	-
948		47	_	-	-	-	_
958	mod	46	<b>3</b> 0	_	10	-	2
964				-	10	60	2.
	barren	45 44	70	-	-	-	_
969 077	mod	44	30 30	-	10	60	2-
977	low	43	30	-	30	40	2
989	v. low	42	-	-	-	-	NA
998	barren "	41	-	=	-	-	
1010	**	40	-	-	-	-	_
1020		39	-	-	-	-	-
1031	*1	38	-	-	-	-	-
1041.9	**	37	-	-	• •	-	-
1050	<b>†1</b>	36	-	-	. <b>-</b>	-	-
1060	11	35	-	-	- '		-
1072	-	34		-	-	-	-
1080	v. low	33	50	-	35	15	2
1090	barren	32	-	-	-	-	-
1110	low	30	40	-	30	30	2
1120	barren	29	-	-	-	-	_
1131	if	28	-	-	-	-	-
1142	it .	27	-	-	-	-	-
1157	*1	26	-	-	-	-	-
1160	11	31	-	-	-	-	-
1162	tt ·	<b>2</b> 5	-	-	-	-	-
1177	11	24		-	-	-	-
1181.9	71	23	-	-	-	-	-
1191.9	71	22	-	-	-	-	-
1207	mod	21	95	-		5	2
1217.9	barren	20	-	-	-	-	
1228	17	19	-	-	· •	-	_
1238.1	11	18	-	-	-	- ;	_

DEPTH	TOM	SWC NO.	PHYR.	AMORPHO	HYLOGEN	MELANO	TAI
1244 0		17				ř	
1244.9	mod	17	-	-	-	-	-
1252 <b>.</b> 9	v.low	16	-	-	-	-	ND
1261	abundant	15	65	<b>-</b> .	30	5	2
1272.9	v.low	14	_	-	-	-	-
1282.9	v.low	13	-	-	-	-	ND
1292.9	barren	12	-		-	-	_
1302.1	abundant	11	95	-	· 🛶	5	2
1315	v. low	10	_	-	-	· -	-
1325	v. low	9	-	-	-	-	-
1335	barren	8	-	-	•-	_	-
1345	v. low	7	_	-	-	-	•••
1355	barren	6	-	-	-	_	_
1365.1	71	5		_	-	_	-
1377.1	11	4	-	-	-	_	_
1386.1	11	3	-	-	_	_	-
1400	71	2	-	-	_	-	_
1411.1	37	1	_	-	-	_	-

Total organic matter (TOM) is expressed semi-quantitatively in the scaleabundant, moderate, low, very low, barren. Samples classed as having abundant or moderate amounts of TOM would be expected to have TOC's (total organic content) greater than 1%.

In this report four classes of organic matter are recognised – amorphogen, phyrogen, hylogen and melanogen and these terms are more or less synonymous with amorphous, herbaceous, woody, and coaly. For reasons as outlined by Bujak et al. (1977) the former terms are preferred because they do not have a botanical connotation. The thermal alteration index scale follows that of Staplin (1969) and as outlined by Bujak et al. (1977). At a TAI of 2+ all four types of organic material contributed to hydrocarbon generation whereas at a TAI of 2, only amorphogen forms liquid hydrocarbons. The upper boundary defining the oil window is at a TAI of approximately 3 but varies according to the organic type. Above TAI 3+ all organic types only have a potential for thermally derived methane.

## 1. <u>Cretaceous Section</u>

Kerogen types in this unit are characterised by high phyrogen towards the bottom of the well and high melanogen towards the top.

Spore colour throughout is consistent at about 2 and cannot be considered to be mature. These factors together with low to very low TOM values, imitigates against this section as a potential hydrocarbon source.

# 2. Tertiary Section - Eocene

This section is characterised by very low TOM's and the dominant kerogen type is melanogen in the ?M. diversus zone and amorphogen is prominent in two samples from the L. balmei zone.

Where spore colour was determined it is indicative of immaturity.

All of the evidence suggests that this section in the early Tertiary is immature and does not contain sufficient organic matter of a favourable nature to be considered as a potential source rock for the generation of hydrocarbons.

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5.

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W.K. Harris,

C.B. Foster,

13 January 1983

# TABLE III

# DISTRIBUTION OF TERTIARY SPECIES

#### SPERM WHALE #1

Senegalinium dilwynense Spiniferites ramosus

SPERM WHALE #1																
Spore/Pollen	Depth in metres	904	896	885	877	869	859	851	846	843	828	825	821	817	812	806
Araucariacites australices Clavifera triplex Cyathidites australis Dilwynites granulatus Gambierina edwardsii	is	•						X X X X	X X					X		
Haloragacidites harrisi								Χ	Χ					Χ	X	Х
Lygistepollenites balm	ei							X X	X X						Х	
Laevigatosporites ovat								Χ								X
Microcachynidites anta Nothofagidites brachys								X	X X						X X	
N. flemingii	pinaiooio							Χ	Χ						x	
Podosporites sp. Podocarpidites sp.								X X	X X					Χ		χ
Peromonolites densus								Ŷ	^					^		X
Phyllocladidites reticul	losaccatus							Χ	χ							
P. verrucosus Proteacidites spp.								X X							χ	Х
P. parvus								χ̈́							^	۸
P. tenviexinus								Χ	X							
Simplicepollis meridian	IUS							X	. :			٠				
Triporopollenites sp. Cyathidites splendens								X	X							
Gleicheniidites circinid	lites								X							
Latrobosporites ohaiens									X							
Lygistepollenites ellipt Phyllocladities mawson									X X						Х	Х
Ischyosporites gremius	111								^						X	٨
Cupanieidites orthoteic															^	X
Proteacidites annularis Tricolpites sp.																X X
Dinoflagellates								-								

X X

# C C DISTRIBUTION OF CRETACEOUS SPECIES

TABLE II

SPERM	WHAI	(F #1

(

SPERM WHALE #1	•																																			
	Depth in metres	137	1365.	1345	1335	1315 1325	130	129		P 1261		_	1238	3 5	1207	119	118	1177	1160	1157	1142	1131	1120	1110	1090		1060	1050	1041	1020	1010	998	989	969 977	964	958
	oth n res	77.1	5.1	<u> წ</u>	. 35°	<b>6</b> 6 5	1302.1	1292.9	1282.9	5 22	1252.9	1244.9	1238,1	1000	97	1191.9	1181.9	77	8 S	57	**	31	8	5 3	3 E	3 2	8	50	1041.9	3 20	6	Φ.		7 9	, ->	B
Baculatisporites comeumensis Cicatricosporites australiensis Osmundacidites spp.							X X X		X	X	X X	x												X X										X X		X X
Fodocarpidites sp. Cingutriletes clavus Ceratosporites equalis		X					X X X		X		X			)	K X			X						X					;	(	X			х		
Corollina sp. Triceccites sp. Cyathidites sp.							? X v								v																		X			
Podosporites microsaccatus Cicatricosisporites sp.							â			X	X				Х									X	X	•								X X		
Forminisporis assymetricus Polypodidites sp. Cepotospora paradoxa						•					X ? Y																	•						X		
Balmeisporites holodictyus Nadraistrickia truncata Clascopollis sp.					X						Ŷ		;	X		•																				
Laptolapidites verrucatus Lycopodiumsporites sp.													,	X >	(									X X	Х				X					X X		
Leiotriletes sp. Microcachryidites antarcticus Aequitriradites spinulosus Podocarpidites ellipticus																						:		X										X		x
Cinqutriletes clavus Foraminisporis wonthegglensis																								X X ?	X											
Klukisporitos scaberis Neoraistrickia sp. Anculispora folliculosa					•		• .																		X X X			X								X
Cycadopites sp. Camerozonotriletes sp. Podecarpites sp.																									X			•					X X X			
Baculatisperites sp. Kraneselisporites sp. Cycadopites ovatus																																	X	x		
Stereisporites antiquasporites Cookconites variabilis																																		X ? X		
Lundbladisporasp. Caratosporites spp. Triletes sp. of. T. tuberculiformis	s																																	? X X		
Cuycadopites follicularis Nodocus sp. Glaicheniidites sp.					•																													x		X ?
Schizesporis sp.										OW	ked	Spor	res/P	olle	n.																					?
Alisporites sp. Puncatisporites gretensis Striatopodocarpites sp.									X													X				X				X						
Aratrisporites Gabsonus sp. Horriditriletes ramosa																										^ .				X	•	7		·X		
Polypodiaceoisporites tortuosus																																		Χ.,		

APPENDIX G3

 $W \cdot I : R : E \cdot L \cdot I \cdot N \cdot E := L \cdot O \cdot G$ 

INTERPRETATION

(SEE ATTACHED REPORT)

PE 904241

APPENDIX G4

 $G \; E \; O \; C \; H \; E \; M \; I \; S \; T \; R \; Y$ 

REPORT

# GEOCHEMICAL ANALYSIS OF

GAS SAMPLES A-4974, A-12042

9024-25 AND 15089/5 FROM

SPERM WHALE #1

## G.W. WOODHOUSE

Petroleum Geochemistry Group School of Applied Chemistry W.A. Institute of Technology Kent Street BENTLEY WA 6102

February, 1982

# 1.

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RESULTS

**s**la

### RESULTS

# COMPOSITIONAL DATA:

		%		
		<del></del>		
Component	<u>A-4974</u>	<u>A-12042</u>	9024-25	15089/5
Methane	93.4	87.8 (93.4)	93.5	93.8
Ethane	3.00	2.76 (2.94)	3.00	2.94
Propane .	0.29	0.27 (0.28)	0.39	0.27
iso-Butane	0.084	0.051 (0.060)	0.100	0.060
n-Butane	0.030	0.015 (0.020)	0.030	0.020
Pentanes	0.004	0.005 (0.005)	0.002	0.001
Nitrogen	0.68	5.45 (0.69)	0.55	0.53
Carbon Dioxide	2.49	2.45 (2.59)	2.45	2.37
Oxygen	Trace	1.20 (Trace)	Trace	Trace

NB: Sample A-12042: The compositional data obtained from gas chromatographic analysis is shown in the left hand column. We believe this sample was contaminated by air during sampling and therefore assuming that the oxygen is from the air we have calculated the true composition of the gas and placed these calculated values in brackets.

# ISOTOPE ANALYSIS:

Sample	$\delta^{13}$ C (PDB)
A-4974	-40.2
A-12042	-38.7
9024-25	-37.4
15089/5	-38.6

COMMENTS AND CONCLUSIONS

#### COMMENTS AND CONCLUSIONS

### GENERAL

Four cylinders (A-4947, A-12042, 9024-25 and 15089/5) of gas from the Sperm Whale #1 exploration well were provided for geochemical analysis. Firstly, the C<sub>2</sub>-C<sub>5</sub> hydrocarbon composition of each gas was determined by gas chromatography using a Chromosorb 102 column and flame ionization detector (FID). Secondly, the relative proportions of carbon dioxide, nitrogen plus oxygen, methane and ethane were determined for the samples by gas chromatography using a Chromosorb 102 column and thermal conductivity detector (TCD). Finally, the relative proportion of nitrogen and oxygen in each sample was determined by gas chromatography using a Molecular Sieve column and TCD. Since ethane was measured in the first two analyses on each sample and relative detector responses were obtained by using Town Gas as a standard, the relative proportion by volume of each component was able to be calculated. In this case the data from the third method of analysis of each sample was used to calculate the relative proportions of nitrogen and oxygen. This procedure is not normally necessary because natural gas generally contains an insignificant level of oxygen.

### GAS COMPOSITION

If it is assumed that the A-12042 sample is contaminated with air and the corrected data is used for this sample then all four samples analysed have a very similar composition. Although these gases have considerably more of the  $C_2^+$  components than the recently analysed Baleen #1 gas samples they still have less than the 5%  $C_2^+$  components usually required to consider a gas as "wet". In other words the Sperm Whale gas samples have a composition which is representative of neither a truly wet gas nor a truly dry gas. Another interesting difference between the Sperm Whale and Baleen gases is that the Sperm Whale samples have a very significant carbon dioxide component and relatively much less nitrogen whereas the Baleen gases contained low levels of carbon dioxide and relatively much larger amounts of nitrogen.

