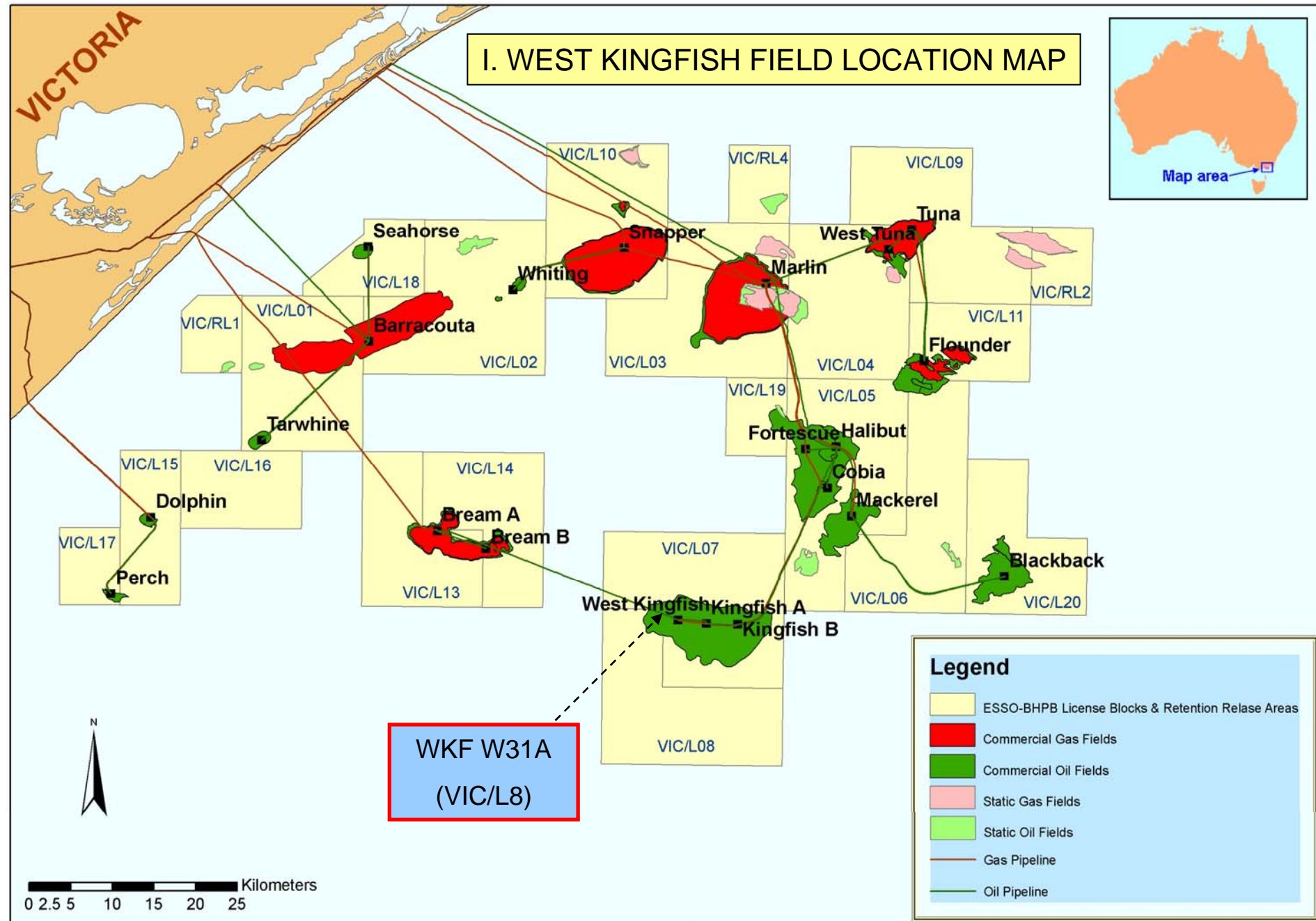


**WELL COMPLETION REPORT**  
**WEST KINGFISH W31A**  
**GIPPSLAND BASIN, VICTORIA**

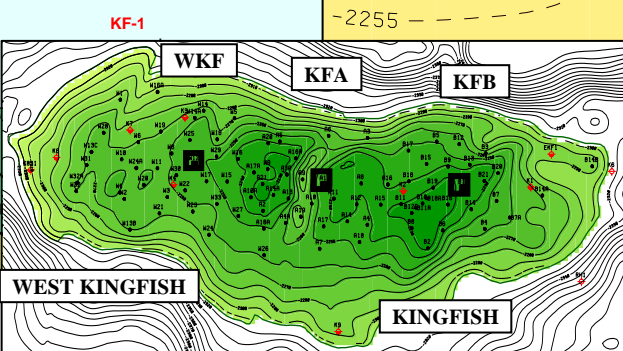
