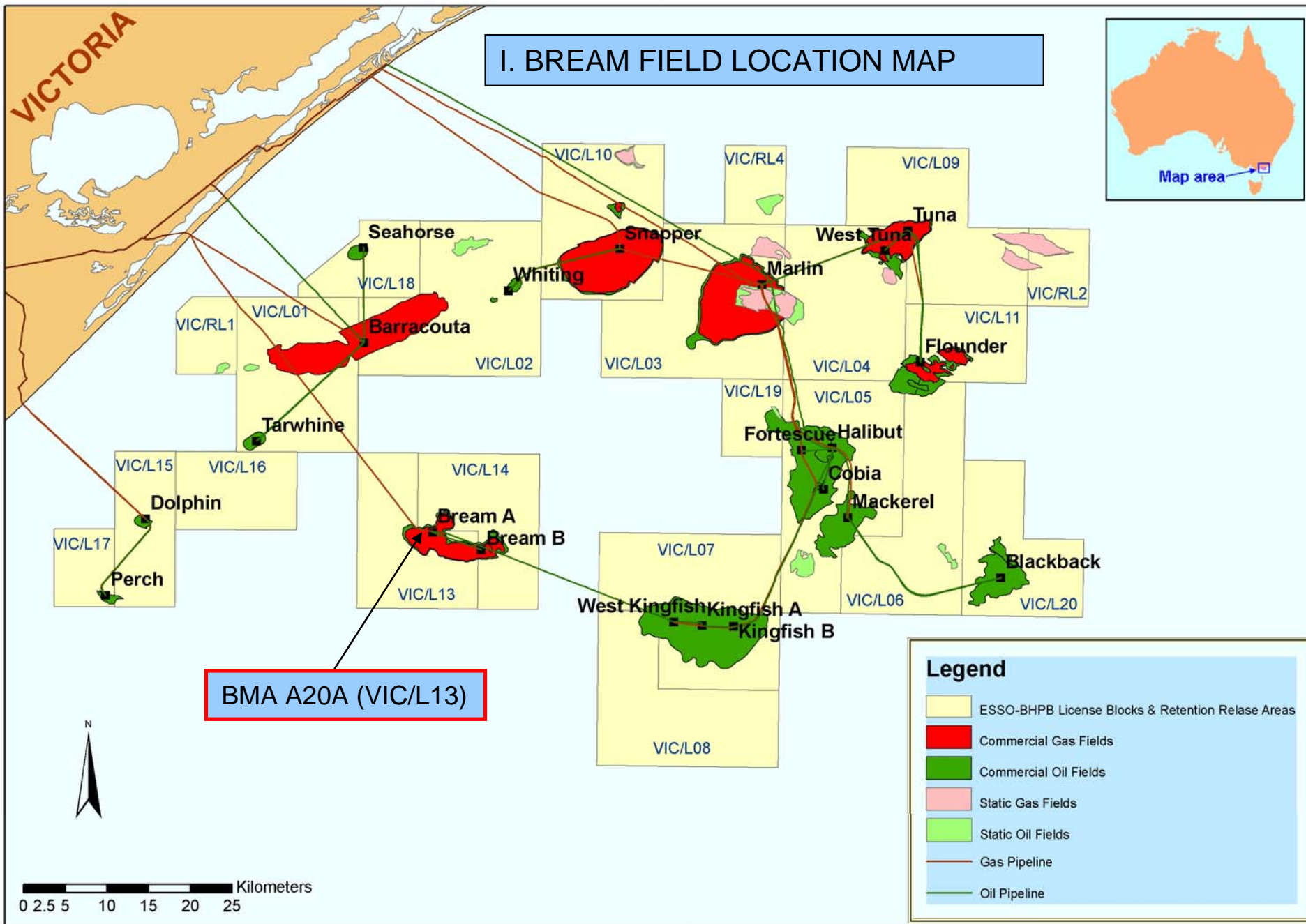


**WELL COMPLETION REPORT**  
**BREAM A20A**  
**GIPPSLAND BASIN, VICTORIA**

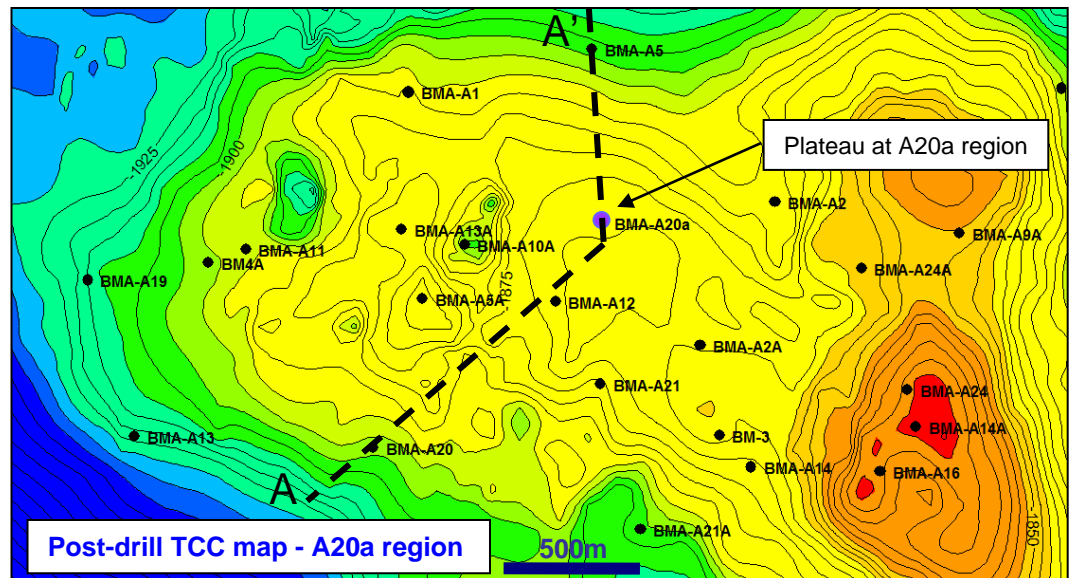
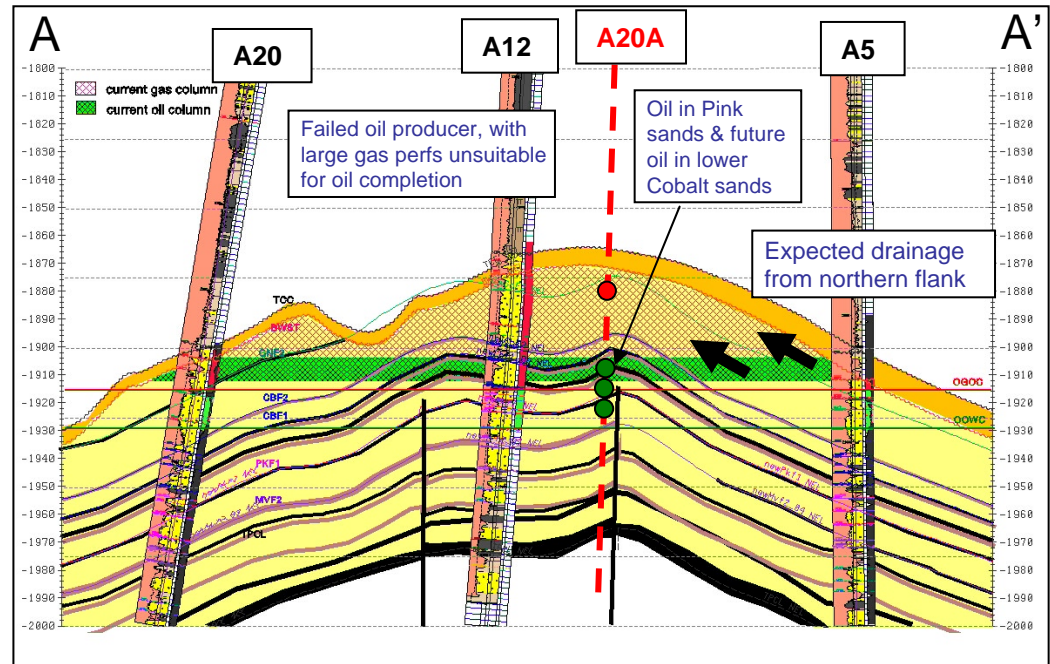
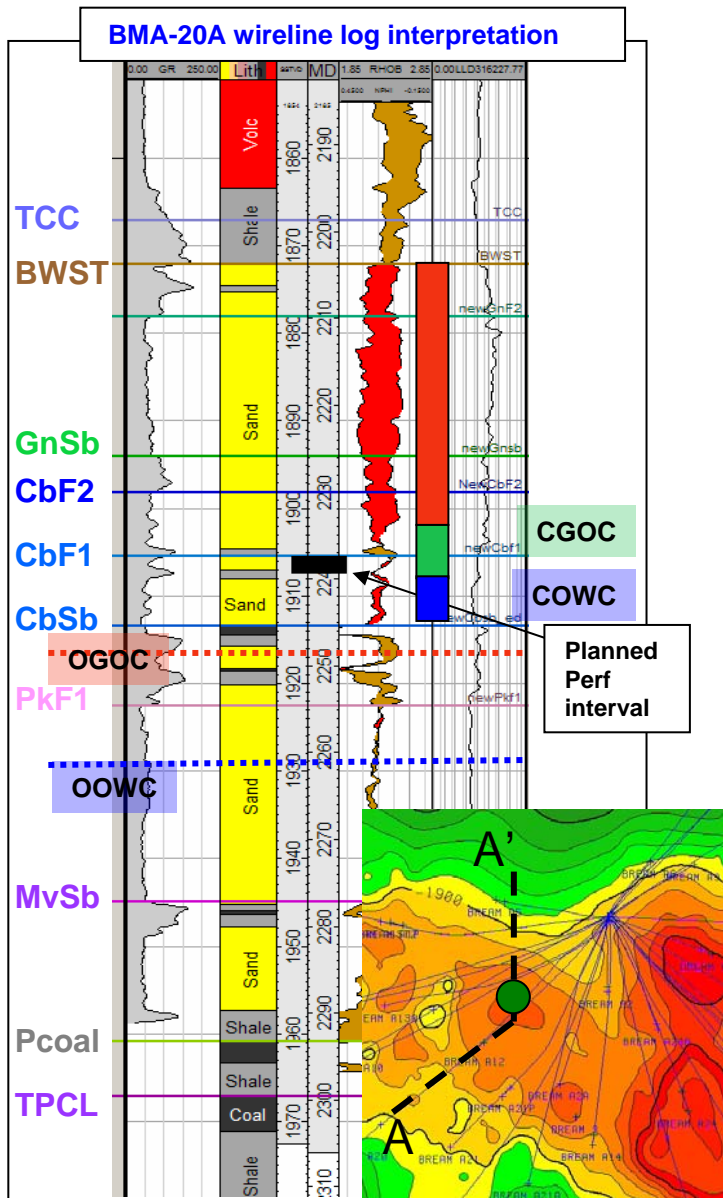
Author: Peter Ryan  
Compiler: Sheryl Sazenis  
March 2006

# CONTENTS

<b>BREAM A20A</b>	<b>1</b>
<b>I. BREAM FIELD LOCATION MAP</b>	<b>1</b>
<b>II. WELL DATA RECORD: SUMMARY LOG, MAP &amp; N-1 SECTION</b>	<b>2</b>
<b>II. WELL DATA RECORD: SEISMIC PROFILE ALONG WELL PATH</b>	<b>3</b>
<b>LOCATION</b>	<b>4</b>
<b>ELEVATIONS &amp; DEPTHS</b>	<b>4</b>
<b>MISCELLANEOUS</b>	<b>4</b>
<b>WELL CLASSIFICATION</b>	<b>4</b>
<b>CASING RECORD</b>	<b>5</b>
<b>CEMENTING RECORD</b>	<b>5</b>
<b>DRILLING PERFORMANCE</b>	<b>6</b>
<b>BMA A20A - FINAL WELL REPORT</b>	<b>6</b>
<i>GENERAL</i>	<i>6</i>
<i>TIME ANALYSIS</i>	<i>6</i>
<i>COSTS (based on projected)</i>	<i>6</i>
<i>CASING (all depths herein are based on Rig 453 elevations: RT-MSL=32.82m)</i>	<i>6</i>
<i>COMPLETION</i>	<i>6</i>
<i>ADDITIONAL</i>	<i>6</i>
<b>COMPLETION SCHEMATIC</b>	<b>7</b>
<b>III. SAMPLES</b>	<b>8</b>
<b>CONVENTIONAL CORING</b>	<b>8</b>
<b>SIDEWALL CORING</b>	<b>8</b>
<b>IV. LOGS AND SURVEYS</b>	<b>9</b>
<b>V. FORMATION RESERVOIR TOPS</b>	<b>10</b>
<b>VI. GEOLOGICAL ANALYSIS - BREAM A20A</b>	<b>11</b>
 <b>VII. APPENDICES</b>	
<b>1. Survey Data &amp; Listing</b>	
<b>1a. Survey Data</b>	
<b>1b. MD-TVD Survey Data Listing</b>	
<b>2. Petrophysics</b>	
<b>2a. Petrophysics Evaluation Summary</b>	
<b>3. Sample Descriptions</b>	
<b>3a. Lithology/Show Descriptions</b>	
<b>4. Logs</b>	
<b>4a. Mud Log</b>	
<b>4b. Well Completion Log</b>	

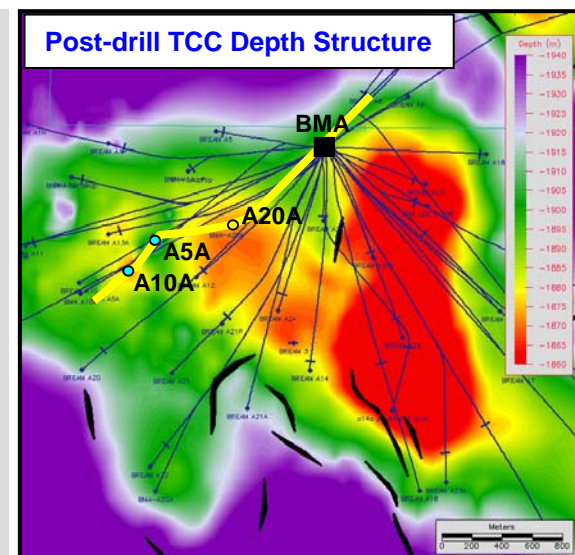
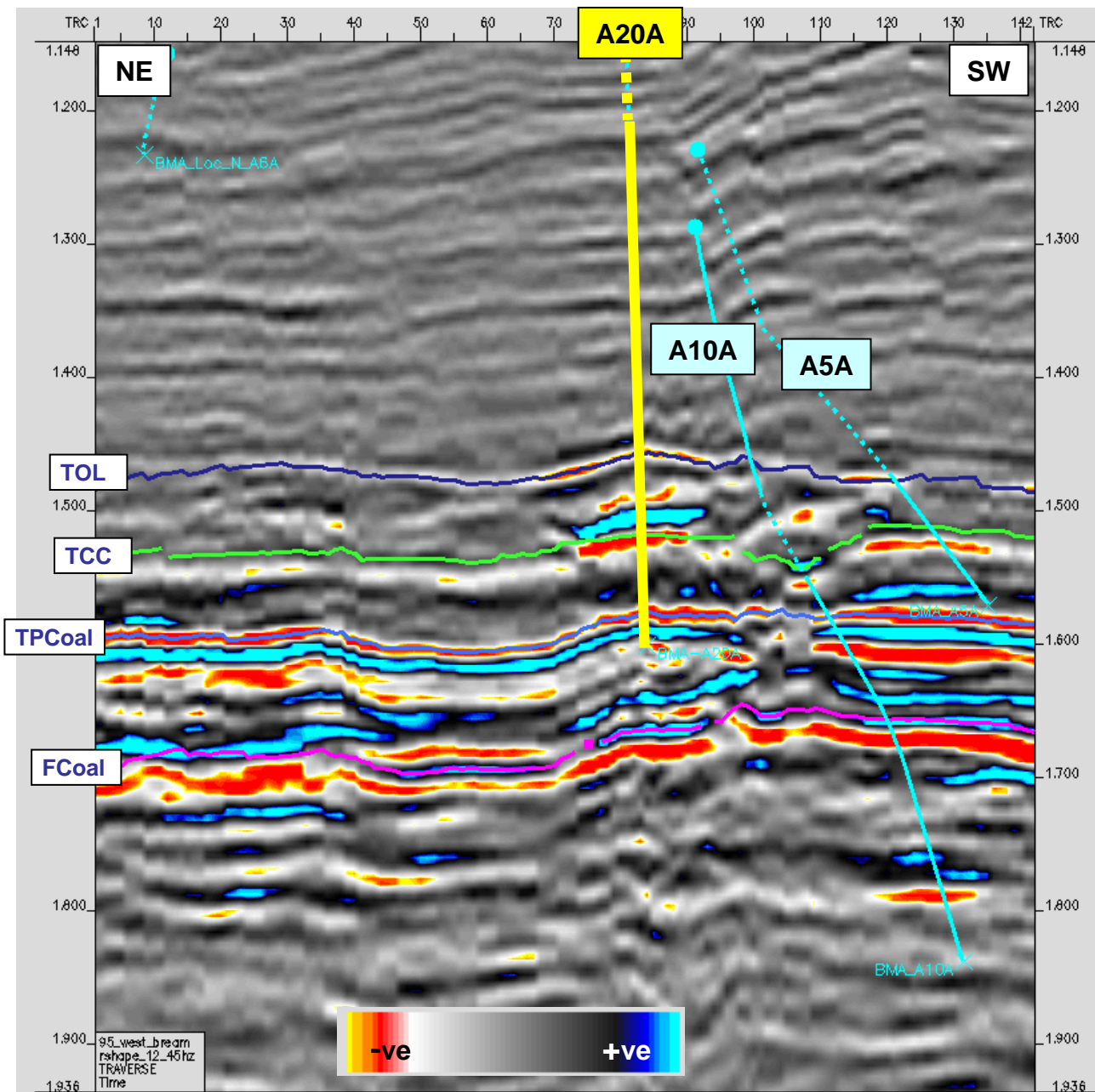


## II. WELL DATA RECORD: BREAM A20A Summary Log, Map & N-1 section





## II. WELL DATA RECORD: BREAM A20A Seismic Profile along well path



## II. WELL DATA RECORD (cont'd)

### LOCATION

<b>Field</b>	<b>Bream</b>	<b>Conductor #20 Surface Coordinates</b>	
<b>Well Name</b>	<b>A20A (Loc F)</b>	(GDA94 ) X	567338.3m E
<b>Conductor Number</b>	Slot 20	(MGA94) Y	5738458.0 N
<b>State</b>	Victoria	Latitude	38° 29' 58.898" S
<b>Permit/Licence</b>	Vic/L13	Longitude	147° 46' 20.057" E
<b>Geological Basin</b>	Gippsland	<b>Perforations (driller)</b>	None
<b>Top of Latrobe</b>	2096.5m MDRT	<b>Datum</b>	GDA94 (GRS80)
	1801.5m TVDRT	<b>Projection</b>	Transverse Mercator
	-1768.7m TVDSS		MGA94/UTM Zone 55 (S)
MGA94 X	566716.0m E		
MGA94 Y	5737932.9m N		
Latitude	38° 30' 16.103" S		
Longitude	147° 45' 54.548" E		

### ELEVATIONS & DEPTHS

<b>Water Depth</b>	59.43 m
<b>Top Wellhead to MSL</b>	27.43m
<b>Main Deck Rel to MSL</b>	25.12 m
<b>RT Relative to MSL</b>	32.82 m
<b>Average Well Angle</b>	5.9 deg (Tan)
<b>Total Depth</b>	2326.0m MDRT
	2029.7m TVDRT
	-1996.9m TVDSS
<b>Plug Back Depth</b>	2294.0m MDRT

### DATES

<b>Skid Rig</b>	12/10/2005
<b>Kicked Off</b>	14/10/2005
<b>Development Rig Days</b>	12.6
<b>NPT Days</b>	1.37
<b>Rig Released</b>	01/10/2005
<b>I.P. Established</b>	15/11/2005

### MISCELLANEOUS

<b>Operator</b>	Esso Australia Pty Ltd	<b>Contractor</b>	International Sea Drilling Ltd
<b>Esso Interest</b>	50%	<b>Rig Name</b>	Nabors Rig 453
<b>Permittee/Licensee</b>	Esso/BHPP	<b>Equipment Type</b>	Platform
<b>Other Interest</b>	50% J.V. Interest	<b>Completion Type</b>	Single
<b>Overriding Royalty</b>	2.5%	<b>Completion Size</b>	3-1/2"
<b>Drilling AFE No.</b>	L0501F463		

### WELL CLASSIFICATION

<b>Before Drilling</b>	Oil and gas Development	<b>After Drilling</b>	Oil well
------------------------	-------------------------	-----------------------	----------

## II. WELL DATA RECORD (cont.)

### CASING RECORD

Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Original A20 Surface	10 <sup>3</sup> / <sub>4</sub>	40.5	K-55	BTC	1123.0
Production	7	26	L-80	Vam T	2321.0

### CEMENTING RECORD

Casing details	Cement Type	Dry Cement Volume (sacks)	Cement Additives	Mix Water  (bbls)	Slurry Volume  (bbls)	Slurry Density  (ppg)	Cement to/from  (m MDRT)	Casing Pressure Test (psi)
7" 26 lb/ft	ABC HTB	440	HALAD 413L 30 gal / 10 bbl NF-6 0.25 gal / 10 bbl  CFR-3L 3 gal / 10 bbl  SCR-100L 0.5 gal / 10 bbl	49.0	88.0	15.8	2321.0 to 1745.0	2500 for 15 minutes

## II. WELL DATA RECORD (cont.)

### DRILLING PERFORMANCE

#### BMA A20A - Final Well Report

### GENERAL

<b>Platform:</b>	Bream	<b>Rig:</b>	453	<b>Reservoir:</b>	N-1 (TCC) Sands
<b>Well:</b>	A20A	<b>Well Slot:</b>	#20	<b>RT-MSL (Rig453)</b>	32.82
<b>Drilling Complexity Index</b>	3.3	<b>Wellwork Complexity Index</b>	1.8		

DEPTH		PERFORMANCE		MUD	
m MDRT	2,326.00	20" Cond. Hole	N/A	Max Wt (ppg)	10.1
m TVDRT	2,029.71	12-1/4" Surf. Hole	N/A	Type (Surf. Hole)	N/A
Vert. Section (m)	836.90	8-1/2" Prod. Hole	389 m/day	Type (Inter. Hole)	N/A
INCLINATION		6" Liner Hole	N/A	Type (Prod. Hole)	KCl/PHPA/Poly/Glycol
Max (deg) / Ave (deg)	56.3/ 5.9 (Tang)	* time to drill interval, incl's Connections & NPT.		Type (Liner Hole)	N/A

Comments: New hole drilled: 1,123m to 2,326mMDRT (1,203m MDRT drilled).

### TIME ANALYSIS

<b>Start Date:</b>	12/10/2005, 0200hrs	<b>Finish Date:</b>	24/10/2005, 1630hrs		
<b>Target Days (P10):</b>	11.4	<b>Total Days:</b>	12.6	<b>% Under Target:</b>	10.5 % (over)
<b>AFE Days (P50):</b>	13.5	<b>NPT Days:</b>	1.37	<b>% of Total Days:</b>	10.9%
<b>Supplementary AFE Days (P50):</b>	N/A				

### COSTS *(based on projected)*

<b>AFE No.:</b>	L0501F463	<b>Revisions:</b>	--	<b>\$ per m</b>	A \$2.52 k / metre (new hole)
<b>\$ per day:</b>	A\$ 241 k/day	<b>\$ per day (excl. T + L)</b>	A\$ 180 k/day		A\$ 1.30 k / metre*
		* Equipment, LWD & Reeves			* based on TD <b>not</b> new hole

	Equipment	Materials	Contracts	Allocations	Contingency	Total
<b>AFE (Original)</b>	905,000	491,850	1,590,150	492,600	220,400	A\$3,700,000
<b>AFE (Supplement)</b>	-	-	-	-	-	-
<b>Projected</b>	651,000	267,000	1,454,000	534,000	126,000	A\$3,032,000

### CASING *(all depths herein are based on Rig 453 elevations: RT-MSL=32.82m)*

	<u>Size / Weight / Grade / Thread</u>	m MDRT	m TVDRT	PIT (ppg)
<b>Conductor Casing *</b>	22"	167	167	N/A
<b>Surface Casing *</b>	10-3/4", 40.5 ppf, K55, BTC	1,123	878	13.0 (PIT)
<b>Prod Casing</b>	7", 26.0 ppf, L80, Vam Top HC	2,321	2,025	N/A

Comments: \* Pre-existing casing strings.

### COMPLETION

	<u>Size / Weight / Grade / Thread</u>	MMDRT	MTVDRT	Type
<b>Completion</b>	3-1/2", 9.2ppf, 13Cr80, Vam Ace	2,172	1,874	Single oil

	Upper Interval [m MDRT]	Upper Interval [m TVDRT]	Lower Interval [mMDRT]	Lower Interval [mTVDRT]	Gun Type
<b>Perforation Interval:</b>	2,237.5-2,239.0	1,941.78-1,943.29	NA	NA	MAXR

Comments: Completion was 3-1/2" 13Cr80 with TR-SSSV and 3 SPMs for gas lift, and one packer.

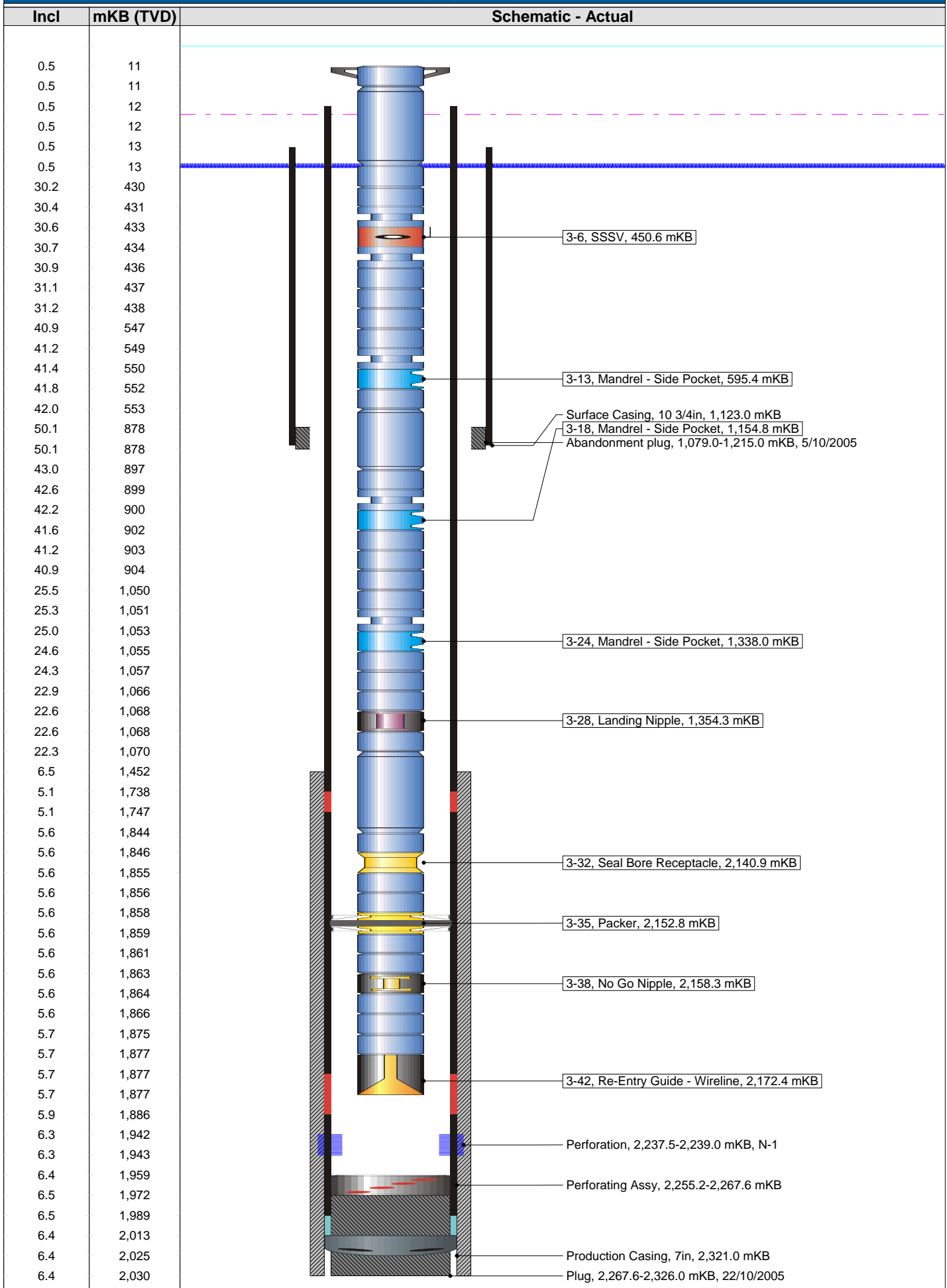
### ADDITIONAL

		Upper Interval [m MDRT]	Lower Interval [m MDRT]
<b>Logs Run</b>	GR-Resistivity-Density-Neutron-Sonic-Caliper	1,100	2,323

Comments: The 8-1/2" hole interval was logged using the Reeves well shuttle system. All data was retrieved on first attempt.



# Bream A20A: Existing Schematic



### III. SAMPLES

The cuttings sampling programme for BREAM A20A are detailed in the following table:

Interval	Formation	Sampling Details
<b>KOP</b> to 150 m above Top of Latrobe (prognosed at 2100.9mMDRT)  1123.0 – 1950.0 mMDRT	Lakes Entrance	Cuttings samples for description only at 30 m intervals.
150 m above Top of Latrobe to Top of Latrobe (prognosed at 2100.9mMDRT)  1950.0 – 2090.0 mMDRT	Latrobe Group	Three sets of washed and oven dried cuttings at 10 m intervals.
Top of Latrobe (prognosed at 2100.9mMDRT) to <b>Total Depth (TD)</b>  2090.0 – 2326.0 mMDRT	Latrobe Group / Coarse Clastics	Three sets of washed and oven dried cuttings at 5 m intervals.

Detailed cuttings descriptions for the interval 1123.0 to 2326.0 mMDRT (TD) are contained in Appendix 3a.

#### CONVENTIONAL CORING

No conventional cores were cut in BREAM A20A.

#### SIDEWALL CORING

No sidewall core samples were shot in BREAM A20A.