## CARBON ISOTOPE COMPOSITION

It is now well-established that the following carbon isotope criteria can often be used to characterize the source of natural gas:

Carbon Isotope Values	Gas Source
-75 to -58°/oo	dry bacterial methane
$-58$ to $-40^{\circ}/_{\circ\circ}$	gas associated with oil
$-40 \text{ to } -25^{\circ}/_{00}$	deep, dry thermal gas

Thus, the isotope ratios for the Sperm Whale gas samples suggest that these gases are very thermally mature and have probably been sourced from deep in the basin. Although the compositional data shows that the gas samples are not as dry as might be expected on the basis of isotope data, there has probably been a contribution to the  $C_2$ + components of the gas from oil associated with this gas.

GEOCHEMICAL EVALUATION OF

RFT #2, RFT #21, RFT #1, DST #1B,

DST #2 AND THE 833m SIDEWALL

CORE FROM SPERM WHALE #1

G.W. WOODHOUSE

Petroleum Geochemistry Group School of Applied Chemistry W.A. Institute of Technology Kent Street BENTLEY WA 6102 February, 1982

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CAPTILARY GLC TRACES	19

TABULATED DATA

Start Start

WELLNAME = SPERM WHALE NO 1 S.W.C.

DATE OF JOB = FEBRUARY 1982

## COMPOSITIONAL DATA

DEPTH(m) %SAT %ARON ZNSO PRIST/PHYT PRIST/NC17 PHYT/NC18 PAP AROM/SAT CPI(1) CPI(2) 21+22/28+29 833.0 60.0 26.8 13.2 nd nd 0.45 nd nd nd nd nd

WELLNAME = SPERM WHALE NO 1 S.W.C.

DATE OF JOB = FEBRUARY 1982

### ORGANIC CONTENT OF SEDIMENTS

DEPTH(m) %SOM %TOC SOM(mg)/TOC(g) SAT(mg)/TOC(g) %SmOM 833.0 .525 nd nd nd nd .315

# N-ALKANE DISTRIBUTIONS

-	DILNAME			CN12	CN13	CN14	CN15	CN16	CN17	CN18	CN19	<b>CN20</b>	CN21	CN22	CN23	CN24	CN25	CN26	CN27	CN28	CN29	CN30	CN31
- SPERM	WHALE 1	RFT	2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd								
- SPERM	WHALE 1	RFT	21	nd	nd	nd 1	nd	nd	nd	nd	nd	nd	nd	nd	nd								
- SPERM	WHALE 1	RFT	1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd								
- SPERM	WHALE 1	DST	2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd								
- SPERM	UHALE 1	DST	1 B	1.5	5.0	10.9	13.8	14.0	12.5	10.4	9.1	6.9	5.1	3.7	2.6	1.8	1.1	0.8	0.4	0.2	0.1	0.1	0.0

# COMPOSITIONAL DATA

	DILNAME	7SAT	ZARON	ZNSO	PRIST/PHYT	PRIST/NC17	PHYT/NC18	PAP	AROM/SAT	CPI(1)	CPI(2)	21+22/28+29
- SPERM	WHALE 1 RFT 2	63.0	30.8	6.3	nd	nd	nd	nd	0.49	nd	nd	nd
- SPERM	WHALE 1 RFT 21	61.0	28.6	10.4	nd	nd	nd	nd	0.47	nd	nd	nd
- SPERM	WHALE 1 RFT 1	59.5	31.7	8.8	nd	nd	nd	nd	0.53	nd	nd	nd
- SPERM	WHALE 1 DST 2.	60.4	30.4	9.2	nd	nd	nd	nd	0.50	nd	nd	nd
- SPERM	WHALE 1 DST 1B	67.6	27.0	5.4	2.45	.39	-19	nd	0.40	1.06	1.06	26.2

# GRAVITY AND SULPHUR DATA - SPERM WHALE #1

Sample	API Gravity	% Sulphur
RFT #2 832m	25.6	0.50
RFT #21 836.6m	25.6	0.36
RFT #1 842m	23.9	0.43
DST #2	15.7	2.40
DST #1B	37.0	0.50
SWC 833m	· nd*	0.59%

<sup>\*</sup> no data due to insufficient sample

### KEY

%SOM = Percentage of soluble organic matter in the sediment sample (W/W)

%SAT = Percentage by weight of saturated compounds in the extract

%AROM = Percentage by weight of aromatic compounds in the extract

%NSO = Percentage by weight of asphaltenes plus resins in the extract

PRIST = Pristane

PHYT = Phytane

NC17 =  $\underline{n}$ -heptadecane (i.e.  $\underline{n}$ -alkane with 17 carbon atoms)

NC18 =  $\underline{n}$ -octadecane (i.e.  $\underline{n}$ -alkane with 18 carbon atoms)

PAP = Percentage of aromatic protons in the aromatic fraction

CPI = Carbon Preference Index

<u>n</u>-Alkane Composition: CN12 etc. = <u>n</u>-alkane with 12 carbon atoms etc. (Values are weight percent of the n-alkane fraction)

TOC = Total organic carbon (soluble + insoluble)

 $C_{\mathbf{r}}$  = Total insoluble organic carbon

 $C_R$  = Residual organic carbon

HC = Hydrocarbon

nd = No data

21+22/28+29: Sum of percentages of <u>n</u>-alkanes with carbon numbers 21 and 22 divided by sum of percentages of <u>n</u>-alkanes with carbon numbers 28 and 29

%SaOM = Percentage of saturated organic matter in the sediment sample (W/W)

# SPECIAL TEST REPORT

Requested by

Hudbay Oil (Aust) Pty. Ltd.

Sample Book No. 82/081

Date Received

Natural Gas

Job No. ......253

Query

type only within he lines Material

Analysis

Origin of Sample

Sperm Whale

REPORT'

## Analysis of Cylinder A 4926.

Component	Mole Cor	<u>icentrati</u>	on
Methane	93.3	0.2	%
Ethane	2.83	0.2	%
Propane	0.28	0.01	%
iso-Butane	0.069	0.002	%
n-Butane	0.027	0.002	%
neo-Pentane	30 pp	m ± 5	ppn
iso-Pentane	60 pp	m ± 5	ppn
n-Pentane	50 pp	m ± 5	ppn
Higher Hydrocarbons	100 pp	m ± 5	ppm
Carbon Dioxide	2.84 ±	0.03	%
Nitrogen	0.64 ±	0.01	%
Oxygen + Argon	0.02 ±	0.01	%
Helium	25 pp	m ± 10	ppm

Pressure in cylinder approximately 550 lb/in<sup>2</sup>.

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Chemist Checked C. Rudolph & K. Jones

Date Laboratory 12/2/82

type only within the line

# GAS AND FUEL CORPORATION OF VICTORIA SCIENTIFIC SERVICES DEPARTMENT

# SPECIAL TEST REPORT Hudbay Oil (Aust) Pty. Ltd. Sample Book No. 82/08; Natural Gas Job No. 253 Analysis Report No. 82/75/AN

Origin of Sample

REPORT'

Query

Requested by

Date Received Material

# Analysis of Cylinder 15098/17

Sperm Whale

Component	Mole Conce	entration
Methane	93•5 ±	0.2 %
Ethane	2.82 ±	0.2 %
Propane	0.27 ±	0.01 %
iso-Butane	0.069 ±	0.002 %
n-Butane	0.025 ±	0.002 %
neo-Pentane	20 ppm	± 5 ppm
iso-Pentane	50 ppm	± 5 . ppm
n-Pentane	30 ppm	± 5 ppm
Higher Hydrocarbons	15 ppm	± 5 ppm
Carbon Dioxide	2.63 ±	0.03 %
Nitrogen	0.61 ±	0.01 %
Oxygen + Argon	0.02 ±	0.01 %
Helium	30 ppm	± 10 ppm

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Chemist C. Rudolph & K. Jones Checked

Date Laboratory 12/2/82

Please type only within

# GAS AND FUEL CORPORATION OF VICTORIA SCIENTIFIC SERVICES DEPARTMENT

REPORT TEST SPECIAL

Requested by Date Received Hudbay Oil (Aust) Pty. Ltd.

Sample Book No. 82/082

Material

Natural Gas

Job No. .....253

Query

Analysis

Report No. 82/74/AN

Origin of Sample

Sperm Whale

REPORT

# Analysis of Cylinder A 7387.

Component	Mole Conce	ntrati	on
Methane	93•8 ±	0.2	%
Ethane	2.60 ±	0.2	%
Propane	0.21 ±	0.01	%
iso-Butane	0.045 ±	0.002	%
n-Butane	0.013 ±	0.001	%
neo-Pentane	20 ppm	± 5	ppm
iso-Pentane	30 ppm	<del>*</del> 5	ppm
n-Pentane	20 ppm	± 5	ppm
Higher Hydrocarbons	20 ppm	± 5	ppm
Carbon Dioxide	2.56 ±	0.03	%
Nitrogen	0.70 ±	0.01	%
Oxygen + Argon	0.04 ±	0.01	%
Helium	35 ppm	± 10	ppm

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Chemist Checked

Rudolph & K. Jones

Date Laboratory

THEORY AND METHOD

#### THEORY AND METHOD

#### 1. API GRAVITY

A 1 ml specific gravity (SG) bottle was accurately weighed, then filled with petroleum at 60°F and finally reweighed. The weight difference was divided by the weight of 1 ml of water at 60°F to obtain the specific gravity. The following formula was then used to calculate the API gravity:

API Gravity = 
$$\left(\frac{141.5}{SG\ (60^{\circ}F)}\right)$$
 - 131.5

The reported gravity value is the average of duplicate determinations.

#### 2. SULPHUR DETERMINATION ....

The % sulphur values were measured using an x-ray fluorescence spectrometer equipped with a liquid sample holder. This parameter is influenced by the nature of the source material from which a crude is derived, the depositional environment of the source rocks, and reservoir alteration processes such as bacterial alteration.

#### 3. EXTRACTION OF SEDIMENT SAMPLES

Crushed sediment (maximum of 250g) and 320 mls of purified dichloromethane: methanol (10:1) were placed in a 500 ml conical flask. A double surface condenser was fitted to the flask, and the sample was then extracted under the influence of ultra-sonic vibration (60-70°C) using a Buehler Ultramet II sonic bath for 2 hours. The solvent was then separated from the sediment using a large Buchner filtration system. The extract was recovered by careful evaporation of the solvent on a steam bath and weighed. The weight of extract was used to calculate %SOM(UNC) using the following formula:

# 4. SEPARATION OF PETROLEUM INTO CONSTITUENT FRACTIONS

The petroleum was separated into saturated, aromatic and NSO (asphaltenes plus resins) fractions by column chromatography on silicic acid. The crude sample was applied to the top of a silicic acid column (sample to adsorbent ratio 1:50) and the saturated compounds were eluted with n-pentane, aromatic compounds with a 50:50 mixture of ether and n-pentane,

and finally the NSO fraction was eluted with a 20:1 mixture of methanol and dichloromethane. The neat fractions were recovered by careful removal of the solvent by fractional distillation and weighed.

The sum weight of the three fractions was used to calculate the %SOM using the following formula:

%SOM = 
$$\frac{\text{Wt. AROM.} + \text{Wt. SAT.} + \text{Wt. NSO}}{\text{Wt. SEDIMENT EXTRACTED}} \times \frac{100}{1}$$

This parameter can be used to assess the suitability of the sediments as source rocks according to the classification shown (later in this section) in the table "Classification of Source Rock Richness".

The weight of saturated compounds was used to calculate the percentage of saturated compounds in the sediment according to the following formula:

$$%$$
SaOM =  $\frac{\text{Wt. Saturates}}{\text{Wt. Sediment Extracted}} \times \frac{100}{1}$ 

This parameter can be used to assess the suitability of the sediments as oil source rocks according to the classification shown in the table "Classification of Source Rock Richness".

The weight of each fraction was used to calculate the % by weight of each fraction in the extract according to the following formula:

% Fraction = 
$$\frac{\text{Wt. Fraction}}{\text{Wt. All Fractions}}$$
 x  $\frac{100}{1}$ 

The composition of the extracts can provide information about their levels of maturity and/or source type (LeTran et al., 1974; Philippi, 1974). Generally, marine extracts have relatively low concentrations of saturated and NSO compounds at low levels of maturity, but these concentrations increase with increased maturation. Terrestrially derived organic matter usually has a low level of saturates and large amount of aromatic and NSO compounds irrespective of the level of maturity.