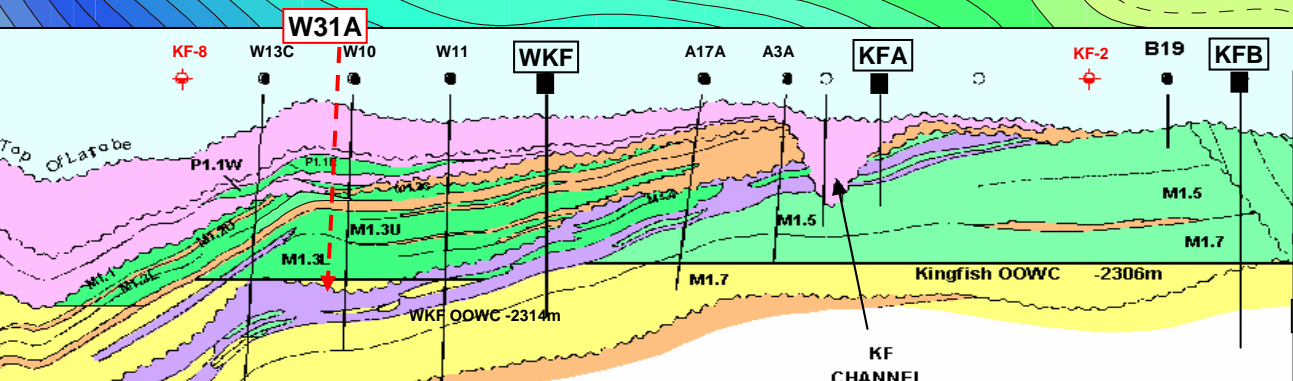
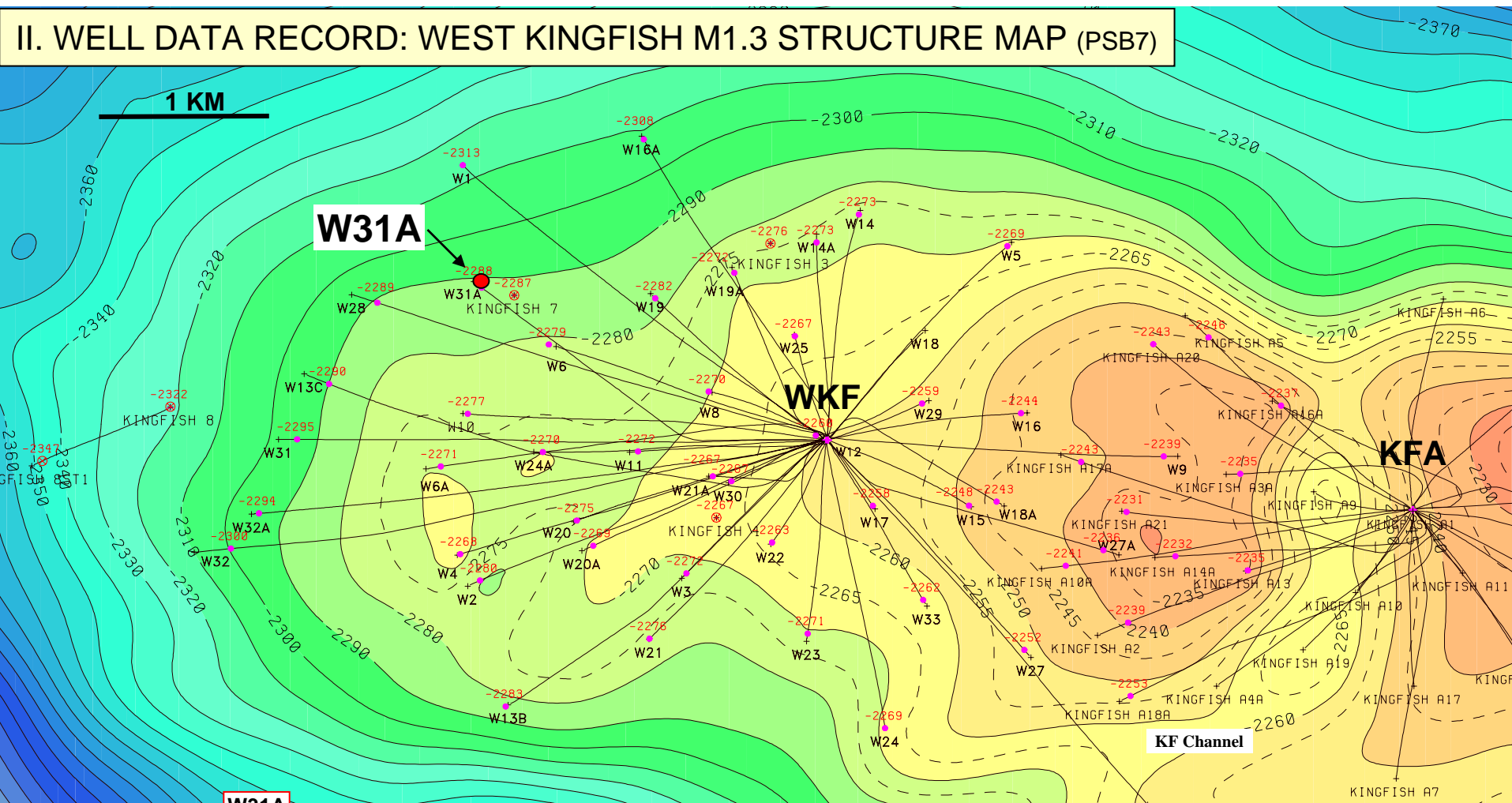
Author: Mike Hordern  
Compiler: Sheryl Sazenis  
November 2006