## IV. LOGS AND SURVEYS

### BREAM A20A

Survey/Log	Company	Top (m MDRT)	Bottom (m MDRT)
MWD Run 1, Powerpulse (Directional & GR)	Schlumberger/Anadrill	1123.0	1193.0
MWD Run 2, Powerpulse (Directional & GR)	Schlumberger/Anadrill	1123.0	2326.0
Run 1: Drillpipe conveyed Logging MCG-MDN-MPD-MSS-MDL	Reeves (Precision Logging) Compact wireline tools run on drillpipe (Shuttle System, memory mode)	2323.0	1123.0

(Reeves logs = memory/compact GR-Dual Neutron-Photo Density -Sonic -Dual Laterolog -

## V. FORMATION RESERVOIR TOPS

Horizon	m TVDSS			m MDRT  ACTUAL	mTVT HC Column	
	Predicted Tops	ACTUAL	Diff. (m)		Predicted	ACTUAL
Lakes Entrance Form.	-1000.0	-1002.4	2.4 low	1318.0	-	-
Top of Latrobe (TOL)	-1770.0	-1768.7	1.3m high	2096.5	-	-
Top +of Coarse Clastics (TCC)	-1860.0	-1867.2	7.2m low	2195.5	-	-
BWST	-1865.0	-1875.3	10.3m low	2203.6	46m net	29.7m net
newGnF2	-1870.0	-1881.0	11.0m low	2209.4	gas in	gas in
newGnsb	-	-1897.5	-	2226.0	Green &	Green and
newCbF2	-1892.0	-1900.9	8.9m low	2229.4	Cobalt	Cobalt
GOC	-1911.0	-1905.0	6.0m high	2233.5	units	units
newCbf1	-1895.0	-1908.9	13.9m low	2237.5	-	2.8m net oil
OWC	-1915.0	-1911.7	3.3m high	2240.3	4m net	2.8m net oil
newCbsb	-1905.0	-1916.7	11.7m low	2245.3	oil	-
newPkf2	-	-1919.8	-	2248.5	in Pink unit	-
newPkf1	-	-1924.4	-	2253.1	-	-
newPkfb	-	-1934.7	-	2263.4	-	-
newMvf2	-	-1937.9	-	2266.7	-	-
newMvsb	-	-1948.2	-	2277.0	-	-
PCOL	-	-1972.9	-	2301.8	-	-
TPCL	-1970.0	-1976.9	6.9m low	2305.9	-	-
BPCL	-	-1979.2	-	2308.2	-	-
Total Depth (TD)	-1993.5	-1996.9	3.4m low	2326.0	-	-

## VI. GEOLOGICAL ANALYSIS - BREAM A20A

### Objectives

BMA-A20A was designed to capture N-1 oil reserves from a local structural crest in the western half of Bream field. This culmination was penetrated by the nearby BMA-A12 well located 330 m to the SSW of the Top Coarse Clastics (TCC) target. The failure of the A12 long string in 2004 provided the opportunity to re-drill this location and at the same time improve on its structural position. BMA-A20A was expected to provide a key collection point for oil migrating upwards as a result of gas cap blow-down.

The BMA-A20A well was expected to encounter a similar stratigraphy to that observed in the A12 which penetrated well developed Green, Cobalt and Pink-Mauve sands within the N-1 reservoir section. A locally continuous, 4m TVT shale and coal above the Cobalt Flooding Surface #1 (CBF1) horizon, may act as a barrier to vertical oil column movement allowing separation and crestal trapping of the migrating oil column.

### Results

The Bream A20A well was spudded on 14<sup>th</sup> October, 2005 from the 10-3/4" casing shoe at 1123.0mMDRT and drilled to a Total Depth of 2326.0mMDRT (2029.7mTVDRT) in an 8-1/2" production hole. The well was logged up with the Precision Energy Services compact shuttle system. The well was completed with 4½" liner and 3½" completion tubing, with initial production established on 15<sup>th</sup> November, 2005.

The Top of Latrobe Group (TOL) was intersected at 2096.5.0mMDRT (-1768.7 mSS), 1.3m TVD high to prediction. A 99m Gurnard Formation interval comprised of siltstone above a 42.2m MD section of volcanics was intersected between the TOL and TCC. A 1m glauconitic, pyritic siltstone was intersected at the base of this volcanic unit.

The Top of Coarse Clastics was intersected at 2195.5m MDRT (-1867.2m TVDSS), 7.2m low to prognosis. All subsequent intra-Latrobe formation tops were also intersected low to prognosis. The Top *P. Asperopolus* coal marker (TPCL), which in combination with the TCC is one of the two main seismic mapping surfaces, was intersected 6.9m low to prognosis suggesting a probable 'time pull-up' effect on the N-1 reservoir section at the A20A location. The presence of a thick, high density, high velocity (210 us/m) volcanic unit within the Gurnard Formation, manifested as a limited extent, high impedance, high seismic amplitude event on the seismic profile along the well path, is the most likely explanation for the error (+0.38%) in depth prediction.

The N-1 reservoir sandstone units were found to be present and well developed, as predicted from nearby control. The Green and upper Cobalt units were found to be gas bearing with a total of 29.7m TVD net gas pay being intersected below the Base Waste (2203.6m MDRT, -1875.3 m TVDSS). A gas-oil contact was logged at 2233.5m MDRT (-1905m TVDSS). Two 2.8m MD net (2.8m TVD net) oil bearing intervals, separated by a flooding surface claystone (new Cbf1), were logged between the gas column and a 16.6m MD gross residual oil and gas zone, with an oil-water contact interpreted at 2240.3m MD (-1911.7m TVDSS). This total gross oil column of 6.7m TVD is interpreted to lie within the mid and lower Cobalt units of the N-1 reservoir. The lowermost Cobalt and upper Pink units were found to be swept with average water saturations calculated between 75.6 and 93.1%. The lowermost Pink and Mauve units were intersected below the original field OWC (-1929 m TVDSS) and were water wet as expected. The BMA-A20A well was initially completed at the top of the lower of the two oil columns below the Cobalt flooding surface (newCBf1).

## **APPENDIX 1a**

### **BREAM A20A**

#### **Survey Data**





Report Date: October 25, 2005  
Client: Esso Australia Pty Ltd  
Field: Bream A GDA 94  
Structure / Slot: Bream A / 20  
Well: 20  
Borehole: BMA A-20A  
UWI/API#:   
Survey Name / Date: BMA A-20A Final / October 11, 2005  
Tort / AHD / DDI / ERD ratio: 129.894° / 849.89 m / 5.618 / 0.419  
Grid Coordinate System: GDA94/MGA94 Zone 55  
Location Lat/Long: S 38 29 58.899, E 147 46 20.056  
Location Grid N/E Y/X: N 5738458.020 m, E 567338.250 m  
Grid Convergence Angle: -0.48074421°  
Grid Scale Factor: 0.99965584

Survey / DLS Computation Method: Minimum Curvature / Lubinski  
Vertical Section Azimuth: 230.920°  
Vertical Section Origin: S 4.440 m, E 1.750 m  
TVD Reference Datum: RKB  
TVD Reference Elevation: 32.8 m relative to MSL  
Sea Bed / Ground Level Elevation: -59.400 m relative to MSL  
Magnetic Declination: 13.103°  
Total Field Strength: 60139.611 nT  
Magnetic Dip: -69.022°  
Declination Date: October 11, 2005  
Magnetic Declination Model: BGGM 2004  
North Reference: Grid North  
Total Corr Mag North -> Grid North: +13.584°  
Local Coordinates Referenced To: Structure Reference Point

Comments	Measured Depth (m)	Inclination (deg)	Azimuth (deg)	TVD (m)	Vertical Section (m)	NS (m)	EW (m)	DLS (deg/30 m)	Northing (m)	Easting (m)	Latitude	Longitude
Tie-In	0.00	0.00	0.00	0.00	0.00	-4.44	1.75	0.00	5738458.02	567338.25	S 38 29 58.899	E 147 46 20.056
	5.00	0.00	0.00	5.00	0.00	-4.44	1.75	0.00	5738458.02	567338.25	S 38 29 58.899	E 147 46 20.056
	9.32	0.56	229.88	9.32	0.02	-4.46	1.73	3.89	5738458.01	567338.23	S 38 29 58.899	E 147 46 20.056
	19.32	0.38	221.83	19.32	0.10	-4.51	1.67	0.57	5738457.95	567338.17	S 38 29 58.901	E 147 46 20.053
	29.32	0.36	275.10	29.32	0.16	-4.53	1.62	1.00	5738457.93	567338.12	S 38 29 58.902	E 147 46 20.051
	39.32	0.37	280.08	39.32	0.20	-4.52	1.56	0.10	5738457.94	567338.06	S 38 29 58.901	E 147 46 20.048
	49.32	0.36	296.03	49.32	0.24	-4.51	1.50	0.31	5738457.96	567338.00	S 38 29 58.901	E 147 46 20.046
	59.32	0.37	309.37	59.32	0.26	-4.47	1.45	0.26	5738457.99	567337.94	S 38 29 58.900	E 147 46 20.044
	69.32	0.42	309.37	69.32	0.27	-4.43	1.39	0.15	5738458.03	567337.89	S 38 29 58.898	E 147 46 20.042
	79.32	0.45	301.76	79.32	0.29	-4.38	1.33	0.20	5738458.08	567337.83	S 38 29 58.897	E 147 46 20.039
	89.32	0.54	279.86	89.32	0.33	-4.35	1.25	0.62	5738458.11	567337.75	S 38 29 58.896	E 147 46 20.036
	99.32	0.83	249.69	99.32	0.43	-4.37	1.14	1.36	5738458.09	567337.64	S 38 29 58.896	E 147 46 20.031
	109.32	1.56	226.75	109.32	0.64	-4.49	0.97	2.58	5738457.97	567337.47	S 38 29 58.900	E 147 46 20.024
	119.32	2.94	216.24	119.31	1.02	-4.79	0.72	4.30	5738457.67	567337.22	S 38 29 58.910	E 147 46 20.014
	129.32	4.64	211.57	129.28	1.65	-5.34	0.35	5.18	5738457.12	567336.85	S 38 29 58.928	E 147 46 19.999
	139.32	6.15	208.18	139.24	2.53	-6.16	-0.11	4.63	5738456.30	567336.39	S 38 29 58.955	E 147 46 19.980
	149.32	7.44	206.93	149.17	3.61	-7.21	-0.66	3.90	5738455.25	567335.84	S 38 29 58.989	E 147 46 19.958
	159.32	8.27	207.54	159.08	4.86	-8.42	-1.28	2.50	5738454.04	567335.22	S 38 29 59.029	E 147 46 19.933
	169.32	8.50	216.18	168.97	6.24	-9.66	-2.05	3.84	5738452.81	567334.45	S 38 29 59.069	E 147 46 19.901
	179.32	8.84	227.10	178.86	7.72	-10.78	-3.05	5.03	5738451.69	567333.45	S 38 29 59.105	E 147 46 19.860
	189.32	9.51	230.73	188.73	9.31	-11.82	-4.25	2.66	5738450.64	567332.25	S 38 29 59.140	E 147 46 19.811
	199.32	10.38	230.51	198.58	11.04	-12.92	-5.59	2.61	5738449.55	567330.91	S 38 29 59.175	E 147 46 19.757
	209.32	11.09	228.81	208.40	12.90	-14.13	-7.01	2.33	5738448.34	567329.50	S 38 29 59.215	E 147 46 19.698
	219.32	11.76	225.70	218.20	14.88	-15.47	-8.46	2.73	5738447.00	567328.04	S 38 29 59.259	E 147 46 19.639
	229.32	12.32	223.33	227.98	16.95	-16.96	-9.92	2.24	5738445.51	567326.58	S 38 29 59.308	E 147 46 19.579
	239.32	12.68	222.46	237.75	19.09	-18.54	-11.39	1.22	5738443.92	567325.11	S 38 29 59.359	E 147 46 19.519
	249.32	13.30	222.16	247.49	21.32	-20.21	-12.91	1.87	5738442.26	567323.60	S 38 29 59.414	E 147 46 19.457
	259.32	14.43	222.17	257.20	23.68	-21.98	-14.52	3.39	5738440.49	567321.99	S 38 29 59.472	E 147 46 19.391
	269.32	16.03	222.48	266.85	26.28	-23.92	-16.28	4.81	5738438.54	567320.22	S 38 29 59.535	E 147 46 19.319
	279.32	17.35	222.92	276.43	29.12	-26.03	-18.23	3.98	5738436.43	567318.27	S 38 29 59.604	E 147 46 19.239
	289.32	18.49	223.19	285.94	32.17	-28.28	-20.33	3.43	5738434.19	567316.17	S 38 29 59.678	E 147 46 19.153
	299.32	19.44	223.32	295.40	35.39	-30.65	-22.56	2.85	5738431.82	567313.95	S 38 29 59.755	E 147 46 19.062
	309.32	20.15	223.38	304.81	38.75	-33.11	-24.88	2.13	5738429.36	567311.62	S 38 29 59.836	E 147 46 18.967
	319.32	20.74	223.49	314.18	42.21	-35.65	-27.29	1.77	5738426.82	567309.22	S 38 29 59.918	E 147 46 18.869
	329.32	21.20	223.55	323.52	45.76	-38.24	-29.75	1.38	5738424.23	567306.76	S 38 30 0.003	E 147 46 18.768
	339.32	21.61	223.76	332.83	49.38	-40.88	-32.27	1.25	5738421.59	567304.24	S 38 30 0.090	E 147 46 18.665
	349.32	22.18	224.14	342.10	53.08	-43.57	-34.86	1.76	5738418.91	567301.65	S 38 30 0.177	E 147 46 18.559
	359.32	22.77	224.31	351.34	56.88	-46.31	-37.52	1.78	5738416.17	567298.99	S 38 30 0.267	E 147 46 18.450
	369.32	23.45	224.37	360.54	60.78	-49.12	-40.27	2.04	5738413.36	567296.25	S 38 30 0.359	E 147 46 18.338
	379.32	24.27	224.41	369.69	64.80	-52.01	-43.10	2.46	5738410.47	567293.42	S 38 30 0.453	E 147 46 18.222
	389.32	25.11	224.51	378.77	68.95	-54.99	-46.02	2.52	5738407.49	567290.49	S 38 30 0.551	E 147 46 18.102
	399.32	25.89	224.66	387.80	73.23	-58.05	-49.05	2.35	5738404.43	567287.47	S 38 30 0.651	E 147 46 17.979
	409.32	26.98	224.86	396.75	77.65	-61.21	-52.18	3.28	5738401.27	567284.34	S 38 30 0.754	E 147 46 17.850
	419.32	27.72	224.99	405.64	82.22	-64.47	-55.42	2.23	5738398.02	567281.09	S 38 30 0.861	E 147 46 17.718
	429.32	28.55	225.18	414.45	86.91	-67.80	-58.76	2.50	5738394.69	567277.76	S 38 30 0.970	E 147 46 17.581
	439.32	29.44	225.46	423.20	91.74	-71.20	-62.21	2.70	5738391.28	567274.31	S 38 30 1.081	E 147 46 17.440
	449.32	30.48	225.81	431.86	96.71	-74.70	-65.78	3.16	5738387.79	567270.74	S 38 30 1.195	E 147 46 17.294
	459.32	31.48	226.12	440.44	101.84	-78.27	-69.48	3.04	5738384.21	567267.04	S 38 30 1.312	E 147 46 17.142
	469.32	32.42	226.41	448.92	107.11	-81.93	-73.30	2.86	5738380.56	567263.22	S 38 30 1.432	E 147 46 16.986
	479.32	33.23	226.64	457.33	112.52	-85.66	-77.24	2.46	5738376.83	567259.29	S 38 30 1.554	E 147 46 16.825
	489.32	33.98	226.83	465.65	118.04	-89.45	-81.27	2.27	5738373.04	567255.26	S 38 30 1.678	E 147 46 16.660
	499.32	34.69	227.00	473.91	123.66	-93.31	-85.39	2.15	5738369.18	567251.14	S 38 30 1.804	E 147 46 16.491
	509.32	35.36	227.17	482.10	129.39	-97.22	-89.59	2.03	5738365.28	567246.94	S 38 30 1.932	E 147 46 16.319
	519.32	35.97	227.40	490.23	135.21	-101.17	-93.88	1.87	5738361.32	567242.66	S 38 30 2.061	E 147 46 16.144
	529.32	36.46	227.64	498.29	141.11	-105.16	-98.23	1.53	5738357.34	567238.30	S 38 30 2.192	E 147 46 15.965
	539.32	36.91	227.89	506.31	147.07	-109.18	-102.66	1.42	5738353.32	567233.88	S 38 30 2.323	E 147 46 15.784
	549.32	37.33	228.17	514.29	153.10	-113.21	-107.14	1.36	5738349.29	567229.39	S 38 30 2.456	E 147 46 15.600
	559.32	37.93	228.58	522.21	159.20	-117.27	-111.71	1.95	5738345.23	567224.83	S 38 30 2.588	E 147 46 15.413
	569.32	38.66	229.04	530.05	165.39	-121.35	-116.37	2.35	5738341.15	567220.17	S 38 30 2.722	E 147 46 15.222
	579.32	39.53	229.53	537.81	171.70	-125.46	-121.15	2.77	5738337.04	567215.39	S 38 30 2.857	E 147 46 15.026
	589.32	40.66	230.02	545.46	178.14	-129.62	-126.07	3.52	5738332.88	567210.48	S 38 30 2.993	E 147 46 14.825

599.32	41.94	230.46	552.98	184.73	-133.84	-131.14	3.94	5738328.67	567205.40	S 38 30 3.131	E 147 46 14.617
609.32	43.19	230.82	560.34	191.50	-138.13	-136.37	3.82	5738324.38	567200.18	S 38 30 3.272	E 147 46 14.403
619.32	44.32	231.06	567.57	198.41	-142.49	-141.74	3.43	5738320.02	567194.81	S 38 30 3.414	E 147 46 14.183
629.32	45.29	231.23	574.66	205.46	-146.91	-147.23	2.93	5738315.60	567189.32	S 38 30 3.559	E 147 46 13.958
639.32	46.22	231.40	581.64	212.62	-151.39	-152.82	2.81	5738311.13	567183.73	S 38 30 3.706	E 147 46 13.728
649.32	47.14	231.57	588.50	219.90	-155.92	-158.51	2.78	5738306.60	567178.04	S 38 30 3.854	E 147 46 13.495
659.32	48.10	231.80	595.24	227.29	-160.50	-164.31	2.92	5738302.02	567172.25	S 38 30 4.004	E 147 46 13.257
669.32	49.09	232.03	601.85	234.78	-165.12	-170.21	3.01	5738297.39	567166.35	S 38 30 4.156	E 147 46 13.015
679.32	50.12	232.27	608.33	242.40	-169.80	-176.23	3.14	5738292.72	567160.33	S 38 30 4.309	E 147 46 12.769
689.32	51.25	232.53	614.67	250.13	-174.52	-182.36	3.44	5738288.00	567154.21	S 38 30 4.464	E 147 46 12.518
699.32	52.33	232.78	620.85	257.99	-179.28	-188.60	3.29	5738283.24	567147.96	S 38 30 4.620	E 147 46 12.261
709.32	53.32	233.02	626.90	265.95	-184.09	-194.96	3.02	5738278.44	567141.61	S 38 30 4.778	E 147 46 12.001
719.32	54.15	233.21	632.81	274.01	-188.93	-201.41	2.53	5738273.60	567135.16	S 38 30 4.937	E 147 46 11.736
729.32	54.69	233.38	638.63	282.13	-193.79	-207.93	1.67	5738268.74	567128.64	S 38 30 5.096	E 147 46 11.469
739.32	55.07	233.54	644.38	290.30	-198.66	-214.50	1.21	5738263.87	567122.07	S 38 30 5.256	E 147 46 11.199
749.32	55.29	233.70	650.09	298.50	-203.53	-221.11	0.77	5738259.00	567115.47	S 38 30 5.415	E 147 46 10.928
759.32	55.36	233.86	655.78	306.72	-208.39	-227.74	0.45	5738254.14	567108.83	S 38 30 5.575	E 147 46 10.656
769.32	55.37	234.01	661.47	314.93	-213.23	-234.40	0.37	5738249.30	567102.19	S 38 30 5.734	E 147 46 10.383
779.32	55.34	234.14	667.15	323.15	-218.06	-241.06	0.33	5738244.48	567095.53	S 38 30 5.892	E 147 46 10.110
789.32	55.32	234.22	672.84	331.36	-222.87	-247.73	0.21	5738239.67	567088.86	S 38 30 6.050	E 147 46 9.837
799.32	55.33	234.27	678.53	339.57	-227.68	-254.40	0.13	5738234.86	567082.19	S 38 30 6.208	E 147 46 9.563
809.32	55.39	234.31	684.21	347.78	-232.48	-261.08	0.21	5738230.06	567075.51	S 38 30 6.365	E 147 46 9.289
819.32	55.49	234.36	689.88	356.00	-237.28	-267.77	0.32	5738225.26	567068.82	S 38 30 6.523	E 147 46 9.014
829.32	55.62	234.37	695.54	364.24	-242.09	-274.47	0.39	5738220.46	567062.12	S 38 30 6.680	E 147 46 8.739
839.32	55.78	234.31	701.18	372.48	-246.90	-281.19	0.50	5738215.64	567055.41	S 38 30 6.838	E 147 46 8.464
849.32	55.97	234.08	706.79	380.75	-251.74	-287.90	0.81	5738210.80	567048.70	S 38 30 6.997	E 147 46 8.189
859.32	56.23	232.94	712.36	389.04	-256.68	-294.57	2.94	5738205.87	567042.03	S 38 30 7.159	E 147 46 7.915
869.32	56.29	231.11	717.92	397.35	-261.80	-301.13	4.57	5738200.75	567035.48	S 38 30 7.327	E 147 46 7.646
879.32	56.03	228.86	723.49	405.66	-267.14	-307.49	5.66	5738195.42	567029.12	S 38 30 7.502	E 147 46 7.386
889.32	55.05	226.44	729.15	413.89	-272.69	-313.58	6.67	5738189.86	567023.03	S 38 30 7.683	E 147 46 7.136
899.32	53.44	224.18	734.99	421.96	-278.39	-319.35	7.32	5738184.16	567017.26	S 38 30 7.870	E 147 46 6.900
909.32	51.88	222.31	741.06	429.84	-284.18	-324.80	6.46	5738178.37	567011.81	S 38 30 8.059	E 147 46 6.677
919.32	50.61	220.97	747.32	437.54	-290.01	-329.98	4.93	5738172.55	567006.63	S 38 30 8.250	E 147 46 6.465
929.32	50.35	220.57	753.68	445.13	-295.85	-335.02	1.21	5738166.71	567001.60	S 38 30 8.440	E 147 46 6.259
939.32	50.31	220.42	760.06	452.70	-301.71	-340.02	0.37	5738160.86	566996.60	S 38 30 8.632	E 147 46 6.055
949.32	50.43	220.45	766.44	460.27	-307.57	-345.01	0.37	5738155.00	566991.61	S 38 30 8.823	E 147 46 5.851
959.32	50.48	220.53	772.81	467.86	-313.43	-350.02	0.24	5738149.13	566986.60	S 38 30 9.015	E 147 46 5.646
969.32	50.48	220.63	779.17	475.45	-319.29	-355.04	0.23	5738143.28	566981.59	S 38 30 9.206	E 147 46 5.441
979.32	50.45	220.74	785.54	483.04	-325.14	-360.06	0.27	5738137.43	566976.56	S 38 30 9.397	E 147 46 5.236
989.32	50.37	220.87	791.91	490.62	-330.97	-365.10	0.38	5738131.60	566971.53	S 38 30 9.587	E 147 46 5.030
999.32	50.30	221.02	798.29	498.20	-336.79	-370.14	0.41	5738125.79	566966.48	S 38 30 9.777	E 147 46 4.824
1009.32	50.20	221.17	804.69	505.78	-342.58	-375.20	0.46	5738120.00	566961.43	S 38 30 9.967	E 147 46 4.617
1019.32	50.08	221.34	811.10	513.35	-348.35	-380.26	0.53	5738114.23	566956.37	S 38 30 10.155	E 147 46 4.410
1029.32	50.00	221.50	817.52	520.91	-354.10	-385.33	0.44	5738108.48	566951.30	S 38 30 10.343	E 147 46 4.203
1039.32	49.97	221.65	823.95	528.46	-359.83	-390.41	0.36	5738102.75	566946.22	S 38 30 10.530	E 147 46 3.995
1049.32	50.00	221.81	830.38	536.02	-365.55	-395.51	0.38	5738097.04	566941.13	S 38 30 10.717	E 147 46 3.787
1059.32	50.04	221.96	836.80	543.59	-371.25	-400.63	0.37	5738091.34	566936.01	S 38 30 10.903	E 147 46 3.578
1069.32	50.09	222.09	843.22	551.17	-376.95	-405.76	0.33	5738085.64	566930.88	S 38 30 11.089	E 147 46 3.368
1079.32	50.15	222.00	849.63	558.75	-382.65	-410.90	0.27	5738079.95	566925.74	S 38 30 11.276	E 147 46 3.158
1089.32	50.23	222.27	856.04	566.34	-388.34	-416.05	0.67	5738074.25	566920.59	S 38 30 11.462	E 147 46 2.947
1099.32	50.28	222.36	862.43	573.94	-394.03	-421.23	0.26	5738068.57	566915.42	S 38 30 11.647	E 147 46 2.735
1109.32	50.25	222.45	868.82	581.55	-399.71	-426.41	0.23	5738062.89	566910.23	S 38 30 11.833	E 147 46 2.523
1119.32	50.13	222.53	875.23	589.15	-405.37	-431.60	0.40	5738057.23	566905.05	S 38 30 12.018	E 147 46 2.311
1123.20	50.12	222.56	877.71	592.09	-407.56	-433.62	0.19	5738055.04	566903.03	S 38 30 12.090	E 147 46 2.229
1130.05	47.49	222.04	882.22	597.19	-411.38	-437.09	11.64	5738051.23	566899.56	S 38 30 12.214	E 147 46 2.087
1158.55	41.35	225.01	902.57	616.95	-425.85	-450.79	6.82	5738036.76	566885.86	S 38 30 12.687	E 147 46 1.526
1186.68	36.10	227.21	924.51	634.48	-438.06	-463.46	5.79	5738024.55	566873.20	S 38 30 13.087	E 147 46 1.008
1215.77	35.19	227.08	948.15	651.39	-449.59	-475.88	0.94	5738013.03	566860.78	S 38 30 13.464	E 147 46 0.499
1244.76	33.70	227.07	972.06	667.75	-460.75	-487.89	1.54	5738001.86	566848.78	S 38 30 13.829	E 147 46 0.007
1273.63	30.94	226.91	996.45	683.15	-471.28	-499.18	2.87	5737991.34	566837.50	S 38 30 14.174	E 147 45 59.545
1302.40	29.31	226.75	1021.34	697.55	-481.16	-509.71	1.70	5737981.47	566826.97	S 38 30 14.497	E 147 45 59.114
1331.20	25.98	228.95	1046.84	710.89	-490.13	-519.60	3.63	5737972.49	566817.08	S 38 30 14.791	E 147 45 58.708
1359.76	21.86	230.77	1072.95	722.47	-497.61	-528.44	4.40	5737965.02	566808.24	S 38 30 15.035	E 147 45 58.346
1388.77	19.17	232.97	1100.11	732.63	-503.89	-536.43	2.89	5737958.74	566800.26	S 38 30 15.241	E 147 45 58.019
1417.01	15.02	239.52	1127.10	740.88	-508.54	-543.29	4.85	5737954.09	566793.40	S 38 30 15.394	E 147 45 57.737
1445.56	10.81	249.92	1154.93	747.08	-511.34	-548.99	5.04	5737951.29	566787.70	S 38 30 15.486	E 147 45 57.503
1474.78	9.02	260.03	1183.71	751.67	-512.68	-553.82	2.56	5737949.96	566782.87	S 38 30 15.531	E 147 45 57.304
1502.94	7.99	258.30	1211.56	755.34	-513.46	-557.91	1.13	5737949.18	566778.78	S 38 30 15.557	E 147 45 57.135
1531.72	7.61	252.76	1240.08	758.88	-514.43	-561.69	0.88	5737948.21	566775.00	S 38 30 15.590	E 147 45 56.980
1560.64	7.50	256.14	1268.75	762.37	-515.45	-565.36	0.47	5737947.19	566771.34	S 38 30 15.624	E 147 45 56.829
1588.81	7.68	254.24	1296.67	765.76	-516.40	-568.95	0.33	5737946.24	566767.74	S 38 30 15.656	E 147 45 56.681
1617.61	7.60	252.84	1325.21	769.29	-517.49	-572.62	0.21	5737945.15	566764.07	S 38 30 15.692	E 147 45 56.530
1646.36	7.28	251.97	1353.72	772.76	-518.61	-576.17	0.35	5737944.03	566760.53	S 38 30 15.729	E 147 45 56.384
1675.14	7.18	253.68	1382.27	776.12	-519.68	-579.63	0.25	5737942.96	566757.07	S 38 30 15.765	E 147 45 56.241
1703.77	6.89	255.65	1410.69	779.33	-520.61	-583.01	0.40	5737942.03	566753.69	S 38 30 15.796	E 147 45 56.102
1733.18	6.64	254.42	1439.89	782.49	-521.50	-586.36	0.29	5737941.14	566750.34	S 38 30 15.826	E 147 45 55.964
1761.59	6.22	258.30	1468.12	785.36	-522.26	-589.45	0.64	5737940.38	566747.25	S 38 30 15.851	E 147 45 55.837
1790.90	6.07	260.30	1497.27	788.12	-522.84	-592.53	0.27	5737939.80	566744.17	S 38 30 15.871	E 147 45 55.710
1819.91	5.75	257.03	1526.12	790.76	-523.42	-595.46	0.48	5737939.22	566741.25	S 38 30 15.891	E 147 45 55.589
1848.48	5.62	256.99	1554.55	793.30	-524.06						

1906.02	5.55	256.59	1611.82	798.31	-525.30	-603.65	0.08	5737937.34	566733.06	S 38 30 15.954	E 147 45 55.252
1934.96	5.39	257.55	1640.63	800.78	-525.92	-606.34	0.19	5737936.72	566730.37	S 38 30 15.975	E 147 45 55.141
1963.74	5.23	257.27	1669.29	803.17	-526.50	-608.94	0.17	5737936.14	566727.77	S 38 30 15.994	E 147 45 55.034
1993.31	5.19	255.69	1698.73	805.59	-527.13	-611.55	0.15	5737935.51	566725.16	S 38 30 16.015	E 147 45 54.927
2020.70	5.03	254.63	1726.01	807.81	-527.76	-613.91	0.20	5737934.89	566722.81	S 38 30 16.036	E 147 45 54.830
2049.27	5.09	254.20	1754.47	810.12	-528.43	-616.33	0.07	5737934.21	566720.38	S 38 30 16.059	E 147 45 54.730
2077.81	5.37	254.60	1782.89	812.51	-529.13	-618.84	0.30	5737933.51	566717.87	S 38 30 16.082	E 147 45 54.626
2106.43	5.47	255.61	1811.39	814.98	-529.83	-621.45	0.14	5737932.82	566715.26	S 38 30 16.105	E 147 45 54.519
2134.94	5.59	253.27	1839.76	817.49	-530.56	-624.10	0.27	5737932.08	566712.62	S 38 30 16.130	E 147 45 54.410
2163.87	5.60	251.38	1868.56	820.12	-531.42	-626.78	0.19	5737931.22	566709.93	S 38 30 16.158	E 147 45 54.299
2192.89	6.08	250.96	1897.43	822.89	-532.37	-629.58	0.50	5737930.27	566707.14	S 38 30 16.190	E 147 45 54.184
2221.62	6.23	249.36	1925.99	825.80	-533.42	-632.48	0.24	5737929.22	566704.24	S 38 30 16.225	E 147 45 54.065
2250.35	6.42	249.94	1954.54	828.80	-534.52	-635.44	0.21	5737928.12	566701.28	S 38 30 16.261	E 147 45 53.943
2278.98	6.58	249.35	1982.99	831.87	-535.65	-638.48	0.18	5737927.00	566698.24	S 38 30 16.299	E 147 45 53.818
2305.83	6.41	248.34	2009.67	834.76	-536.74	-641.31	0.23	5737925.90	566695.41	S 38 30 16.335	E 147 45 53.701
2326.00	6.35	248.00	2029.71	836.90	-537.58	-643.39	0.11	5737925.07	566693.33	S 38 30 16.363	E 147 45 53.616