# 5. GLC ANALYSIS OF SATURATED COMPOUNDS

Capillary GLC traces were recorded for each saturate fraction. The following information was obtained from these traces:

- (a) <u>n</u>-Alkane Distribution The C<sub>12</sub>-C<sub>31</sub> <u>n</u>-alkane distribution was determined from the area under peaks representing each of these <u>n</u>-alkanes. This distribution can yield information about both the level of maturity and the source type (LeTran et al., 1974).
- (b) Carbon Preference Index Two values were determined:

$$\frac{\text{CPI(1)} = \frac{(c_{23} + c_{25} + c_{27} + c_{29})\text{Wt\%} + (c_{25} + c_{27} + c_{29} + c_{31})\text{Wt\%}}{2 \times (c_{24} + c_{26} + c_{28} + c_{30})\text{Wt\%}}$$

$$\frac{\text{CPI(2)} = \frac{(c_{23} + c_{25} + c_{27})\text{Wt\%} + (c_{25} + c_{27} + c_{29})\text{Wt\%}}{2 \times (c_{24} + c_{26} + c_{28})\text{Wt\%}}$$

The CPI is believed to be a function of both the level of maturity (Cooper and Bray, 1963; Scalan and Smith, 1970) and the source type (Tissot and Welte, 1978). Marine extracts tend to have values close to 1 irrespective of maturity whereas values for terrestrial extracts decrease with maturity from values as high as 20 but don't usually reach a value of 1.

- (c) C<sub>21</sub>+C<sub>22</sub>/C<sub>28</sub>+C<sub>29</sub> This parameter provides information about the source of the organic matter (Philippi, 1974). Generally, a terrestrial source gives values <1.2 whereas a marine source results in values >1.5.
- (d) Pristane/Phytane Ratio This value was determined from the areas of peaks representing these compounds. The ratio renders information about the depositional environment according to the following scale (Powell and McKirdy, 1975):
  - <3.0 Marine depositional environment (i.e. reducing environment)</p>
    3.0-4.5 Mixed depositional environment (i.e. reducing/oxidising environment)
  - >4.5 Terrestrial depositional environment (i.e. oxidising environment)
- (e) Pristane/n-C<sub>17</sub> Ratio This ratio was determined from the areas of peaks representing these compounds. The value can provide information about both the source type and the level of maturation (Lijmbach, 1975). Very immature crude oil has a pristane/n-C<sub>17</sub> ratio >1.0, irrespective of the source type. However, the following

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classification can be applied to mature crude oil:

<0.5 Marine source

0.5-1.0 Mixed source

>1.0 Terrestrial source

In the case of sediment extracts these values are significantly higher and the following classification is used:

<1.0 Marine source

1.0-1.5 Mixed source

>1.5 Terrestrial source

- (f) Phytane/n-C<sub>18</sub> Ratio This ratio was determined from the areas of peaks representing these compounds. The value usually only provides information about the level of maturity of petroleum. The value decreases with increased maturation.
- (g) Relative Amounts of <u>n</u>-Alkanes and Naphthenes Since <u>n</u>-alkanes and naphthenes are the two dominant classes of compounds in the saturate fraction, a semi-quantitative estimate of the relative amounts of these compounds was made. This information can be used to assess the degree of maturation and/or the source type of the petroleum (Philippi, 1974; Tissot and Welte, 1978). Very immature petroleum has only small proportions of <u>n</u>-alkanes, but as maturity increases the relative amount of <u>n</u>-alkanes increases. In addition, terrestrial petroleum has a greater proportion of high molecular weight naphthenes than marine petroleum.

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COMMENTS AND CONCLUSIONS

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#### GENERAL

Three RFT samples (#1, #2, #21), two DST samples (#1B, #2) and one sidewall core (833m) were provided for geochemical analysis. The RFT #1, RFT #21, DST #1B and DST #2 were provided as oil/water mixtures and therefore the oil had to be separated from the water and dried prior to being analysed.

Each oil sample was firstly analysed for its % sulphur content and API gravity. An aliquot of each sample was then liquid chromatographed to obtain saturate, aromatic and NSO fractions. The saturate fractions were analysed by capillary column gas chromatography and combined capillary column gas chromatography/ mass spectrometry (GC/MS). It should be noted that the results and discussion for the GC/MS study are included in a separate report.

The sidewall core was placed in an extraction flask, covered with dichloromethane/
methanol (10:1) solvent, partially crushed with a stainless steel rod and was
then ultrasonically extracted. After removal of the extracting solvent from the
partially crushed SWC the sediment was carefully dried, crushed to 0.1 mm and
extracted for a second time. The soluble organic matter recovered after the
double extraction was analysed by the same sequence of methods as those described
above for the oil samples.

Normally our report for this type of study would include  $\underline{n}$ -alkane histograms and values for parameters such as pristane/phytane, pristane/ $\underline{n}$ -C<sub>17</sub> and the carbon preference index. From this data it is generally possible to draw conclusions about the maturity and type of organic matter under investigation. However, in this case the composition of the extracts has prevented the preparation of a report of this type, although the maturity and type of organic matter is discussed in the GC/MS report on these samples.

#### COMPOSITION OF THE SOM

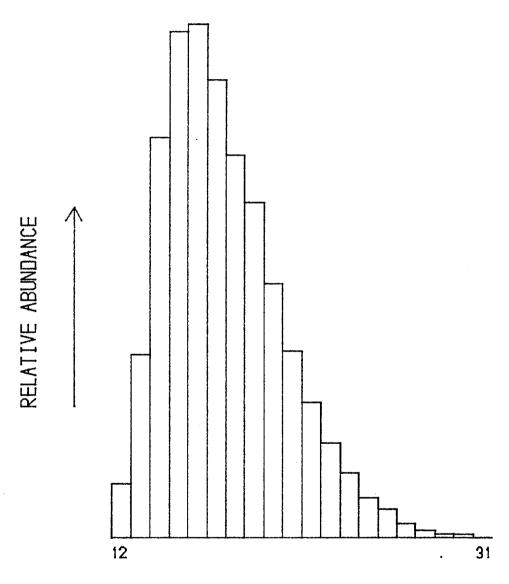
The capillary GLC trace for the DST #1B saturate fraction shows that this sample is dominated by  $\underline{n}$ -alkanes. However, the distribution of  $\underline{n}$ -alkanes is very similar to that observed for diesel. Since this sample is anomalous compared to the other Sperm Whale samples and its  $\underline{n}$ -alkane distribution is very similar to that for diesel it is assumed that it is severely contaminated with diesel and therefore is excluded from any further discussion.

The capillary GLC traces of the saturate fraction from the RFT #1, RFT #2, RFT #21 and DST #2 samples and the SWC extract show that these samples are almost devoid of n-alkanes and therefore it is most likely that they have been altered by bacteria. The level of saturates in the SOM and the API gravities for these samples are much lower than the values normally observed for unaltered Gippsland crudes while the % sulphur values are much higher than those commonly observed for unaltered Gippsland oils. These variations are consistent with biodegradation having taken place and support the contention that the Sperm Whale oil samples and SWC extract are biodegraded.

#### OTHER COMMENTS

It is of interest that the DST #2 sample has a lower API gravity and higher % sulphur value than the other samples. This observation suggests that the DST #2 sample is significantly more biodegraded than the other samples, although it could be accounted for by other more tenuous explanations.

n-ALKANE DISTRIBUTION



SPERM WHALE #1 DST #1B

CAPILLARY GLC TRACES

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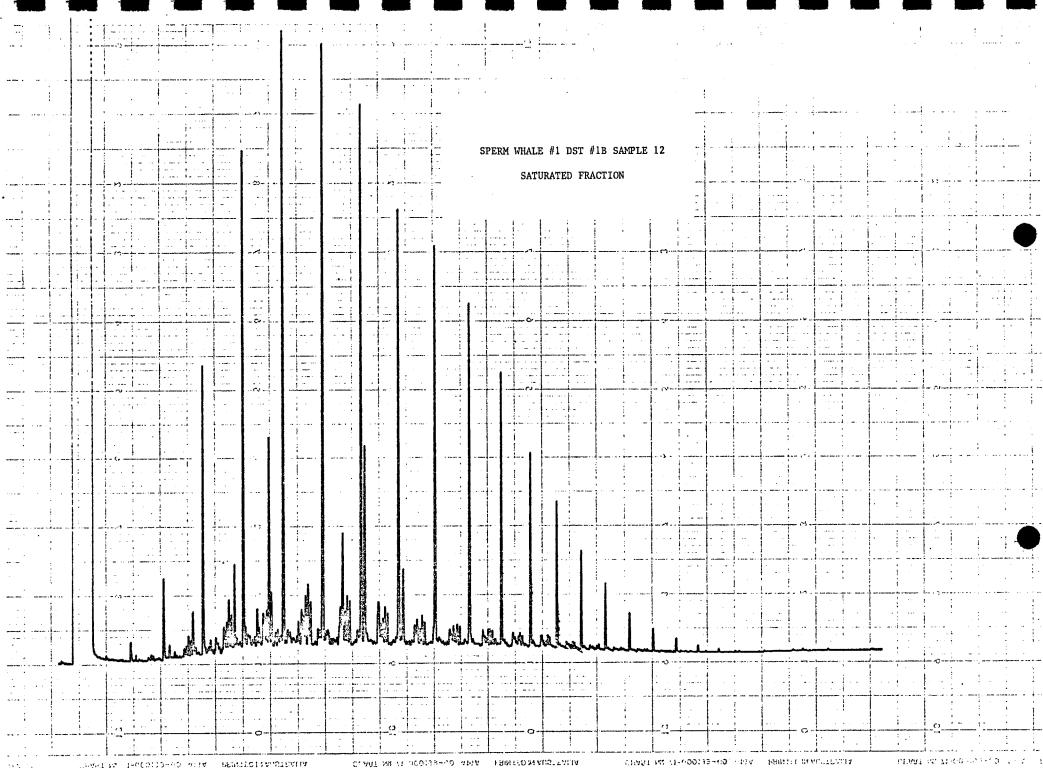
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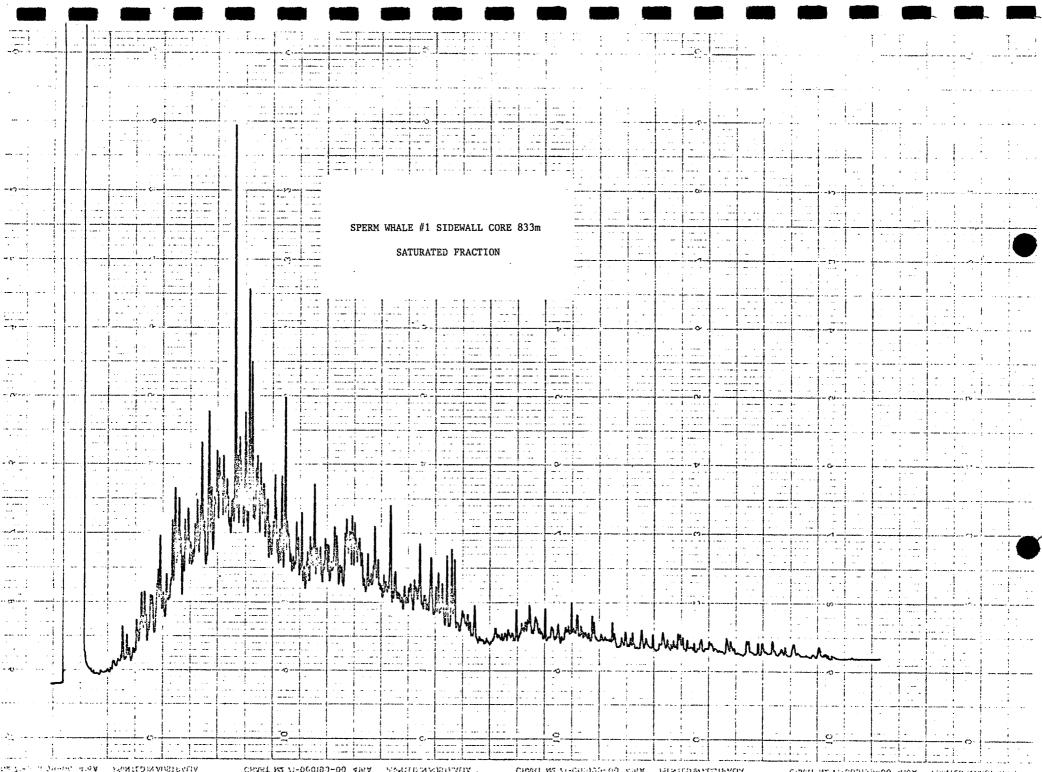
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V STALL AND SAGRAGE