## CONTENTS

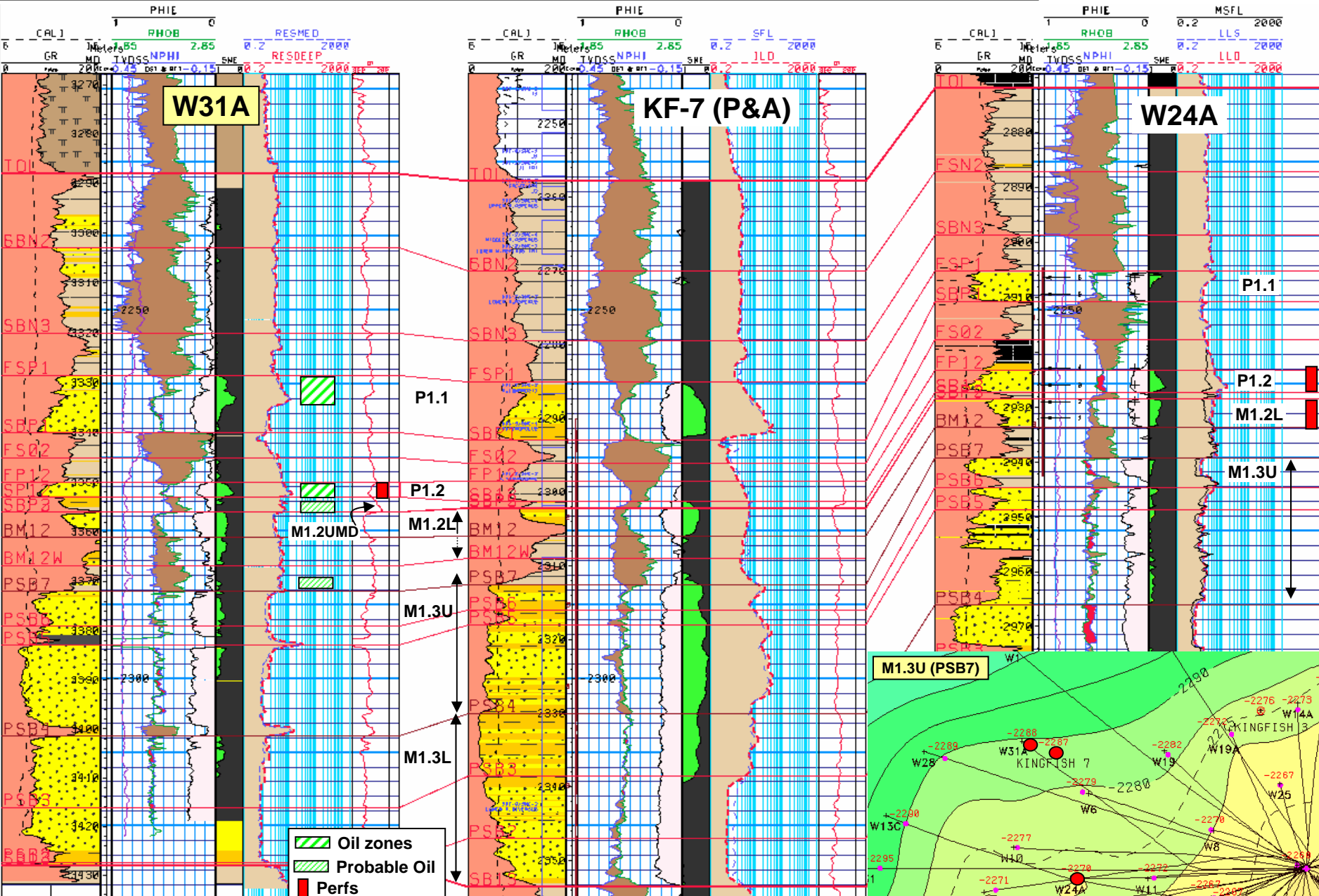
<b>WEST KINGFISH W31A</b>	<b>1</b>
<b>I. WEST KINGFISH FIELD LOCATION MAP</b>	<b>1</b>
<b>II. WELL DATA RECORD: M1.3 Structure Map</b>	<b>2</b>
<b>II. WELL DATA RECORD: Well Log Cross-Section</b>	<b>3</b>
<b>II. WELL DATA RECORD – W31A (cont'd)</b>	<b>4</b>
<b>LOCATION</b>	<b>4</b>
<b>MISCELLANEOUS</b>	<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>COMPLETION SCHEMATIC</b>	<b>7</b>
<b>III. SAMPLES – W31A</b>	<b>8</b>
<b>CONVENTIONAL CORING</b>	<b>8</b>
<b>SIDEWALL CORING</b>	<b>8</b>
<b>IV. LOGS AND SURVEYS – W31A</b>	<b>9</b>
<b>V. RESERVOIR &amp; FORMATION TOPS - W31A</b>	<b>10</b>
<b>VI. GEOLOGICAL ANALYSIS – WEST KINGFISH W31A</b>	<b>11</b>
 <b>VII. APPENDICES</b>	
1. Survey Data & Listing	
1a. Survey Data	
1b. MD-TVD Survey Data Listing	
2. Petrophysics	
2a. Petrophysics Evaluation Summary	
3. Sample Descriptions	
3a. Lithology/Show Descriptions	
4. Logs	
4a. Mud Log	
4b. Well Completion Log	