Projected to TD

**Survey Type:** Definitive Survey

**Survey Error Model:** SLB ISCWSA version 24 \*\*\* 3-D 95.00% Confidence 2.7955 sigma

**Surveying Prog:**

<u>MD From ( m )</u>	<u>MD To ( m )</u>	<u>EOU Freq</u>	<u>Survey Tool Type</u>	<u>Borehole -&gt; Survey</u>
0.00	92.22	Act-Stns	SLB_NSG+MSHOT-Depth Only	BMA A-20A -> BMA A-20A Final
92.22	1123.20	Act-Stns	SLB_NSG+MSHOT	BMA A-20A -> BMA A-20A Final
1123.20	2326.00	Act-Stns	SLB_MWD-STD	BMA A-20A -> BMA A-20A Final

**APPENDIX 1b**

**BREAM A20A**

**Survey Data Listing**

Report Date:	27 February 2006
Well:	Bream A20A
Structure / Slot:	NABORS Rig 453
TVD Reference Datum:	DrillSite Elevation
TVD Reference Elevation:	32.82 m relative to MSL
Sea Bed / Ground Level Elevation:	59.43 m relative to MSL
Grid Coordinate System:	GDA94/MGA94 Zone 55
Location Lat/Long:	S -38 29' 58.898400", E 147 46' 20.056800"
Location Grid N/E:	N 5738458.0251 m, E 567338.2598 m
Survey Azimuth Reference:	Grid North

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
0	0	360	0	32.82	0	0	5738458.02	567338.25
5	0	360	5	27.82	0	0	5738458.02	567338.25
10	0.55	229.33	10	22.82	-0.02	-0.02	5738458.01	567338.23
15	0.46	225.31	15	17.82	-0.05	-0.05	5738457.98	567338.2
20	0.38	225.45	20	12.82	-0.07	-0.08	5738457.95	567338.17
25	0.37	252.09	25	7.82	-0.08	-0.11	5738457.94	567338.15
30	0.36	275.44	30	2.82	-0.09	-0.13	5738457.93	567338.12
35	0.37	277.93	35	-2.18	-0.09	-0.16	5738457.94	567338.09
40	0.37	281.16	40	-7.18	-0.08	-0.2	5738457.94	567338.06
45	0.36	289.14	45	-12.18	-0.07	-0.23	5738457.95	567338.03
50	0.36	296.94	50	-17.18	-0.06	-0.26	5738457.96	567338
55	0.37	303.61	55	-22.18	-0.04	-0.28	5738457.98	567337.97
60	0.37	309.37	60	-27.18	-0.03	-0.31	5738458	567337.94
65	0.4	309.37	65	-32.18	0	-0.34	5738458.02	567337.92
70	0.42	308.85	70	-37.18	0.02	-0.36	5738458.04	567337.89
75	0.44	305.05	75	-42.18	0.04	-0.39	5738458.06	567337.86
80	0.46	300.27	80	-47.18	0.06	-0.43	5738458.08	567337.83
85	0.5	289.32	85	-52.18	0.07	-0.47	5738458.1	567337.79
90	0.56	277.81	90	-57.18	0.09	-0.51	5738458.11	567337.74
95	0.7	262.72	95	-62.18	0.08	-0.57	5738458.1	567337.69
100	0.88	248.13	100	-67.18	0.06	-0.63	5738458.09	567337.63
105	1.24	236.66	105	-72.18	0	-0.71	5738458.03	567337.54
110	1.65	226.04	109.99	-77.17	-0.07	-0.8	5738457.95	567337.45
115	2.34	220.78	114.99	-82.17	-0.22	-0.92	5738457.8	567337.33
120	3.06	215.92	119.99	-87.17	-0.39	-1.06	5738457.64	567337.2
125	3.91	213.59	124.97	-92.15	-0.66	-1.24	5738457.36	567337.01
130	4.74	211.34	129.96	-97.14	-0.96	-1.43	5738457.07	567336.82
135	5.5	209.64	134.94	-102.12	-1.36	-1.66	5738456.66	567336.59
140	6.24	208.09	139.92	-107.1	-1.79	-1.9	5738456.23	567336.35
145	6.88	207.47	144.88	-112.06	-2.31	-2.17	5738455.71	567336.08
150	7.5	206.97	149.84	-117.02	-2.85	-2.45	5738455.17	567335.8
155	7.91	207.28	154.8	-121.98	-3.46	-2.76	5738454.57	567335.49
160	8.29	208.13	159.75	-126.93	-4.07	-3.08	5738453.96	567335.17
165	8.4	212.45	164.7	-131.88	-4.68	-3.47	5738453.34	567334.78
170	8.52	216.92	169.64	-136.82	-5.29	-3.87	5738452.73	567334.38
175	8.69	222.38	174.58	-141.76	-5.85	-4.37	5738452.17	567333.88
180	8.89	227.35	179.53	-146.71	-6.41	-4.88	5738451.62	567333.37
185	9.22	229.16	184.46	-151.64	-6.93	-5.48	5738451.09	567332.77
190	9.57	230.72	189.4	-156.58	-7.46	-6.09	5738450.57	567332.16
195	10	230.61	194.32	-161.5	-8	-6.76	5738450.02	567331.49
200	10.43	230.39	199.25	-166.43	-8.56	-7.43	5738449.46	567330.82
205	10.78	229.54	204.16	-171.34	-9.16	-8.14	5738448.86	567330.11
210	11.14	228.6	209.07	-176.25	-9.78	-8.86	5738448.25	567329.4
215	11.47	227.04	213.97	-181.15	-10.45	-9.58	5738447.58	567328.67
220	11.8	225.54	218.87	-186.05	-11.13	-10.31	5738446.89	567327.94
225	12.08	224.35	223.76	-190.94	-11.87	-11.04	5738446.15	567327.21

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
230	12.34	223.27	228.65	-195.83	-12.62	-11.77	5738445.4	567326.48
235	12.52	222.84	233.53	-200.71	-13.42	-12.51	5738444.61	567325.74
240	12.72	222.44	238.41	-205.59	-14.22	-13.25	5738443.81	567325
245	13.03	222.29	243.28	-210.46	-15.05	-14	5738442.98	567324.25
250	13.38	222.16	248.15	-215.33	-15.89	-14.77	5738442.14	567323.48
255	13.94	222.17	253.01	-220.19	-16.77	-15.57	5738441.25	567322.68
260	14.54	222.19	257.86	-225.04	-17.67	-16.39	5738440.35	567321.87
265	15.34	222.35	262.68	-229.86	-18.64	-17.27	5738439.38	567320.98
270	16.12	222.51	267.5	-234.68	-19.63	-18.17	5738438.4	567320.08
275	16.78	222.73	272.29	-239.47	-20.68	-19.14	5738437.34	567319.11
280	17.43	222.94	277.07	-244.25	-21.75	-20.13	5738436.28	567318.13
285	18	223.07	281.83	-249.01	-22.87	-21.18	5738435.15	567317.08
290	18.55	223.2	286.59	-253.77	-24	-22.24	5738434.02	567316.02
295	19.03	223.26	291.31	-258.49	-25.19	-23.35	5738432.84	567314.9
300	19.49	223.32	296.04	-263.22	-26.38	-24.47	5738431.65	567313.78
305	19.84	223.35	300.74	-267.92	-27.61	-25.63	5738430.42	567312.62
310	20.19	223.39	305.45	-272.63	-28.84	-26.8	5738429.18	567311.45
315	20.49	223.44	310.13	-277.31	-30.11	-28	5738427.91	567310.25
320	20.77	223.49	314.81	-281.99	-31.38	-29.2	5738426.64	567309.05
325	21	223.52	319.48	-286.66	-32.68	-30.44	5738425.34	567307.81
330	21.23	223.56	324.15	-291.33	-33.98	-31.67	5738424.04	567306.58
335	21.43	223.67	328.8	-295.98	-35.3	-32.93	5738422.72	567305.32
340	21.65	223.79	333.46	-300.64	-36.63	-34.2	5738421.4	567304.05
345	21.93	223.98	338.1	-305.28	-37.97	-35.49	5738420.06	567302.76
350	22.22	224.15	342.73	-309.91	-39.31	-36.79	5738418.71	567301.46
355	22.52	224.24	347.35	-314.53	-40.68	-38.12	5738417.34	567300.13
360	22.82	224.31	351.97	-319.15	-42.06	-39.46	5738415.97	567298.79
365	23.16	224.34	356.57	-323.75	-43.46	-40.83	5738414.56	567297.42
370	23.51	224.37	361.16	-328.34	-44.87	-42.21	5738413.15	567296.04
375	23.92	224.39	365.74	-332.92	-46.32	-43.63	5738411.71	567294.63
380	24.33	224.42	370.31	-337.49	-47.77	-45.05	5738410.26	567293.21
385	24.75	224.47	374.85	-342.03	-49.26	-46.51	5738408.77	567291.74
390	25.16	224.52	379.39	-346.57	-50.75	-47.98	5738407.27	567290.27
395	25.55	224.6	383.9	-351.08	-52.29	-49.49	5738405.74	567288.76
400	25.96	224.67	388.41	-355.59	-53.83	-51.01	5738404.2	567287.24
405	26.51	224.77	392.88	-360.06	-55.41	-52.58	5738402.62	567285.68
410	27.03	224.87	397.36	-364.54	-56.99	-54.15	5738401.03	567284.1
415	27.4	224.93	401.8	-368.98	-58.62	-55.77	5738399.4	567282.48
420	27.78	225	406.23	-373.41	-60.25	-57.4	5738397.77	567280.85
425	28.19	225.1	410.64	-377.82	-61.92	-59.07	5738396.11	567279.18
430	28.61	225.2	415.05	-382.23	-63.59	-60.75	5738394.44	567277.5
435	29.06	225.34	419.42	-386.6	-65.29	-62.47	5738392.73	567275.78
440	29.51	225.48	423.79	-390.97	-67	-64.2	5738391.02	567274.05
445	30.03	225.66	428.12	-395.3	-68.75	-65.99	5738389.28	567272.26
450	30.55	225.83	432.45	-399.63	-70.5	-67.78	5738387.52	567270.47
455	31.05	225.99	436.73	-403.91	-72.29	-69.63	5738385.74	567268.62
460	31.54	226.14	441.01	-408.19	-74.08	-71.49	5738383.94	567266.76
465	32.01	226.28	445.26	-412.44	-75.91	-73.4	5738382.11	567264.85
470	32.48	226.43	449.49	-416.67	-77.74	-75.32	5738380.28	567262.93
475	32.88	226.54	453.7	-420.88	-79.61	-77.29	5738378.41	567260.96
480	33.28	226.65	457.89	-425.07	-81.48	-79.26	5738376.55	567258.99
485	33.66	226.75	462.06	-429.24	-83.37	-81.28	5738374.65	567256.97
490	34.03	226.84	466.22	-433.4	-85.28	-83.3	5738372.75	567254.95
495	34.38	226.93	470.34	-437.52	-87.2	-85.36	5738370.82	567252.89
500	34.74	227.01	474.47	-441.65	-89.13	-87.42	5738368.89	567250.83
505	35.07	227.1	478.56	-445.74	-91.09	-89.53	5738366.94	567248.73
510	35.4	227.19	482.65	-449.83	-93.04	-91.63	5738364.98	567246.62
515	35.71	227.3	486.72	-453.9	-95.02	-93.78	5738363	567244.48



MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
520	36	227.42	490.77	-457.95	-97	-95.92	5738361.02	567242.33
525	36.25	227.54	494.81	-461.99	-99	-98.1	5738359.03	567240.15
530	36.49	227.66	498.84	-466.02	-100.99	-100.28	5738357.03	567237.97
535	36.72	227.78	502.85	-470.03	-103	-102.5	5738355.02	567235.76
540	36.94	227.91	506.85	-474.03	-105.01	-104.71	5738353.01	567233.54
545	37.15	228.05	510.84	-478.02	-107.03	-106.96	5738351	567231.3
550	37.37	228.2	514.82	-482	-109.05	-109.2	5738348.98	567229.05
555	37.67	228.4	518.78	-485.96	-111.07	-111.49	5738346.95	567226.77
560	37.98	228.61	522.74	-489.92	-113.1	-113.77	5738344.92	567224.48
565	38.34	228.84	526.66	-493.84	-115.14	-116.11	5738342.88	567222.15
570	38.72	229.07	530.58	-497.76	-117.19	-118.45	5738340.84	567219.81
575	39.15	229.32	534.46	-501.64	-119.24	-120.84	5738338.78	567217.42
580	39.61	229.56	538.34	-505.52	-121.3	-123.24	5738336.72	567215.02
585	40.17	229.81	542.16	-509.34	-123.38	-125.69	5738334.64	567212.56
590	40.75	230.05	545.98	-513.16	-125.47	-128.16	5738332.56	567210.09
595	41.39	230.27	549.73	-516.91	-127.58	-130.7	5738330.45	567207.55
600	42.02	230.48	553.48	-520.66	-129.69	-133.25	5738328.33	567205
605	42.65	230.66	557.16	-524.34	-131.84	-135.86	5738326.19	567202.39
610	43.27	230.84	560.83	-528.01	-133.99	-138.49	5738324.04	567199.76
615	43.83	230.96	564.44	-531.62	-136.16	-141.17	5738321.86	567197.08
620	44.39	231.07	568.05	-535.23	-138.35	-143.87	5738319.68	567194.39
625	44.87	231.16	571.59	-538.77	-140.56	-146.61	5738317.47	567191.64
630	45.35	231.24	575.13	-542.31	-142.77	-149.36	5738315.25	567188.89
635	45.82	231.33	578.62	-545.8	-145.01	-152.16	5738313.01	567186.1
640	46.28	231.41	582.1	-549.28	-147.25	-154.96	5738310.77	567183.29
645	46.74	231.5	585.53	-552.71	-149.52	-157.81	5738308.5	567180.45
650	47.21	231.59	588.96	-556.14	-151.79	-160.66	5738306.24	567177.59
655	47.69	231.7	592.33	-559.51	-154.08	-163.56	5738303.95	567174.7
660	48.17	231.82	595.69	-562.87	-156.37	-166.46	5738301.65	567171.79
665	48.66	231.93	598.99	-566.17	-158.68	-169.41	5738299.34	567168.84
670	49.16	232.05	602.29	-569.47	-161	-172.37	5738297.02	567165.88
675	49.68	232.17	605.53	-572.71	-163.34	-175.38	5738294.69	567162.87
680	50.2	232.29	608.76	-575.94	-165.68	-178.39	5738292.35	567159.86
685	50.76	232.42	611.93	-579.11	-168.04	-181.46	5738289.99	567156.79
690	51.32	232.55	615.09	-582.27	-170.4	-184.53	5738287.62	567153.72
695	51.86	232.67	618.18	-585.36	-172.78	-187.66	5738285.24	567150.6
700	52.4	232.8	621.26	-588.44	-175.17	-190.79	5738282.86	567147.47
705	52.89	232.92	624.29	-591.47	-177.57	-193.96	5738280.45	567144.29
710	53.38	233.03	627.3	-594.48	-179.98	-197.15	5738278.05	567141.1
715	53.79	233.13	630.26	-597.44	-182.4	-200.37	5738275.63	567137.88
720	54.19	233.22	633.21	-600.39	-184.82	-203.6	5738273.21	567134.65
725	54.46	233.31	636.12	-603.3	-187.25	-206.86	5738270.78	567131.39
730	54.72	233.39	639.02	-606.2	-189.68	-210.13	5738268.34	567128.13
735	54.91	233.47	641.9	-609.08	-192.11	-213.41	5738265.91	567124.84
740	55.08	233.55	644.77	-611.95	-194.55	-216.7	5738263.47	567121.55
745	55.19	233.63	647.63	-614.81	-196.98	-220	5738261.04	567118.25
750	55.29	233.71	650.48	-617.66	-199.42	-223.31	5738258.61	567114.94
755	55.33	233.79	653.32	-620.5	-201.85	-226.63	5738256.18	567111.62
760	55.36	233.87	656.17	-623.35	-204.27	-229.95	5738253.75	567108.31
765	55.37	233.95	659.01	-626.19	-206.7	-233.27	5738251.33	567104.98
770	55.37	234.02	661.85	-629.03	-209.12	-236.6	5738248.91	567101.65
775	55.35	234.08	664.69	-631.87	-211.53	-239.93	5738246.49	567098.32
780	55.34	234.15	667.54	-634.72	-213.94	-243.26	5738244.08	567094.99
785	55.33	234.19	670.38	-637.56	-216.35	-246.6	5738241.67	567091.66
790	55.32	234.22	673.22	-640.4	-218.76	-249.93	5738239.27	567088.32
795	55.33	234.25	676.07	-643.25	-221.16	-253.27	5738236.86	567084.98
800	55.33	234.27	678.91	-646.09	-223.56	-256.6	5738234.46	567081.65
805	55.36	234.29	681.76	-648.94	-225.96	-259.94	5738232.06	567078.31

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
810	55.4	234.31	684.6	-651.78	-228.36	-263.29	5738229.66	567074.97
815	55.45	234.34	687.43	-654.61	-230.76	-266.63	5738227.26	567071.62
820	55.5	234.36	690.27	-657.45	-233.17	-269.98	5738224.86	567068.27
825	55.56	234.37	693.1	-660.28	-235.57	-273.33	5738222.46	567064.92
830	55.63	234.37	695.92	-663.1	-237.97	-276.68	5738220.05	567061.57
835	55.71	234.34	698.74	-665.92	-240.38	-280.04	5738217.64	567058.22
840	55.79	234.29	701.56	-668.74	-242.79	-283.39	5738215.23	567054.86
845	55.89	234.18	704.36	-671.54	-245.21	-286.75	5738212.81	567051.5
850	55.99	234	707.17	-674.35	-247.64	-290.1	5738210.39	567048.15
855	56.12	233.43	709.95	-677.13	-250.11	-293.44	5738207.92	567044.81
860	56.23	232.82	712.74	-679.92	-252.59	-296.77	5738205.44	567041.48
865	56.26	231.9	715.52	-682.7	-255.14	-300.05	5738202.88	567038.21
870	56.27	230.96	718.3	-685.48	-257.72	-303.31	5738200.31	567034.94
875	56.14	229.83	721.08	-688.26	-260.39	-306.49	5738197.64	567031.76
880	55.96	228.7	723.87	-691.05	-263.07	-309.65	5738194.95	567028.6
885	55.47	227.49	726.7	-693.88	-265.85	-312.7	5738192.17	567025.55
890	54.94	226.29	729.54	-696.72	-268.64	-315.72	5738189.39	567022.53
895	54.14	225.16	732.47	-699.65	-271.49	-318.61	5738186.53	567019.64
900	53.33	224.05	735.4	-702.58	-274.35	-321.47	5738183.68	567016.78
905	52.55	223.12	738.43	-705.61	-277.24	-324.19	5738180.78	567014.06
910	51.79	222.22	741.48	-708.66	-280.14	-326.9	5738177.88	567011.35
915	51.16	221.55	744.61	-711.79	-283.05	-329.49	5738174.97	567008.76
920	50.59	220.94	747.75	-714.93	-285.97	-332.07	5738172.06	567006.18
925	50.46	220.74	750.93	-718.11	-288.89	-334.59	5738169.13	567003.66
930	50.35	220.56	754.11	-721.29	-291.81	-337.11	5738166.21	567001.14
935	50.33	220.48	757.3	-724.48	-294.74	-339.61	5738163.29	566998.65
940	50.32	220.42	760.5	-727.68	-297.66	-342.11	5738160.36	566996.15
945	50.38	220.44	763.69	-730.87	-300.6	-344.6	5738157.43	566993.65
950	50.43	220.46	766.87	-734.05	-303.53	-347.1	5738154.5	566991.15
955	50.46	220.5	770.06	-737.24	-306.46	-349.61	5738151.56	566988.65
960	50.48	220.54	773.24	-740.42	-309.39	-352.11	5738148.63	566986.14
965	50.48	220.59	776.42	-743.6	-312.32	-354.62	5738145.7	566983.63
970	50.48	220.64	779.6	-746.78	-315.25	-357.13	5738142.77	566981.12
975	50.46	220.69	782.79	-749.97	-318.17	-359.64	5738139.85	566978.61
980	50.44	220.75	785.97	-753.15	-321.1	-362.16	5738136.93	566976.1
985	50.4	220.81	789.16	-756.34	-324.01	-364.67	5738134.01	566973.58
990	50.37	220.88	792.34	-759.52	-326.93	-367.19	5738131.1	566971.06
995	50.33	220.96	795.53	-762.71	-329.84	-369.72	5738128.19	566968.54
1000	50.29	221.03	798.73	-765.91	-332.74	-372.24	5738125.28	566966.01
1005	50.24	221.11	801.92	-769.1	-335.64	-374.77	5738122.39	566963.49
1010	50.19	221.18	805.12	-772.3	-338.53	-377.29	5738119.49	566960.96
1015	50.13	221.27	808.33	-775.51	-341.42	-379.82	5738116.6	566958.43
1020	50.07	221.35	811.53	-778.71	-344.3	-382.36	5738113.72	566955.9
1025	50.03	221.43	814.74	-781.92	-347.18	-384.89	5738110.85	566953.36
1030	50	221.51	817.96	-785.14	-350.05	-387.43	5738107.97	566950.83
1035	49.98	221.59	821.17	-788.35	-352.91	-389.97	5738105.11	566948.28
1040	49.97	221.66	824.39	-791.57	-355.78	-392.51	5738102.25	566945.74
1045	49.99	221.74	827.6	-794.78	-358.64	-395.06	5738099.39	566943.19
1050	50	221.82	830.81	-797.99	-361.49	-397.61	5738096.53	566940.64
1055	50.02	221.9	834.03	-801.21	-364.35	-400.17	5738093.68	566938.08
1060	50.04	221.97	837.24	-804.42	-367.2	-402.73	5738090.83	566935.53
1065	50.07	222.03	840.45	-807.63	-370.04	-405.29	5738087.98	566932.96
1070	50.09	222.08	843.66	-810.84	-372.89	-407.86	5738085.13	566930.39
1075	50.12	222.04	846.86	-814.04	-375.74	-410.43	5738082.28	566927.82
1080	50.16	222.02	850.07	-817.25	-378.59	-413	5738079.43	566925.25
1085	50.2	222.15	853.27	-820.45	-381.44	-415.58	5738076.58	566922.68
1090	50.23	222.28	856.47	-823.65	-384.29	-418.16	5738073.74	566920.1
1095	50.26	222.32	859.67	-826.85	-387.13	-420.74	5738070.89	566917.51

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1100	50.28	222.37	862.87	-830.05	-389.97	-423.33	5738068.05	566914.92
1105	50.26	222.41	866.06	-833.24	-392.81	-425.92	5738065.21	566912.33
1110	50.24	222.46	869.26	-836.44	-395.65	-428.52	5738062.37	566909.73
1115	50.18	222.5	872.46	-839.64	-398.48	-431.11	5738059.54	566907.14
1120	50.13	222.54	875.66	-842.84	-401.31	-433.71	5738056.71	566904.55
1125	49.43	222.42	878.9	-846.08	-404.12	-436.28	5738053.9	566901.97
1130	47.51	222.04	882.19	-849.37	-406.91	-438.81	5738051.12	566899.44
1135	46.42	222.56	885.76	-852.94	-409.45	-441.22	5738048.57	566897.04
1140	45.35	223.08	889.33	-856.51	-411.99	-443.62	5738046.04	566894.63
1145	44.27	223.6	892.9	-860.08	-414.53	-446.03	5738043.5	566892.23
1150	43.19	224.12	896.47	-863.65	-417.07	-448.43	5738040.96	566889.82
1155	42.11	224.64	900.04	-867.22	-419.6	-450.84	5738038.42	566887.42
1160	41.08	225.12	903.7	-870.88	-422.04	-453.2	5738035.99	566885.06
1165	40.15	225.51	907.6	-874.78	-424.21	-455.45	5738033.82	566882.81
1170	39.21	225.91	911.5	-878.68	-426.38	-457.7	5738031.65	566880.55
1175	38.28	226.3	915.4	-882.58	-428.55	-459.95	5738029.48	566878.3
1180	37.35	226.69	919.3	-886.48	-430.72	-462.2	5738027.31	566876.05
1185	36.41	227.08	923.2	-890.38	-432.89	-464.45	5738025.14	566873.8
1190	36	227.2	927.21	-894.39	-434.93	-466.62	5738023.09	566871.63
1195	35.84	227.17	931.27	-898.45	-436.91	-468.76	5738021.11	566869.49
1200	35.68	227.15	935.34	-902.52	-438.9	-470.9	5738019.13	566867.36
1205	35.53	227.13	939.4	-906.58	-440.88	-473.03	5738017.15	566865.22
1210	35.37	227.11	943.46	-910.64	-442.86	-475.17	5738015.16	566863.08
1215	35.21	227.08	947.53	-914.71	-444.84	-477.31	5738013.18	566860.95
1220	34.97	227.08	951.64	-918.82	-446.78	-479.39	5738011.25	566858.87
1225	34.72	227.08	955.76	-922.94	-448.7	-481.46	5738009.32	566856.8
1230	34.46	227.08	959.89	-927.07	-450.63	-483.53	5738007.4	566854.72
1235	34.2	227.07	964.01	-931.19	-452.55	-485.6	5738005.47	566852.65
1240	33.94	227.07	968.13	-935.31	-454.48	-487.67	5738003.54	566850.58
1245	33.68	227.07	972.26	-939.44	-456.4	-489.73	5738001.62	566848.52
1250	33.2	227.04	976.48	-943.66	-458.22	-491.69	5737999.8	566846.56
1255	32.72	227.01	980.71	-947.89	-460.05	-493.64	5737997.98	566844.61
1260	32.24	226.99	984.93	-952.11	-461.87	-495.6	5737996.15	566842.65
1265	31.77	226.96	989.16	-956.34	-463.69	-497.55	5737994.33	566840.7
1270	31.29	226.93	993.38	-960.56	-465.52	-499.51	5737992.51	566838.74
1275	30.86	226.9	997.64	-964.82	-467.31	-501.43	5737990.71	566836.82
1280	30.58	226.87	1001.96	-969.14	-469.03	-503.26	5737989	566834.99
1285	30.3	226.85	1006.29	-973.47	-470.74	-505.09	5737987.28	566833.16
1290	30.01	226.82	1010.61	-977.79	-472.46	-506.92	5737985.56	566831.33
1295	29.73	226.79	1014.94	-982.12	-474.18	-508.75	5737983.85	566829.5
1300	29.45	226.76	1019.26	-986.44	-475.89	-510.58	5737982.13	566827.67
1305	29.01	226.95	1023.64	-990.82	-477.53	-512.35	5737980.49	566825.9
1310	28.43	227.33	1028.07	-995.25	-479.09	-514.07	5737978.94	566824.18
1315	27.85	227.71	1032.5	-999.68	-480.64	-515.79	5737977.38	566822.47
1320	27.28	228.09	1036.92	-1004.1	-482.2	-517.5	5737975.82	566820.75
1325	26.7	228.48	1041.35	-1008.53	-483.76	-519.22	5737974.26	566819.03
1330	26.12	228.86	1045.78	-1012.96	-485.32	-520.94	5737972.7	566817.31
1335	25.43	229.19	1050.32	-1017.5	-486.69	-522.53	5737971.34	566815.72
1340	24.71	229.51	1054.89	-1022.07	-488	-524.08	5737970.03	566814.18
1345	23.99	229.83	1059.46	-1026.64	-489.3	-525.62	5737968.72	566812.63
1350	23.27	230.15	1064.03	-1031.21	-490.61	-527.17	5737967.41	566811.08
1355	22.55	230.47	1068.6	-1035.78	-491.92	-528.72	5737966.1	566809.53
1360	21.84	230.79	1073.17	-1040.35	-493.22	-530.26	5737964.8	566807.99
1365	21.37	231.17	1077.85	-1045.03	-494.3	-531.63	5737963.72	566806.62
1370	20.91	231.55	1082.54	-1049.72	-495.39	-533.01	5737962.64	566805.24
1375	20.45	231.93	1087.22	-1054.4	-496.47	-534.39	5737961.55	566803.86
1380	19.98	232.3	1091.9	-1059.08	-497.55	-535.77	5737960.47	566802.49
1385	19.52	232.68	1096.58	-1063.76	-498.64	-537.14	5737959.39	566801.11

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1390	18.99	233.26	1101.29	-1068.47	-499.66	-538.48	5737958.37	566799.77
1395	18.25	234.41	1106.07	-1073.25	-500.48	-539.69	5737957.54	566798.56
1400	17.52	235.57	1110.85	-1078.03	-501.3	-540.91	5737956.72	566797.34
1405	16.78	236.73	1115.63	-1082.81	-502.13	-542.12	5737955.9	566796.13
1410	16.05	237.89	1120.4	-1087.58	-502.95	-543.34	5737955.07	566794.92
1415	15.32	239.05	1125.18	-1092.36	-503.77	-544.55	5737954.25	566793.7
1420	14.58	240.62	1130.02	-1097.2	-504.4	-545.64	5737953.63	566792.62
1425	13.83	242.45	1134.89	-1102.07	-504.89	-546.64	5737953.14	566791.62
1430	13.09	244.29	1139.76	-1106.94	-505.38	-547.63	5737952.65	566790.62
1435	12.35	246.12	1144.64	-1111.82	-505.87	-548.63	5737952.16	566789.62
1440	11.61	247.95	1149.51	-1116.69	-506.36	-549.63	5737951.67	566788.62
1445	10.86	249.79	1154.38	-1121.56	-506.85	-550.63	5737951.18	566787.62
1450	10.53	251.51	1159.3	-1126.48	-507.09	-551.47	5737950.93	566786.78
1455	10.22	253.23	1164.23	-1131.41	-507.32	-552.3	5737950.7	566785.95
1460	9.92	254.95	1169.16	-1136.34	-507.55	-553.12	5737950.47	566785.13
1465	9.62	256.67	1174.08	-1141.26	-507.78	-553.95	5737950.24	566784.3
1470	9.31	258.39	1179.01	-1146.19	-508.01	-554.78	5737950.01	566783.47
1475	9.01	260.02	1183.93	-1151.11	-508.23	-555.6	5737949.79	566782.65
1480	8.83	259.71	1188.88	-1156.06	-508.37	-556.33	5737949.65	566781.93
1485	8.65	259.4	1193.82	-1161	-508.51	-557.05	5737949.51	566781.2
1490	8.46	259.09	1198.77	-1165.95	-508.65	-557.78	5737949.37	566780.47
1495	8.28	258.79	1203.71	-1170.89	-508.79	-558.51	5737949.24	566779.75
1500	8.1	258.48	1208.66	-1175.84	-508.93	-559.23	5737949.1	566779.02
1505	7.96	257.9	1213.61	-1180.79	-509.08	-559.93	5737948.95	566778.32
1510	7.9	256.94	1218.56	-1185.74	-509.24	-560.59	5737948.78	566777.67
1515	7.83	255.98	1223.51	-1190.69	-509.41	-561.24	5737948.61	566777.01
1520	7.76	255.02	1228.47	-1195.65	-509.58	-561.9	5737948.44	566776.35
1525	7.7	254.05	1233.42	-1200.6	-509.75	-562.55	5737948.27	566775.7
1530	7.63	253.09	1238.38	-1205.56	-509.92	-563.21	5737948.1	566775.04
1535	7.6	253.14	1243.33	-1210.51	-510.09	-563.85	5737947.93	566774.4
1540	7.58	253.73	1248.29	-1215.47	-510.27	-564.49	5737947.75	566773.77
1545	7.56	254.31	1253.24	-1220.42	-510.45	-565.12	5737947.58	566773.13
1550	7.54	254.9	1258.2	-1225.38	-510.62	-565.75	5737947.4	566772.5
1555	7.52	255.48	1263.16	-1230.34	-510.8	-566.38	5737947.22	566771.87
1560	7.5	256.07	1268.11	-1235.29	-510.97	-567.02	5737947.05	566771.23
1565	7.53	255.85	1273.07	-1240.25	-511.14	-567.66	5737946.88	566770.6
1570	7.56	255.51	1278.03	-1245.21	-511.31	-568.29	5737946.71	566769.96
1575	7.59	255.17	1282.98	-1250.16	-511.48	-568.93	5737946.54	566769.32
1580	7.62	254.83	1287.94	-1255.12	-511.65	-569.57	5737946.37	566768.68
1585	7.66	254.5	1292.9	-1260.08	-511.82	-570.21	5737946.2	566768.04
1590	7.68	254.18	1297.85	-1265.03	-511.99	-570.85	5737946.03	566767.41
1595	7.66	253.94	1302.81	-1269.99	-512.18	-571.48	5737945.84	566766.77
1600	7.65	253.7	1307.76	-1274.94	-512.37	-572.12	5737945.65	566766.13
1605	7.64	253.45	1312.72	-1279.9	-512.56	-572.76	5737945.46	566765.49
1610	7.62	253.21	1317.67	-1284.85	-512.75	-573.4	5737945.28	566764.86
1615	7.61	252.97	1322.63	-1289.81	-512.94	-574.03	5737945.09	566764.22
1620	7.57	252.77	1327.59	-1294.77	-513.13	-574.66	5737944.9	566763.59
1625	7.52	252.62	1332.54	-1299.72	-513.32	-575.28	5737944.7	566762.97
1630	7.46	252.47	1337.5	-1304.68	-513.52	-575.9	5737944.51	566762.36
1635	7.41	252.31	1342.46	-1309.64	-513.71	-576.51	5737944.31	566761.74
1640	7.35	252.16	1347.42	-1314.6	-513.91	-577.13	5737944.11	566761.12
1645	7.3	252.01	1352.38	-1319.56	-514.1	-577.75	5737943.92	566760.5
1650	7.27	252.19	1357.34	-1324.52	-514.29	-578.35	5737943.73	566759.9
1655	7.25	252.48	1362.3	-1329.48	-514.48	-578.95	5737943.54	566759.3
1660	7.23	252.78	1367.26	-1334.44	-514.66	-579.56	5737943.36	566758.7
1665	7.22	253.08	1372.22	-1339.4	-514.85	-580.16	5737943.17	566758.1
1670	7.2	253.37	1377.18	-1344.36	-515.04	-580.76	5737942.99	566757.49
1675	7.18	253.67	1382.14	-1349.32	-515.22	-581.36	5737942.8	566756.89