APPENDIX G5

L 0 G 0 F C 0 R E S

# Hudbay Oil (Australia) Ltd.

GRAINS

CLAY SILT GRAIN SIZE % SIZE % TYPE & %

SIDEWALL CORE DESC	CRIPTIONS
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				WI	ELL:	SPERM WHALE - 1
	ACCI	ESSOR	IES	BONS	TARY RES	
% #	TYPE 8 %	түре в %	TYPE 8 %	HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA
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-						
_						
			<u> </u>			
_	***					
N	ETIC)	<u> </u>	1	<u> </u>		DENETIC CIPUCTURES
S	tructures	$\blacksquare$	Solution		ures	GENETIC STRUCTURES  Tectonic structures
eddi	77- 75- 119 <i>V</i>		Breccia, Disolutio Sylolite Vadose	solution, n - com pisoliti	collapse paction(horse	Fractures Slickensides Fractures Fra
	ing 0		Vadose Boxwork Salt hop	silt opers or	casts	Miscellaneous Geopetal fabric Cone-in-cone Stromatactics Boudinage, ball and age flow
	ACCESS Py Pyr				NETIC TE	
	Mc Mid			MX M	rypto < 1/25 icro 1/256	56mm

Second Content of the content of t		≿જ્ઞ			CL	AY %	SIL	LT E%T	YPE 8	RAIN % %		E	CEM	IENT	DIAG	ENES	- 11	<u>5</u>	ပ္က	TYPE	ACC	ESSOF	RIES	BONS	rary Res			
217 5.0 CALCILUTITE Lt gry 10 5 65 30 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	DEPTH (metres)	RECOVEF (centimetre	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	QUARTZ	CALCITE	GUARI 2 SKFI FTAL	CALCITE	RANGE	DOMINANT	ø5	ď	TYPE	%	TEXTURE	SORTING	HARDNES	POROSITY 8 %	PE 38	ග	YPE 8	HYDROCAR	SEDIMENT	SUP	PLEMENTARY	DATA
237   S. 0   CALCILOTTE   L6 gry   10   80   10   10   10   10   10   10	217	5.0	CALCISILTITE	Lt gry				60						·					s									•
276 2.5 CALCILUTITE Le gry 90 10 10 8 8 90 10 10 8 8 90 10 10 90 10 10 90 10 10 90 1	237	5.0	CALCILUTITE		5	65		30											S								·	
30. 3.0 CALCISITTE Lt gry Tr 80 20 Tr 80 2 S S S S S S S S S S S S S S S S S S	251	5.0	CALCILUTITE	Lt gry	10	80		10											s									
328 5.0 CALCILUTITE Lt gry Tr 80 20 Tr S S S S S S S S S S S S S S S S S S	276	2.5	CALCILUTITE	Lt gry		90		10											s				:					
346 1.5 CALCILUTITE Lt gry Tr 80 20 Tr S S STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  384 2.0 CALCILUTITE Lt olv gry Tr 80 20 Tr S STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  384 2.0 CALCILUTITE Lt olb gry Tr 90 1d Tr STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  385 STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  386 5.0 CALCILUTITE Lt olb gry Tr 90 1d Tr STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  386 5.0 CALCILUTITE Lt olb gry Tr 90 1d Tr STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  387 STRUCTURES (STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  388 STRUCTURES (STRUCTURES (STRUCTURES SHIP)  389 STRUCTURES (STRUCTURES (STRUCTURES SHIP)  380 STRUCTURES SHIP)  380 STRUCTURES SHIP)  380 SHIP SHIP SHIP SHIP SHIP SHIP SHIP SHIP	301	3.0	CALCISILTITE	Lt gry		40		60	Тз										s									
366 5.0 CALCILUTITE Lt olv gry 5 75 20 Tr  384 2.0 CALCILUTITE Lt olv gry Tr 80 20 Tr  405 2.0 CALCILUTITE Lt olb gry Tr 90 10 Tr  STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  SYNGENETIC STRUCTURES  Current-produced markings  Circultic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Syngenetic Structures  Solution structures  Soluti	328	5.0	CALCILUTITE	Lt gry	Tr	80		20	Tì										s									
2.0 CALCILUTITE Lt olv gry Tx 80 2C Tx  STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  SYNGENETIC STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  STRUCTURES  SIdentification  Parallel Type  Trickness of bedding  Multinestree  Immultoner bed Immultoner bedding  Ton-Iomn millimeter bed Immultoner bedding  Ton-Iomn millimeter bed Immultoner bedding  Ton-Iomn millimeter bed Immultoner bedding  Ton-Iomn millimeter bed Immultoner bedding  Ton-Iomn millimeter bed Immultoner bedding  Ton-Iomn millimeter bed Immultoner bedding  Ton-Iomn millimeter bed Immultoner bedding  Ton-Iomn millimeter bed Immultoner bedding  Ton-Iomn millimeter bedding  Ton-Iomn millimeter bedding  Ton-Iomn millimeter bedding  Ton-Iomn millimeter bedding  Trequiar bedding  Trequiar bedding  Trequiar bedding  Trequiar bedding  Trequiar bedding  Trequiar bedding  Trequiar bedding  Ton-Iomn millimeter bedding  Ton-Iomn mill	346	1.5	CALCILUTITE	Lt gry	Tr	80		20	Tı										s									
STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  SYNGENETIC STRUCTURES  Solution structures  Forectives  Forectives  Solution structures  Fractives  Fractives  Solution structures  Fractives  Fractives  Solution structures  Fractives  Solution structures  Fractives  Solution structures  Fractives  Fractives  Fractives  Fractives  Fractives  Solution structures  Solution structures  Solution structures  Fractives  Fract	366	5.0	CALCILUTITE	Lt olv gry	5	75		20	Ti										S								···	
Stratification Parallel Type Thickness of bedding Metric System Millimeter bed Cross Bedding With enough indicated With enough indic	384	2.0	CALCILUTITE	Lt olv gry	Tr	80		20	T	s									s						_			<b></b>
Stratification Parallel Type Thickness of bedding Metric System millimeter bed centimeter bed centimeter bed centimeter bed convolution of the product of the plant of the pla	405	2.0	CALCILUTITE	Lt olb gry	Tr	.90		10	T:																			
G Granule & larger	millimete centimet Cross Be in gene with an chevror climbing festoon planar	Metri er bed er bed edding ral gle indica	Parallel Type    Compared to the content of the con	Irregular bedding Graded bedding No apparent bedding Nodular bedding  Nodular bedding  CEMENT Q Silica Py Pyrite C Calcite D Dolomite Sd Siderite	DIAGE Q S	Curre  Ripple asym Inter sym Pull o Scour Flute Groov Stria: Partii ENESIS	e mar metro ference ver flo and f cast ve cas tion ng lin ization allization	oduced  ks ical ce al ame stru fill st neation	marking	TRUC  S  P  ING  Dunded  Jibangu	Organis  Burrowe slight moder well b Churner Bored Bored Sorganis Plant ravereb	ed ly burn rately l urrowe d  urface m trac oot tub rate t SORT P M	rowed burrowed ed cks and t bes tracks	arkings	P. M. R. R. P. S. C. L. T. B. B. Uncon Very Soft Model	enecor lud cr lain or vull-ap lump Convolu- oad c epee Birdsey S solida Soft	racks hall part struct lute b cast struc ye, fen	oraneon orints ures are edding ture estral for	us defo ad conto abric ROSITY Intergr Vugula	anular	ACCES Py Py Mc Min Ch Ch Ch Ch Ch Hm He	SORIES rite ca ert gnite/Coa	Breccia, Disolutic Sylolite Vadose Vadose Boxwor Salt hop	solution on - com pisolit silt k opers or	ures , collapse ,paction(hor e casts	se tail)  See tail)  See tail)  See tail)	Fractures Fractures Slickensides Breccia, tectonic Miscellaneous Geopetal fabric Cone-in-cone Stromatactics Boudinage, ball and HYDROCARB( ** Signifies Full details	age flow

#### SIDEWALL CORE DESCRIPTIONS

WELL: SPERM WHALE - 1 BONS TARY RES

` .	es s			CL SIZE	AY : % S	SILT	6 TYP		AIN:	SIZE		СЕМЕ	ENT	DIAGE	NESIS	9	ایا	SS	TYPE	ACCI	ESSOR	IES	BONS	rary res			
EPTH metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	₹١	түре в %	түре в %	TYPE %	TEXTURE	ROUNDING	SORTING	HARDNESS	POROSITY 8 %	түре в %	түре в %	түре в %	HYDROCARBONS	SEDIMENTARY STRUCTURES	SUF	PPLEMENTARY DA	ATA
425	5.0	CALCILUTITE	Lt gry	5	60	3	0	5		VF	VF							s								-	•
436	5.0	CALCILUTITE	Lt olv gry	Tr	80	2	0											s. S						<del>∫m</del> - <b>-</b>			•
452		INSUFFICENT RECOVERY																								•	
467	1.5	CALCILUTITE	Lt gry	Tr	75	2	5											s									
483		LOST BULLET																									
500	5.0	CALCILUTITE	Lt olv gry	5	60	3	5	Tr										s		G Tr					1		
518	5.0	CALCILUTITE	Lt gry	5	60	3	:5	Tr										s		G Tr						·	
534	1.5	CALCISILTITE	Lt olv gry	20	25		id	Tr	П					D 5	мх			s									
554	2.5	CALCILUTITE	Lt olv gry	Tr	75	7	:5	Tr	П									s		G Tr				Ì			
570	2.5	CALCILUTITE	Lt olv gry	Tr	75	7	25											s		G Tr							
Thickness millimeter centimeter Cross Bed in genero with angli chevron climbing festoon planar Abbrevia	Metric bed r bed Iding. at indicate	c System I mm-IOmm mm I cm-IOcm cm	Irregular bedding Graded bedding No apparent bedding	Q Si	Ripple r asymme interfe symme Pull over Scour ar Flute co Groove Striation Parting	produ narks etrical rence frical flame d fill st cast lineat	structur on ROI R SR	S TR stings S TR S TR S TR S TR S TR S TR S TR S TR	B B C B E C G G G G G G G G G G G G G G G G G G	JRES Drganism Burrowed slightly moderat well bur Churned Bored Bored surf Drganism Plant roo Vertebra  Sci P M W	- produ burrow- tely burrowed face tracks t tubes te track ORTING	ed rowed  and trail  ks  G  or  derate	HARLU VS S M	Pen Mud Rair Pull Slun Con Loa Tep	econte crack or ha - apart np stru volute d cast ee str seye, f	s il print ictures beddi ucture enestro	s and ing all fabr	deforr		ructures  Total Property Accessing to the Check Check Check Him Head Left Lift Head Left Lift Lift Lift Lift Lift Lift Lift Li	te	Sylolite Vadose Vadose Boxwork Salt hopp	pisolite pisolite silt pers or	collapse paction(hors	e tail)	TRUCTURES  Tectonic structures  Fractures  F	<u> </u>