II. WELL DATA RECORD: WEST KINGFISH M1.3 STRUCTURE MAP (PSB7)



## II. WELL DATA RECORD: WELL LOG CROSS-SECTION THROUGH W31A



## II. WELL DATA RECORD – W31A (cont'd)

### LOCATION

<b>Field</b>	<b>West Kingfish</b>		
<b>Well Name</b>	<b>W31A</b> (Predrill Loc G)	<b>Conductor #31 Surface Coordinates</b>	
<b>Conductor Number</b>	Slot 31	(MGA94 ) X	596265.03m E
<b>State</b>	Victoria	(MGA94) Y	5727807.76m N
<b>Permit/Licence</b>	Vic/L8	Latitude	38° 35' 34.800" S
<b>Geological Basin</b>	Gippsland	Longitude	148° 06' 19.408" E
<b>Top of Latrobe</b>	3288.0m MDRT	<b>Perforations</b> (driller)	3350.0- 3353.0 m MDRT
	2264.8m TVDRT		2306.8 – 2308.8m TVDRT
	-2231.4m TVDSS		(-2273.4 – 2275.4m TVDSS)
(MGA94) X	594312.20m E	<b>Datum</b>	GDA94 (Geocentric Datum of Australia)
(MGA94) Y	5728657.31m N	<b>Spheroid</b>	GRS80 (Geodetic Ref. System 1980)
Latitude	38° 35' 8.16" S	<b>Projection</b>	UTM (Universal Transverse Mercator)
Longitude	148° 04' 58.44" E	<b>Map Grid / Zone</b>	MGA Zone 55
		<b>Central Meridian</b>	147 deg E

### ELEVATIONS & DEPTHS

<b>Water Depth</b>	76.13 m
<b>Main Deck Rel to MSL</b>	25.12m
<b>RT Relative to MSL</b>	33.43m
<b>Average Well Angle</b>	48 deg in Latrobe
<b>Max Well Angle</b>	59.9 deg at 1061m
<b>Total Depth</b>	3450.0m MDRT
	2373.2m TVDRT
	(-2339.8m TVDSS)
<b>Plug Back Depth</b>	3379m MDRT (Actual wireline HUD)
	[original PBTD 3417m]

### DATES

<b>Skid Rig</b>	20/06/2006
<b>Kicked Off</b>	21/06/2006
<b>Development Rig Days</b>	25
<b>NPT Days</b>	6.14
<b>Rig Released</b>	15/07/2006
<b>I.P. Established</b>	01/08/2006