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1680	7.13	253.96	1387.1	-1354.28	-515.39	-581.95	5737942.64	566756.3
1685	7.08	254.25	1392.06	-1359.24	-515.55	-582.54	5737942.47	566755.71
1690	7.03	254.54	1397.02	-1364.2	-515.71	-583.13	5737942.31	566755.12
1695	6.98	254.82	1401.99	-1369.17	-515.88	-583.72	5737942.14	566754.53
1700	6.93	255.11	1406.95	-1374.13	-516.04	-584.31	5737941.98	566753.94
1705	6.88	255.29	1411.91	-1379.09	-516.2	-584.89	5737941.82	566753.36
1710	6.84	255.14	1416.88	-1384.06	-516.36	-585.46	5737941.67	566752.79
1715	6.79	254.98	1421.84	-1389.02	-516.51	-586.03	5737941.51	566752.22
1720	6.75	254.83	1426.81	-1393.99	-516.66	-586.6	5737941.36	566751.65
1725	6.71	254.67	1431.77	-1398.95	-516.82	-587.17	5737941.21	566751.08
1730	6.67	254.52	1436.74	-1403.92	-516.97	-587.74	5737941.05	566750.51
1735	6.61	254.67	1441.7	-1408.88	-517.12	-588.3	5737940.91	566749.96
1740	6.54	255.35	1446.67	-1413.85	-517.25	-588.84	5737940.77	566749.41
1745	6.47	256.03	1451.64	-1418.82	-517.38	-589.38	5737940.64	566748.87
1750	6.39	256.72	1456.61	-1423.79	-517.52	-589.93	5737940.51	566748.32
1755	6.32	257.4	1461.58	-1428.76	-517.65	-590.47	5737940.38	566747.78
1760	6.24	258.08	1466.55	-1433.73	-517.78	-591.02	5737940.24	566747.24
1765	6.2	258.53	1471.52	-1438.7	-517.89	-591.55	5737940.13	566746.71
1770	6.18	258.87	1476.49	-1443.67	-517.99	-592.07	5737940.03	566746.18
1775	6.15	259.22	1481.46	-1448.64	-518.09	-592.6	5737939.93	566745.65
1780	6.13	259.56	1486.43	-1453.61	-518.19	-593.12	5737939.83	566745.13
1785	6.1	259.9	1491.4	-1458.58	-518.29	-593.65	5737939.73	566744.6
1790	6.07	260.24	1496.37	-1463.55	-518.39	-594.18	5737939.64	566744.08
1795	6.02	259.84	1501.35	-1468.53	-518.49	-594.68	5737939.53	566743.57
1800	5.97	259.27	1506.32	-1473.5	-518.59	-595.19	5737939.43	566743.06
1805	5.91	258.71	1511.29	-1478.47	-518.69	-595.69	5737939.33	566742.56
1810	5.86	258.15	1516.27	-1483.45	-518.79	-596.2	5737939.23	566742.05
1815	5.8	257.58	1521.24	-1488.42	-518.89	-596.7	5737939.13	566741.55
1820	5.75	257.03	1526.21	-1493.39	-518.99	-597.21	5737939.03	566741.05
1825	5.73	257.02	1531.19	-1498.37	-519.1	-597.69	5737938.92	566740.56
1830	5.7	257.02	1536.16	-1503.34	-519.21	-598.17	5737938.81	566740.08
1835	5.68	257.01	1541.14	-1508.32	-519.33	-598.65	5737938.7	566739.6
1840	5.66	257	1546.11	-1513.29	-519.44	-599.14	5737938.59	566739.11
1845	5.64	256.99	1551.09	-1518.27	-519.55	-599.62	5737938.47	566738.63
1850	5.62	257.01	1556.07	-1523.25	-519.66	-600.1	5737938.36	566738.15
1855	5.6	257.08	1561.04	-1528.22	-519.77	-600.57	5737938.26	566737.68
1860	5.58	257.14	1566.02	-1533.2	-519.87	-601.05	5737938.15	566737.21
1865	5.57	257.21	1571	-1538.18	-519.98	-601.52	5737938.04	566736.73
1870	5.55	257.27	1575.97	-1543.15	-520.09	-601.99	5737937.93	566736.26
1875	5.54	257.34	1580.95	-1548.13	-520.2	-602.47	5737937.83	566735.78
1880	5.53	257.3	1585.92	-1553.1	-520.31	-602.94	5737937.72	566735.31
1885	5.54	257.16	1590.9	-1558.08	-520.41	-603.41	5737937.61	566734.84
1890	5.54	257.03	1595.88	-1563.06	-520.52	-603.88	5737937.5	566734.37
1895	5.54	256.89	1600.85	-1568.03	-520.63	-604.35	5737937.39	566733.9
1900	5.55	256.75	1605.83	-1573.01	-520.74	-604.82	5737937.28	566733.43
1905	5.55	256.62	1610.81	-1577.99	-520.85	-605.29	5737937.17	566732.96
1910	5.53	256.72	1615.78	-1582.96	-520.96	-605.76	5737937.07	566732.5
1915	5.5	256.89	1620.76	-1587.94	-521.06	-606.22	5737936.96	566732.03
1920	5.47	257.05	1625.74	-1592.92	-521.17	-606.69	5737936.85	566731.57
1925	5.45	257.22	1630.72	-1597.9	-521.28	-607.15	5737936.75	566731.1
1930	5.42	257.39	1635.69	-1602.87	-521.38	-607.61	5737936.64	566730.64
1935	5.39	257.55	1640.67	-1607.85	-521.49	-608.08	5737936.53	566730.17
1940	5.36	257.5	1645.65	-1612.83	-521.59	-608.53	5737936.43	566729.72
1945	5.33	257.45	1650.63	-1617.81	-521.69	-608.98	5737936.33	566729.27
1950	5.31	257.4	1655.61	-1622.79	-521.79	-609.43	5737936.23	566728.82
1955	5.28	257.36	1660.59	-1627.77	-521.89	-609.89	5737936.13	566728.37
1960	5.25	257.31	1665.56	-1632.74	-521.99	-610.34	5737936.03	566727.91
1965	5.23	257.2	1670.54	-1637.72	-522.1	-610.79	5737935.93	566727.47

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1970	5.22	256.94	1675.52	-1642.7	-522.2	-611.23	5737935.82	566727.02
1975	5.21	256.67	1680.5	-1647.68	-522.31	-611.67	5737935.71	566726.58
1980	5.21	256.4	1685.48	-1652.66	-522.41	-612.11	5737935.61	566726.14
1985	5.2	256.13	1690.46	-1657.64	-522.52	-612.55	5737935.5	566725.7
1990	5.19	255.87	1695.44	-1662.62	-522.63	-612.99	5737935.4	566725.26
1995	5.18	255.62	1700.42	-1667.6	-522.74	-613.43	5737935.29	566724.82
2000	5.15	255.43	1705.4	-1672.58	-522.85	-613.86	5737935.17	566724.39
2005	5.12	255.24	1710.38	-1677.56	-522.96	-614.29	5737935.06	566723.96
2010	5.09	255.04	1715.36	-1682.54	-523.08	-614.72	5737934.94	566723.53
2015	5.06	254.85	1720.34	-1687.52	-523.19	-615.15	5737934.83	566723.1
2020	5.03	254.66	1725.32	-1692.5	-523.31	-615.58	5737934.72	566722.67
2025	5.04	254.57	1730.3	-1697.48	-523.42	-616.01	5737934.6	566722.24
2030	5.05	254.49	1735.28	-1702.46	-523.54	-616.43	5737934.48	566721.82
2035	5.06	254.41	1740.26	-1707.44	-523.66	-616.86	5737934.36	566721.39
2040	5.07	254.34	1745.24	-1712.42	-523.78	-617.28	5737934.24	566720.97
2045	5.08	254.26	1750.22	-1717.4	-523.9	-617.71	5737934.13	566720.54
2050	5.1	254.21	1755.2	-1722.38	-524.02	-618.13	5737934.01	566720.12
2055	5.15	254.28	1760.18	-1727.36	-524.14	-618.57	5737933.88	566719.68
2060	5.2	254.35	1765.16	-1732.34	-524.26	-619.01	5737933.76	566719.24
2065	5.24	254.42	1770.14	-1737.32	-524.38	-619.45	5737933.64	566718.8
2070	5.29	254.49	1775.12	-1742.3	-524.51	-619.89	5737933.52	566718.36
2075	5.34	254.56	1780.1	-1747.28	-524.63	-620.33	5737933.39	566717.92
2080	5.38	254.68	1785.08	-1752.26	-524.75	-620.78	5737933.27	566717.48
2085	5.4	254.85	1790.05	-1757.23	-524.87	-621.23	5737933.15	566717.02
2090	5.41	255.03	1795.03	-1762.21	-524.99	-621.69	5737933.03	566716.56
2095	5.43	255.21	1800.01	-1767.19	-525.12	-622.15	5737932.91	566716.11
2096.5	5.44	255.26	1801.5	-1768.68	-525.15	-622.28	5737932.87	566715.97
2097	5.44	255.28	1802	-1769.18	-525.16	-622.33	5737932.86	566715.92
2098	5.44	255.31	1803	-1770.18	-525.19	-622.42	5737932.83	566715.83
2099	5.44	255.35	1803.99	-1771.17	-525.21	-622.51	5737932.81	566715.74
2100	5.45	255.38	1804.99	-1772.17	-525.24	-622.6	5737932.79	566715.65
2101	5.45	255.42	1805.98	-1773.16	-525.26	-622.69	5737932.76	566715.56
2102	5.45	255.45	1806.98	-1774.16	-525.29	-622.79	5737932.74	566715.47
2103	5.46	255.49	1807.97	-1775.15	-525.31	-622.88	5737932.71	566715.38
2104	5.46	255.52	1808.97	-1776.15	-525.33	-622.97	5737932.69	566715.28
2105	5.47	255.56	1809.96	-1777.14	-525.36	-623.06	5737932.66	566715.19
2106	5.47	255.59	1810.96	-1778.14	-525.38	-623.15	5737932.64	566715.1
2107	5.47	255.56	1811.96	-1779.14	-525.41	-623.24	5737932.62	566715.01
2108	5.48	255.48	1812.95	-1780.13	-525.43	-623.34	5737932.59	566714.92
2109	5.48	255.4	1813.95	-1781.13	-525.46	-623.43	5737932.56	566714.82
2110	5.49	255.32	1814.94	-1782.12	-525.49	-623.52	5737932.54	566714.73
2111	5.49	255.23	1815.94	-1783.12	-525.51	-623.61	5737932.51	566714.64
2112	5.49	255.15	1816.93	-1784.11	-525.54	-623.71	5737932.49	566714.55
2113	5.5	255.07	1817.93	-1785.11	-525.56	-623.8	5737932.46	566714.45
2114	5.5	254.99	1818.92	-1786.1	-525.59	-623.89	5737932.43	566714.36
2115	5.51	254.91	1819.92	-1787.1	-525.61	-623.98	5737932.41	566714.27
2116	5.51	254.82	1820.91	-1788.09	-525.64	-624.08	5737932.38	566714.17
2117	5.51	254.74	1821.91	-1789.09	-525.67	-624.17	5737932.36	566714.08
2118	5.52	254.66	1822.9	-1790.08	-525.69	-624.26	5737932.33	566713.99
2119	5.52	254.58	1823.9	-1791.08	-525.72	-624.36	5737932.3	566713.9
2120	5.53	254.5	1824.9	-1792.08	-525.74	-624.45	5737932.28	566713.8
2121	5.53	254.41	1825.89	-1793.07	-525.77	-624.54	5737932.25	566713.71
2122	5.54	254.33	1826.89	-1794.07	-525.8	-624.63	5737932.23	566713.62
2123	5.54	254.25	1827.88	-1795.06	-525.82	-624.73	5737932.2	566713.52
2124	5.54	254.17	1828.88	-1796.06	-525.85	-624.82	5737932.18	566713.43
2125	5.55	254.09	1829.87	-1797.05	-525.87	-624.91	5737932.15	566713.34
2126	5.55	254	1830.87	-1798.05	-525.9	-625.01	5737932.12	566713.25
2127	5.56	253.92	1831.86	-1799.04	-525.93	-625.1	5737932.1	566713.15



MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2128	5.56	253.84	1832.86	-1800.04	-525.95	-625.19	5737932.07	566713.06
2129	5.56	253.76	1833.85	-1801.03	-525.98	-625.28	5737932.05	566712.97
2130	5.57	253.68	1834.85	-1802.03	-526	-625.38	5737932.02	566712.88
2131	5.57	253.59	1835.84	-1803.02	-526.03	-625.47	5737931.99	566712.78
2132	5.58	253.51	1836.84	-1804.02	-526.05	-625.56	5737931.97	566712.69
2133	5.58	253.43	1837.83	-1805.01	-526.08	-625.65	5737931.94	566712.6
2134	5.59	253.35	1838.83	-1806.01	-526.11	-625.75	5737931.92	566712.5
2135	5.59	253.27	1839.83	-1807.01	-526.13	-625.84	5737931.89	566712.41
2136	5.59	253.2	1840.82	-1808	-526.16	-625.93	5737931.86	566712.32
2137	5.59	253.14	1841.82	-1809	-526.19	-626.03	5737931.83	566712.23
2138	5.59	253.07	1842.81	-1809.99	-526.22	-626.12	5737931.8	566712.13
2139	5.59	253	1843.81	-1810.99	-526.25	-626.21	5737931.77	566712.04
2140	5.59	252.94	1844.8	-1811.98	-526.28	-626.3	5737931.74	566711.95
2141	5.59	252.87	1845.8	-1812.98	-526.31	-626.4	5737931.71	566711.85
2142	5.59	252.81	1846.79	-1813.97	-526.34	-626.49	5737931.68	566711.76
2143	5.59	252.74	1847.79	-1814.97	-526.37	-626.58	5737931.65	566711.67
2144	5.59	252.68	1848.78	-1815.96	-526.4	-626.68	5737931.62	566711.58
2145	5.59	252.61	1849.78	-1816.96	-526.43	-626.77	5737931.59	566711.48
2146	5.59	252.55	1850.77	-1817.95	-526.46	-626.86	5737931.56	566711.39
2147	5.59	252.48	1851.77	-1818.95	-526.49	-626.96	5737931.54	566711.3
2148	5.59	252.42	1852.76	-1819.94	-526.52	-627.05	5737931.51	566711.2
2149	5.59	252.35	1853.76	-1820.94	-526.55	-627.14	5737931.48	566711.11
2150	5.6	252.29	1854.75	-1821.93	-526.58	-627.23	5737931.45	566711.02
2151	5.6	252.22	1855.75	-1822.93	-526.61	-627.33	5737931.42	566710.93
2152	5.6	252.16	1856.74	-1823.92	-526.64	-627.42	5737931.39	566710.83
2153	5.6	252.09	1857.74	-1824.92	-526.67	-627.51	5737931.36	566710.74
2154	5.6	252.02	1858.74	-1825.92	-526.69	-627.61	5737931.33	566710.65
2155	5.6	251.96	1859.73	-1826.91	-526.72	-627.7	5737931.3	566710.55
2156	5.6	251.89	1860.73	-1827.91	-526.75	-627.79	5737931.27	566710.46
2157	5.6	251.83	1861.72	-1828.9	-526.78	-627.88	5737931.24	566710.37
2158	5.6	251.76	1862.72	-1829.9	-526.81	-627.98	5737931.21	566710.27
2159	5.6	251.7	1863.71	-1830.89	-526.84	-628.07	5737931.18	566710.18
2160	5.6	251.63	1864.71	-1831.89	-526.87	-628.16	5737931.15	566710.09
2161	5.6	251.57	1865.7	-1832.88	-526.9	-628.26	5737931.12	566710
2162	5.6	251.5	1866.7	-1833.88	-526.93	-628.35	5737931.09	566709.9
2163	5.6	251.44	1867.69	-1834.87	-526.96	-628.44	5737931.06	566709.81
2164	5.6	251.38	1868.69	-1835.87	-526.99	-628.53	5737931.03	566709.72
2165	5.62	251.36	1869.68	-1836.86	-527.02	-628.63	5737931	566709.62
2166	5.64	251.35	1870.68	-1837.86	-527.06	-628.73	5737930.97	566709.52
2167	5.65	251.33	1871.67	-1838.85	-527.09	-628.82	5737930.93	566709.43
2168	5.67	251.32	1872.67	-1839.85	-527.12	-628.92	5737930.9	566709.33
2169	5.68	251.31	1873.66	-1840.84	-527.16	-629.02	5737930.87	566709.24
2170	5.7	251.29	1874.66	-1841.84	-527.19	-629.11	5737930.84	566709.14
2171	5.72	251.28	1875.65	-1842.83	-527.22	-629.21	5737930.8	566709.04
2172	5.73	251.26	1876.65	-1843.83	-527.25	-629.31	5737930.77	566708.95
2173	5.75	251.25	1877.64	-1844.82	-527.29	-629.4	5737930.74	566708.85
2174	5.77	251.23	1878.64	-1845.82	-527.32	-629.5	5737930.7	566708.75
2175	5.78	251.22	1879.63	-1846.81	-527.35	-629.59	5737930.67	566708.66
2176	5.8	251.2	1880.62	-1847.8	-527.39	-629.69	5737930.64	566708.56
2177	5.82	251.19	1881.62	-1848.8	-527.42	-629.79	5737930.61	566708.47
2178	5.83	251.18	1882.61	-1849.79	-527.45	-629.88	5737930.57	566708.37
2179	5.85	251.16	1883.61	-1850.79	-527.48	-629.98	5737930.54	566708.27
2180	5.87	251.15	1884.6	-1851.78	-527.52	-630.08	5737930.51	566708.18
2181	5.88	251.13	1885.6	-1852.78	-527.55	-630.17	5737930.47	566708.08
2182	5.9	251.12	1886.59	-1853.77	-527.58	-630.27	5737930.44	566707.98
2183	5.92	251.1	1887.59	-1854.77	-527.62	-630.36	5737930.41	566707.89
2184	5.93	251.09	1888.58	-1855.76	-527.65	-630.46	5737930.38	566707.79
2185	5.95	251.07	1889.58	-1856.76	-527.68	-630.56	5737930.34	566707.69

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2186	5.97	251.06	1890.57	-1857.75	-527.71	-630.65	5737930.31	566707.6
2187	5.98	251.05	1891.57	-1858.75	-527.75	-630.75	5737930.28	566707.5
2188	6	251.03	1892.56	-1859.74	-527.78	-630.85	5737930.24	566707.41
2189	6.02	251.02	1893.56	-1860.74	-527.81	-630.94	5737930.21	566707.31
2190	6.03	251	1894.55	-1861.73	-527.85	-631.04	5737930.18	566707.21
2191	6.05	250.99	1895.55	-1862.73	-527.88	-631.14	5737930.15	566707.12
2192	6.07	250.97	1896.54	-1863.72	-527.91	-631.23	5737930.11	566707.02
2193	6.08	250.95	1897.54	-1864.72	-527.94	-631.33	5737930.08	566706.92
2194	6.09	250.9	1898.53	-1865.71	-527.98	-631.43	5737930.04	566706.82
2195	6.09	250.84	1899.52	-1866.7	-528.02	-631.53	5737930.01	566706.72
2196	6.1	250.79	1900.52	-1867.7	-528.05	-631.63	5737929.97	566706.62
2197	6.1	250.73	1901.51	-1868.69	-528.09	-631.73	5737929.93	566706.52
2198	6.11	250.68	1902.51	-1869.69	-528.13	-631.83	5737929.9	566706.42
2199	6.11	250.62	1903.5	-1870.68	-528.16	-631.93	5737929.86	566706.32
2200	6.12	250.56	1904.5	-1871.68	-528.2	-632.03	5737929.82	566706.22
2201	6.12	250.51	1905.49	-1872.67	-528.24	-632.14	5737929.79	566706.12
2202	6.13	250.45	1906.48	-1873.66	-528.27	-632.24	5737929.75	566706.02
2203	6.13	250.4	1907.48	-1874.66	-528.31	-632.34	5737929.71	566705.92
2204	6.14	250.34	1908.47	-1875.65	-528.34	-632.44	5737929.68	566705.81
2205	6.14	250.29	1909.47	-1876.65	-528.38	-632.54	5737929.64	566705.71
2206	6.15	250.23	1910.46	-1877.64	-528.42	-632.64	5737929.61	566705.61
2207	6.15	250.17	1911.46	-1878.64	-528.45	-632.74	5737929.57	566705.51
2208	6.16	250.12	1912.45	-1879.63	-528.49	-632.84	5737929.53	566705.41
2209	6.16	250.06	1913.44	-1880.62	-528.53	-632.94	5737929.5	566705.31
2210	6.17	250.01	1914.44	-1881.62	-528.56	-633.04	5737929.46	566705.21
2211	6.17	249.95	1915.43	-1882.61	-528.6	-633.14	5737929.42	566705.11
2212	6.18	249.9	1916.43	-1883.61	-528.64	-633.24	5737929.39	566705.01
2213	6.18	249.84	1917.42	-1884.6	-528.67	-633.35	5737929.35	566704.91
2214	6.19	249.78	1918.42	-1885.6	-528.71	-633.45	5737929.31	566704.81
2215	6.2	249.73	1919.41	-1886.59	-528.74	-633.55	5737929.28	566704.71
2216	6.2	249.67	1920.4	-1887.58	-528.78	-633.65	5737929.24	566704.6
2217	6.21	249.62	1921.4	-1888.58	-528.82	-633.75	5737929.21	566704.5
2218	6.21	249.56	1922.39	-1889.57	-528.85	-633.85	5737929.17	566704.4
2219	6.22	249.51	1923.39	-1890.57	-528.89	-633.95	5737929.13	566704.3
2220	6.22	249.45	1924.38	-1891.56	-528.93	-634.05	5737929.1	566704.2
2221	6.23	249.39	1925.38	-1892.56	-528.96	-634.15	5737929.06	566704.1
2222	6.23	249.37	1926.37	-1893.55	-529	-634.25	5737929.02	566704
2223	6.24	249.39	1927.36	-1894.54	-529.04	-634.36	5737928.98	566703.9
2224	6.25	249.41	1928.36	-1895.54	-529.08	-634.46	5737928.95	566703.79
2225	6.25	249.43	1929.35	-1896.53	-529.12	-634.56	5737928.91	566703.69
2226	6.26	249.45	1930.35	-1897.53	-529.15	-634.67	5737928.87	566703.59
2227	6.27	249.47	1931.34	-1898.52	-529.19	-634.77	5737928.83	566703.48
2228	6.27	249.49	1932.33	-1899.51	-529.23	-634.87	5737928.79	566703.38
2229	6.28	249.51	1933.33	-1900.51	-529.27	-634.98	5737928.75	566703.28
2230	6.29	249.53	1934.32	-1901.5	-529.31	-635.08	5737928.72	566703.17
2231	6.29	249.55	1935.31	-1902.49	-529.35	-635.18	5737928.68	566703.07
2232	6.3	249.57	1936.31	-1903.49	-529.38	-635.29	5737928.64	566702.97
2233	6.31	249.59	1937.3	-1904.48	-529.42	-635.39	5737928.6	566702.86
2234	6.31	249.61	1938.3	-1905.48	-529.46	-635.49	5737928.56	566702.76
2235	6.32	249.63	1939.29	-1906.47	-529.5	-635.6	5737928.52	566702.66
2236	6.33	249.65	1940.28	-1907.46	-529.54	-635.7	5737928.49	566702.55
2237	6.33	249.67	1941.28	-1908.46	-529.58	-635.8	5737928.45	566702.45
2238	6.34	249.69	1942.27	-1909.45	-529.61	-635.91	5737928.41	566702.35
2239	6.34	249.71	1943.27	-1910.45	-529.65	-636.01	5737928.37	566702.24
2240	6.35	249.73	1944.26	-1911.44	-529.69	-636.11	5737928.33	566702.14
2241	6.36	249.75	1945.25	-1912.43	-529.73	-636.22	5737928.29	566702.04
2242	6.36	249.77	1946.25	-1913.43	-529.77	-636.32	5737928.26	566701.93
2243	6.37	249.79	1947.24	-1914.42	-529.81	-636.42	5737928.22	566701.83

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2244	6.38	249.81	1948.24	-1915.42	-529.84	-636.53	5737928.18	566701.73
2245	6.38	249.83	1949.23	-1916.41	-529.88	-636.63	5737928.14	566701.62
2246	6.39	249.85	1950.22	-1917.4	-529.92	-636.73	5737928.1	566701.52
2247	6.4	249.87	1951.22	-1918.4	-529.96	-636.84	5737928.06	566701.42
2248	6.4	249.89	1952.21	-1919.39	-530	-636.94	5737928.03	566701.31
2249	6.41	249.91	1953.21	-1920.39	-530.04	-637.04	5737927.99	566701.21
2250	6.42	249.93	1954.2	-1921.38	-530.07	-637.15	5737927.95	566701.11
2251	6.42	249.93	1955.19	-1922.37	-530.11	-637.25	5737927.91	566701
2252	6.43	249.91	1956.19	-1923.37	-530.15	-637.36	5737927.87	566700.9
2253	6.43	249.89	1957.18	-1924.36	-530.19	-637.46	5737927.83	566700.79
2254	6.44	249.86	1958.17	-1925.35	-530.23	-637.57	5737927.79	566700.68
2255	6.45	249.84	1959.17	-1926.35	-530.27	-637.68	5737927.75	566700.58
2256	6.45	249.82	1960.16	-1927.34	-530.31	-637.78	5737927.71	566700.47
2257	6.46	249.8	1961.15	-1928.33	-530.35	-637.89	5737927.67	566700.36
2258	6.46	249.78	1962.15	-1929.33	-530.39	-637.99	5737927.63	566700.26
2259	6.47	249.76	1963.14	-1930.32	-530.43	-638.1	5737927.6	566700.15
2260	6.47	249.74	1964.13	-1931.31	-530.47	-638.21	5737927.56	566700.05
2261	6.48	249.72	1965.13	-1932.31	-530.51	-638.31	5737927.52	566699.94
2262	6.49	249.7	1966.12	-1933.3	-530.55	-638.42	5737927.48	566699.83
2263	6.49	249.68	1967.12	-1934.3	-530.59	-638.52	5737927.44	566699.73
2264	6.5	249.66	1968.11	-1935.29	-530.62	-638.63	5737927.4	566699.62
2265	6.5	249.64	1969.1	-1936.28	-530.66	-638.74	5737927.36	566699.52
2266	6.51	249.62	1970.1	-1937.28	-530.7	-638.84	5737927.32	566699.41
2267	6.51	249.6	1971.09	-1938.27	-530.74	-638.95	5737927.28	566699.3
2268	6.52	249.58	1972.08	-1939.26	-530.78	-639.05	5737927.24	566699.2
2269	6.52	249.56	1973.08	-1940.26	-530.82	-639.16	5737927.2	566699.09
2270	6.53	249.54	1974.07	-1941.25	-530.86	-639.27	5737927.16	566698.98
2271	6.54	249.51	1975.06	-1942.24	-530.9	-639.37	5737927.12	566698.88
2272	6.54	249.49	1976.06	-1943.24	-530.94	-639.48	5737927.08	566698.77
2273	6.55	249.47	1977.05	-1944.23	-530.98	-639.59	5737927.04	566698.67
2274	6.55	249.45	1978.05	-1945.23	-531.02	-639.69	5737927	566698.56
2275	6.56	249.43	1979.04	-1946.22	-531.06	-639.8	5737926.97	566698.45
2276	6.56	249.41	1980.03	-1947.21	-531.1	-639.9	5737926.93	566698.35
2277	6.57	249.39	1981.03	-1948.21	-531.14	-640.01	5737926.89	566698.24
2278	6.57	249.37	1982.02	-1949.2	-531.18	-640.12	5737926.85	566698.14
2279	6.58	249.35	1983.01	-1950.19	-531.22	-640.22	5737926.81	566698.03
2280	6.57	249.31	1984.01	-1951.19	-531.26	-640.33	5737926.77	566697.92
2281	6.57	249.27	1985	-1952.18	-531.3	-640.43	5737926.73	566697.82
2282	6.56	249.24	1985.99	-1953.17	-531.34	-640.54	5737926.69	566697.71
2283	6.55	249.2	1986.99	-1954.17	-531.38	-640.64	5737926.64	566697.61
2284	6.55	249.16	1987.98	-1955.16	-531.42	-640.75	5737926.6	566697.5
2285	6.54	249.12	1988.97	-1956.15	-531.46	-640.86	5737926.56	566697.4
2286	6.54	249.09	1989.97	-1957.15	-531.5	-640.96	5737926.52	566697.29
2287	6.53	249.05	1990.96	-1958.14	-531.54	-641.07	5737926.48	566697.19
2288	6.52	249.01	1991.95	-1959.13	-531.58	-641.17	5737926.44	566697.08
2289	6.52	248.97	1992.95	-1960.13	-531.62	-641.28	5737926.4	566696.97
2290	6.51	248.94	1993.94	-1961.12	-531.66	-641.38	5737926.36	566696.87
2291	6.5	248.9	1994.94	-1962.12	-531.7	-641.49	5737926.32	566696.76
2292	6.5	248.86	1995.93	-1963.11	-531.75	-641.59	5737926.28	566696.66
2293	6.49	248.82	1996.92	-1964.1	-531.79	-641.7	5737926.24	566696.55
2294	6.48	248.79	1997.92	-1965.1	-531.83	-641.8	5737926.2	566696.45
2295	6.48	248.75	1998.91	-1966.09	-531.87	-641.91	5737926.16	566696.34
2296	6.47	248.71	1999.9	-1967.08	-531.91	-642.02	5737926.11	566696.24
2297	6.47	248.67	2000.9	-1968.08	-531.95	-642.12	5737926.07	566696.13
2298	6.46	248.63	2001.89	-1969.07	-531.99	-642.23	5737926.03	566696.03
2299	6.45	248.6	2002.88	-1970.06	-532.03	-642.33	5737925.99	566695.92
2300	6.45	248.56	2003.88	-1971.06	-532.07	-642.44	5737925.95	566695.81
2301	6.44	248.52	2004.87	-1972.05	-532.11	-642.54	5737925.91	566695.71

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2302	6.43	248.48	2005.86	-1973.04	-532.15	-642.65	5737925.87	566695.6
2303	6.43	248.45	2006.86	-1974.04	-532.19	-642.75	5737925.83	566695.5
2304	6.42	248.41	2007.85	-1975.03	-532.24	-642.86	5737925.79	566695.39
2305	6.42	248.37	2008.85	-1976.03	-532.28	-642.96	5737925.75	566695.29
2306	6.41	248.34	2009.84	-1977.02	-532.32	-643.07	5737925.71	566695.18
2307	6.41	248.32	2010.83	-1978.01	-532.36	-643.17	5737925.66	566695.08
2308	6.4	248.3	2011.83	-1979.01	-532.4	-643.28	5737925.62	566694.98
2309	6.4	248.29	2012.82	-1980	-532.44	-643.38	5737925.58	566694.87
2310	6.4	248.27	2013.81	-1980.99	-532.48	-643.48	5737925.54	566694.77
2311	6.39	248.25	2014.81	-1981.99	-532.52	-643.59	5737925.5	566694.67
2312	6.39	248.24	2015.8	-1982.98	-532.56	-643.69	5737925.46	566694.56
2313	6.39	248.22	2016.8	-1983.98	-532.61	-643.79	5737925.42	566694.46
2314	6.39	248.2	2017.79	-1984.97	-532.65	-643.9	5737925.38	566694.36
2315	6.38	248.19	2018.78	-1985.96	-532.69	-644	5737925.33	566694.25
2316	6.38	248.17	2019.78	-1986.96	-532.73	-644.1	5737925.29	566694.15
2317	6.38	248.15	2020.77	-1987.95	-532.77	-644.2	5737925.25	566694.05
2318	6.37	248.13	2021.77	-1988.95	-532.81	-644.31	5737925.21	566693.94
2319	6.37	248.12	2022.76	-1989.94	-532.85	-644.41	5737925.17	566693.84
2320	6.37	248.1	2023.75	-1990.93	-532.9	-644.51	5737925.13	566693.74
2321	6.36	248.08	2024.75	-1991.93	-532.94	-644.62	5737925.09	566693.63
2322	6.36	248.07	2025.74	-1992.92	-532.98	-644.72	5737925.05	566693.53
2323	6.36	248.05	2026.73	-1993.91	-533.02	-644.82	5737925	566693.43
2324	6.36	248.03	2027.73	-1994.91	-533.06	-644.93	5737924.96	566693.32
2325	6.35	248.02	2028.72	-1995.9	-533.1	-645.03	5737924.92	566693.22
2326	6.35	248	2029.72	-1996.9	-533.14	-645.13	5737924.88	566693.12

**APPENDIX 2a**

**BREAM A20A**

**Petrophysics Evaluation Summary**

**Esso Australia Pty Ltd.**  
**Exploration Department**

**Bream A20A**  
**Petrophysics Report**

**Petrophysicist: B.L. Rayner**  
**March 2006**



# Bream A20A Petrophysics Report

## INTRODUCTION

Bream A20A is a directional well which was designed to capture- N-1 oil reserves from a local structural crest at a central location within the Bream A field.