# SIDEWALL CORE DESCRIPTIONS

	≻∵⊛			CL		SI SIZI	LT E% TY		RAIN			СЕМЕ	NT	DIAG	ENESI	s ,			ТҮРЕ	ACC	ESSOF	IES	SNC	rRY ES		···· <u>.</u>		
DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY MINERALS		QUARTZ	CALCITE	TJ	CALCITE	_	DOMINANT	TYPE 8 %	түре в %	TYPE	%	POUNDING	SORTING	HARDNESS	POROSITY T	TYPE 8 %	түре в %	TYPE 8%	HYDROCARBONS	SEDIMENTARY STRUCTURES	SU	PPLEMENTA	RY DAT	ΓΔ
587	3.0	CALCILUTITE	Lt olv gry	Tr	80		20											s		Mc Tr								•
604	5.0	CALCILUTITE	Olv gry - lt olv gry	10	85		5											s		Mc Tr								
621	2.5	CALCILUTITE	Lt olv gry - olv gry	15	80		5											s		G Tr								
638	5.0	Calcareous CLAYSTONE	Olv gry	60	40													S-M						#				
662	4.5	Calcareous CLAYSTONE	Olv gry - lt olv gry	40	30		25											s-м		G 5				+	-			
672	2.0	CALCILUTITE	Lt olv gry	25	40		20	15		VF -F	VF							s		*				+				
682	1.5	Argillaceous CALCILUTITE	Lt olv gry	30	30		20	20		VF -F	VF					T		s						#				
692	4.0	Calcareous CLAYSTONE	Olv gry	50	30		20											s						#				
702	4.0	Calcareous CLAYSTONE	Olv gry	40	40		20											s						<b>***</b>				
712	2.5	Calcareous CLAYSTONE	Olv gry	40	40		20											s						***				
millimete centimete <u>Cross Be</u> in gene	r bed er bed edding ral gle indica	ic System Imm-IOmm mm I cm-IOcm cm  ted ∠ie°	Irregular bedding Graded bedding No apparent bedding Nodular bedding  CEMENT Q Silica Py Pyrite	DIAGE D D Q S	Currer Ripple asym inter symr Pull ov Scour Flute Groov Striat Partin NESIS olomitizi	e marinmetri ference metrical ver flatand f cast e cast ion ing line	cal ee in me struct ill t eation  F	ounding Substitution of Substi	RUCT	URES Organism Burrowed slightly moders well bur Churned Bored sur Organism Plant roc Vertebro	burro tely burro tely burrowed face track of tube ate fro	urrowed us and trail us ucks NG poor	Ings ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊗ X → HARE UVS	Primary  Mr. Rr. S. C. C. L. T. B. D. N. E. S. Unconst	ud crac ain or h ull-apar ull-apar onvolution oad cas epee st irdseye,	empo ks ail pr rt ructu e be it ructu fenes	raneou rints res and dding ire stral fa	s defor	mation s	tructures	ıte	Sylolite Vadose Vadose Boxwork Salt hop	solution, n - comp pisolite silt pers or  DIAGEN CX Cr	collapse caction(hors	Se tail)  See tail)  S	TRUCTURES  Tectonic structures Slickensides Breccia, tectonic  Miscellaneous Geopetal fabric Cone-in-cone Stromatactics Boudinage, ball (  HYDROCA  # Signific Full deta	₩ III	
		M Medium C Course VC Very Coarse G Granule & larger	C Calcite D Dolomite Sd Siderite	X R	ecrysto hloritiz	ollızat	ion S	A Sub-	angu la	r V	v w	ell ery Well	S M	Soft Moder Hard			1	Intraske	eletal	Ch Che Cc Lig Hm Hed Lf Lift	ert nite/Coal avy miner nic fragme uconite	als		, 200	., , , , , , , , , , , , , , , , , , ,	supplemen	ary data	A4-GL-51

# SIDEWALL CORE DESCRIPTIONS

CLAY   SITE   SHAINS   CEMENT   DATA   SHAINS   CEMENT   DATA   STRUCTURES   STRU		ζ. (Si			CL. SIZE	AY : %	SII SIZE	_T _% T		GRAI		E	CEM	IENT	DIA	GENE	SIS	NG	<sub>G</sub>	SS	TYPE	ACC	ESSOR	IES	BONS	TARY		
727   3.1   CALCILUTITE   Olv gry   10   20   60   Tr		RECOVER (centimetre	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	QUÁRTZ	CALCITE	QUARIZ	CALCITE	RANGE	DOMINANT	ot i	Ф	TYPE	%	TEXTURE	ROUNDI	SORTIN	HARDNE	POROSITY 8 %	PE B	ď	ď	HYDROCAR	SEDIMEN STRUCTU	SUPPLEMENTARY DA	TA
727   3.1   CALCISILITYE   Pale cly gry   10   20   60   Tr	723	4.7	CALCILUTITE	Olv gry		70			1	0					Х	Tò	Мx			М								
734   4.8   CALCILITITE   Olv gry   15   70   5	727	3.1		Pale olv gry	10	20	60		r			<u>.</u>			Х	10	Мх			H								:
750   3.5 NICRITE   Olv gry   30   60   5	734	4.8	CALCILUTITE		5	65	10		1	0	_				х	10	Мх			н		Cc Tr						
750 3.5 MICRITE OLV GTY 30 60 5 TY X 10 MX S-M  750 2.5 CALCISILITIE OLV GTY 45 45 TY X 10 MX 15 MX H PY TY  762 2.0 CALCISILITIE Lt olv GTY 150 TY X 15 MX H PY TY  768 4.4 CALCILUTITE OLV GTY 100 TY X 15 MX H PY TY  773 5.0 CALCILUTITE OLV GTY 65 15 TY TY X 15 MX M PY 5  782 4.8 CALCILUTITE OLV GTY 85 10 TY X 5 MX S-M PY TY  Thickness of bedding Strategies of the deling Imperior of the	741	4.1	CALCILUTITE	Olv gry	15	70	5							<u></u>	Х	10	Мx			м-н								
756 2.5 CALCISILITIE Olv gry 45 45 57 Tr 1 X 15 Mx H Py Tr  768 4.4 CALCIUTITE Olv gry 100 Tr X Tr MX H Py Tr  773 5.0 CALCIUTITE Olv gry 65 15 Tr Tr X 15 Mx N Py 5  782 4.8 CALCIUTITE Olv gry 85 10 Tr X X 15 Mx N Py 5  782 4.8 CALCIUTITE Olv gry 85 10 Tr X X 15 Mx N Py 5  Thickness of badding	750	3.5	_	Olv gry	30	60			5						х	5	Мx			s-M		G Tr			<u> </u>			
Thickness of bedding millinethe bed immillinethe bed immi	756	2.5				45		45	ı	r					х	10	Мх			s-M					_			-
773 5.0 CALCILUTITE Olv gry 65 15 Tr Tr Tr X 15 MX M Py 5  782 4.8 CALCILUTITE Olv gry 85 10 Tr Tr X X 15 MX M Py Tr  STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  SYNGENETIC STRUCTURES  Current-produced morkings  Parcial Type  Thickness of bedding millimater bed in more receitment bed in moderately burrowed with ongle indicated date of the component bedding in general with ongle indicated date of the component bedding with ongle indicated date of the c	762	2.0	CALCISILTITE	Lt olv gry		15		70		T	r'r				х	15	Мx			н	ļ	Py Tr	ļ		_			
773 5.0 CALCILUTITE OLV Gry 85 10 Tr    STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)   SYNGENETIC STRUCTURES	768	4.4	CALCILUTITE	Olv gry		100				7	r				х	Tr	М×			н		Py Tr						
STRUCTURES   Solution structures   Solutio	773	5.0	CALCILUTITE	Olv gry		65		15	7	r	r.				Х	15	Мх	Ш		М		₽y 5	ļ	<u> </u>		<u> </u>	Shall fragments are recrusts	llised
Stratification Parollel Type Thickness of bedding Metric System millimeter bed Imm-lorm mm centimeter bed Imm-lorm defined during in general with ongle indicated during w	782	4.8	CALCILUTITE	Olv gry		85		10	2						х										L	+	Shell liagments are reelysee	
	Stratification Parallel Type  Thickness of bedding Imregular bedding Imgelienter bed Imm-lorm minimage indicated Zig* With angle indicated Zig* Chevron chevron climbing Impelienter bed Sedding Imgelient of the Chevron climbing Imgelient of the														DW													



# SIDEWALL CORE DESCRIPTIONS

DEPTH		۲. اع)	•		CL. SIZE		SIL SIZE	T :% TYP		AIN %	S	$\exists$	CEM	ENT	DIAG	ENE		9	,	٥	TYPE	ACC	ESSOR	IES	SONS	'ARY RES	
787   4.1   CALCISITITE   GY   10   20   40   57   17		RECOVERY (centimetres)	ROCK TYPE	COLOUR	Y YES		$\overline{}$		Τ.	П	RANGE	DOMINANT	ಹ	ď	) YPE	. %	TEXTURE	ROUNDIN	SOLING	"	.0	PE &	PE 8	YPE 8	HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA
792   S.O   CALCESTITYE   Crash gry   10   20   Tr	787	4.1				20		40	Tr	Tr					χ Q							G Tr	Py Tr			***	Fine laminations
Solution   Solution	792	5.0		Grnsh gry		10		20	Tr					-	Х	70	Мх		H	ı		Py Tr				#	
80.5   3.2   CALCARENTEE   Legranh gry   10   10   10   30   30   VP-F VF   RAYSILLOS	799	5.5	CALCILUTITE			85		5	Tr	5			C 5						s	;		Py Tr				***	Bivalve and coral stems evident re- placed by calcite
STEATHER STREET   STREETING   STATEFICIAN   STREETING   STREETIN	803.9	3.2	CALCARENITE	Lt grnsh gry		10	10	10 30		30	VF-F	VF					2	A- SA I	M M	1		G 10				***	Mnr clast of Clclt, pale brn & some gry Clslt. Min Fluor only
SANDSTONE   OLV blk   5   95   VP-G VC	806	4.0	-		25		50	20			VF						Į.	A- SR I	v v	rs		Py 5				<del></del>	
STRUCTURES   STR	812	5.0	SANDSTONE	Olv blk	5			95			VF-G	c- vc					<i>Z</i>	A- R 1	_						*	L	blooming mky solu Fluor - no cut
325 4.2 SANDSTONE Lt olv gry 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -Tr gry cut  328 4.5 SANDSTONE Lt olv gry 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -Slow by the solv Fluor -no cut  329 4.5 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -Tr gry cut  329 4.5 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -no cut  320 4.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  320 4.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  321 2.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  322 4.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  323 4.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  324 4.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  325 4.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  326 4.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  327 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  328 4.2 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  329 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  320 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  320 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  320 SANDSTONE Brash blk 5 95 P-C M SR P U g 30 Cc Tr Zr Tr PyTr * solv Fluor -To cut  321 SANDSTONE Brash blk 1 1 1000-1100-1100-1100-1100-1100-1100	817	5.0	PYRITE	Lt olv grv	_		60 -	I -			-	F					7	. 1.				Py <b>Tr</b> Py100 Py 20			*	-^-	Load cast with Pyr & silt over sand Minor Tr slow blooming milky solu fluor
825 4.2 SANDSTONE Lt olv gry 5 95 P-C M P-	821		SANDSTONE								C-G	VC							PU	J	g 30	Cc Tr		ı '	*	+	
STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)  SYNGENETIC STRUCTURES  Current-produced markings Parollel Type Thickness of bedding Meltines bystem Imm-Onomism Gradeb bedding, on enerol with angle indicate de Imm-Onomism in enerol with angle indicated with angle indicated Filte cost Corrow cast Cherron Paring lineation Structures Filte cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost Filt cost	825	4.2	SANDSTONE	Lt olv gry	5			95			F-C	М							M t	j	g 25	Cc Tr			*	=	-
Stratification Parallel Type  Thickness of bedding Millimeter bed Irm-IOmm millimeter bed Irm-IOm millimeter bed I	828	4.5	SANDSTONE	Brnsh blk							F-G	VC							P L	J	g 30	l				+=	Clay may be due to filtrate or O res Oily smell no Fluor (Spl solv or cut)
	millimete centimet Cross B in gene with ar chevro climbin festooi plandr	Metr er bed er bed edding ral gle indicc	Parallel Type  Inmin-lorm mm Icm-locm cm  Ited 419"  GRAIN SIZE  VF Very Fine F F F F Medium C Course  VC Very Coarse	rregular bedding Graded bedding No apparent bedding Nodular bedding  CEMENT Q Silica Py Pyrite C Calcite D Dolomite Sd Siderite	DIAGE D D C S X R	Currer  Ripple asymmetric symmetric	mt-pro mark metric ference wer flow and five cast e cast ion ag line zation allization	duced male	STF kings  Subject of the subject of	RUCT	URES Organism Burrower slightly moderc well bu Churned Bored su Organism Plant ro Vertebr	n-prod d y burroutely burrowed irrowed	duced mo owed urrowed d ks and trees racks ING Poor foderate Yell	#kings  ### ### ### ### ### ### ### ### ###	RDNES Uncor Very Soft	Mud c Rain o Pull-a Slump Convo Load Tepee Birdse	eracks or hall in part struct blute b cast struct eye, fen	prints tures opedding	ous d and co fabric OROSIT	eform ntorte	nation st	ACCESS Py Pyr Mc Mic Ch Che Che Che Lig Hm Hec Lif Lift	ite a ert nite/Coa avy mine nic fragme	Breccia, Disclutio Sylolite Vadose Vadose Boxwork Salt hop	solution, n - com pisolite silt c ppers or	ures collapse paction(horse casts	Tectonic structures  Fractures Slickensides   1   Breccio, tectonic   Miscellaneous Geopetal fabric Cone-in-cone Stromatactics Boudinage, ball and age flow  XTURES  HYDROCARBONS Signifies presence Full details described under