### 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>Licensee</b>	Esso/BHPBilliton	<b>Equipment Type</b>	Platform
<b>Other JV Interest</b>	50% (BHPB)	<b>Completion Type</b>	Single
<b>Overriding Royalty</b>	2.5% (Weekes)	<b>Completion Size</b>	2-7/8"
<b>Drilling AFE No.</b>	L0501F655		

### WELL CLASSIFICATION

<b>Before Drilling</b>	Oil Development	<b>After Drilling</b>	Cased & Completed - Oil well
------------------------	-----------------	-----------------------	------------------------------

## II. WELL DATA RECORD – W31A (cont.)

### CASING RECORD

Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Conductor *	20				186
Surface *	13 <sup>3</sup> / <sub>8</sub>	68.0	K-55/N-80	BTC	1300
Production	7	26.0	L-80	Vam Top HC	3443.0
Tubing	2 <sup>7</sup> / <sub>8</sub>	6.5	13Cr-80	Vam Ace	3305.3

\* Pre-existing W31 casing strings

### 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	AB  CLASS G	485	Gascon-469 30gal / 10 bbl  HALAD-413L 30gal / 10 bbl  NF-6 0. 25gal/ 10 bbl  CFR-3L 5.0 gal / 10 bbl  SCR-100L 7.0 gal / 10 bbl	60	101	15.8	TD 3450 to 2725.0	3000 (15mins)



## II. WELL DATA RECORD (cont.)

### DRILLING PERFORMANCE

#### West Kingfish W31A - Final Well Report

#### GENERAL

Platform:	West Kingfish	Rig:	Nabors 453	Reservoir:	P1.1, P1.2, M 1.2L sands
Well:	W31A	Well Slot:	#31	RT-MSL (Rig453)	33.43
Drilling Complexity Index	3.2	Wellwork Complexity Index	1.8		
DEPTH		PERFORMANCE		MUD	
m MDRT	3450.0	20" Cond. Hole	N/A	Max Wt (ppg)	9.8
m TVDRT	2373.2	12-1/4" Surf. Hole	N/A	Type (Surf. Hole)	N/A
Vert. Section (m)	2247.1	8-1/2" Prod. Hole	180 m/day	Type (Inter. Hole)	N/A
INCLINATION		6" Liner Hole	N/A	Type (Prod. Hole)	KCl/PHPA/Poly/Glycol
Max (deg) / Ave (deg)	59.9 / 48 (average in Latrobe)	* time to drill interval, incl's Connections & NPT.		Type (Liner Hole)	N/A

Comments: New hole drilled: 1300m to 3450mMDRT (2150m MDRT drilled).

#### TIME ANALYSIS

Start Date:	21/06/2006, 1900hrs	Finish Date:	15/07/2006, 1800hrs		
Target Days (P10):	15.74	Total Days:	25	% Under Target:	19.5% (over)
AFE Days (P50):	18.52	NPT Days:	6.14	% of Total Days:	24.6%
Supplementary AFE Days (P50):	9.29				

Comments: Drilling Days, NPT, and Costs based on Drilling portion only. Does not include supplement

#### COSTS *(based on projected)*

COOFS (based on projected)

AFE No.:	L0501G655		Revisions:	A\$ 2,892k	\$ per m	A\$ 2.91k / metre (new hole)
\$ per day:	A\$ 251 k/day		\$ per day (excl. T+L) * Equipment, MWD & Precision logs	A\$ 180 k/day		A\$ 1.82 k / metre*
						* based on TD not new hole
	Equipment	Materials	Contracts	Allocations	Contingency	Total
AFE (Original)	493,500	422,300	2,203,400	867,000	222,000	A\$4,208,200
AFE (Supplement)	844,600	-	1,562,400	392,100	92,900	A\$2,892,000
Projected	995,479	693,000	3,570,121	768,000	250,000	A\$6,276,600

#### CASING *(all depths herein are based on Rig 453 elevations: RT-MSL=33.43m)*

	Size / Weight / Grade / Thread	m MDRT	m TVDRT	PIT (ppg)
Conductor Casing *	20"	186	186	N/A
Surface Casing *	13-3/8", 68.0 ppf, K55, BTC	1300	975.1	13.0 (PIT)
Prod Casing	7", 26.0 ppf, L80, Vam Top HC	3443	2368.6	N/A

Comments: \* Pre-existing casing strings.

#### COMPLETION

	Size / Weight / Grade / Thread	MMDRT	MTVDRT	Type
Completion	2-7/8", 6.5ppf, 13Cr80, Vam Ace	3305.3	2276.6	Single oil

	Upper Interval [m MDRT]	Upper Interval [m TVDRT]	Lower Interval [mMDRT]	Lower Interval [mTVDRT]	Gun Type
Perforation Interval:	3350 - 3353	2306.8 – 2308.8	NA	NA	MAXR

Comments: Completion was 2-7/8" 13Cr80 with TR-SSSV and 3 SPMs for gas lift, and one packer (3284.7m).