Bream A20A was spudded from the 10<sup>3</sup>/<sub>4</sub>" casing shoe at 1123.0 mMDRT and drilled to a Total Depth of 2326.0 mMDRT (2029.7 mTVDRT) in an 8<sup>1</sup>/<sub>2</sub>" production hole.

LWD GR and D&I data were acquired using Schlumberger Drilling & Measurements PowerPulse while drilling from 1123 mMDRT to 2326 mMDRT.

After reaching TD, the well was logged up in memory mode with Precision Energy Service's shuttle on drill pipe from 2309 mMDRT to 1123 mMDRT.

The Precision logs were depth matched to the Schlumberger LWD GR log and analysed for porosity, water saturation and net pay over the interval 2170 - 2290 mMDRT.

Note that all depth quoted in this report are logged mMDRT unless otherwise specified.

## DATA

Data from the following logging surveys were used in the interpretation:

Survey/Log	Suite	Company	Top (m MDRT)	Bottom (m MDRT)
LWD-GR	2	Schlumberger	1123	2326
Dual Laterolog (DDL, DSL), Gamma Ray (GRGC), Photo Density (PDPE, DEN), Caliper (CLDC), Compensated Neutron (NPRL) and Compensated Sonic (DT)	1	Precision	1123	2309

### Deviation

The well deviation over the reservoir interval was 6.35° towards an average azimuth of 248°.

### Mud Data

Mud Type: KCl/Glycol/PHPA  
Mud Weight: 10.1 ppg  
Rm: 0.116 @ 25 °C  
Rmf: 0.107 @ 25 °C  
Rmc: 0.211 @ 25 °C  
KCL 8%  
BHT: 77.9 °C (as measured by the Precision tools)

### Hole Size

1123 - 2326 mMDRT 8 ½ inches

### Data Acquisition & Log Quality

Good quality Schlumberger D&M LWD data and Precision shuttle data were acquired without incident.

### Data Processing

The LWD-GR is the primary depth reference for this well and all the shuttle logs have been depth matched to the LWD-GR.

As the shuttle GR 1<sup>st</sup> reading (2291 mMDRT) was shallow to the LWD GR 1<sup>st</sup> reading (2306 mMDRT) a complete GR for the well was generated by depth splicing the two GR

## Bream A20A Petrophysics Report

The resistivity logs (DDL & DSL) and the bulk density logs (DEN & related curves) were depth matched to the composite GR curve. The neutron logs (NPRL & related curves) and the sonic logs (DT-35 & related curves) were depth matched to the GR depth matched DEN curve.

The PDPE showed a sinusoidal habit that parallels the CLDC curve. The sinuosity is thought to reflect the rugosity rather than lithology. The PDPE was smoothed and shifted in order to damp this rugosity effect before U was generated for lithology determination.

### INTERPRETATION

#### Logs Used

The primary logs used in the interpretation were the depth matched DDL (deep resistivity), GRGC (composite gamma from GRGC and the basal LWD-GR), DEN (bulk density), PDPE (photo-electric effect) and NPRL (thermal neutron porosity). In addition coal intervals were identified using a coal flag (Flag\_coal). Hydrocarbon types were denoted using a hydrocarbon flag (Flag\_rhoH). A temperature log was created using the following data:

Depth (mMDRT)	Temperature (deg. C)
93	10
2323	88

The temperature at depth 93 mMDRT represents the temperature of the sea-bed and the temperature at 2309 mMDRT (first reading of the Precision logs) is the estimated formation temperature –BHT +10 deg.

Several radioactive reservoir sands are present in the interval 2203 – 2241 mMDRT and the GR proved to be a poor clay indicator across this interval. The approach taken here to adequately characterise the clay content was to use both the U and GR measurements below 2241 mMDRT, but only the U measurement over the interval 2203 - 2241mMDRT.

#### Formation Water Salinity

R<sub>wa</sub> analysis using a = 1, m = 2 and n = 2 indicates clean water sands have an apparent formation water salinity of 20,000 ppm NaCl equivalent throughout the zone of interest.

#### Hydrocarbon Type Identification

A combination of resistivity, density-neutron logs, total Near-Far neutron counts, mud log shows and production from nearby Bream A wells were used to determine hydrocarbon types present in the reservoirs. The following table lists the determination made using this process:

Zone	Top Depth mMD	Bottom Depth mMD	Hydrocarbon Type
N1_Cob_Grn_Gas	2203.6	2233.5	Gas Bearing
N1_Cob_Mid_Oil	2233.5	2236.3	Oil Bearing
N1_Cob_Low_Oil	2237.3	2240.3	Oil Bearing
N1_Cob_Low_Resid	2240.3	2244.9	Residual Oil & Gas
N1_Pin_Low_Resid	2252.0	2257.0	Residual Oil & Gas
N1_Mau_Water	2257.0	2277.2	Water Bearing
N1_Cyn_Water	2280.4	2289.5	Water Bearing

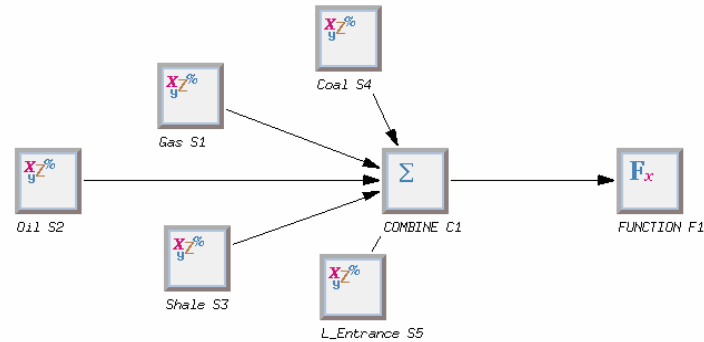
#### Shale Volume, Porosity and Water Saturation

Schlumberger's Geoframe ELAN+ module was used to determine mineral volumes, total porosity, effective porosity and effective saturation. The details of the models are illustrated in the figures and tables below.

# Bream A20A Petrophysics Report

## ELAN+ MODEL

### Elan+ Model and Module Configuration



### ELAN Input Channels

	Compound Name Spec	BREAM A20A
TEMP_CH	TEMP;*	TEMP TEMP@ELANInputLogs;8 .V2 [A1464261]
RHOB_IFAC_CH	IFRH;*	
NPHI_IFAC_CH	INPH;*	
RHOB_CH	DEN:BPB;*	DEN DEN@ELANInputLogs;15 .V2 .WELLEDIT [A1464262]
NPHI_CH	NPRL:BPB;*	NPRL NPRL@ELANInputLogs;13 .V2 [A1464281]
U_CH	U;*	U U@ELANInputLogs;9 .V2 [A1464289]
CUDC_CH/RT_CH	DDLL:BPB;*	DDLL DDLL@ELANInputLogs;13 .V2 [A1464271]
GR_CH	GR;*	GR GR@ELANInputLogs;8 .V2 [A1464268]
PRB1_CH	FLAG_RHOH;*	FLAG_RHOH FLAG_RHOH@ELANInputLogs;8 .V2 [A1464265]
PRB2_CH	DEPT;*	DEPT DEPT@ELANInputLogs;8 .V2 [A1464265]
PRB3_CH	PRB3;*	
PRB4_CH	FLAG_COAL;*	FLAG_COAL FLAG_COAL@ELANInputLogs;12 .V2 [A1464265]
PRB5_CH	PRB5;*	
M_CH	MXP;*	
N_CH	SXP;*	

### ELAN Global Parameters

Reference Index	MD
Processing Interval	2170.0000(m) To 2290.6904(m)
Sampling Rate	0.3281(m)
Uncertainty Channel	FALSE
Clay Input	DRY

# Bream A20A Petrophysics Report

Special Fluids

IMMOVABLE\_HYDROCARBON

## ELAN Zone Definition

Name	Bottom To Top
N1_useGR	2310.0029(m) To 2241.0000(m)
N1_usePE	2241.0000(m) To 2170.0000(m)

## ELAN Process Definition

Process	SOLVE1 "Gas"
Equations	RHOB NPHI U CUDC_DWA GR CT1
Volumes	QUAR ORTH ILLI XWAT UWAT XGAS UGAS
Constraint Zones	Bottom Top
UNDEFINED	2310.0029(m ) 2170.0000(m )
Constraints Applied	
UNDEFINED	- WaterBaseMud_SXO_gt_SW
UNDEFINED	- IrreducibleXWater
UNDEFINED	- IrreducibleUWater

Process	SOLVE2 "Oil"
Equations	RHOB NPHI U CUDC_DWA GR CT2
Volumes	QUAR ORTH ILLI XWAT UWAT XOIL UOIL
User Constraints	constraint(maxDolomite, DOLO<0)
Constraint Zones	Bottom Top
UNDEFINED	2310.0029(m ) 2170.0000(m )
Constraints Applied	
UNDEFINED	- IrreducibleXWater
UNDEFINED	- IrreducibleUWater
UNDEFINED	- WaterBaseMud_SXO_gt_SW

Process	SOLVE3 "Shale"
Equations	RHOB NPHI CUDC_DWA GR
Volumes	QUAR ILLI XWAT UWAT
Constraint Zones	Bottom Top
UNDEFINED	2310.0029(m ) 2170.0000(m )

Process	SOLVE4 "Coal"
Equations	RHOB
Volumes	COAL
Constraint Zones	Bottom Top
UNDEFINED	2310.0029(m ) 2170.0000(m )

Process	SOLVE5 "L_Entrance"
Equations	RHOB
Volumes	ILLI
Constraint Zones	Bottom Top
UNDEFINED	2310.0029(m ) 2170.0000(m )

Process	COMBINE 1 "COMBINE"
Order	SOL.2 SOL.1 SOL.3 SOL.4 SOL.5

## Bream A20A Petrophysics Report

Combine Method

"Coarse Clast" 7578.7500 (m ) Internal Average

"Gurnard " 7229.6919 (m ) Sol.5

Probability Functions

probability(SOL.4, PRB4\_CH)

prob3 = linear(ILLI\_VOL.SOL.3, 0.3, 0, 0.5, 1)

probability(SOL.3, prob3)

prob1 = if (PRB1\_CH <=0.25, 1, 0)

probability(SOL.1, prob1)

Process           FUNCTION 1 "FUNCTION"

Outputs           VCL   SXWI   SWT   SUWI   PIGN   PHIT

User-defined Function/n   swt\_cmp=if((PRB4\_CH > 0),1,(UWAT\_VOL + XBWA\_VOL)/(UWAT\_VOL + XBWA\_VOL + UOIL\_VOL + UGAS\_VOL))

output(SWT, swt\_cmp)

### ELAN Different Parameters

Parameters	N1_useGR	N1_usePE		
n*****	*****	*****	*****	*****
CXDC_XWAT (mS/m )	18.736	18.362		
CXDC_XBWA (mS/m )	10.707	10.492		
CUDC_UWAT (mS/m )	8.187	8.000		
CUDC_UBWA (mS/m )	4.399	4.295		
CUDC_UNC_ZP (mS/m )	0.043	0.042		
GR_UNC_WM ( )	0.300	0.000		

### ELAN Same Parameters

Parameter	Value	Parameter	Value
RHOB_QUAR	2.650(g/cm3 )	RHOB_CALC	2.710(g/cm3 )
RHOB_DOLO	2.847(g/cm3 )	RHOB_ORTH	2.570(g/cm3 )
RHOB_PYRI	4.990(g/cm3 )	RHOB_GLAU	2.650(g/cm3 )
RHOB_ILLI	2.780(g/cm3 )	RHOB_KAOL	2.620(g/cm3 )
RHOB_COAL	1.200(g/cm3 )	RHOB_IGNE	3.000(g/cm3 )
RHOB_XWAT	1.000(g/cm3 )	RHOB_UWAT	0.981(g/cm3 )
RHOB_XOIL	0.500(g/cm3 )	RHOB_UOIL	0.500(g/cm3 )
RHOB_XGAS	-0.021(g/cm3 )	RHOB_UGAS	-0.021(g/cm3 )
RHOB_XBWA	0.974(g/cm3 )	NPHI_QUAR	-0.059(m3/m3 )
NPHI_CALC	0.000(m3/m3 )	NPHI_DOLO	0.032(m3/m3 )
NPHI_ORTH	-0.010(m3/m3 )	NPHI_PYRI	0.008(m3/m3 )
NPHI_GLAU	0.410(m3/m3 )	NPHI_ILLI	0.247(m3/m3 )
NPHI_KAOL	0.450(m3/m3 )	NPHI_COAL	0.450(m3/m3 )
NPHI_XWAT	1.000(m3/m3 )	NPHI_UWAT	1.000(m3/m3 )
NPHI_XOIL	0.600(m3/m3 )	NPHI_UOIL	0.600(m3/m3 )
NPHI_XGAS	0.162(m3/m3 )	NPHI_UGAS	0.162(m3/m3 )
NPHI_XBWA	1.000(m3/m3 )	DT_QUAR	55.500(us/m )
DT_CALC	47.800(us/m )	DT_DOLO	43.500(us/m )
DT_ORTH	60.000(us/m )	DT_ILLI	60.000(us/m )
DT_KAOL	91.318(us/m )	DT_COAL	121.920(us/m )

## Bream A20A Petrophysics Report

DT_IGNE	16.916(us/m )	DT_XWAT	0.000(us/m )
DT_UWAT	220.000(us/m )	DT_XOIL	0.000(us/m )
DT_UOIL	240.000(us/m )	DT_XGAS	0.000(us/m )
DT_UGAS	289.865(us/m )	DT_XBWA	189.000(us/m )
U_QUAR	5.000( )	U_CALC	14.100( )
U_DOLO	9.100( )	U_ORTH	8.700( )
U_ILLI	9.900( )	U_KAOL	5.100( )
U_COAL	1.000( )	U_XWAT	0.692( )
U_UWAT	0.000( )	U_XOIL	0.136( )
U_UOIL	0.000( )	U_XGAS	0.012( )
U_UGAS	0.000( )	U_XBWA	0.398( )
CXDC_ILLI	-999.250(mS/m )	CXDC_KAOL	-999.250(mS/m )
CUDC_GLAU	-999.250(mS/m )	CUDC_ILLI	-999.250(mS/m )
CUDC_KAOL	-999.250(mS/m )	GR_QUAR	40.000(gAPI )
GR_CALC	11.000(gAPI )	GR_DOLO	3.000(gAPI )
GR_ORTH	200.000(gAPI )	GR_PYRI	0.000(gAPI )
GR_GLAU	150.000(gAPI )	GR_ILLI	220.000(gAPI )
GR_KAOL	98.000(gAPI )	GR_COAL	40.000(gAPI )
GR_IGNE	40.000(gAPI )	GR_XWAT	0.000(gAPI )
GR_UWAT	0.000(gAPI )	GR_XOIL	0.000(gAPI )
GR_UOIL	0.000(gAPI )	GR_XGAS	0.000(gAPI )
GR_UGAS	0.000(gAPI )	GR_XBWA	0.000(gAPI )
EX1_QUAR	0.000( )	EX1_CALC	0.000( )
EX1_ORTH	0.000( )	EX1_PYRI	0.000( )
EX1_ILLI	0.000( )	EX1_COAL	0.000( )
EX1_XWAT	0.000( )	EX1_UWAT	0.000( )
EX1_XOIL	0.000( )	EX1_UOIL	0.000( )
EX1_XGAS	0.000( )	EX1_UGAS	0.000( )
EX1_XBWA	0.000( )	CT1_QUAR	0.000( )
CT1_CALC	0.000( )	CT1_DOLO	0.000( )
CT1_ORTH	0.000( )	CT1_PYRI	0.000( )
CT1_GLAU	0.000( )	CT1_ILLI	0.000( )
CT1_KAOL	0.000( )	CT1_COAL	0.000( )
CT1_IGNE	0.000( )	CT1_XWAT	0.000( )
CT1_UWAT	0.000( )	CT1_XOIL	0.000( )
CT1_UOIL	0.000( )	CT1_XGAS	1.000( )
CT1_UGAS	-0.300( )	CT1_XBWA	0.000( )
CT2_QUAR	0.000( )	CT2_CALC	0.000( )
CT2_DOLO	0.000( )	CT2_ORTH	0.000( )
CT2_PYRI	0.000( )	CT2_GLAU	0.000( )
CT2_ILLI	0.000( )	CT2_KAOL	0.000( )
CT2_COAL	0.000( )	CT2_IGNE	0.000( )
CT2_XWAT	0.000( )	CT2_UWAT	0.000( )
CT2_XOIL	1.000( )	CT2_UOIL	-0.300( )
CT2_XGAS	0.000( )	CT2_UGAS	0.000( )
CT2_XBWA	0.000( )	CT3_QUAR	-0.100( )
CT3_CALC	0.000( )	CT3_ORTH	1.000( )
CT3_PYRI	0.000( )	CT3_GLAU	0.000( )
CT3_ILLI	0.000( )	CT3_KAOL	0.000( )
CT3_COAL	0.000( )	CT3_XWAT	0.000( )
CT3_UWAT	0.000( )	CT3_XOIL	0.000( )
CT3_UOIL	0.000( )	CT3_XGAS	0.000( )
CT3_UGAS	0.000( )	CT3_XBWA	0.000( )

## Bream A20A Petrophysics Report

CT4_QUAR	0.010( )	CT4_CALC	0.000( )
CT4_ORTH	0.000( )	CT4_PYRI	-1.000( )
CT4_GLAU	0.000( )	CT4_ILLI	0.000( )
CT4_COAL	0.000( )	CT4_XWAT	0.000( )
CT4_UWAT	0.000( )	CT4_XOIL	0.000( )
CT4_UOIL	0.000( )	CT4_XGAS	0.000( )
CT4_UGAS	0.000( )	CT4_XBWA	0.000( )
ARHOB_GLAU	2.960(g/cm3 )	ARHOB_ILLI	2.780(g/cm3 )
ARHOB_KAOL	2.620(g/cm3 )	WCLP_GLAU	0.156(m3/m3 )
WCLP_ILLI	0.154(m3/m3 )	WCLP_KAOL	0.058(m3/m3 )
CBWA_GLAU	-999.250(mS/m )	CBWA_ILLI	-999.250(mS/m )
CBWA_KAOL	-999.250(mS/m )	CECA_GLAU	0.233(meq/g )
CECA_ILLI	0.200(meq/g )	CECA_KAOL	0.090(meq/g )
RMF	0.160(ohm.m )	MST	61.880(degC )
RW	0.567(ohm.m )	RWT	-999.250(degC )
SALIN_ISOL	-999.250(ppk )	SALIN_PARA	-999.250(ppk )
SALIN_XWAT	12.924(ppk )	SALIN_UWAT	30.000(ppk )
SALIN_XIWA	-999.250(ppk )	SALIN_UIWA	-999.250(ppk )
SALIN_XOIL	0.000(ppk )	SALIN_UOIL	0.000(ppk )
SALIN_XGAS	0.000(ppk )	SALIN_UGAS	0.000(ppk )
SALIN_XSFL	-999.250(ppk )	SALIN_USFL	-999.250(ppk )
CT1_ZP	0.000( )	CT2_ZP	0.000( )
CT3_ZP	0.000( )	CT4_ZP	0.000( )
RHOB_UNC_ZP	0.027(g/cm3 )	NPHI_UNC_ZP	0.015(m3/m3 )
DT_UNC_ZP	2.250(us/m )	U_UNC_ZP	0.225( )
CXDC_UNC_ZP	0.072(mS/m )	GR_UNC_ZP	2.250(gAPI )
EX1_UNC_ZP	0.015( )	CT1_UNC_ZP	0.015( )
CT2_UNC_ZP	0.015( )	CT3_UNC_ZP	0.015( )
CT4_UNC_ZP	0.015( )	VOLS_UNC_ZP	0.015(m3/m3 )
RHOB_UNC_WM	1.000( )	NPHI_UNC_WM	1.000( )
DT_UNC_WM	0.300( )	U_UNC_WM	0.600( )
CXDC_UNC_WM	0.500( )	CUDC_UNC_WM	0.670( )
EX1_UNC_WM	1.000( )	CT1_UNC_WM	0.800( )
CT2_UNC_WM	0.800( )	CT3_UNC_WM	0.900( )
CT4_UNC_WM	1.000( )	VOLS_UNC_WM	1.000( )
RHOB_IFAC_ZP	0.600( )	NPHI_IFAC_ZP	0.400( )
A_ZP	1.000( )	N_ZP	2.000( )
C_DWA	0.000( )	M_DWA	2.000( )
BVIRR	0.010(m3/m3 )		

### RESULTS AND DISCUSSION

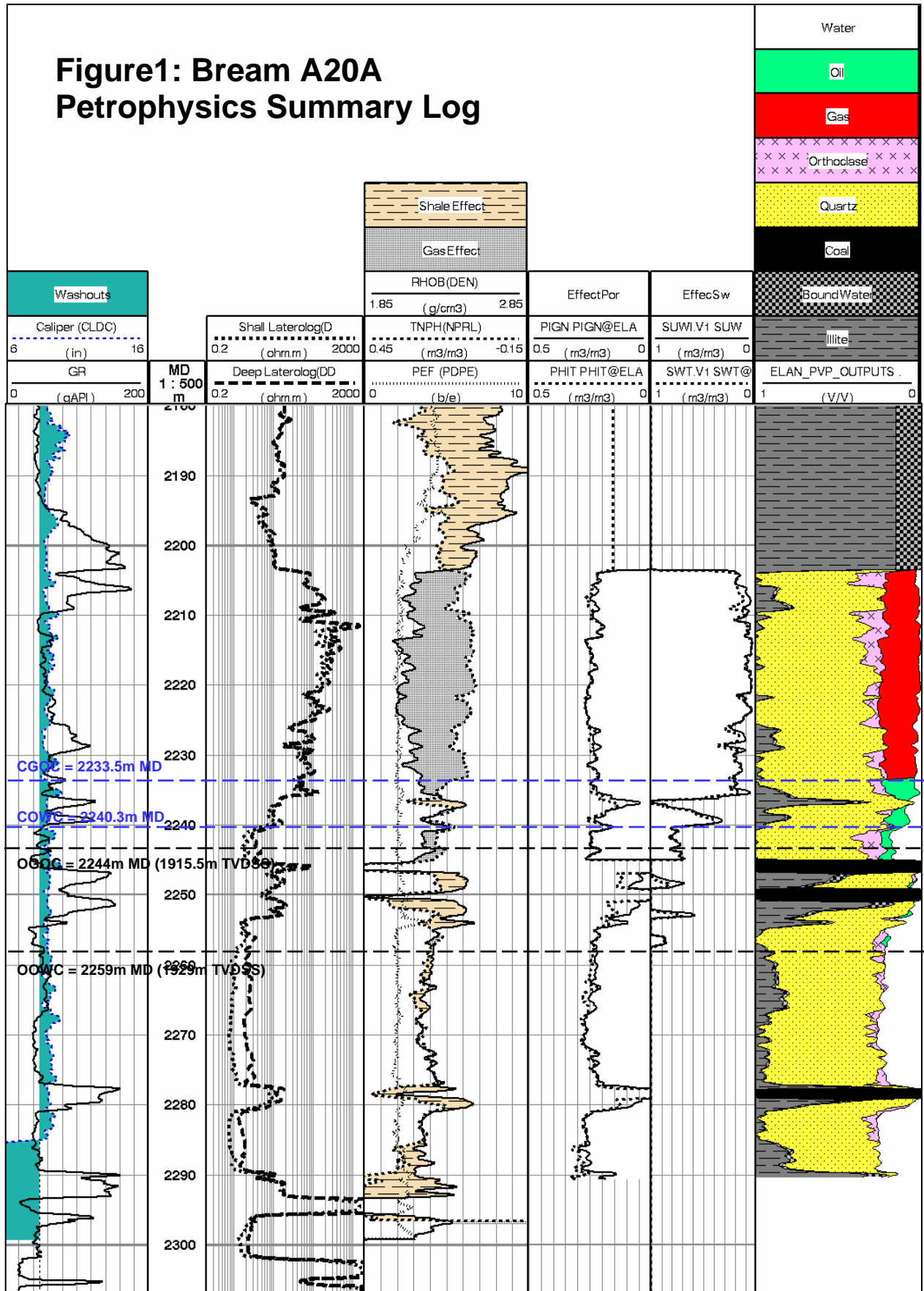
In this well, gas shows were recorded from 2195.mMDRT through to coals at 2310m.

The interval 2195 – 2203 mMDRT contains two thin, very shaly sands with extremely poor reservoir qualities. For the purposes of this analysis, this interval was considered to be non-reservoir.

It is clear from the logs that the N-1 reservoir over the interval 2203 – 2241 mMDRT has several radioactive zones as indicated by the high GR levels. The reservoir properties of these zones are comparable to those zones with low GR levels, as indicated by their density-neutron character.

The petrophysical analysis indicates that there is one oil productive interval in this well and it extends from a GOC at 2233.5 mMDRT to an OWC at 3240.3 mMDRT (Figure 1 & Table 1).