# SIDEWALL CORE DESCRIPTIONS

	RY es)			CL SIZE	AY 8	SILT SIZE %	TYP	GRA		ZE	CEM	IENT	DIAG	ENESI	s <sub>o</sub>		(0	TYPE	ACC	ESSOR	IES	SNO	ARY ES	
DEPTH (metres)	RECOVEF (centimetre	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	QUARTZ	RTZ	SKELETAL	+	DOMINANT	түре в %	TYPE 8 %	TYPE	%	ROUNDING	SORTING	HARDNESS	POROSITY 1 8 %	түре в %	туре в %	TYPE 8 %	HYDROCARBONS	SEDIMENTAR STRUCTURES	SUPPLEMENTARY DATA
833	5.0	SANDSTONE	Lt olv gry - olv gry	Tr - 5			100 <b>-</b> 95		F-VC	c c					SA- SR		Ū	g 30	Cc Tr			*	+	-50-70% lemon-wh Fluor -Instant streaming & blooming Bl-wh solv -V dull vel cut Oily smell -Ctc between A & T is sharp
843	4.8	COAL SILTSTONE SANDSTONE	Blk Dusky yel brn Olv gry	15 5		75 -	10 95		VF M-G	VF C					- SR SA <sub>T</sub>	W M	S-M VS U	- g 20	Cc 100 - -			- - -	₩	-Ctc between A & T is sharp -Sand is cleaner at contacts -Sd strgrs (lmm)between silt & coal
846	5.3	CLAYSTONE	Olv blk	100													S-M						+	
851	4.0	Argillaceous Arenaceous SILTSTONE	Lt olv gry	20		60	20		VF	VF					SA	W	s		Py Tr	Lf Tr	Cc Tr		+	,
859	2.0	SANDSTONE	Lt olv gry	Tr			100		F-G	C- G					SA -R	P	U	g 30				*	#	-Grains 5-10mm in diameter Nil-Tr lemon p.p. Fluor Tr blooming (slow) solv Fluor
869	4.0	SANDSTONE	Lt gry - Lt olv gry	Tr			100		F-VC	M- C					SA- SR	М	ט	g 25	Cc Tr				#	May-be?? Some oil staining???
877	4.8	SANDSTONE	Lt gry	Tr			100		F-G	VC		·			SA- R	P	υ	g 25	Cc Tr				+	Smokey Quartz
885	5.0	SANDSTONE	Med gry	5	Tr		95		F-C	м	QTr				SA- SR	м	U	g 20					#	
896	3.8	Argillaceous SILTSTONE	Lt olv gry	25		65	10		VF	VF Ç	Q Tr	C Tr			SA	W	s		Cc Tr				+	
904	5.0	SANDSTONE	Lt olv gry	10			90		VF-M	VF Ç	Q Tr				SA- SR	W	VS	g 5	Lf Tr	```		*	+	Mnr iron staining Tr orange Fluor No cut
Thickness millimeter centimete Cross Be in gener with and chevron climbing festoon plandr Abbrevia	Metric bed or bed dding allele indicate ations :	System I mm-IOmm mm I cm-IOcm cm	Irregular bedding & Graded bedding & No apparent bedding	Q Si X Re	Curren Ripple asymmintert symm Pull ov Scour Flute Groove Striati Partine NESIS clomitizi	marks metrical erence netrical er flame and fill cast e cast on g lineation tion	ed mark	STRUC	Organis  Burrowe slightl moder well b Churnec Bored so Organis Plant ro Vertebi	m-proceed by burrowed furface m track port tube rate tro SORTII P Po M Me W W W	owed prowed prowed to see and tra	### ### #############################	Mu Rai Pul Slu Co Lo Tej Bir	neconte d crack in or ha II-apar imp str involute ad cas pee str dseye,	mpora ss pil prin t ucture: bedd t ructure fenestr	neous ts s and ling al fab	deform	nation st	ructures  THE PROPERTY OF THE	ORIES te	Sylolite Vadose Vadose Boxwork Salt hopp	solution, n - comp pisolite sult pers or	collapse paction(hors	
		****	· · · · · · · · · · · · · · · · · · ·																J. 0.00		*			

# SIDEWALL CORE DESCRIPTIONS

	۲۲ اعد)			CL SIZE	AY : %	SIL SIZE	T % TYP	GRA		ZE	CEM	IENT	DIAG	SENES	SIS	ي اچ	SS	TYPE	ACC	ESSOR	IES	BONS	TARY RES	·
DÉPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	QUARTZ	QUARTZ	SKELETAL	RANGE	DOMINANT	TYPE & %	TYPE 8 %	TYPE	%	TEXTURE	SORTING	HARDNESS	POROSITY B %	TYPE 8 %	TYPE & %	TYPE & %	HYDROCARBONS	SEDIMENTAR STRUCTURES	SUPPLEMENTARY DATA
917	2.6	Silty SANDSTONE	Lt olv gry	5		30	65		VF	VF	Q Tr				s	R W	vs	g Tr	Lf Tr	Cc Tr			#	
923	4.0	SANDSTONE	Lt gry	10			90		VF-	СМ	Q Tr					A- R W	U	g 20	Lf Tr	Cc Tr			+	
932	2.0	Argillaceous SANDSTONE	Lt gry	30		10	60		VF-	G VF	Q Tr				A S	- R W	s	g Tr					+	5mm + Quartz grain some smokey quartz
940	2.0	Silty SANDSTONE	V Lt gry	20		40	40		VF-	G VF	Q Tr					R R P	ន	g Tr					+	Two quartz pebbles greater than 5mm
948	3.0	Argillaceous SANDSTONE	Med blsh gry	45		5	40		VF-	FF	Q Ťr				s		S-M	g Tr	Lf 10			*	+	Spl is Mtrx supported. No spl Fluor, solv Fluor slow mky yel (blooming)
958	3.8	CLAYSTONE	Med gry	85		15									S	A- R	м		Cc Tr	Py Tr			+	Laminations apparent
964	4.1	SANDSTONE	Med blsh gry	15		5	50		VF-	м Б	Q Tr					A- R W	М	g Tr	Lf 30	Cc Tr			+	
969	4.0	SANDSTONE	Med gry	10		Tr	70		VF-	м ғ	Q Tr					A- R W	S-M	g Tr	Lf 20	Cc Tr			+	Mnr lamination due to percent increase of coal or silt
977	1.8	SANDSTONE	Med gry	15		10	55		VF-	мF	Q Tr					A- R W	s-m	g Tr	Lf 20	Cc Tr			***	
989	3.0	Argillaceous SANDSTONE	Med bl gry	20		Tr	45		VF-	FF	Q Tr				s	A- R W	S-M	g Tr	Lf 30	Cc 5			+	
					•						(STRA	TIFICA	TION	, SE	DIM	ENT.	ARY,	DIAGE	NETIC)				E DI	GENETIC STRUCTURES
		Stratificatio	<u>.n</u>		_		LNETIC luced ma	STRU rkinas			oduced m	ng:kings	F	Peneco	ontemp	oraneo	us defo	rmation	structures	7	Solution	struct		Tectonic structures
millimete centime <u>Cross B</u> in gene	er bed fer bed edding eral ngle indica n g	Parallel Typ Iding ic System Imm-IOmm mm I cm-IOcm cm	e Irregular bedding Graded bedding No apparent bedding	<b>≈</b> + ≈	Ripple asyn inter symi Pull ov Scour Flute Groov Striat	e mark nmetrica ference metrica ver flor and fi cast e cast	s al : ne structu	201 201 201	Burro sligi mod well Churr Bored Organ	wed htly bur lerately burrow ed surface	rowed burrowed ed .	<del></del>	= } !	Mud ci Rain or Pull-a Slump Convol Load o	racks r hail p part struct lute b	ures a edding ture estral t	nd conta	orted bed	ding v	-	Breccia, Disolutio Sylolite Vadose Vadose Boxwor	solution, on - com pisolite silt k ppers or	, collapse spaction (hos e	Fractures  Slickensides  Fraction  Fraction  Slickensides  Fraction  Fract
Abbrev	<u>viations</u> :	GRAIN SIZE VF Very Fine F Fine M Medium C Course VC Very Coarse G Granule & large	CEMENT Q Silica Py Pyrite C Calcite D Dolomite Sd Siderite	D I	ENESIS Dolomiti Silicifico Recrysto Chloritiz	ation allizati	R	A Subang	inded jular	W	TING Poor Moderate Well Very We	U VS S	Unco Very Soft Mode Hard	nsolid Soft erate	ated	g v i	Vuquk	ranular ır keletal	Py Py Mc Mi Ch Ch Cc Li Hm He Lf Li	SORIES  rite ca pert gnite/Coc eavy mine thic fragm auconite	rals		NETIC TI rypto<1/2 licro 1/256	## Signifies presence - 1/16mm # Signifies presence Full details described under supplementary data

#### DESCRIPTIONS SIDEWALL CORF

vс

Very Coarse

Granule & larger

Sd Siderite WELL: SPERM WHALE-1

SIDEA	<b>1</b> —	L CORE	DESCRI		014	•																		•••		
	≿(g			CL	AY %	SII SIZE	LT E% T	YPE		AIN %		E.	CEM	IENT	DIA	GENE	SIS	ی	ပ္သ	TYPE	ACC	ESSOR	IES	BONS	TARY RES	
DEPTH (metres)	RECOVEF (centimetre	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	DOMINANT	TYPE 8 %	түре в %	TYPE	%	TEXTURE S	SORTING	HARDNESS	POROSITY B %	TYPE & %	түре в %	ТҮРЕ в %	HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA
998		Argillaceous SANDSTONE	Lt gry	25		5	١	50			VF		Q Tr				SA SR	W	Н		Lf 20	Cc Tr			#	
1010	4.0	SANDSTONE	Med bl gry	10			7	70			VF-M	F	Q Tr				SA SR	м	м	g Tr	Cc 5	Ch Tr	Lf 15		#	
1020	3.0	CLAYSTONE	Olv gry	80		15		5			VF						SR	W	м		Cc Tr					Laminations of silt
1031	3.4	SANDSTONE	Med gry	10			8	во			VF-F	VF	Q Tr				SA SR	- W	м	g Tr	Lf 10	Cc Tr			+	
1041.9	2.5	SANDSTONE	Med ġry	15				75			VF-F	VF	Q Tr				SA SR	- W	s- M	g Tr	Lf 10	Cc Tr			#	
1050	3.0	CLAYSTONE	Dk gry	90		10							C Tr						М		Cc Tr	Py Tr				
1060	2.4	SANDSTONE	Med bl gry	15		5		75			VF-F	VF	Q Tr				SA SR	- W	s- M	g Tr	Lf 5	Py Tr			+	
1072	2.9	SANDSTONE	Med gry	10				90			VF-M	F	Q Tr				SA SR	w	s- M	g Tr	Lf Tr				#	
1080	3,2	SANDSTONE	Med gry	15		5		70			VF-F	F	Q Tr				SA R	w	S- M	g Tr	Cc 10	Lf Tr			+	
1090		Argillaceous SANDSTONE	Med gry	20				80			VF-F	VF	Q Tr				SA -R	w	н	g Tr	Lf Tr				+	
		Stratificatio	on.		_		GENE oduced		STF	RUCT	TURES		(STRA		110						IETIC)	T	Solution	struct		GENETIC STRUCTURES  Tectonic structures