#### ADDITIONAL

	Top [m MDRT]	Bottom [m MDRT]
Logs Run	GR-Resistivity-Density-Neutron-Sonic-Caliper 1300	TD 3450

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

Schlumberger/ Anadrill GR also obtained with MWD direction data during drilling.



# West Kingfish W31A: Existing Schematic

Incl	mKB (TVD)	Schematic - Actual
0.0	12	
0.0	12	
0.0	12	
0.0	13	
0.0	14	
0.0	16	
0.0	16	
0.0	16	
0.0	17	
0.0	18	
0.0	20	
0.0	21	
0.0	23	
27.2	434	
27.3	435	
27.4	436	
27.5	437	
27.7	439	
27.8	441	
55.2	744	
57.7	793	
57.8	794	
57.9	795	
58.1	797	
58.3	798	
57.1	975	
49.5	1,369	
49.4	1,370	
49.4	1,371	
49.4	1,373	
49.3	1,374	
48.9	1,763	
48.9	1,764	
48.9	1,765	
48.8	1,767	
48.8	1,768	
48.7	1,780	
48.7	1,782	
48.7	1,782	
48.8	1,783	
49.0	2,203	
48.7	2,211	
47.9	2,260	
47.9	2,261	
47.9	2,261	
47.8	2,261	
47.8	2,263	
47.7	2,264	
47.6	2,266	
47.6	2,267	
47.5	2,267	
47.5	2,268	
47.4	2,274	
47.4	2,275	
47.4	2,275	
47.4	2,276	
47.4	2,276	
47.4	2,277	
47.6	2,307	
47.7	2,309	
48.5	2,343	
48.5	2,343	
48.7	2,351	
48.7	2,352	
48.9	2,360	
49.1	2,369	

3-1, Tubing Hanger, 11.8 mKB, 12.3 mKB, 88.9mm

3-4, Cross Over - Reducing, 16.0 mKB, 16.3 mKB, 88.9mm

3-12, Flow Coupling, 446.2 mKB, 448.0 mKB, 73.0mm

3-13, SSSV, 448.0 mKB, 449.2 mKB, 73.0mm

3-14, Flow Coupling, 449.2 mKB, 451.0 mKB, 73.0mm

3-18, Flow Coupling, 953.5 mKB, 955.2 mKB, 73.0mm

3-19, Mandrel - Side Pocket, 955.2 mKB, 957.5 mKB, 73.0mm

Surface Casing, 339.7mm, 1,300.0 mKB

3-23, Flow Coupling, 1,920.0 mKB, 1,921.8 mKB, 73.0mm

3-24, Mandrel - Side Pocket, 1,921.8 mKB, 1,923.9 mKB, 73.0mm

3-28, Flow Coupling, 2,522.5 mKB, 2,523.9 mKB, 73.0mm

3-29, Mandrel - Side Pocket, 2,523.9 mKB, 2,526.0 mKB, 73.0mm

3-33, Landing Nipple, 2,548.5 mKB, 2,548.9 mKB, 73.0mm

3-37, Cross Over - Enlarging, 3,281.7 mKB, 3,282.1 mKB, 88.9mm

3-40, Packer, 3,284.7 mKB, 3,286.9 mKB, 88.9mm

3-43, Cross Over - Reducing, 3,290.9 mKB, 3,291.3 mKB, 88.9mm

3-47, Landing Nipple, 3,302.9 mKB, 3,303.4 mKB, 73.0mm

3-49, Cross Over - Enlarging, 3,304.7 mKB, 3,305.1 mKB, 88.9mm

3-50, Re-Entry Guide - Wireline, 3,305.1 mKB, 3,305.3 mKB, 88.9mm

Perforation, 3,350.0-3,353.0 mKB, P1.2

Perforating Assy, 3,404.6-3,417.0 mKB

Plug, 3,417.0-3,443.0 mKB, 10/07/2006  
Production Casing, 177.8mm, 3,443.0 mKB

### III. SAMPLES – W31A

The cuttings sampling programme for WEST KINGFISH W31A are detailed in the following table:

Interval	Formation	Sampling Details
KOP to 150 m above predicted Top of Latrobe (prognosed at 3280.0m MDRT)  1300.0 – 3120.0m MDRT	Gippsland Limestone & Lakes Entrance	Cuttings samples for description only at 30 m intervals.
150 m above predicted Top of Latrobe to Top of Latrobe (prognosed at 3280.0m MDRT)  3120.0 – 3270.0 mMDRT	Lakes Entrance Formation	Three sets of washed and oven dried cuttings at 10 m intervals.
Top of Latrobe (prognosed at 3280.0m MDRT) to Total Depth (TD)  3270.0 – 3450.0 mMDRT	Latrobe Group / Coarse Clastics	Three sets of washed and oven dried cuttings at 5 m intervals.