**Figure1: Bream A20A  
Petrophysics Summary Log**





## Bream A20A

Petrophysical Summary 2180 - 2300m MD

Depth Reference:

Mean VCL, Mean PHIE (or PIGN), Mean SWE (or SUWI) is based on a PHIE or PIGN cutoff:

Primary: MDKB

0.08 for Gas, 0.12 for oil and water

Zone	Top Depth mMD	Top Depth mTVDSS	Bottom Depth mMD	Bottom Depth mTVDSS	Gross Thickness mMD	Gross Thickness mTVD	Net/Gross	Mean VCL	Mean PHIE	Mean SWE	Comments	Net Pay Thickness mMD	Net Pay Thickness mTVD
N1_Cob_Grn_Gas	2203.6	1875.3	2233.5	1905.0	29.9	29.8	1.0	0.05	0.23	0.10	Gas Bearing, GOC@2233.5 mMD (1905 mTVDSS)	29.9	29.7
N1_Cob_Mid_Oil	2233.5	1905.0	2236.3	1907.8	2.8	2.8	1.0	0.12	0.21	0.18	Oil Bearing	2.8	2.8
N1_Cob_Low_Oil	2237.3	1908.8	2240.3	1911.7	3.0	3.0	0.9	0.12	0.19	0.48	Oil Bearing, OWC@2240.3 mMD (1911.7 mTVDSS)	2.8	2.8
N1_Cob_Low_Resid	2240.3	1911.7	2244.9	1916.3	4.6	4.6	1.0	0.00	0.23	0.76	Residual Oil & Gas	4.6	4.6
N1_Pin_Low_Resid	2252.0	1923.4	2257.0	1928.3	5.0	5.0	0.7	0.10	0.20	0.93	Residual Oil & Gas	3.5	3.5
N1_Mau_Water	2257.0	1928.3	2277.2	1948.4	20.2	20.1	1.0	0.10	0.24	0.91	Water Bearing	20.2	20.1
N1_Cyn_Water	2280.4	1951.6	2289.5	1960.6	9.1	9.1	1.0	0.12	0.26	0.97	Water Bearing	9.0	8.9

Table 1



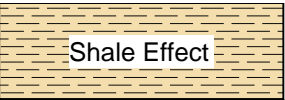
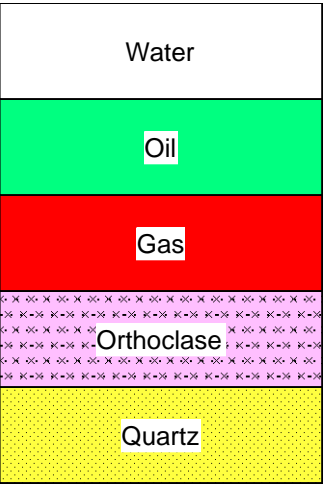
# BREAM A20A

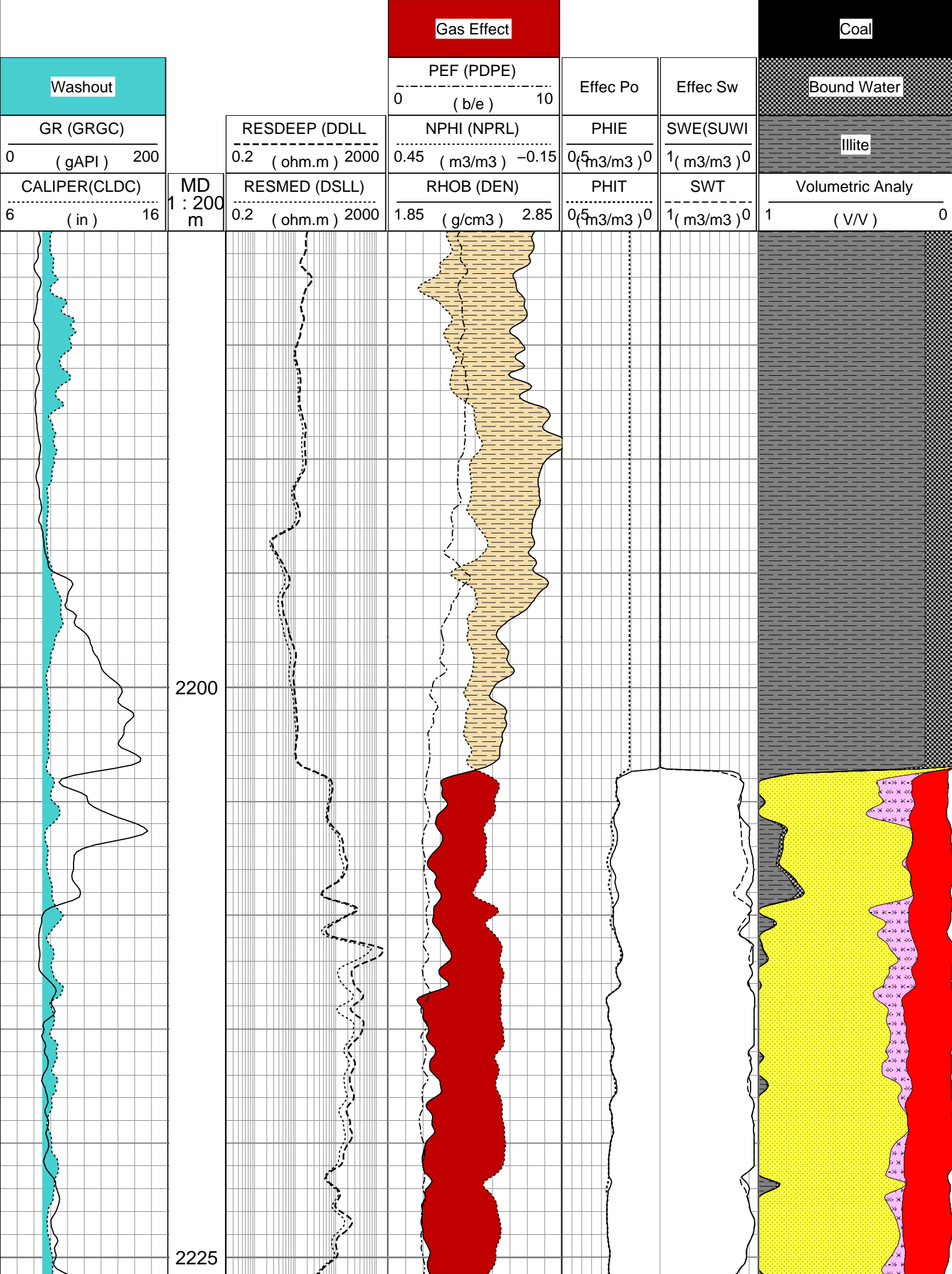
## Petrophysical Analysis

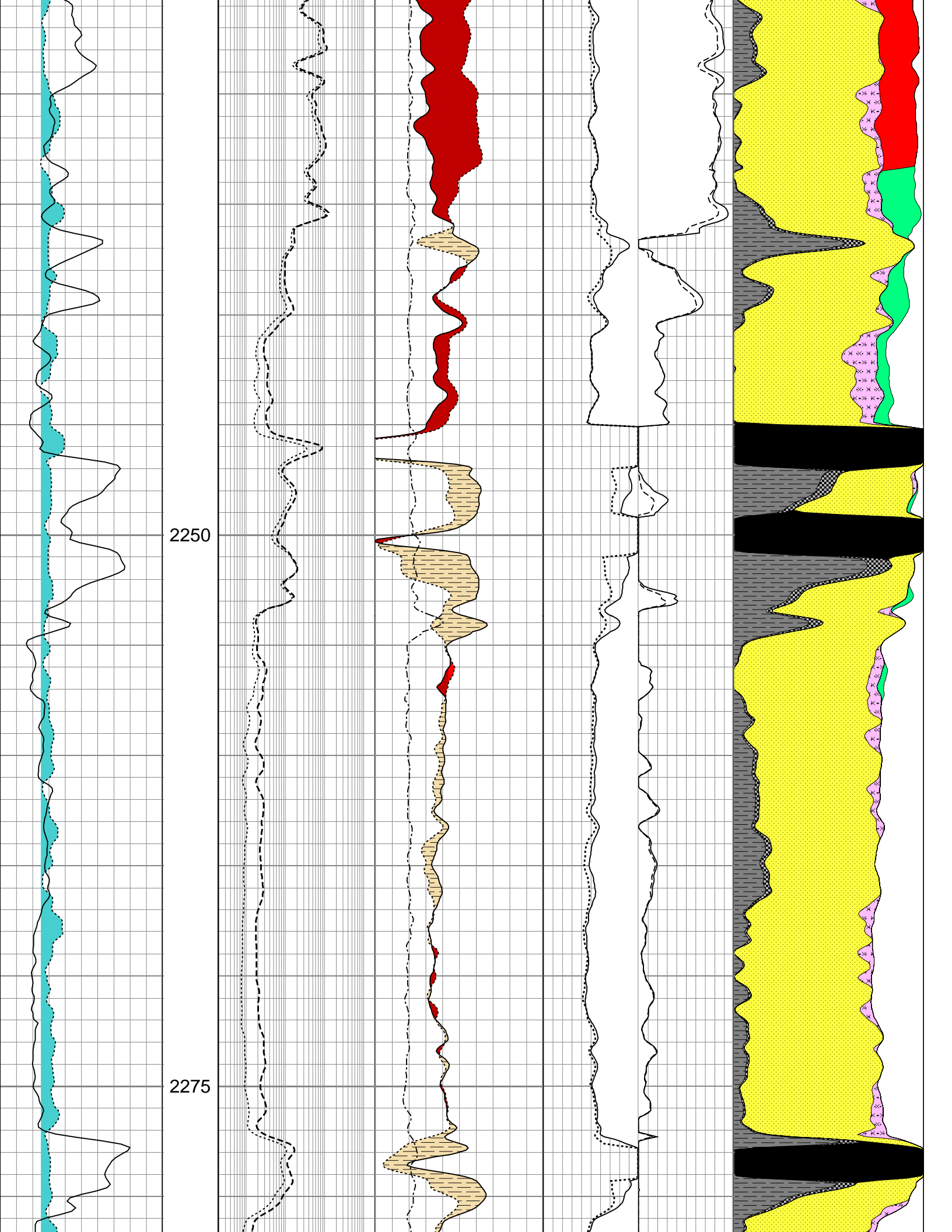
COMPANY: Esso Australia Pty. Ltd.  
WELL: BREAM A20  
BOREHOLE: BREAM A20A  
FIELD: BREAM  
STATE: VIC  
COUNTRY: AUSTRALIA

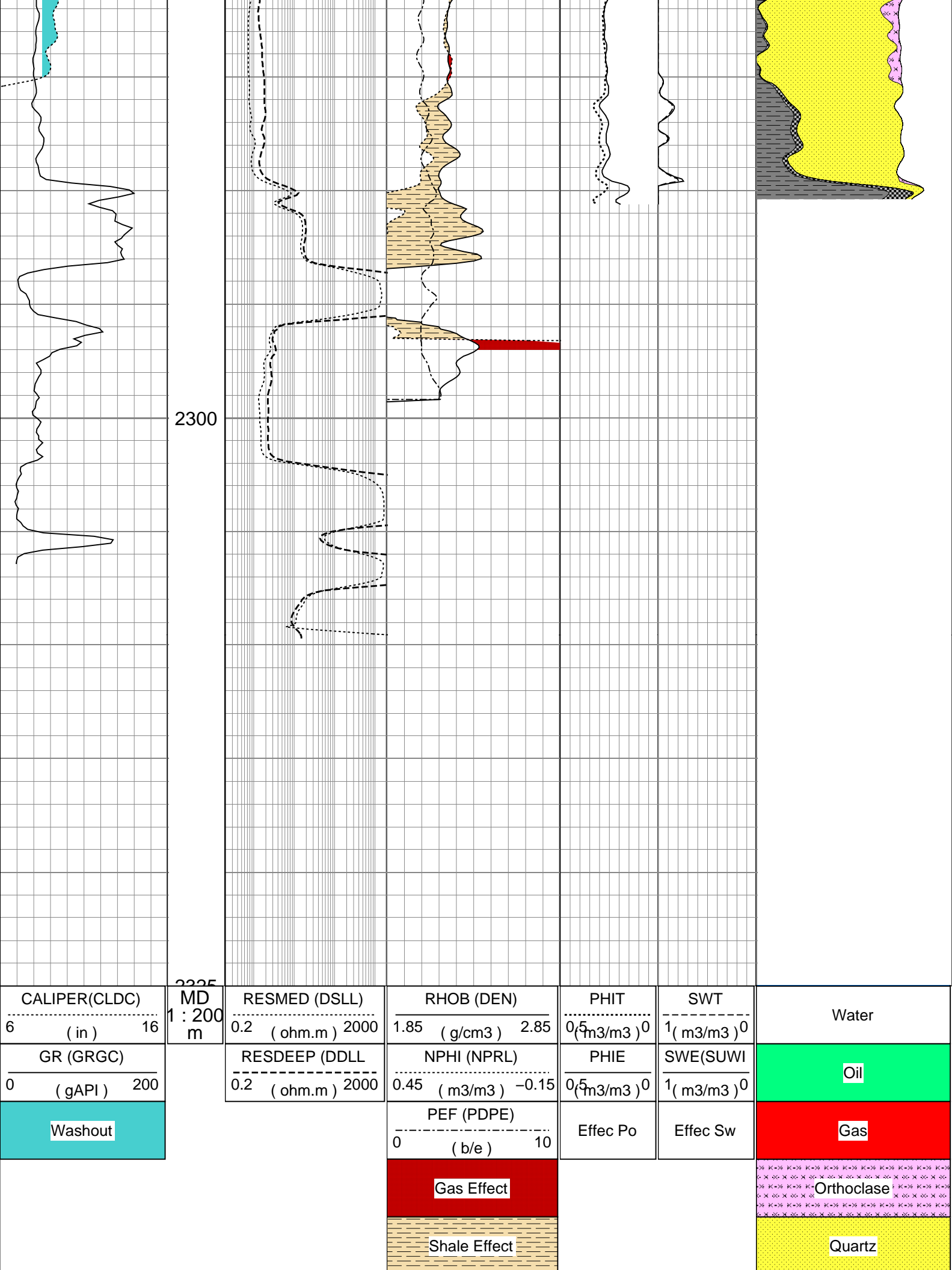
PETROPHYSICIST: BERNIE RAYNER

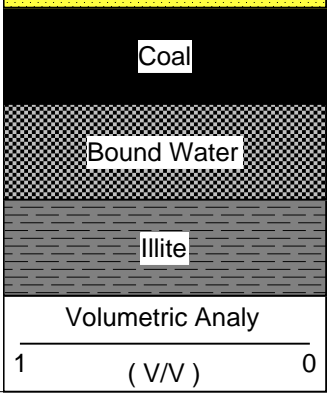
Date Logged: October 2005      Date of Analysis: March 2006  
Well Location: 2.80  
Elevations: K.B. 32.82 m      D.F. <DF>  
Latitude: <LATI>      G.L. <GL>  
Longitude: <LONG>











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## **APPENDIX 3a**

### **BREAM A20A**

#### **Lithology/Show Descriptions**

## Bream A20A Lithology / Show Descriptions

Interval  
(m)  
From To

% Lithology / Show Description

Previous Well History:

Bream A20A Previous Well History:

Bream A20A Plugged and Abandoned on 12 October 2005 at 0200 hrs.

10.75" Surface Casing at 1123.0 mMDRT (877.6 mTVDRT).

Tag TOC at 1106.0 mMDRT at 1215 hrs 12 October 2005.

Attempt to Kick-off BMA A20A from 1123.0 mMDRT, with a Smith S73PX bit on steerable motor assembly.

Drilled from 1123.0 mMDRT (877.6 mTVDRT) , at 1215 hrs 12 October 2005 to 1193.0 mMDRT (931.3 mTVDRT) at 1515 hrs 12 October 2005 with a Smith S73PX bit on steerable motor assembly without encountering any new formation. The cement drilled was soft to firm.

Stopped drilling at 1193.0 mMDRT, 2 metres above the depth at which the 7.00" production casing was cut and pulled at 1195.0 mMDRT.

Bit Details:

BHA # 1, Bit # 1.

Size: 8.5", Manufacturer / Type: Smith S73PX, Serial #: JW0241.

Jets: 20 x 6, TFA: 1.841 sq.in, Grading: **0-0-NO-A-X-IN-NO-DP**.

Krevs: 17.0, Top Drive RPM: 50-60 ( + 170 RPM DHM).

Metres drilled: 70.0 m, HOB: 1.20

Average ROP: 70.0 / 1.20 = 58.33 m/hr.

Rotating: 70.0 metres / Rotating HOB = 1.20, Average Rotating ROP = 58.33 m/hr.

Steering: 0.0 metres / Steering HOB = 0.00 , Average Steering ROP = N/A m/hr.

Decided to set another cement plug.

Set second cement plug.



## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
<p>Tag TOC at 1079.0 mMDRT at 1515 hrs on 13 October 2005.            Drilled cement from 1079.0 to 1093.0 mMDRT at 58.0 m/hr, encountering cement that was firm to moderately hard. Stopped drilling cement at 1093.0 mMDRT at 1730 hrs 13 October 2005            Decided to wait for 6 hours before drilling again.            Drilled from 1093.0 mMDRT at 0015 hrs 14 October 2005, to 1159.0 mMDRT (900.7 mTVDRT) at 1305 hrs 14 October 2005, with the cement in the samples getting harder with depth.            The spot 1 metre samples from 1123.0 to 1152.0 mMDRT showed an increasing percentage of new formation, with the 1152.0 mMDRT sample having 75% new formation (Calcilutite). The samples 1155.0 to 1159.0 mMDRT (bottoms-up) had 90% new formation.            Perform PIT at 1159.0 mMDRT (900.7 mTVDRT) at 1420 hrs 14 October 2005.            Pressure = 540 psi using 9.5 ppg mud, EMW = 13.0 ppg.</p>			
<p>Drilled from 1123.0 mMDRT to TD of 2326.0 mMDRT (2029.7 mTVDRT) with a Smith S73PX bit on steerable motor assembly.            Bit Details:            BHA # 2, Bit # 2 (RR1).            Size: 8.5", Manufacturer / Type: Smith S73PX, Serial #: JW0241.            Jets: 20 x 6, TFA: 1.841 sq.in, Grading: <b>2-2-WT-A-X-1-ER-TD</b>.</p>			
<p>Krevs: 821.0, RPM: 80-110 ( + 175 RPM DHM).            Metres drilled: 1203.0 m, HOB: 54.40            Average ROP: 1203.0 / 54.40 = 22.1 m/hr.            Rotating: 1074.0 metres / Rotating HOB = 38.20, Average Rotating ROP = 28.12 m/hr.            Steering: 129.0 metres / Steering HOB = 16.20 , Average Steering ROP = 7.96 m/hr.</p>			
<p><b>Geologist continued on rig at 1123.0 mMDRT (877.6 mTVDRT), at 1535 hrs on 11 October 2005.</b></p>			
<p>Cuttings samples for description only at 30 m intervals from 1123.0 to 1950.0 mMDRT. (To 150 mMD above the Top of Latrobe prognosed at 2100.9 mMDRT).</p>			
<p>Cuttings samples bagged at 10 m intervals from 1950.0 to 2090.0 mMDRT</p>			
<p>Cuttings samples bagged at 5 m intervals from 2090.0 to TD of 2326.0 mMDRT.</p>			
1123	1159	SPOT	Spot 1 metre samples from 1123.0-1159.0 mMDRT showed an increasing percentage of new formation (Calcilutite). The 1152.0 mMDRT spot sample had 75% new formation.
			CALCILUTITE: light grey to light blueish grey, silty in part grading to CALCISILTITE, trace forams, soft to firm, amorphous to sub blocky.
1159	1170	100	CALCILUTITE: light grey to medium light grey, silty in part grading to CALCISILTITE, trace forams, firm to moderately hard, sub blocky.
1170	1200	100	CALCILUTITE: as above.
1200	1230	100	CALCILUTITE: medium light grey to light grey, silty in part grading to CALCISILTITE, trace forams, firm to moderately hard, sub blocky.
1230	1260	100	CALCILUTITE: as above.

## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
1260	1290	100	CALCILUTITE: light grey to medium grey, silty in part grading to CALCISILTITE, trace forams, trace light brownish grey fossil fragments, firm to moderately hard, sub blocky. <b>Midnight Depth 14 October 2005 = 1312.0 mMDRT (1029.9 mTVDRT)</b> <b>Top of Lakes Entrance at 1318.0 mMDRT, 1035.2 mTVDRT (-1002.4 mTVDSS).</b>
1290	1320	95	CALCILUTITE: as above.
		5	CALCAREOUS CLAYSTONE: medium grey to medium light grey, silty, moderately calcareous, trace forams, rare ooids, firm to occasionally moderately hard, sub blocky to blocky.
1320	1350	20	CALCILUTITE: as above.
		80	CALCAREOUS CLAYSTONE: medium grey to medium light grey, silty, moderately calcareous, trace forams, trace fossil fragments, rare ooids, firm to moderately hard, sub blocky to blocky.
1350	1380	Trace	CALCILUTITE: as above.
		100	CALCAREOUS CLAYSTONE: as above.
1380	1410	100	CALCAREOUS CLAYSTONE: medium grey to medium light grey, silty, moderately calcareous, common fossil fragments, trace forams, trace ooids, firm to moderately hard, sub blocky to blocky.
1410	1440	100	CALCAREOUS CLAYSTONE: as above, trace fossil fragments, trace forams, trace ooids.
1440	1470	100	CALCAREOUS CLAYSTONE: as above, trace fossil fragments, trace ooids.
1470	1500	100	CALCAREOUS CLAYSTONE: medium grey to medium light grey, occasionally greenish grey, silty, moderately calcareous, trace fossil fragments, rare forams, rare ooids, rare gastropods, rare glauconite pellets, firm to moderately hard, sub blocky to blocky.
Spot Slow	1509 drilling	100	<b>CALCAREOUS CLAYSTONE: as above, trace disseminated pyrite.</b>
1500	1530	100	CALCAREOUS CLAYSTONE: as above.
1530	1560	100	CALCAREOUS CLAYSTONE: medium grey to greenish grey, silty, moderately calcareous, rare fossil fragments, rare ooids, firm to moderately hard, sub blocky to blocky.
1560	1590	100	CALCAREOUS CLAYSTONE: as above.
1590	1620	100	CALCAREOUS CLAYSTONE: medium grey to greenish grey, occasionally light brownish grey, silty, moderately calcareous, rare fossil fragments, rare ooids, rare gastropods, firm to moderately hard, sub blocky to blocky.
1620	1650	100	CALCAREOUS CLAYSTONE: as above.
1650	1680	100	CALCAREOUS CLAYSTONE: medium grey to medium dark grey, occasionally light brownish grey, silty, moderately calcareous, trace fossil fragments, rare ooids, firm to moderately hard, sub blocky to blocky. <b>Midnight Depth 15 October 2005 = 1696.0 mMDRT (1403.0 mTVDRT)</b>
1680	1710	100	CALCAREOUS CLAYSTONE: as above, trace nodular and disseminated pyrite, rare glauconite pellets.
1710	1740	100	CALCAREOUS CLAYSTONE: as above.
1740	1770	100	CALCAREOUS CLAYSTONE: medium light grey to medium grey, occasionally light brownish grey, silty, moderately calcareous, trace micromicaceous, trace fossil fragments, rare ooids, rare forams, firm to moderately hard, sub blocky to blocky.
1770	1800	100	CALCAREOUS CLAYSTONE: light brownish grey to medium grey, silty, moderately calcareous, trace ooids, rare fossil fragments, rare pyrite nodules, rare disseminated pyrite, firm to moderately hard, sub blocky to blocky.
1800	1830	100	CALCAREOUS CLAYSTONE: as above, trace forams.

## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
1830	1860	100	CALCAREOUS CLAYSTONE: light brownish grey to medium grey, silty, moderately calcareous, rare ooids, rare fossil fragments, rare forams, firm to moderately hard, sub blocky to blocky.
1860	1890	100	CALCAREOUS CLAYSTONE: as above.
1890	1920	100	CALCAREOUS CLAYSTONE: light brownish grey to medium grey, silty, moderately calcareous, rare ooids, rare disseminated pyrite, rare pyrite nodules, firm to moderately hard, sub blocky to blocky.
1920	1950	100	CALCAREOUS CLAYSTONE: as above.
1950	1960	100	<b>Bagged 10 metre samples from 1950.0 to 2090.0 mMDRT.</b> CALCAREOUS CLAYSTONE: light brownish grey to medium grey, silty, moderately calcareous, rare ooids, rare fossil fragments, rare disseminated pyrite, rare pyrite nodules, firm to moderately hard, sub blocky to blocky.
1960	1970	100	CALCAREOUS CLAYSTONE: light brownish grey to medium grey, silty, moderately calcareous, rare ooids, rare fossil fragments, rare disseminated pyrite, firm to moderately hard, sub blocky to blocky.
1970	1980	100	CALCAREOUS CLAYSTONE: as above.
1980	1990	100	CALCAREOUS CLAYSTONE: as above, rare ooids, rare forams, rare disseminated pyrite.
1990	2000	100	CALCAREOUS CLAYSTONE: light brownish grey to medium grey, silty, moderately calcareous, common ooids, rare fossil fragments, rare forams, rare disseminated pyrite, firm to moderately hard, sub blocky to blocky.
2000	2010	100	CALCAREOUS CLAYSTONE: as above, rare nodular pyrite.
2010	2020	100	CALCAREOUS CLAYSTONE: as above, trace ooids, rare disseminated pyrite, rare nodular pyrite.
2020	2030	100	CALCAREOUS CLAYSTONE: as above, trace micromicaceous.
2030	2040	100	CALCAREOUS CLAYSTONE: as above, rare glauconite.
2040	2050	100	CALCAREOUS CLAYSTONE: as above, minor medium grey, rare glauconite.
2050	2060	100	CALCAREOUS CLAYSTONE: as above, occasional medium grey, trace glauconite.
2060	2070	100	CALCAREOUS CLAYSTONE: light brownish grey to occasionally medium grey, silty, moderately calcareous, trace ooids, rare forams, rare glauconite, rare micromicaceous, rare disseminated pyrite, firm to moderately hard, sub blocky to blocky.
2070	2080	100	CALCAREOUS CLAYSTONE: light brownish grey to occasionally medium grey, silty, moderately calcareous, trace ooids, rare glauconite, firm to moderately hard, sub blocky to blocky.
2080	2090	100	CALCAREOUS CLAYSTONE: light brownish grey to occasionally medium grey, silty, moderately calcareous, trace ooids, trace glauconite, rare micromicaceous, rare disseminated pyrite, firm to moderately hard, sub blocky to blocky. <b>Bagged 5 metre samples from 2090 mMDRT to TD.</b> <b>Start adding Baracarb at 5ppb to mud system from 2090.0 mMDRT.</b>
2090	2095	100	CALCAREOUS CLAYSTONE: as above.
2095	2100	85	<b>Top of Latrobe at 2096.5 mMDRT, 1801.6 mTVDRT (-1768.8 mTVDSS).</b> CALCAREOUS CLAYSTONE: light brownish grey to occasionally medium grey, silty, moderately calcareous, trace ooids, trace glauconite, firm to moderately hard, sub blocky to blocky.
		5	SILTSTONE: pale brown to dark yellowish brown, very arenaceous grading to very fine SANDSTONE, slightly calcareous, trace micromicaceous, moderately hard, blocky.

## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2100	2105	10	SANDSTONE: white to pale green, moderate green, fine to very fine, moderately well sorted, sub angular to sub rounded, common glauconite matrix, hard aggregates, tight to very poor visible and inferred porosity. No fluorescence.
			<b>Midnight Depth 16 October 2005 = 2103.0 mMDRT (1808.0 mTVDRT)</b>
		60	CLAYSTONE 1: 5%, dark greenish yellow, non calcareous, soft to firm, amorphous to sub blocky. CALCAREOUS CLAYSTONE 2: 55%, light brownish grey to occasionally medium grey, silty, moderately calcareous, trace glauconite, firm to moderately hard, sub blocky to blocky.
		20	SILTSTONE: pale brown to dark yellowish brown, very arenaceous grading to very fine SANDSTONE, slightly calcareous, trace micromicaceous, rare glauconite pellets, moderately hard, blocky.
2105	2110	20	SANDSTONE: as above, trace glauconite pellets. No fluorescence.
		15	CLAYSTONE 1: 5%, as above. CALCAREOUS CLAYSTONE 2: 10%, as above.
		65	SILTSTONE: moderate brown to dark yellowish brown, minor light blueish grey, very arenaceous grading to very fine SANDSTONE, non calcareous, trace micromicaceous, common glauconite pellets, moderately hard, blocky.
		20	SANDSTONE: as above. No fluorescence.
2110	2115	5	CALCAREOUS CLAYSTONE 2: 5%, light brownish grey to occasionally medium grey, silty, moderately calcareous, trace glauconite, firm to moderately hard, sub blocky to blocky.
		85	SILTSTONE: as above.
		10	SANDSTONE: as above. No fluorescence.
2115	2120	5	CLAYSTONE: light brownish grey to occasionally medium grey, silty, moderately calcareous, trace glauconite, firm to moderately hard, sub blocky to blocky.
		90	SILTSTONE: as above.
		5	SANDSTONE: as above. No fluorescence.
2120	2125	5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		5	SANDSTONE: as above. No fluorescence.
2125	2130	5	CLAYSTONE: as above.
		90	SILTSTONE: moderate brown to dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, common glauconite pellets, moderately hard, blocky.
		5	SANDSTONE: as above. No fluorescence.
2130	2135	5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		5	SANDSTONE: white to pale green, moderate green, fine to very fine, moderately well sorted, sub angular to sub rounded, common glauconite matrix, hard aggregates, tight to very poor visible and inferred porosity. No fluorescence.

## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2135	2140	5	CLAYSTONE: light brownish grey to occasionally medium grey, silty, moderately calcareous, trace glauconite, firm to moderately hard, sub blocky to blocky.
		80	SILTSTONE: as above.
		5	SANDSTONE: as above.
			No fluorescence.
2140	2145	10	<b>VOLCANICS 1: greyish green to greyish blue green, dominantly chlorite, crystalline, hard, common bit crushed rock flour.</b>
		5	CLAYSTONE: as above.
		70	SILTSTONE: as above.
		5	SANDSTONE: as above.
2145	2150		No fluorescence.
		20	<b>VOLCANICS 1: greyish green to greyish blue green, dominantly chlorite, crystalline, hard, common bit crushed rock flour.</b>
		5	CLAYSTONE: as above.
		70	SILTSTONE: as above.
2150	2155	5	SANDSTONE: as above.
			No fluorescence.
		20	<b>VOLCANICS 1: greyish green to greyish blue green, dominantly chlorite, crystalline, hard, common bit crushed rock flour.</b>
		Trace	CLAYSTONE: as above.
2155	2160	5	SILTSTONE: as above.
		5	SANDSTONE: white to very pale green, occasionally medium grey, fine to very fine, moderately well sorted, sub angular to sub rounded, common glauconite matrix, weak micropyrrite matrix, trace nodular pyrite, hard aggregates, tight to very poor visible and inferred porosity.
			No fluorescence.
		90	<b>VOLCANICS 1: 25%, greyish green to greyish blue green, dominantly chlorite, crystalline, hard, common bit crushed rock flour.</b>
2160	2165		<b>VOLCANICS 2: 65%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.</b>
		Trace	CLAYSTONE: as above.
		Trace	SILTSTONE: moderate brown to dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, common glauconite pellets, moderately hard, blocky.
		5	SANDSTONE: as above.
2165			No fluorescence.
		95	<b>VOLCANICS 1: 15%, greyish green to greyish blue green, dominantly chlorite, crystalline, hard, common bit crushed rock flour.</b>
			<b>VOLCANICS 2: 80%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.</b>
		Trace	CLAYSTONE: as above.
2165		10	SILTSTONE: moderate brown to pale yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, rare glauconite pellets, moderately hard, blocky.

## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2165	2170	5	SANDSTONE: white to very pale green to light grey, fine to very fine, moderately well sorted, sub angular to sub rounded, weak glauconite matrix, weak micropyrinite matrix, dominantly metamorphosed quartzite grains, common nodular pyrite, dominantly hard aggregates, tight to very poor visible and inferred porosity. No fluorescence.
		85	VOLCANICS 1: 10%, greyish green to greyish blue green, dominantly chlorite, crystalline, hard, common bit crushed rock flour. VOLCANICS 2: 75%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.
		Trace	CLAYSTONE: as above.
		5	SILTSTONE: as above.
		5	SANDSTONE: as above. No fluorescence.
2170	2175	90	VOLCANICS: Trace, as above. VOLCANICS 2: 90%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.
		Trace	CLAYSTONE: as above.
		Trace	SILTSTONE: as above.
		5	SANDSTONE: as above, strong micropyrinite matrix, common nodular pyrite. No fluorescence.
		95	VOLCANICS: Trace, as above. VOLCANICS 2: 95%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.
2175	2180	Trace	SILTSTONE: as above.
		5	SANDSTONE: white to very pale green to light grey, fine to very fine, moderately well sorted, sub angular to sub rounded, weak glauconite matrix, strong micropyrinite matrix, dominantly metamorphosed quartzite grains, common nodular pyrite, dominantly hard aggregates, tight to very poor visible and inferred porosity. No fluorescence. <b>FLUORESCENCE (2180 -2215 mMDRT): trace to 2%, moderately bright greenish yellow pinpoint mineral fluorescence. No direct cut, no crush cut.</b>
		95	VOLCANICS: Trace, as above. VOLCANICS 2: 95%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.
		Trace	SILTSTONE: as above.
		5	SANDSTONE: as above. Trace mineral fluorescence as above.
2180	2185	95	VOLCANICS: Trace, as above. VOLCANICS 2: 95%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.
		Trace	SILTSTONE: as above.
		5	SANDSTONE: as above.
		Trace	Trace mineral fluorescence as above.
		95	VOLCANICS: Trace, as above. VOLCANICS 2: 95%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.
2185	2190	5	SILTSTONE: moderate brown to pale yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, rare glauconite pellets, moderately hard, blocky.

## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2190	2195	5	SANDSTONE: as above. Trace mineral fluorescence as above.
		90	<b>VOLCANICS: Trace, as above.</b> <b>VOLCANICS 2: 90%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.</b>
		35	SILTSTONE: as above.
		5	SANDSTONE: white to very pale green to light grey, fine to very fine, moderately well sorted, sub angular to sub rounded, weak glauconite matrix, strong micropyrinite matrix, dominantly metamorphosed quartzite grains, common nodular pyrite, dominantly hard aggregates, tight to very poor visible and inferred porosity. Trace mineral fluorescence as above.
2195	2200	60	<b>VOLCANICS: Trace, as above.</b> <b>VOLCANICS 2: 60%, medium dark grey to dark grey, minor dusky brown, fine grained, crystalline basic volcanic rocks, 50% very fine quartz grains, common bit crushed to rock flour.</b> <b>Top of Coarse Clastics at 2195.5 mMDRT, 1900.0 mTVDRT (-1867.2 mTVDSS).</b>
		45	SILTSTONE: pale yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, trace glauconite pellets, trace pyrite, moderately hard to hard, sub blocky to blocky.
		50	SANDSTONE: clear to translucent, coarse to dominantly very coarse, moderately well sorted, sub angular to sub rounded, trace micropyrinite matrix, weak pyrite cement, trace nodular pyrite, dominantly loose, generally clean, fair to good inferred and visible porosity. Trace to 2% mineral fluorescence as above.
		5	<b>VOLCANICS 1: greyish green to greyish blue green, dominantly chlorite, crystalline, hard, common bit crushed rock flour.</b> <b>Base of Waste (Top of Green sand) at 2203.0 mMDRT, 1907.5 mTVDRT (-1874.7 mTVDSS).</b>
2200	2205	25	SILTSTONE: as above.
		75	SANDSTONE: as above. Trace mineral fluorescence as above.
2205	2210	Trace	<b>VOLCANICS 1: trace, as above.</b>
		10	SILTSTONE: as above.
		90	SANDSTONE: clear to translucent, coarse to dominantly very coarse, moderately well sorted, sub angular to sub rounded, trace micropyrinite matrix, weak pyrite cement, trace nodular pyrite, dominantly loose, generally clean, fair to good inferred and visible porosity. Trace mineral fluorescence as above.
2210	2215	Trace	<b>VOLCANICS 1: trace, as above.</b>
		15	SILTSTONE: pale yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, trace glauconite pellets, trace pyrite, moderately hard to hard, sub blocky to blocky.
		85	SANDSTONE: clear to translucent, coarse to dominantly very coarse, occasionally medium, moderately well sorted, sub angular to sub rounded, weak pyrite cement, trace nodular pyrite, dominantly loose, generally clean, fair to good inferred and visible porosity. Trace mineral fluorescence as above.
		Trace	<b>VOLCANICS 1: trace, as above.</b>



## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2215	2220	Trace 100	SILTSTONE: as above. SANDSTONE: clear to translucent, coarse to dominantly very coarse, occasionally medium, moderately well sorted, sub angular to sub rounded, weak pyrite cement, trace nodular pyrite, loose, clean, good inferred and visible porosity. No fluorescence.
2220	2225	Trace Trace 100	CLAYSTONE: light blueish grey, slightly calcareous, silty, moderately hard to hard, blocky. SILTSTONE: as above. SANDSTONE: as above. No fluorescence.
2225	2230	5 95	<b>CbF2 at 2229.0 mMDRT, 1933.3 mTVDRT (-1900.5 mTVDSS).</b> CLAYSTONE: as above. SANDSTONE: as above. No fluorescence.
2230	2235	Trace Trace 100	CLAYSTONE: as above. SILTSTONE: as above. SANDSTONE: clear to translucent, coarse to dominantly very coarse, moderately well sorted, sub rounded to sub angular, weak pyrite cement, rare nodular pyrite, loose, clean, good inferred and visible porosity. No fluorescence.
2235	2240	Trace Trace 100	<b>CbF1 at 2237.5 mMDRT, 1941.8 mTVDRT (-1909.0 mTVDSS).</b> CLAYSTONE: as above. SILTSTONE: as above. SANDSTONE: clear to translucent, medium to very coarse, dominantly coarse, moderately well sorted, sub rounded to sub angular, weak pyrite cement, rare nodular pyrite, loose, clean, good inferred and visible porosity. No fluorescence.
2240	2245	5 5 90	CLAYSTONE: light blueish grey, slightly calcareous, silty, moderately hard to hard, blocky. SILTSTONE: dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, rare glauconite pellets, rare pyrite, firm to moderately hard, sub blocky. SANDSTONE: as above. No fluorescence.
2245	2250	5 15 80	CLAYSTONE: as above. SILTSTONE: as above. SANDSTONE: clear to translucent, rare greyish pink, medium to dominantly very coarse, moderately well sorted, sub rounded to sub angular, weak pyrite cement, rare nodular pyrite, loose, clean, fair to good inferred and visible porosity. No fluorescence.
2250	2255	5 5 45 45	<b>PkF1 at 2254.0 mMDRT, 1958.2 mTVDRT (-1925.4 mTVDSS).</b> COAL: dusky brown, silty in part grading to CARBONACEOUS SILTSTONE, earthy, firm, blocky, uneven, woody texture, common pyrite laminations. CLAYSTONE: as above. SILTSTONE: dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, rare glauconite pellets, rare pyrite, firm to moderately hard, sub blocky. SANDSTONE: as above. No fluorescence.



## Bream A20A Lithology / Show Descriptions

Interval (m) From      To		%	Lithology / Show Description
2255	2260	5	CLAYSTONE: as above.
		35	SILTSTONE: as above.
		60	SANDSTONE: clear to translucent, rare greyish pink, rare very pale orange, medium to dominantly very coarse, moderately well sorted, sub angular to sub rounded, weak pyrite cement, trace light brown argillaceous matrix, dominantly loose, generally clean, fair inferred and visible porosity. No fluorescence.
<b>Start adding Barablock at 4ppb to mud system from 2260.0 mMDRT.</b>			
2260	2265	Trace	CLAYSTONE: as above.
		10	SILTSTONE: as above.
		90	SANDSTONE: as above. No fluorescence.
2265	2270	Trace	CLAYSTONE: as above.
		10	SILTSTONE: dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, rare pyrite, firm to moderately hard, sub blocky.
		90	SANDSTONE: clear to translucent, rare very pale orange, medium to very coarse, dominantly coarse, moderately well sorted, sub angular to sub rounded, weak pyrite cement, trace light brown argillaceous matrix, dominantly loose, generally clean, fair inferred and visible porosity. No fluorescence.
2270	2275	Trace	CLAYSTONE: as above.
		5	SILTSTONE: as above.
		95	SANDSTONE: as above. No fluorescence.
2275	2280	20	COAL: dusky brown, silty in part grading to CARBONACEOUS SILTSTONE, earthy, firm, blocky, uneven, woody texture.
		5	CLAYSTONE: light blueish grey, slightly calcareous, silty, moderately hard to hard, blocky.
		15	SILTSTONE: dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, rare pyrite, firm to moderately hard, sub blocky.
		60	SANDSTONE: clear to translucent, medium to very coarse, dominantly coarse, moderately well sorted, sub angular to sub rounded, weak pyrite cement, rare pyrite nodules, loose, clean, fair to good inferred and visible porosity. No fluorescence.
2280	2285	Trace	CLAYSTONE: as above.
		10	SILTSTONE: as above.
		90	SANDSTONE: as above. No fluorescence.
2285	2290	5	COAL: as above.
		5	CLAYSTONE: light blueish grey, slightly calcareous, silty, moderately hard to hard, blocky.
		10	SILTSTONE: as above.
		80	SANDSTONE: clear to translucent, coarse to dominantly very coarse, moderately well sorted, sub angular to sub rounded, rare pyrite nodules, loose, clean, good inferred and visible porosity. No fluorescence.
2290	2295	30	COAL: dusky brown, silty in part grading to CARBONACEOUS SILTSTONE, earthy, firm, blocky, uneven, woody texture, common quartz inclusions.
		Trace	CLAYSTONE: as above.

## Bream A20A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2295	2300	20	SILTSTONE: dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, rare pyrite, firm to moderately hard, sub blocky.
		50	SANDSTONE: clear to translucent, coarse to dominantly very coarse, moderately well sorted, sub angular to sub rounded, weak pyrite cement, rare pyrite nodules, loose, clean, fair to good inferred and visible porosity. No fluorescence.
		5	CLAYSTONE: as above.
		15	SILTSTONE: as above.
		80	SANDSTONE: clear to translucent, medium to dominantly very coarse, moderately well sorted, sub angular to sub rounded, weak pyrite cement, rare pyrite nodules, loose, clean, fair to good inferred and visible porosity. No fluorescence.
2300	2305		<b>P. Asperopolus Coal at 2302.5 mMDRT, 2006.4 mTVDRT (-1973.6 mTVDSS).</b>
		60	COAL: dusky brown, minor black brittle, silty in part grading to CARBONACEOUS SILTSTONE, earthy, firm to moderately hard, sub blocky, uneven, woody texture.
		Trace	CLAYSTONE: as above.
		20	SILTSTONE: pale brown to dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, firm to moderately hard, sub blocky.
		20	SANDSTONE: clear to translucent, medium to dominantly very coarse, moderately well sorted, sub rounded to sub angular, trace very pale orange argillaceous matrix, weak pyrite cement, rare pyrite nodules, dominantly loose, occasionally hard aggregates, generally clean, fair inferred and visible porosity. No fluorescence.
2305	2310	30	COAL: as above.
		Trace	CLAYSTONE: as above.
		30	SILTSTONE: as above.
		40	SANDSTONE: as above, common very pale orange argillaceous matrix, poor to fair inferred and visible porosity. No fluorescence.
2310	2315	15	COAL: as above.
		Trace	CLAYSTONE: as above.
		20	SILTSTONE: as above.
2315	2320	65	SANDSTONE: as above, common very pale orange argillaceous matrix, poor to fair inferred and visible porosity. No fluorescence.
		10	COAL: as above, minor black brittle.
		5	CLAYSTONE: light blueish grey, slightly calcareous, silty, moderately hard, blocky.
		10	SILTSTONE: pale brown to dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, firm to moderately hard, sub blocky.
		75	SANDSTONE: as above, common very pale orange argillaceous matrix, poor to fair inferred and visible porosity. No fluorescence.
2320	<b>2326</b> <b>TD</b>	5	COAL: dusky brown, silty in part grading to CARBONACEOUS SILTSTONE, earthy, firm to moderately hard, sub blocky, uneven, woody texture.
		5	CLAYSTONE: light blueish grey, slightly calcareous, silty, moderately hard, blocky.
		5	SILTSTONE: moderate brown to dark yellowish brown, very arenaceous grading to very fine SANDSTONE, trace micromicaceous, firm to moderately hard, sub blocky.

## **Bream A20A Lithology / Show Descriptions**

Interval (m) From      To		%	Lithology / Show Description
	85		<p>SANDSTONE: clear to translucent, rare very pale orange, fine to dominantly very coarse, moderately well sorted, sub angular to sub rounded, common very pale orange argillaceous matrix, weak pyrite cement, rare pyrite nodules, dominantly loose, occasionally hard aggregates, generally clean, poor to fair inferred and visible porosity. No fluorescence.</p> <p><b>BMA A20A reached a TD of 2326.0 mMDRT = 2029.7 mTVDRRT (-1996.9 mTVDSS) at 1700 hrs on 17 October 2005.</b></p> <p>CBU. Wiper Trip to shoe.</p> <p>Start circulating at bottom at 0245 hrs on 18 October 2005.</p> <p>Trip gas 10 units at 0325 hrs, 18 October 2005.</p> <p>Last circulation on bottom at 0425 hrs, 18 October 2005. Total circulating time for last circulation on bottom = 1 hrs 40 minutes.</p> <p>Start POOH at 0430 hrs, 18 October 2005 for Reeves Wireline Logging Run #1. Bit on Surface at 12:00 hrs 18 October 2005.</p> <p>At 03:03 hrs, 19 October 2005, start Reeves Logging at Logging speed (0.1 metre/second) from 2323.0 mMDRT to 1123.0 mMDRT (casing at 1123.0 mMDRT)</p> <p>At 04:30 hrs, 19 October 2005, at Tripping speed from 2014.8 mMDRT to surface.</p>

**APPENDIX 4a**

**BREAM A20A**

**Mud Log**



# MASTERLOG

## BMA A20A



GENERAL	SURFACE POSITION	HOLE / CASING INFO	DATE / DEPTH	ENGINEERS
Country : AUSTRALIA Permit : VIC L13 Field : Bream Basin : GIPPSLAND Well Type : DEVELOPMENT Rig Name : NABORS 453	GDA Co-ord X : 147 46 20.056 E GDA Co-ord Y : 38 29 58.899 S MGA Co-ord X : 567338.25mE MGA Co-ord Y : 5738458.02mN RT to MSL : 32.82m RT to Sea Bed : 92.22m	8-1/2" Hole to 2326.0m MDRT  10-3/4" Surface Csg at 1123.0m MDRT 7" Production Csg at 2321.0m MDRT	Spud Date : 14-10-2005 Total Depth Date : 17-10-2005 Total Depth : 2326.0m MDRT True Vertical Depth : 2029.7 m Log Scale : 1/ 500	Mark Smith V.B. Jagarlamudi Steve Oades

ABBREVIATIONS		LITHOLOGY LEGEND				ENGINEERING LEGEND	
MW Mud Weight FV Funnel Viscosity PV Plastic Viscosity YP Yield Point Gel Gel Strength WL Water Loss KCl Potassium Chloride Cl Chlorides Incl Inclination Az Azimuth	WOB Weight on Bit (klbs) RPM Rotations Per Min FLW Flow Rate (gpm) SPP Pump Pressure (psi) RR Re-Run Bit TG Trip Gas CG Connection Gas BG Background Gas DGP Drilled Gas Peak MM Mud Motor	CLAYSTONE SILTSTONE SST: F - V FINE SST: MEDIUM SST: COARSE SHALE	MARL LIMESTONE DOLOMITE CHERT CONGLOMERATE COAL	BRYOZOA RADIOLARITES ECHINOIDS CORALS FORAMINIFERA LITHIC FRAGMENT	CARB FRAGMENT QUARTZITE INTRUSIVES GLAUCONITE PYRITE CEMENT	CASING SHOE LINER HANGER BIT CHANGE DEVIA. SURVEY SWC UNRECOV SIDEWALL CORE CORE	WIRELINE LOGS MDT POINTS: PRESSURE ONLY SAMPLE SEAL FAILURE TIGHT

ROP (m/hr)				DEPTH (m) (TVD)	CUTTINGS LITHOLOGY	RESERVAL GAS DATA						CUT FLUOR	DIRECT FLUOR	LITHOLOGICAL DESCRIPTIONS and REMARKS	
500	50	5	.5			C1	C2	C3							
WOB (tons)						iC4	nC4	iC5	TG						
MWD Gamma Ray (api)						Total Gas in Units Chromatograph in PPM									
50	25	0		%	.5	5	50	500	5K	good	fair	poor	good	fair	poor
0	100	200		0	100	100	1K	10K	100K	1000K					
				1110											
				1120											
				1130											
				1140											
				1150											
				1160											

MW: 9.6  
FV: 54  
PV: 13  
YP: 19  
Gel: 7/16  
WL: 5.0  
pH: 10.8  
Cl: 35.5k

WOB: 16-20  
TDRPM: 0  
MMRPM: 148  
SPP: 1230  
FLW: 512

WOB: 5-10  
TDRPM: 60  
MMRPM: 153  
SPP: 1500  
FLW: 528

Tie in Survey: 1123.20mMD (877.72mTVD)  
50.12°inc 222.56°az

Survey: 1130.05mMD (882.2mTVD)  
47.49°inc 222.04°az

BIT #1 8-1/2"  
Smith S73PX  
Jets: 6x20  
In : 1123.0m MDRT  
Out : 1193.0m MDRT  
Run : 70.0m  
Hrs : 1.2  
Cond: 0.0-NO-A-X-IN-NO-DP  
BIT #1RR 8-1/2"  
Smith S73PX  
Jets: 6x20  
In : 1123.0m MDRT  
Out : 2326.0m MDRT  
Run : 1203.0m  
Hrs : 54.4  
Cond: 2-2-WT-A-X-1/16-ER-TD  
Survey: 1158.55mMD (902.6mTVD)  
44.25°inc 225.04°az

PREVIOUS WELL HISTORY  
Plugged & Abandoned October,2005

10-3/4" Surface Csg 1123.0m MDRT

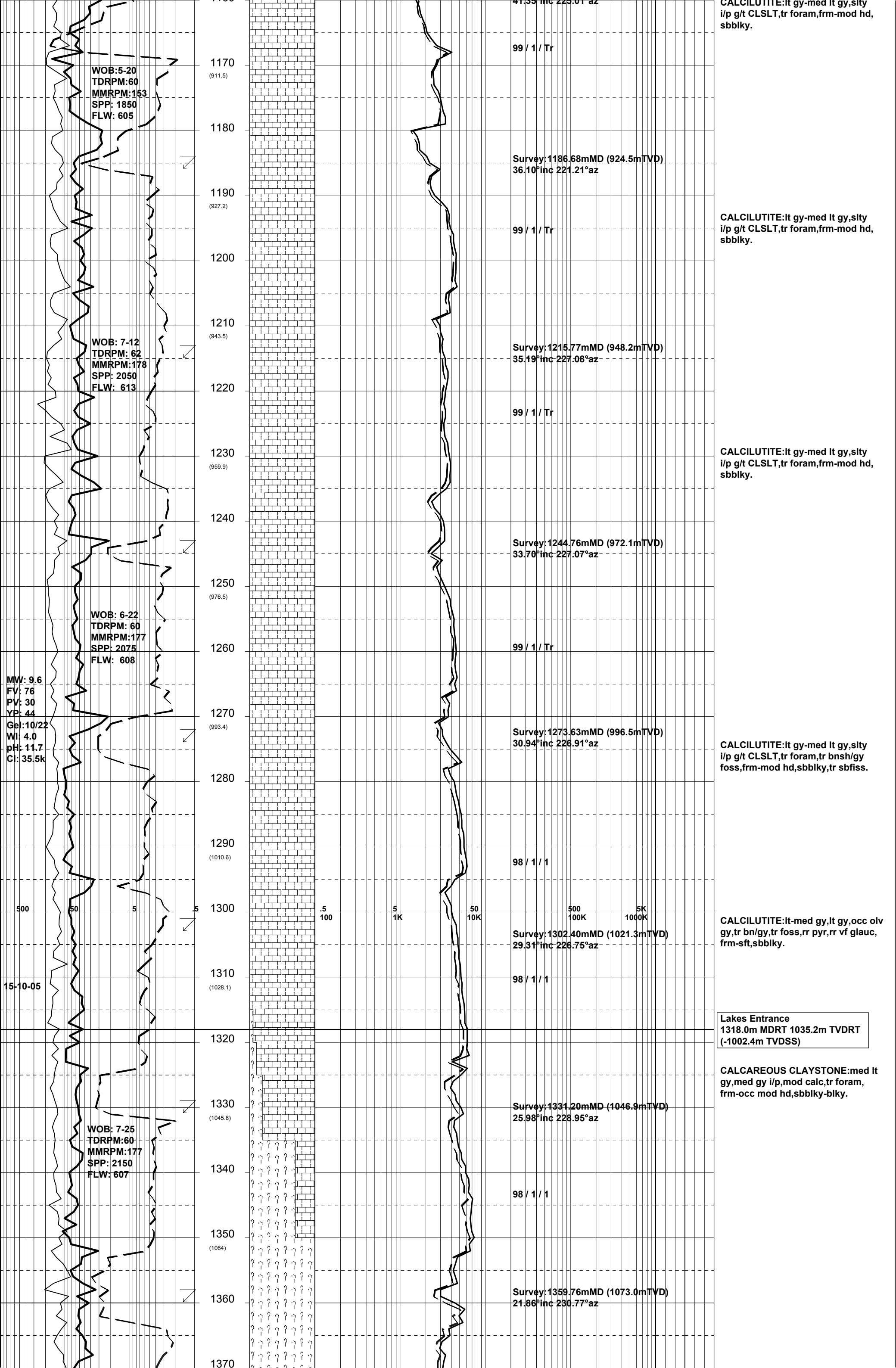
7" Casing cut and pulled from  
1195.0m MDRT  
Cement plug at 1106.0m MDRT  
Drill cement from 1106.0m MDRT to  
1193.0m MDRT with no new formation  
Set cement plug #2 at 1079.0m MDRT

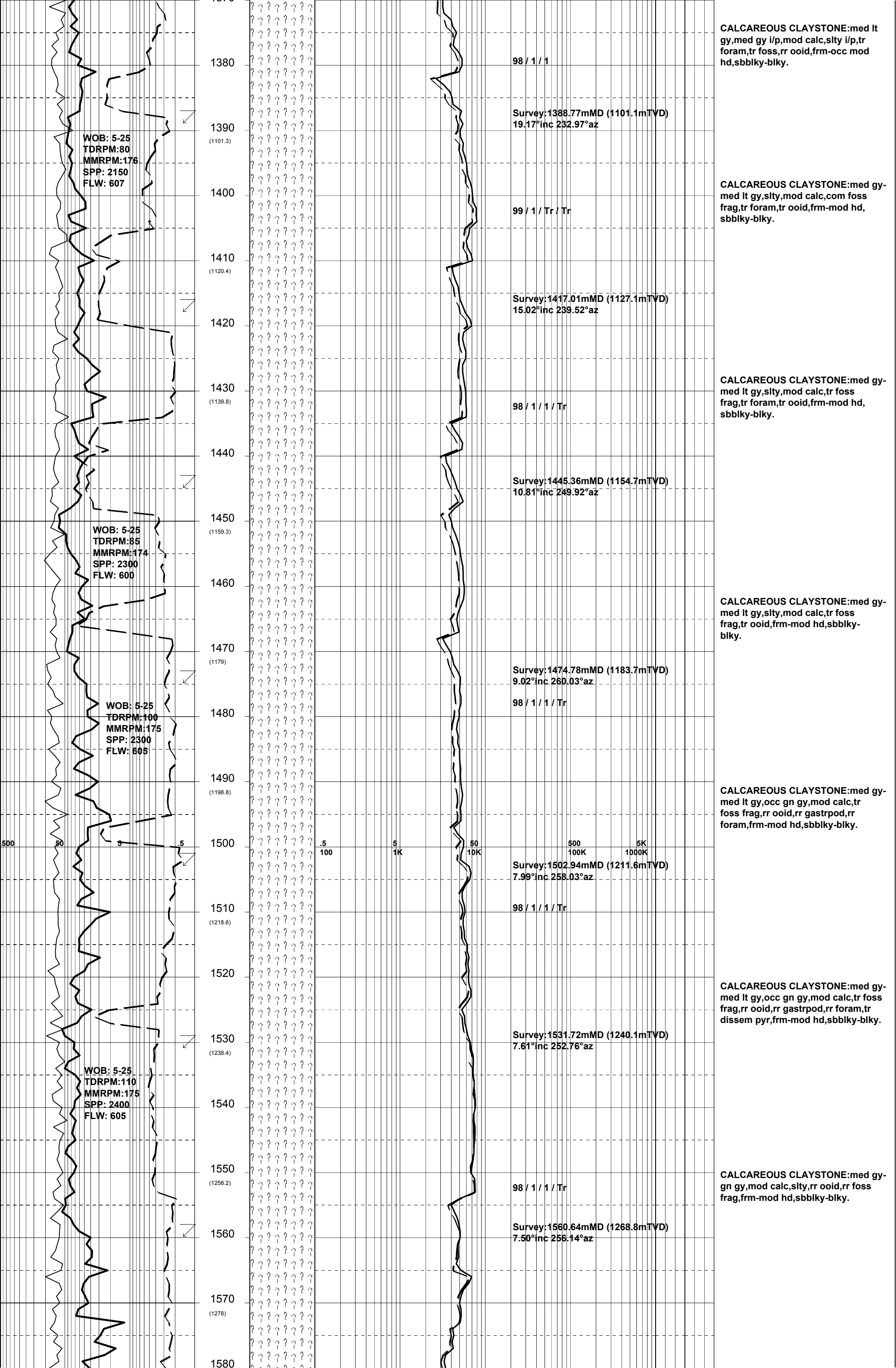
Drill with KCl/Glycol/PHPA  
mud system.

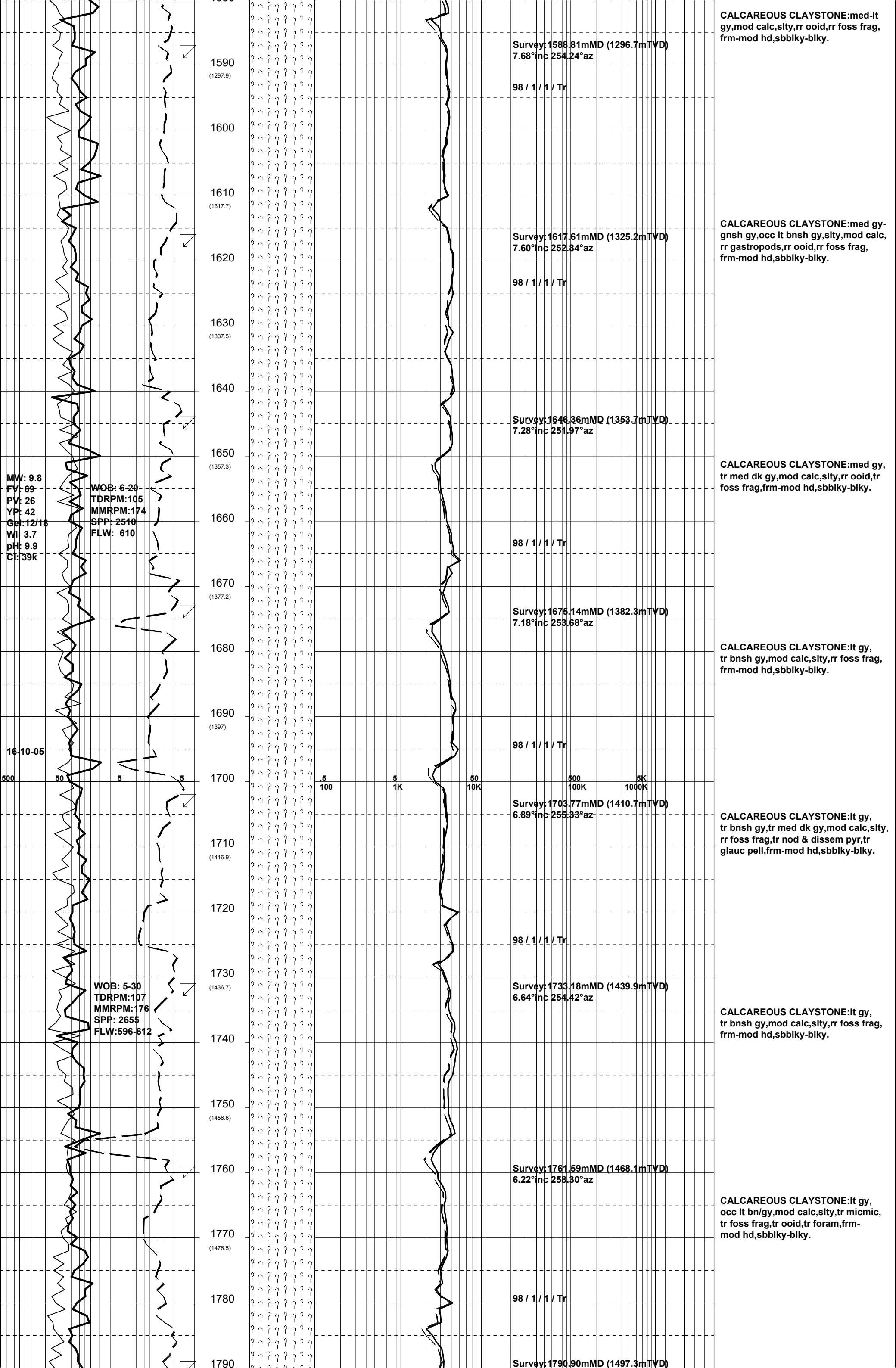
Bream A20A spudded from  
1123.0 mMDRT at 01:30 hours  
on 14-10-2005