#### Organism-produced markings <u>Stratification</u> Current-produced markings Parallel Type \$ Fractures Breccia, solution, collapse Burrowed Mud crocks Thickness of bedding Irregular bedding Ripple marks ~~ Disclution - compaction(horse tail) 7.7 Slickensides slightly burrowed Metric System led I mm-IOmm mm led I cm-IOcm cm asymmetrical Rain or hall prints ~ Graded bedding moderately burrowed Breccia, tectonic 20 Sylolite inter ference <u>~~ i</u> Pull-apart ⇧ millimeter bed No apparent bedding + well burrowed 100 symmetrical ∞ತಿ Slump structures and contorted bedding r Vadose pisolite centimeter bed Nodular bedding Pull over flome structure \_\_\_\_ Churned Ф Vadose silt Cross Bedding Convolute bedding \_ Miscellaneous Scour and fill <del>222</del> Bored Boxwork Load cast in general $\neg$ Geopetal fabric with anale indicated <u>/10°</u> Flute cast Bored surface Tepee structure Salt hoppers or casts X Cone-in-cone $\overline{\pm}$ chevron Groove cast Organism tracks and trails assay -C.— Birdseye, fenestral fabric -0-Stromatactics ~~ climbing Striation Plant root tubes ---Boudinage, ball and age flow --festoon <del>≈</del> Parting lineation Vertebrate tracks planar DIAGENETIC TEXTURES POROSITY ACCESSORIES **HYDROCAR BONS** ROUNDING SORTING HARDNESS Abbreviations: GRAIN SIZE CEMENT DIAGENESIS \* Signifies presence Full details described under Py Pyrite Mc Mica Ch Chert Cc Lignite Hm Heavy Lf Lithic CX Crypto <1/256mm MX Micro 1/256 - 1/16mm Poor Unconsolidated Intergranular R SR SA VF Very Fine Q Silica Dolomitization Rounded Moderate Very Soft Soft Vugular Subrounded VS Рy Pyrite Silicification Intraskeletal supplementary data S M H Recrystallization Subangular Medium Calcite Well Lignite/Coal Angular VW Very Well Moderate Course Dolomite Ce Chloritization Heavy minerals

Hard

Lithic fragments

Glauconite

# ■ Hudbay Oil (Australia) Ltd.

	•									4			Hudson's												
SIDE	NAL	L CORE	DESCRI	PTI	ON	S																	W	ELL:	SPERM WHALE - 1
	RY es)			CL SIZE	AY %	SI SIZI	LT E%1	ГҮРЕ	GRA		ZE	CE	/ENT	DIAG	SENESIS		ŋ	SS	TYPE		ESSOR		BONS	TARY	
DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	DOMINANT	TYPE 8 %	түре в %	TYPE	% TEXTURE	ROUNDIN	SORTING	HARÖNESS	POROSITY 8 %	TYPE 8 %	TYPE 8 %	TYPE 8 %	HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA
1100	2.7	CLAYSTONE	Med to dk gry	100														М						#	•
1110	2.6	CLAYSTONE	Med gry	100	!													М						#	
1120	3.5	SANDSTONE	Med gry	10				70		VF	F VF	Q Tr				SA SR	W	М	g Tr	G Tr	Lf 20			+	
1131.1	3.1	CLAYSTONE	Olv blk	100														М						+	
1142	4.0	Argillaceous SILTSTONE	Med gry	25		60		15		V.	7					SA SR		М		Py Tr		<u> </u>		***	
1152.1	3.5	CLAYSTONE	Grnsh blk	1.00														H						#	
1162	3.5	Argillaceous SILTSTONE	Med gry	30		60		10		v	,					SA		H						+	
1172	4.0	SANDSTONE	Lt blsh gry	10				75		VF	-F F	Q 5				SA SR		н	g Tr	Lf 10	Cc Tr				Mnr laminae of coal denoting bedding
1181.9	3.2	SANDSTONE	Grnsh blk	5				75		VF	-F F	Q 10				SA SR		H	g Tr	Lf 10	Cc Tr			<u></u>	Some quartz grains appear stained (Iron)
1191.9	3.6	Lithic SANDSTONE	Grnsh gry			Г		70			- 1	Q 5				SA SR	W	H		Lf 25	Cc Tr	G Tr		+	
millime centime Cross E in gen with a chevr climbir festoc plana	er bed ster bed Bedding eral ngle indica on ig	ric System Imm-IOmm mm Icm-IOcm cm	e Irregular bedding Graded bedding No apparent bedding	D I	Rippi asy inte sym Pull o Scour Flute Groo Strio	le ma mmetri referen- metri over fil r and e cast ve ca ition ing li stization talliza	rks rical nce cal ame sti fill st	i mark	STRL (ings	Burnsling Burnsling Burnsling Win Born Born Org Plan Ver led unded gular	owed ghtly be derately ill burro ined id d surface int root if tebrate  SOF P M W	roduced in rowed burrowed wed ce acks and ubes	trails >> HAU	RDN ES Unco Very Soft	Penecont Mud crac Rain or h Pull-apa Slump st Convolut Load cat Tepee s Birdseye	empore cks nail prin rt fructure e bed st tructure fenest	an eous es and ding eral fai	defor	ted bedd	ACCESS Py Pyy Mc Mic Ch Ch Cc Lic	rite ca	Disolution Sylolite Vadose Vadose Boxworl Salt hop	solution n - com pisolit silt k opers or	ures , collapse ,paction(hole e casts	Tectonic structures  Fractures Sickensides Sickensides Fractonic  Miscellaneous Cone-in-cone Stromatactics Boudinage, ball and age flow Signifies presence Full details described under supplementary data
		G Granule & large																		Lf Lit GI GI	hic fragm suconite	ents			A4-GL - 51

# SIDEWALL CORE DESCRIPTIONS

	RY es)			CL	AY : %	SILT SIZE	r % TYP		AINS %	S SIZE		СЕМІ	ENT	DIAG	ENESI	s	واع	SS	TYPE	ACC	ESSOF	RIES	BONS	TARY RES			
DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	QUARTZ	QUARTZ	SKELETAL	CALCITE	RANGE	₹	түре в %	түре в %	TYPE	% #FVTIBE	POLINDING	SORTING	HARDNESS	POROSITY 8 %	TYPE 8 %	түре в %	TYPE 8 %	HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLE	EMENTARY DATA	i
1207	2.0	CLAYSTONE	Grysh blk	100														s-M						+			
1217.9	3.2	Lithic SANDSTONE	Med blsh gry				55			F-M	м Q	10				s		H	g Tr	Lf 35				<u>_</u>			
1228	2.2	Argillaceous SANDSTONE	Grnsh blk	30			50,			VF-F	F Q	Tr				s		н	g Tr	Lf 20	-				Mud clasts, sand grains	coal beds, reddish	
1238.1	1.5	Lithic SANDSTONE	Grnsh gry				70			VF-F	G Q	5				S		s-M	g Tr	Lf 25					Reddish sand	-size grains	
1244.9	2.6	Silty CLAYSTONE	Med gry	60		30	10			VF						9		н		Cc Tr							
1252.9	1.8	CLAYSTONE	Med dk gry	100														м									
1261	2.0	CLAYSTONE	Olv blk	100									_	Ш		1		м		Cc Tr							
1272.9	3.0	SANDSTONE	Med blsh gry				75			VF-F	FΩ	2 10		Ш		s		м	g Tr	Lf 15							
1282.9	1.6	SANDSTONE	Grnsh blk	5		20	55			VF-F	F C	Tr		Ш			A- R W	м	g Tr	Lf 20			<u> </u>		Clay and sil bodies (clas	t occur as foreign ts)	
1292.9	2.6	SANDSTONE	Med dk gry				75					5 5				S	A-R	_		Lf 20							
millimete centimet Cross Bi in gene with an chevror climbing festoor planar	er bed er bed edding ral gle indica )	In System Imm-IOmm mm I cm-IOcm cm  ated Zio*  GRAIN SIZE  VF Very Fine F Fine M Medium C Course VC Very Coarse	e Irregular bedding Graded bedding No apparent bedding Nodular bedding  Nodular bedding  CEMENT Q Silica Py Pyrita C Calcite D Dolomite Sd Siderite	D C	Currer Ripple asym inter symr Pull ov Scour Flute Groove Striat	marks metrica ference netrical er flom and fill cast e cast ion g lines zation atlization	e structu	STR kings	ded ounderingula	Organism  Burrowed slightly moderat well burr Churned Bored surf Organism Plant roo Verte bra	- produ burrowed face tracks t tubes te trac ORTIN Moo We	wed rrowed and tro	ails X → HAF	P M R S C L	fund crowdain or to the convolution of the convolut	cks hail pi irt tructu te be st itructu	rints ires ar idding ure stral f	us defo	rmation s	ACCESS Py Pyr Mc Mic Ch Ch Ch Ch Ch Ch Ch Hm He	SORIES rite	Disolution Sylolite Vadose Vadose Boxwor Salt ho	solution on - corr pisolit silt k ppers or	ures , collapse npaction(hoi	se tail)  Fra Slice Bre	ctures ctures ctures ctures ctures ctellaneous coellaneous coellaneous competal fabric ne-in-cone compatatics coellaneous competal fabric ne-in-cone compatatics coellaneous competal fabric ne-in-cone competal f	À ~~ ~~
L		G Granule & larger	г 		_																uconite	01110					\4_G _5



# SIDEWALL CORE DESCRIPTIONS

	RY es)			CL		SIL SIZE	T <b>% T</b> YP		AINS %	SIZE	CEN	MENT	DIAG	ENESI	ıs	واج	, g	TYPE	ACC	ESSOF	IES	BONS	rary Res			
DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY MINERALS	MICRITE	QUARTZ	CALCITE	SKELETAL	CALCITE	RANGE	TYPE 8 %	түре в %	TYPE	% TEVTILEE	I EXIONE   &	SORTING	HARDNESS	POROSITY 8 %	түре в %	TYPE 8 %	TYPE 8 %	HYDROCAR	SEDIMENTARY STRUCTURES	SUF	PPLEMENTARY	DATA
1302.1	3.5	CLAYSTONE	Olv blk	100													м									
1315	2,2	SANDSTONE	Med blsh gry				80		\	vf-f vf	Q 5	C Tr					s-m	g Tr	Lf 15	G Tr						
1325	2.0	Lithic SANDSTONE	Med blsh gry				70		\	VF-M F	Q 5							g Tr	Lf 25	G Tr						
1335	3.4	Lithic SANDSTONE	Med blsh gry				70		7	VF-F F	Q 5				s s		н	g Tr	Lf 25	G Tr						
1345	2.7	Lithic SANDSTONE	Med blsh gry				70		7	VF-M M	Q 5		П		s s		н	g Tr	Lf 25	G Tr						
1355	1.9	SANDSTONE	Med blsh gry				75		7	VF-M M	Q 5		Ħ		s s	A- R W	н	g Tr	Lf 15	G 5						
1365.1	2.1	Arenaceous SILTSTONE	Lt bl gry	Tr		80	20		,	VF.	Q Tr				S S	A- R W	Н									
1377.1	2.2	CLAYSTONE	Olv blk	100					Î								s-M									
1386.1	2.5	Silty SANDSTONE	Lt olv gry			40	60		Ι,	VF	Q Tr		П		S	A-RW	м .	g Tr								
1400	2.1	SANDSTONE	Blsh gry			15	85		,	VF	Q Tr				s s		м	g Tr								
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SIDEWALL CORE **DESCRIPTIONS** 

ROCK TYPE

SANDSTONE

Stratification

Parailei Type

Metric System

ped Imm-IOmm mm

bed I cm-IOcm cm

<del>₩</del>4

GRAIN SIZE

VF F

Very Fine Fine

C Course VC Very Coarse

Granule & larger

Irregular bedding

Nodular bedding

CEMENT

Pyrite Calcite

Sd Siderite

Dolomite

Q Silica

Graded bedding → Graded bedding

≋≋

RECOVERY (centimetres)

2.1

TD

Thickness of bedding

with angle indicated

millimeter bed

centimeter bed

Cross Bedding

in general

chevron

climbing

festoon

planar Abbreviations:

DEPTH

(metres)

1411.1

1417

COLOUR

Blsh gry

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F	TIC	NC:	S																			W	ELL:	SPE	RM WHALE	<u>-1</u>
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	) Sil	lomitiz icifica icrysta	tion Ilizati		ROU R SR SA A	Roun Subra Suba Suba Angu	- ded ounde ngulai	ir \	M M W V	ring Poor Moderate Well Very Well	VS S I M	Unco Very Soft	onsolida y Soft t lerate		F g v i	v۷	SITY Intergrar Vugular Intraskel		Hm Hea	te	l rals	CX Cr	NETIC TE ypto<1/25 cro l/256-	6mm	HYDROCARBONS  * Signifies presence Full details descri supplementary data	ce bed under

APPENDIX G6 LOG OF SAMPLES

APPENDIX G6

## SPERM WHALE No.1 - LOG OF SAMPLES

## Description of Cuttings Samples

All depths quoted are below the Rotary Table, which is 9.4 metres above Mean Spring Low Water and 64 metres above the sea floor.

Colours are taken from the Geological Society of America's "Rock Colour Chart". Samples were collected from the base of the 20 inch casing shoe at 196 metres R.T.