Detailed cuttings descriptions for the interval 1300.0 to 3450.0m MDRT (TD) are contained in Appendix 3a.

#### CONVENTIONAL CORING

No conventional cores were cut in WEST KINGFISH W31A.

#### SIDEWALL CORING

No sidewall core samples were shot in WEST KINGFISH W31A.

## IV. LOGS AND SURVEYS – W31A

<b>Survey/Log</b>	<b>Company</b>	<b>Top (m MDRT)</b>	<b>Bottom (m MDRT)</b>
MWD Run 1, Powerpulse (Directional & GR)	Schlumberger/Anadrill	1300	2794
MWD Run 2, Powerpulse (Directional & GR)	Schlumberger/Anadrill	2794	3450 (GR to 3431)
Run 1: Drillpipe conveyed Logging: MCG-MDN- MPD-MSS-MDL -MAI	Precision Energy Services  Compact logging (wireline tools run on drillpipe with Shuttle System, memory mode)	1300  (3138m top of Latrobe logging)	3450 TD  (3441m bottom of log interval - sonic)

(Precision logs = Compact GR - Dual Neutron - Photo Density - Sonic - Dual Laterolog  
Resistivity - Induction Resistivity)

## V. RESERVOIR & FORMATION TOPS - W31A

Horizon	m TVDSS			m MDRT	mTVT net oil	
	Predicted Tops	ACTUAL	Diff. (m)		Predicted	ACTUAL
Base of Miocene High Velocity Channel	-1400	-1400.0	-	2016.0		
Lakes Entrance Formation	-2000	-2001.2	1.2 low	2935.5		
Top of Latrobe Group (TOL)	-2227	-2231.4	4.4 low	3288.0		
SBN3 (N.asperus Sequence Boundary)	-	-2253.1	-	3320.0		
Top of P1.1 sand (FSP1)	-2259	-2258.8	0.2 high	3328.5	1 – 2 at top of sand	4.0 (P1.1)
COWC		-2263.2		3335.0		
Base of P1.1 sand (SBP1)	-2266	-2266.6	0.6 low	3340.0		
Top of P1.2 sand (FP12)	-2274	-2273.4	0.6 high	3350.0	0	1.8 (P1.2)
Base of P1.2 (SP12) / Top of M1.2UMD	-2277	-2275.4	1.6 high	3353.0		0.2* (M1.2U)
Top of M1.2L ("SBP3")	-2278	-2277.4	0.6 high	3356.0	3 - 4	M1.2L swept
Base of M1.2L sand (BM12)	-2282	-2280.8	1.2 high	3361.1		
M1.2L silty section (BM12W)	-	-2284.6	-	3366.8		
Top of M1.3U PS6 sand (PSB7)	-2288	-2288.2	0.2 low	3372.0		0.1* (PS7 section)
PS5 sand (PSB6)	-2292	-2292.9	0.9 low	3379.0		
PS4 sand (PSB5)	-2295	-2295.5	0.5 low	3383.0		
Top M1.3L PS3 sand (PSB4)	-2305	-2307.8	2.8 low	3401.5		
WKF OOWC	-2314	-2314.0	-	3410.8		
PS2 sand (PSB3)	-	-2317.5	-	3416.1		
PS1 sand (PSB2)	-	-2325.0	-	3427.4		
Base of M1.3L/ Top M1.4U (SB13)	-2325	-2325.3	0.3 low	3428.0		
TD	-2330	-2339.8	9.8 low	3450.0		

\* Probable oil.

Net pay thickness is based on 10% porosity cutoff because sands are often thin or shaly yet productive.

OOWC = Original Oil-Water Contact

COWC = Current Oil-Water Contact

UMD = Upper M.diversus

U = Upper

L = Lower

(The reason predicted depths were not provided for some tops predrill is that the horizons or zones were of less importance than others, rather than they were unexpected).

## VI. GEOLOGICAL ANALYSIS – WEST KINGFISH W31A

### Objectives

The primary objective of West Kingfish W31A (Predrill Location G) was to develop remaining oil reserves anticipated to be present in the P1.1 and M1.2L sandstones near Kingfish-7, northwest of the West Kingfish platform.