PIT at 1159.0m MDRT 900.7m TVDRT  
540 psi, 9.5 ppg, EMW:13.0 ppg

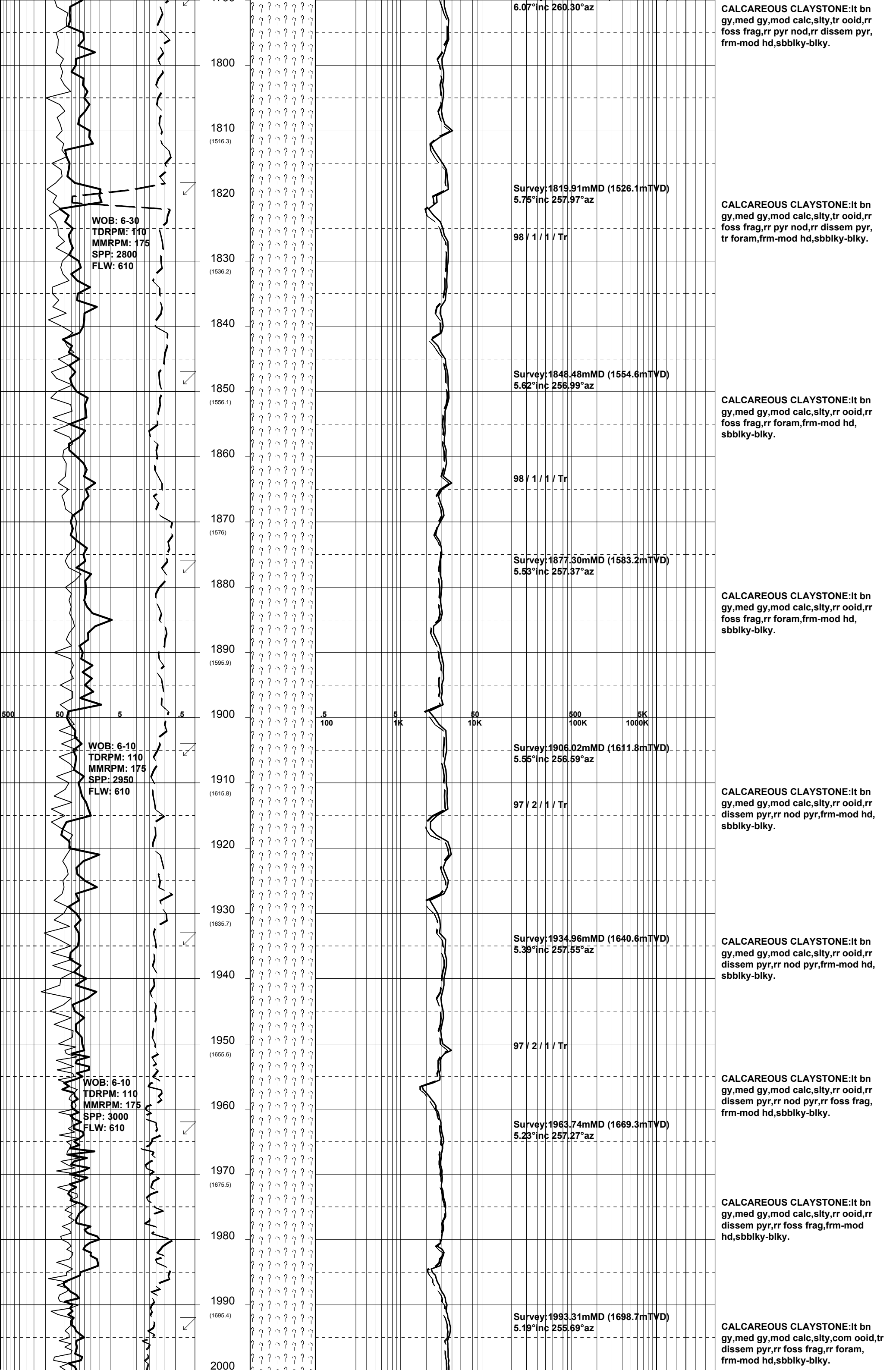
No H2S or CO2 Detected

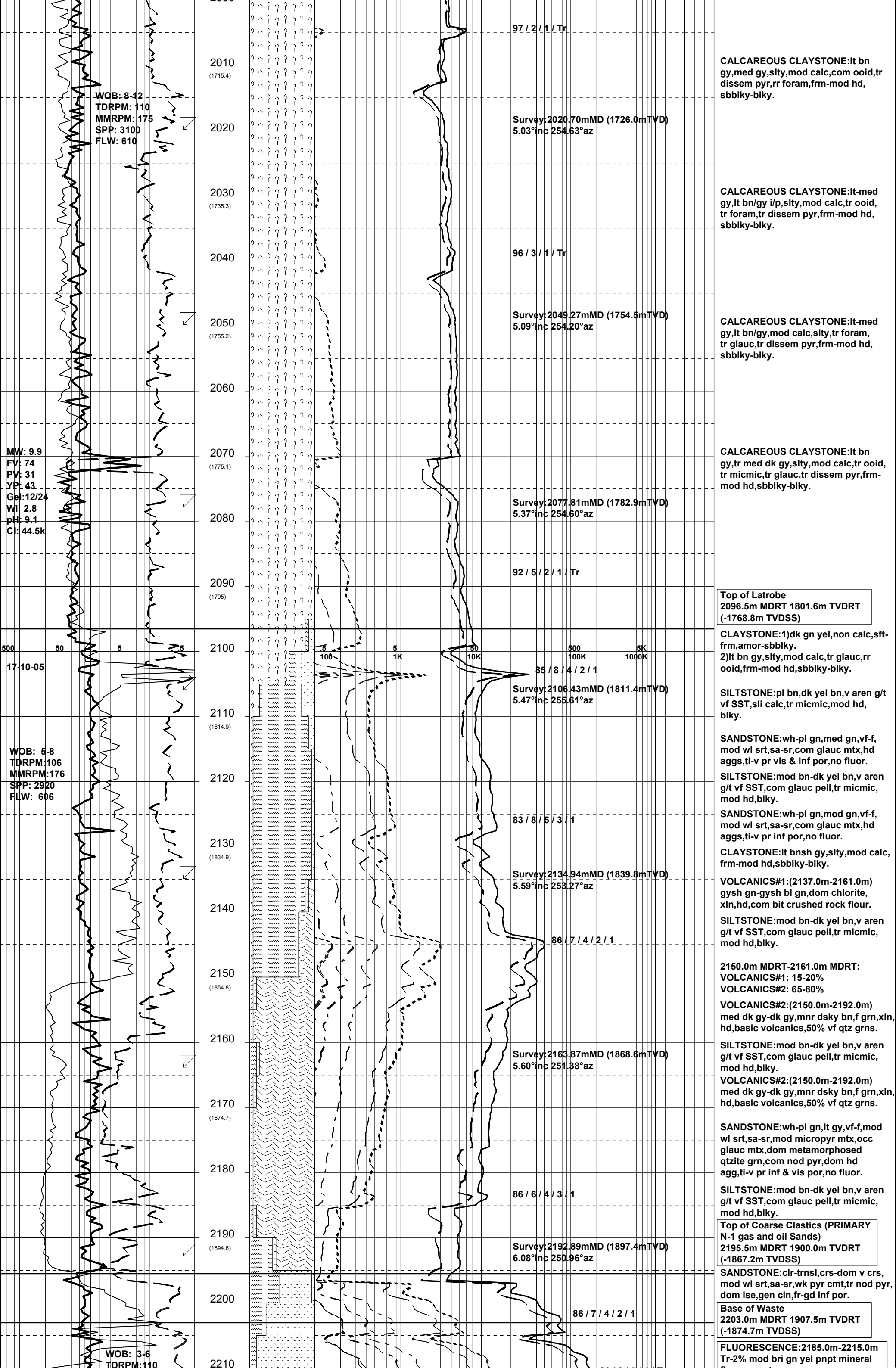


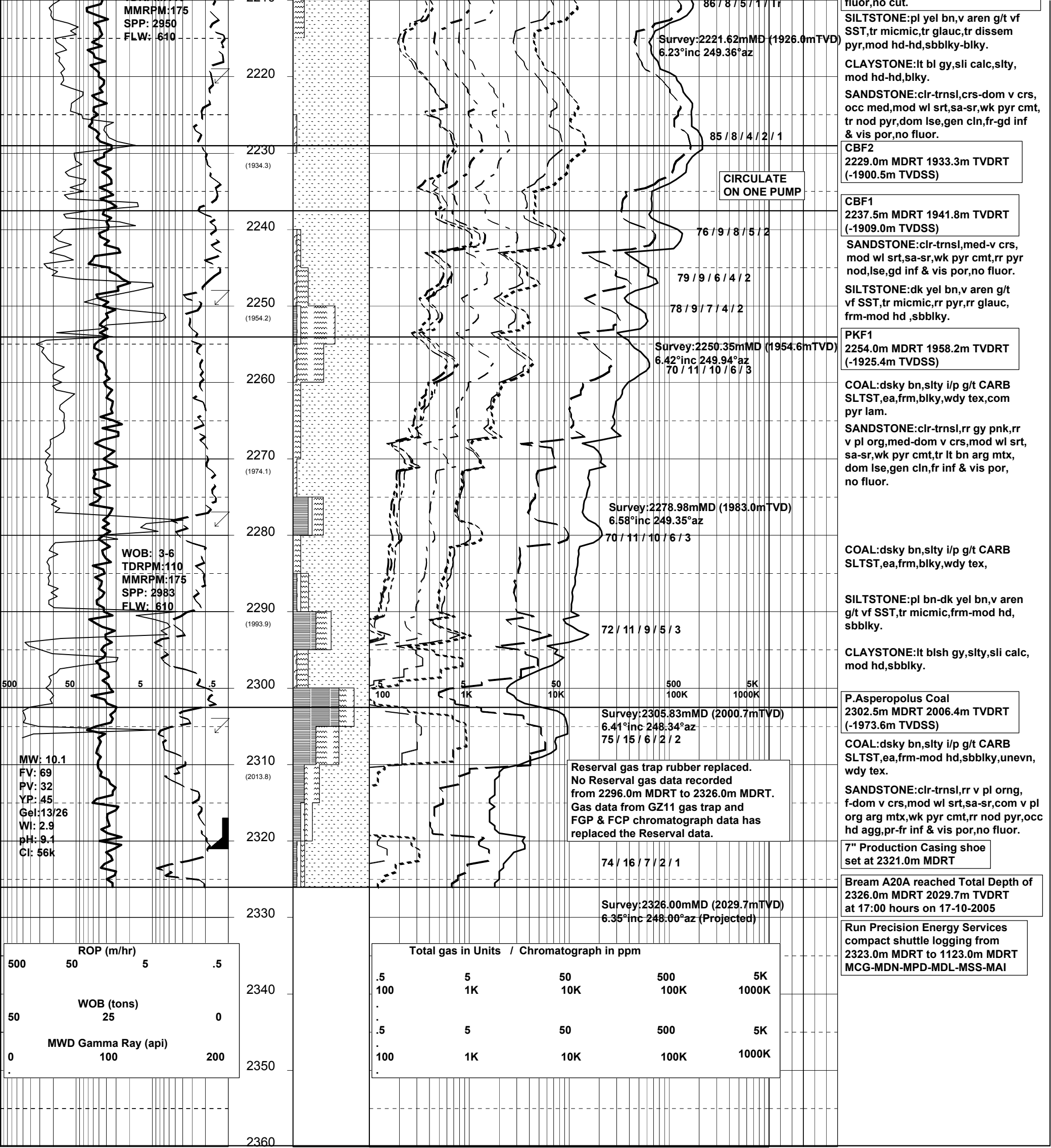












**APPENDIX 4b**

**BREAM A20A**

**Well Completion Log**





















ESSO AUSTRALIA RESOURCES PTY LTD.

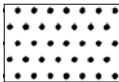
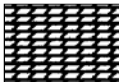

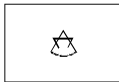

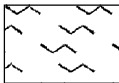



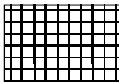

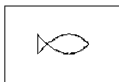
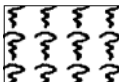

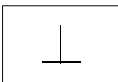
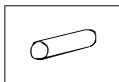
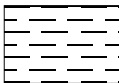

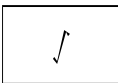


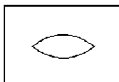
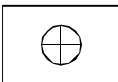

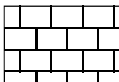
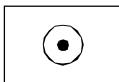
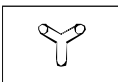
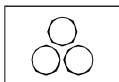
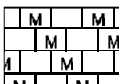

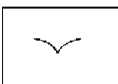

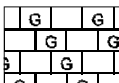
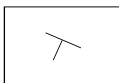

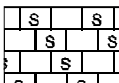
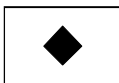
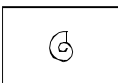
WELL COMPLETION LOG  
Scale – 1:200  
**BREAM A-20A**

Gippsland Basin, Victoria  
Concession: VIC/L13

<b>POST-DRILL LOCATION:</b> <i>Top of Latrobe</i>	Latitude:	38° 30' 16.103" S	<b>COMPILED BY:</b>	Sheryl Sazenis
	Longitude:	147° 45' 54.548" E	<b>DRAFTED BY:</b>	Arnaldo Ribeiro
	MGA X:	566715.97 mE	<b>DRILLED BY:</b>	Nabors Rig 453
	MGA Y:	5737932.87 mN	<b>Datum:</b>	GDA94 (GRS80)
	Depth	2096.5m MDRT 1801.5m TVDRT (-1768.7mTVDSS)	<b>Projection:</b>	MGA/ UTM Zone 55 (S)
<b>ELEVATION:</b>	G.L.:	-59.40 m	<b>TOTAL DEPTH:</b>	2326.0 mMDRT / 2029.7 mTVDRT
	R.T.:	32.82 m		
	Water Depth:	59.40 m		
<b>DATES:</b>	Spudded:	12/10/2006	<b>PLUGGED BACK T.D.:</b>	2267.6m MDRT
	Rig Released:	24/10/2005	<b>CLASSIFICATION:</b>	Development
	I.P. Established:	15/11/2005	<b>STATUS:</b>	Cased and Completed
	<i>(Initial production)</i>			
<b>SERVICE COMPANIES:</b>				
DRILLING CONTRACTOR:	International Sea Drilling Limited (Nabors Rig 453)		PRODUCTION TESTING:	n/a
MWD/DIRECT. DRLG:	Schlumberger Anadrill		DIVERS:	n/a
GYRO SURVEYING:	SDI		MUD LOGGING:	Geoservices Overseas S.A.
CORING:	n/a		PRESSURE RECORDING:	n/a
PIPE CONVEYED LOGGING:	Precision(Reeves Compact Shuttle Logging System)		WELL VELOCITY SURVEY:	n/a
CEMENTING:	Halliburton		MUD ENGINEERING:	Halliburton- Baroid
CASING:	Weatherford		LINER:	n/a

LEGEND

<div>2.7m NOS </div> <div>Ø = 17%</div> <div>Sw = 32%</div>		LOG ANALYSIS DATA		 SHOW OR STAIN	
		NS - Net Sand		 HYDROCARBON CUT	
		NOS - Net Oil Sand		 FLUORESCENCE	
		NGS - Net Gas Sand		 GAS SHOW	
		Sw - Water Saturation		 OIL PRODUCTIVE	
<div><div><div>No Rec.</div><div>Rec.</div></div><div>CORE</div></div>		MUD DATA		 GAS PRODUCTIVE	
		Ø - Porosity		 INTERPRETED OIL PRODUCTION	
		Snd - Sand		 INTERPRETED GAS PRODUCTION	
		MW - Mud Weight		 INTERPRETED WATER PRODUCTION	
		FV - Funnel Velocity		 WATER PRODUCTIVE	
		PV - Plastic Velocity		 CONDENSATE PRODUCTION	
		YP - Yield Point		 INTEPRETED CONDENSATE BEARING	
		Gel - Gel Strength		<div>DSTG </div> DST WITH GAS RECOVERED	
		pH - Acidity/Alkalinity		<div>DSTO </div> DST WITH OIL RECOVERED	
		WL - Water Loss		 SURVEY POINT	
		Cl - Chloride		<div>13-3/8" </div> CASING SHOE	
		Ca - Calcium		 MUD	
		Sol - Solids			
		H2O - Water			
		Oil -Oil			
<div><div>PERFORATED INTERVAL</div></div>		← SST RECOVERED SIDE WALL CORE LITHOLOGY			
		SST - Sandstone CLST - Claystone			
		SLST - Siltstone LMST - Limestone			
		MST - Mudstone ML - Marl			
		SH - Shale COAL - Coal			
<div><div>PLUG</div></div>		← SIDE WALL CORE - NO RECOVERY			
		← FIT			
		← P2/11 MDT/RFT PRETEST RUN/SEAT NUMBER			
		← S11/2 MDT/RFT SAMPLE RUN/SAMPLE NUMBER			
		← P2/40 MDT VERTICAL/HORIZONTAL PERMEABILITY TEST			
<div><div>PACKER</div></div>					
<div><div>BRIDGE PLUG</div></div>					

LITHOLOGICAL SYMBOLS							
	Sandstone		Dolomite		Mica		Pelecypods
	Siltstone		Marl		Chert		Echinoids
	Mudstone		Anhydrite		Carbonaceous Matter		Fish Remains
	Claystone		Volcanics		Calcareous		Plant Remains
	Shale		Basement		Glaucconite		Spores
	Coal		Granule		Corals		Leaves
	Limestone		Oolites		Bryozoans		Foram
	Micritic Limestone		Dolomite		Brachiopods		Fossils
	Grain Limestone		Pyrite		Gastropods		
	Skeletal Limestone		Pyrite		Cephalopods		

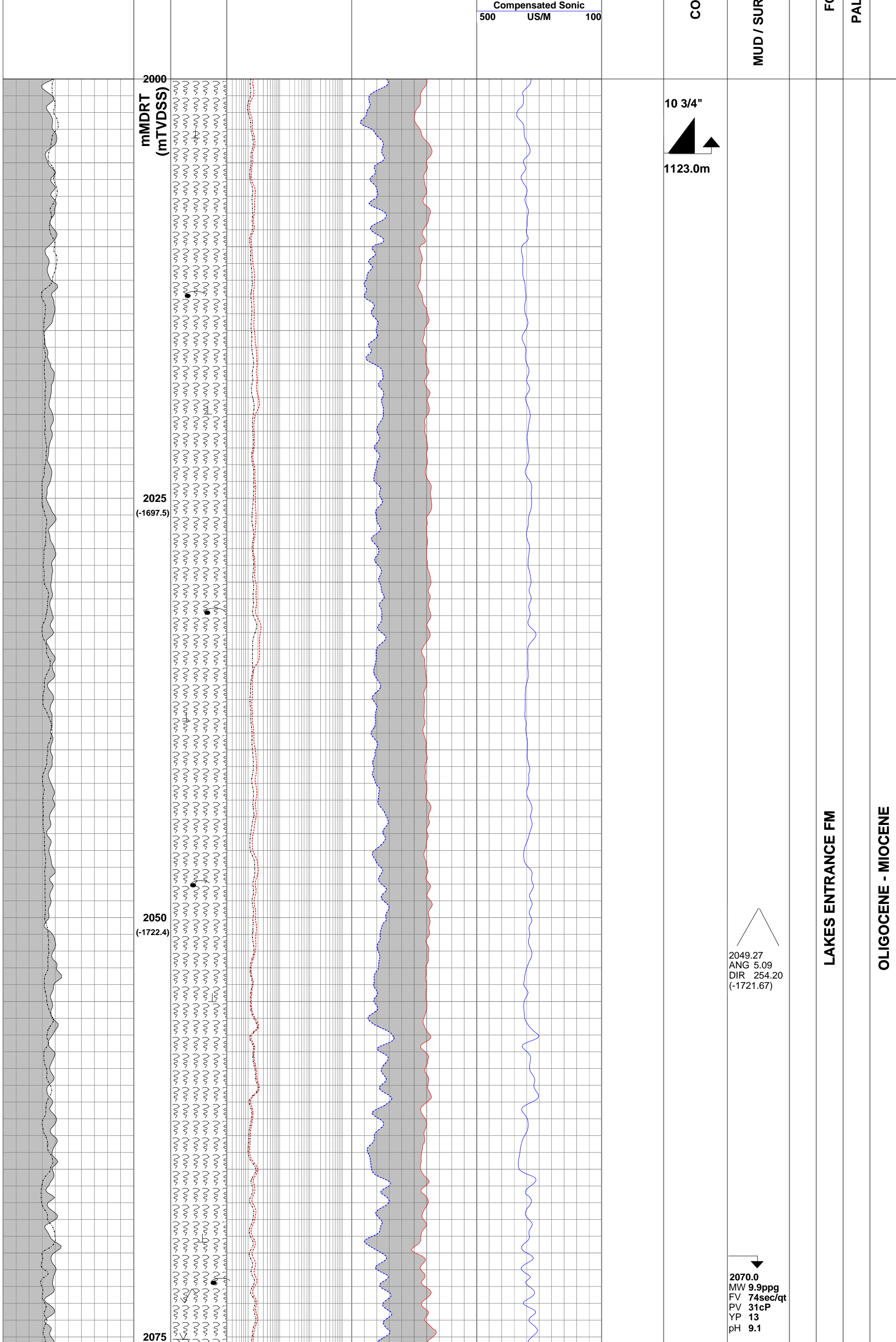
LOGGING AND SURVEYING			
<b>Anadrill Schlumberger</b>	<b>Interval (mMDRT)</b>	<b>Reeves</b>	<b>Interval (mMDRT)</b>
MWD (Directional & GR) – 2 Runs	1123.0 mMDRT - 2326.0 mMDRT	MCG-MDN-MPD-MSS-MDL – 1 Run	2323.0 mMDRT- 1123.0 mMDRT

WELL DATA				
Date	12 October 2005 - 12 October 2005	13 October 2005 - 18 October 2005	18 October 2005 - 19 October 2005	
Run	MWD # 1	MWD # 2	Wireline Run #1 on shuttle	
Log	Powerpulse Directional & GR	Powerpulse Directional & GR	MCG-MDN-MPD-MSS-MDL	
Depth Driller	1193.0 mMDRT	2326.0 mMDRT	2326.0 mMDRT	
Depth Logger	1193.0 mMDRT	2326.0 mMDRT	2326.0 mMDRT	
Bottom Log Interval	1193.0 mMDRT	2326.0 mMDRT	2323.0 mMDRT	
Top Log Interval	1123.0 mMDRT	1193.0 mMDRT	1123.0 mMDRT	
Casing Driller	1123.0 mMDRT	1123.0 mMDRT	1123.0 mMDRT	
Casing Logger	1123.0 mMDRT	1123.0 mMDRT	1123.0 mMDRT	
Casing Size	10 .75"	10 .75"	10 .75"	
Casing Weight	40.5 ppf	40.5 ppf	40.5 ppf	
Bit Size	8.5"	8.5"	8.5"	
Type of Fluid in Hole	KCI/PHPA/GLYCOL	KCI/PHPA/GLYCOL	KCI/PHPA/GLYCOL	
Density	9.60 ppg	10.10 ppg	10.15 ppg	
Rm @ Measured Temp.	N/A	N/A	0.116	
Rmf @ Measured Temp.	N/A	N/A	0.107	
Rmc @ Measured Temp.	N/A	N/A	0.211	
Max. Recorded Temp.	34.0°C	80.0°C	77.9°C	
Equipment / Location	Sale	Sale	Sale	
Recorded By	R.Borjas / B.Pattarakorn	R.Borjas / B.Pattarakorn	B.Moss / G.McManus	
Witnessed By	Trevor Lobo	Trevor Lobo	Trevor Lobo	

CORES			PERFORATIONS		
From (mMDRT)	To (mMDRT)	Rec %	From (mMDRT)	To (mMDRT)	Gun Type
			2237.5	2239.0	MaxR

CASING				PLUGS		
Size	Set @ (mMDRT)	SX Cmt	Formation	From (mMDRT)	To (mMDRT)	SXCmt
10. 75"	1123.0	---	Gippsland Limestone			
7"	2321.0	440	Latrobe Group	2267.6	2326	--

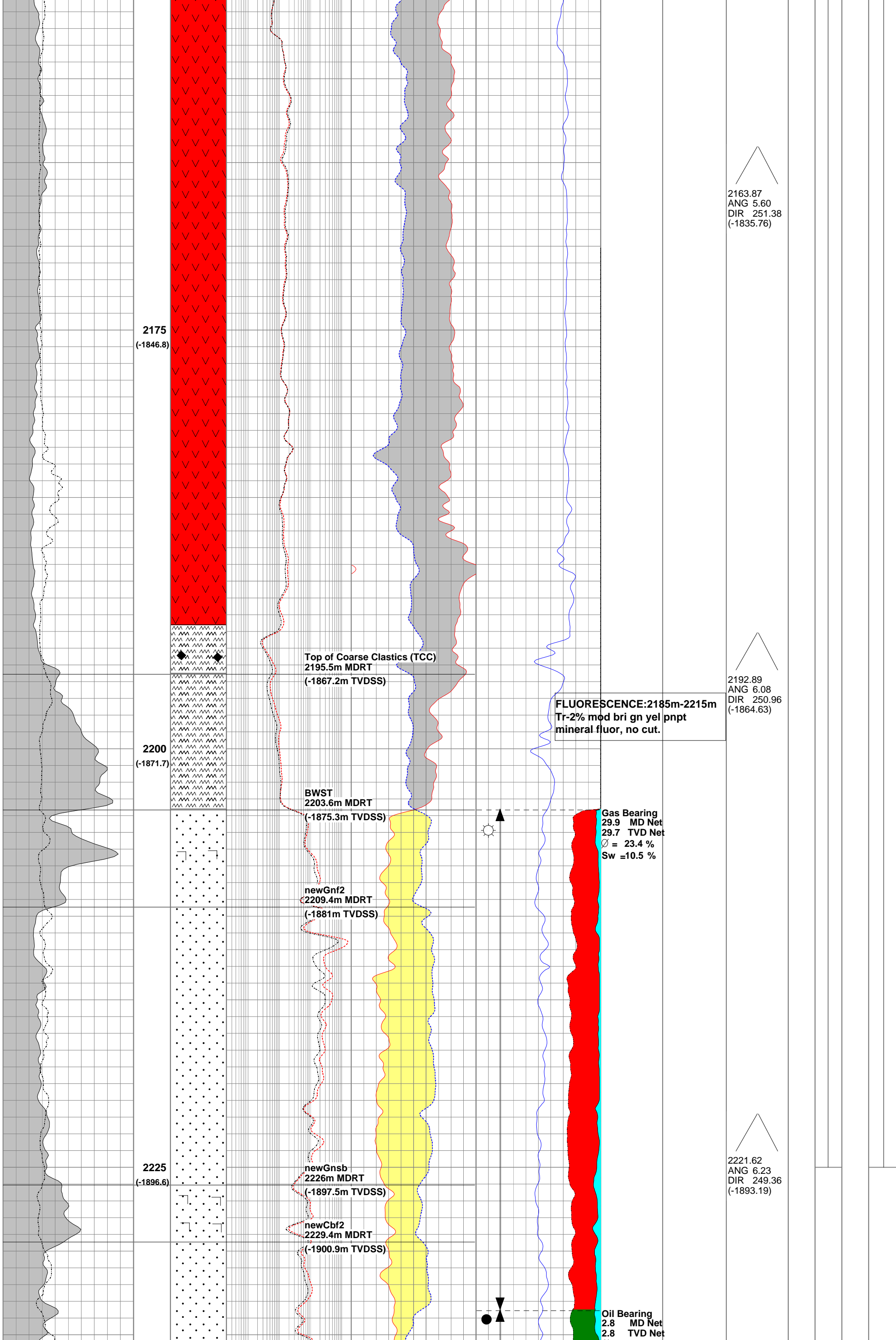
Density Caliper			DEPTH	LITHOLOGY	Deep Laterolog			Compensated Density			Effective Porosity			TEST	MPLETION	VEY DATA	PLUGS	ORMATION	YNOLOGY	AGE
6	IN	16			0.2	OHMM	2000	1.85	G/C3	2.85	1	V/V	0							
Gamma Ray					Shallow Laterolog			Neutron Porosity			Bulk Vol Water									
0	GAPI	200		0.2	OHMM	2000	0.45	V/V	-0.15	1	V/V	0								







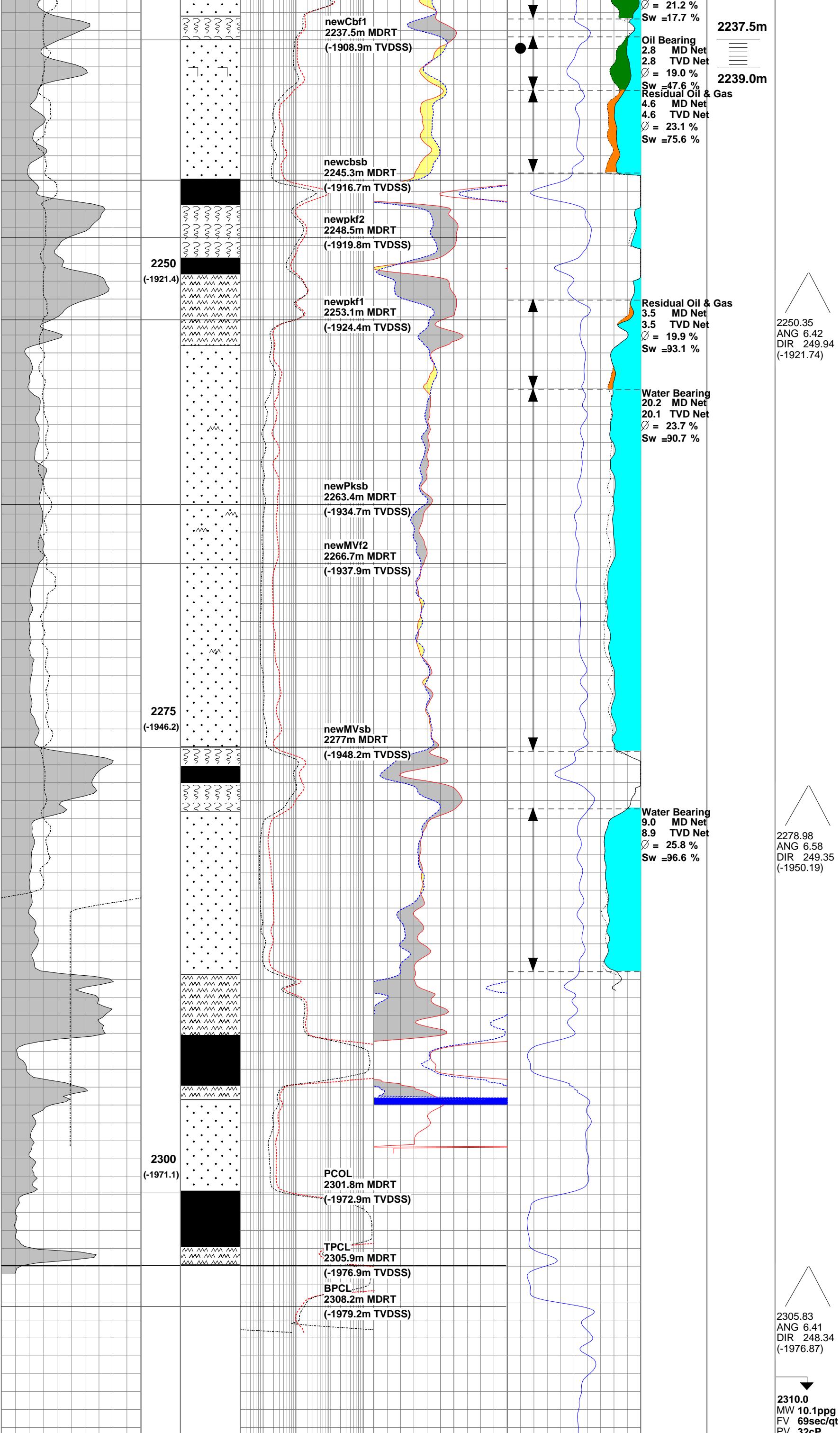




2163.87  
ANG 5.60  
DIR 251.38  
(-1835.76)

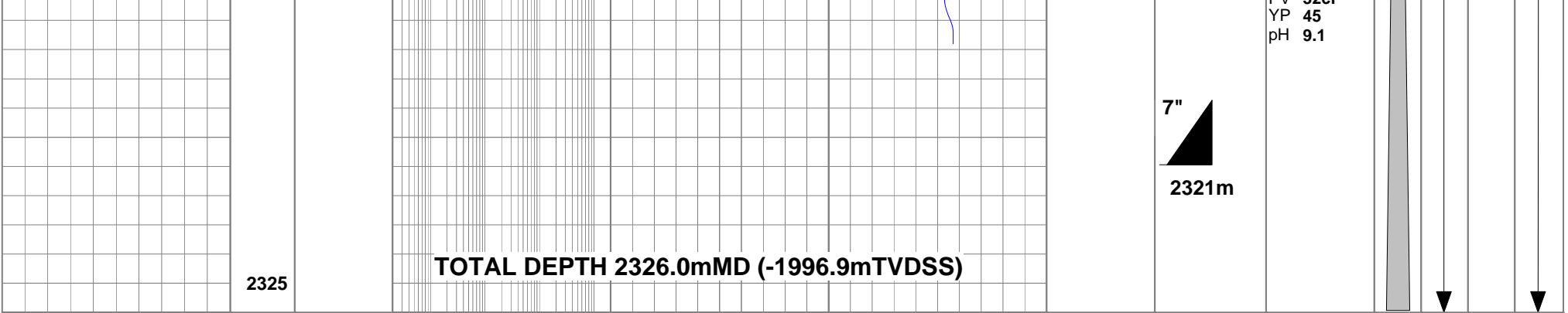
2192.89  
ANG 6.08  
DIR 250.96  
(-1864.63)

2221.62  
ANG 6.23  
DIR 249.36  
(-1893.19)



LATROBE GROUP

PALEOCENE - EARLY EOCENE



GRGC	Gamma Ray	<div>Bream A20A</div> <div>Initial Production Date: 15/11/2005</div> <div>Production Zone N-1</div> <div>Initial Total Liquid Rate 333 kL/day, 25%watercut</div>
CLDC	Density Caliper	
DSLL	Shallow Laterolog	
DGLL	Groningen Deep Laterlog	
DEN	Compensated Density	
NPRL	Limestone Neutron Porosity	
DT35	Compensated Sonic	
PIGN	Effective Porosity	
VUWA	Bulk Volume Water	