210 - 275 metres (65 metres) <u>Calcarenite</u>, skeletal, olive grey to dark, greenish grey, very fine to granular, dominantly coarse, poorly to moderately well sorted, 10-15% carbonate grains, trace-15% calcite silt, 10-15% micrite, 5-10% calcite cement, trace pyrite, 0-trace chlorite, very soft to moderately hard, trace to fair porosity.

With 5-20% <u>Claystone</u>, olive grey, 10-15% micrite, trace glauconite, very soft to soft.

275 - 305 metres (30 metres) Calcisiltite, calcilutitic, calcarenitic, olive grey, 10% carbonate grains, 25-40% skeletal fragments increasing with depth, very fine to granular, poorly sorted, angular to subangular, 20-35% micrite decreasing with depth, 0-trace quartz silt, trace calcite cement, trace glauconite, pyrite and chlorite, soft.

With 15-20% <u>Claystone</u>, calcilutitic, olive grey, 20% micrite, trace glauconite, soft.

305 - 355 metres (50 metres) <u>Calcarenite</u>, calcilutitic at 310m, and 350m, calcisiltitic at 350m, olive grey, very fine to granular, dominantly medium to coarse, poorly sorted, angular to subrounded, 5-15% carbonate grains, 5-20% calcite silt, 15-20% micrite, trace-10% calcite cement, trace glauconite, pyrite and chlorite, soft, nil to poor porosity.

With 5-10%  $\underline{\text{Claystone}}$ , calcilutitic, as between 275-300 m.

355 - 420 metres (65 metres) <u>Calcilutite</u>, calcisiltitic and calcarenitic in part, light olive grey to olive grey, trace carbonate grains, 15-25% skeletal fragments, 15-35% calcite silt, trace-10% clay minerals, trace glauconite and pyrite, trace carbonaceous material to 370m, trace dolomitisation below 395m, very soft.

With below 400m, 5-40%  $\underline{\text{Marl}}$ , increasing with depth, olive grey, 40-65% micrite, 35-60% clay minerals, very soft to soft.

420 - 445 metres (25 metres) <u>Claystone</u>, olive grey, 10-15% micrite, trace glauconite and pyrite, soft.

With 10-20% Calcilutite, as between 355-420m.

445 - 475 metres (30 metres)

Calcisiltite, calcarenite, calcilutitic, olive grey, 0-5% carbonate grains, 25% skeletal fragments, very fine to granular, poorly sorted, angular to rounded, 20-50% micrite, trace-5% clay minerals, 0-trace calcite cement, trace glauconite, pyrite and dolomitisation, very soft to soft.

With 20-50% <u>Claystone</u>, olive grey, 10-15% calcilutite, very soft to soft.

475 - 700 metres (225 metres)

<u>Claystone</u>, calcilutitic in part, olive grey, 5-40% micrite, trace glauconite and pyrite, trace chlorite between 565-650m, trace mica below 650m, very soft to moderately hard.

With 15-50% <u>Calcilutite</u>, calcisiltitic and calcarenitic in part, as between 355-420m.

700 - 760 metres (60 metres)

Claystone, calcilutitic, light olive grey to dark grey, 0-20% skeletal fragments, very fine to fine, 10-20% calcite silt, 10-20% micrite, trace glauconite, trace

pyrite to 720m, trace mica to 725m, soft to moderately hard.

760 - 805 metres (45 metres) <u>Claystone</u>, calcilutitic, light olive grey to dark grey, trace skeletal fragments, very fine, 10% calcite silt, 40% micrite trace glauconite, trace pyrite below 790m, soft.

With 10-30% <u>Calcilutite</u> decreasing with depth, light grey, 20-30% calcite silt, trace-10% glauconite, very soft.

805 - 830 metres (25 metres) <u>Sandstone</u>, clear-frosted, very fine to pebble, dominantly coarse-very coarse, becoming coarser with depth, angular to subrounded, moderately to well sorted, trace pyrite, unconsolidated.

With between 805-815m, 5-10% <u>Calcite</u>, white, 100% calcite grains, very fine to medium, dominantly fine, moderately hard, grains are angular and were probably derived from a carbonate band.

With between 810-820m, trace-5% <u>Coal</u>, brown, lignitic, earthy, soft.

And trace Pyrite nodules.

830 - 885 metres (55 metres) <u>Sandstone</u>, clear to white, very fine to granule, dominantly medium to coarse, subangular to well rounded, poorly sorted, trace pyrite, unconsolidated.

885 - 955 metres (70 metres) <u>Sandstone</u>, as between 830-885m, with traces of calcite cement, trace to 5% lithic fragments, trace-5% chert between 935-945m.

With trace-40% (increasing with depth) <u>Sandstone</u>, argillaceous in part, white to grey, very fine to fine, dominantly very fine, subangular to rounded, well sorted, 10-30% clay minerals, trace calcite cement, trace-10% lithic fragments, soft, trace porosity.

And below 930m, 20-30% <u>Claystone</u>, light grey 10% micrite, soft.

955 - 1085 metres (130 metres) <u>Claystone</u>, silty in part, light brown grey to medium dark grey, 0-10% micrite, 10-20% quartz silt, 10-15% lithic fragments, trace glauconite, trace carbonaceous matter below 1070m, soft.

With down to 1010m, 25%-trace <u>Sandstone</u>, clear to frosted, dominantly coarse to very coarse, angular to sub-rounded, moderate to well sorted, trace pyrite, unconsolidated.

1085 - 1225 metres (140 metres) <u>Claystone</u>, medium dark grey to grey black, 0-10% micrite, trace carbonaceous matter to 1150m, soft.

<u>With Claystone</u>, arenaceous in part, light grey, 5-30% quartz grains, very fine to fine, trace-10% quartz silt, 0-5% lithic fragments, trace glauconite below 1200m, soft.

And trace Coal, black, below 1215m.

1225 - 1250 metres (25 metres)

<u>Sandstone</u>, argillaceous in part, light green grey, very fine to coarse, dominantly fine, subangular to rounded, well sorted, 10-20% clay minerals, 10-20% glauconite, trace calcite cement, trace skeletal fragments between 1235-1245m, soft, trace porosity.

With 20-50% <u>Claystone</u>, medium dark grey, as between 1085-1225m.

1250 - 1275 metres (25 metres) <u>Claystone</u>, medium dark grey to grey black, 0-10% micrite, soft.

With Claystone, arenaceous, as between 1085-1225m.

And below 1270m, 35% Sandstone, as between 1225-1250m.

<u>1275 - 1370 metres</u> (95 metres) Sandstone argillaceous below 1315m, light green grey, very fine to coarse, dominantly fine, subangular to subrounded, well sorted, 15-35% clay minerals, 5-10% calcite cement below 1330m, 5-10% glauconite, trace-10%

coal below 1330m, soft to moderately hard, trace porosity.

With trace-30% <u>Claystone</u> decreasing with depth, light grey, soft.

And below 1280m, trace Coal, black.

1370 - 1405 metres (35 metres) Claystone, light grey, 10% quartz silt, soft.

With 5-30% Sandstone, argillaceous, as between 1290-1360m.

<u>1405 - 1417 metres</u> (T.D.) (12 metres) <u>Sandstone</u>, argillaceous, light grey, very fine to medium grained, dominantly fine, well sorted, subangular to rounded, 35% clay minerals, trace calcite cement, trace-5% carbonaceous material, soft.

With 30-40% <u>Claystone</u>, medium dark grey to grey black, 0-10% micrite, soft.

This is an enclosure indicator page. The enclosure PE601362 is enclosed within the container PE902673 at this location in this document.

The enclosure PE601362 has the following characteristics:

Walter Johnson Albeit

ITEM\_BARCODE = PE601362
CONTAINER\_BARCODE = PE902673

NAME = Composite Well Log

BASIN = GIPPSLAND

PERMIT =

TYPE = WELL

SUBTYPE = COMPOSITE\_LOG

DESCRIPTION = Composite Well Log

REMARKS =

DATE\_CREATED = 22/01/82 DATE\_RECEIVED = 14/04/83

 $W_NO = W762$ 

WELL\_NAME = Sperm Whale-1

CONTRACTOR = Hudbay Oil Australia Ltd CLIENT\_OP\_CO = Hudbay Oil Australia Ltd

This is an enclosure indicator page. The enclosure PE604604 is enclosed within the container PE902673 at this location in this document.

The enclosure PE604604 has the following characteristics:

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ITEM\_BARCODE = PE604604

CONTAINER\_BARCODE = PE902673

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NAME = Velocity Log

BASIN = GIPPSLAND

PERMIT = VIC/P11

TYPE = WELL

SUBTYPE = WELL\_LOG

DESCRIPTION = Velocity Log for Sperm Whale-1

REMARKS =

 $DATE\_CREATED = 7/01/82$ 

 $DATE\_RECEIVED = 14/04/83$ 

 $W_NO = W762$ 

 $WELL\_NAME = SPERM WHALE-1$ 

CONTRACTOR = SEISMOGRAPH SERVICE LIMITED

CLIENT\_OP\_CO = HUDBAY OIL (AUSTRALIA) LIMITED

This is an enclosure indicator page. The enclosure PE604605 is enclosed within the container PE902673 at this location in this document.

The enclosure PE604605 has the following characteristics:

ITEM\_BARCODE = PE604605

CONTAINER\_BARCODE = PE902673

Tear To Joseph Williams

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NAME = Lithology Log

BASIN = GIPPSLAND

PERMIT = VIC/P11

 $\mathtt{TYPE} = \mathtt{WELL}$ 

SUBTYPE = WELL\_LOG

DESCRIPTION = Lithology Log for Sperm Whale-1

REMARKS =

DATE\_CREATED = 22/01/82

 $DATE\_RECEIVED = 14/04/83$ 

 $W_NO = W762$ 

WELL\_NAME = SPERM WHALE-1

CONTRACTOR =

CLIENT\_OP\_CO = HUDBAY OIL (AUSTRALIA) LIMITED

This is an enclosure indicator page. The enclosure PE604606 is enclosed within the container PE902673 at this location in this document.

The enclosure PE604606 has the following characteristics:

ITEM\_BARCODE = PE604606

CONTAINER\_BARCODE = PE902673

NAME = Mud Log

BASIN = GIPPSLAND

PERMIT = VIC/P11

 $\mathtt{TYPE} = \mathtt{WELL}$ 

SUBTYPE = MUD\_LOG

DESCRIPTION = Mud Log for Sperm Whale-1

REMARKS =

 $DATE\_CREATED = 6/01/82$ 

 $DATE\_RECEIVED = 14/04/83$ 

 $W_NO = W762$ 

WELL\_NAME = SPERM WHALE-1

CONTRACTOR = EXPLORATION LOGGING

CLIENT\_OP\_CO = HUDBAY OIL (AUSTRALIA) LIMITED

This is an enclosure indicator page. The enclosure PE904242 is enclosed within the container PE902673 at this location in this document.

The enclosure PE904242 has the following characteristics:

ITEM\_BARCODE = PE904242

CONTAINER\_BARCODE = PE902673

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NAME = Well Velocity and Calibrated Log Data

BASIN = GIPPSLAND

PERMIT = VIC/P11

TYPE = WELL

SUBTYPE = VELOCITY \_CHART

DESCRIPTION = Air Gun Well Velocity Survey and

Calibrated Log Data for Sperm Whale-1

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REMARKS =

 $DATE\_CREATED = 8/01/82$ 

 $DATE_RECEIVED = 14/04/83$ 

 $W_NO = W762$ 

WELL\_NAME = SPERM WHALE-1

CONTRACTOR = SEISMOGRAPH SERVICE LIMITED CLIENT\_OP\_CO = HUDBAY OIL (AUSTRALIA) LIMITED

This is an enclosure indicator page. The enclosure PE902674 is enclosed within the container PE902673 at this location in this document.

The enclosure PE902674 has the following characteristics:

ITEM\_BARCODE = PE902674

CONTAINER\_BARCODE = PE902673

NAME = Tectonic Elements Map

BASIN = GIPPSLAND

PERMIT =

TYPE = WELL

SUBTYPE = MAP

DESCRIPTION = Tectonic Elements Map

REMARKS =

DATE\_CREATED = 1/05/82 DATE\_RECEIVED = 14/04/83

 $W_NO = W762$ 

WELL\_NAME = Sperm Whale-1

CONTRACTOR = Hudbay Oil Australia Ltd CLIENT\_OP\_CO = Hudbay Oil Australia Ltd