These sandstones occur stratigraphically above the major M1.3 reservoir sands of West Kingfish. The effective top of M1.3 reservoir (PSB7 horizon) is marked by the widespread marine shale (M1.3 PS7 interval) which separates the largely depleted M1.3 sands from the overlying 4-8mTVD thick M1.2L section. The M1.2 and M1.3 reservoirs are thus not in communication. The M1.2L varies from low permeability shaley silts to moderate quality sands, and it was interpreted that, in the area of Kingfish-7, the M1.2L was moderately poor quality sand and silt. This interpretation was based on Kingfish-7 core permeability data (1-60md) and weak production performance exhibited at the nearby W13C, W6 and W24A wells (although contribution from the reservoir was limited by commingling with more permeable sands in these wells).

As a result of the low permeability reservoir characteristics, it was thought that the M1.2L was not being effectively drained in this western area so that locally there could be substantial oil remaining in this unit. Hence this was a primary driver for the well; reservoir simulation studies also supported the potential for remaining oil reserves. The simulation showed much of the area west of the platform at high remaining oil saturation at platform life end, without additional wells. The studies indicated that a well near Kingfish-7 could potentially recover around 0.5MBO if the M1.2L zone was oil-bearing and productive. Despite being thin and of low permeability, elsewhere the M1.2L had produced well at several locations such as W2, W11, W8 and W19, with substantial recoveries.

The P1.1 and P1.2 channel sands were secondary objectives. These sands were deposited within a north-south trending region where a major *P. asperopolus* age incision has caused the M1.2 section to have been partially eroded. The P1.1 sand is extensive and typically a good quality sand, up to 8m thick at Kingfish-7, whereas the P1.2 is less widely deposited and varies more in quality. The presence of a small amount of P1.2 sand was considered possible at W31A, however the sand was expected to be non-net based on Kingfish-7 where the P1.2 appears to be clay choked. Further south at the updip W24A well, the P1.2 is productive and a long term production tail is observed.

The W31A well was targeted just north of an apparent narrowing in the P1.1 sand indicated by seismic character and well control (the sand edge occurs nearby at W6 and W1). Although it was recognised that the P1.1 was likely to have substantial sweep due to production updip at W10 and W4, it was thought that the “neck” of the sand body may be partially restricting drainage of P1.1 oil from the north, which would improve the chance of W31A encountering remaining oil. The well was also positioned on a subtle, possibly fault-controlled, E-W ridge which might further limit oil flow to W10 and provide some access of oil to W31A from the west flank where no P1.1 producers are present. However, because W16A displayed substantial sweep when drilled downdip on the north flank in 1999, it was conservatively predicted that only a thin 1-2m zone of remaining net oil would be intersected at the top of the P-1.1 sand at W31A.

Both the P1.1 and the M1.2L were expected to be significantly drawdown in pressure by previous production. While this did not present a significant reservoir management problem, it was managed as a drilling issue with close monitoring of mud weight.

The potential for three reservoir levels P-1.1, P-1.2, M1.2L, increased the attractiveness of the well.

### Results

West Kingfish W31A was kicked off below the W31 existing surface casing on 21 June 2006 and drilled 8 ½” production hole to Total Depth of 3450m MDRT (-2339.8mTVDSS). The well was logged with Precision Energy Services’ compact wireline tools on drillpipe (Shuttle system) and

## VI. GEOLOGICAL ANALYSIS – WEST KINGFISH W31A (continued)

### Results (continued)

cased and completed with 2 7/8" tubing. The well was handed over to production operations on 15 July 2006.

The Top of Latrobe was intersected at 3288.0m MDRT (-2231.4m TVDSS), 4.4mTVD low to prediction. The top of the P1.1 reservoir was intersected at 3328.5m MDRT (-2258.8m TVDSS), essentially on prediction. The P1.1 encountered is a 7.8m thick package of moderate to good quality sand, similar to Kingfish-7, with a 4.4mTVD oil column at the top with OWC at -2263.2mTVDSS. Net oil pay is 4.0mTVD with average porosity 16.7% and water saturation 51%. This thicker than expected oil column may be partly due to the poorer quality sand in the upper several metres holding up oil which is less able to be swept than in cleaner sand.

Based on Kingfish-7 it was expected that the P1.2 section would be poor quality, however a 2mTVD good quality P1.2 sand was encountered, with the sand top at 3350 mMDRT (-2273.4m TVDSS), 0.6m high. The sand contains 1.8mTVD net oil pay with average 15.8% porosity and 47% water saturation. The well has been completed in this zone and initial oil production rate was 184 kl/day. This corresponded to a water cut of 13%, which has gradually increased to 69% after 3 months. Nevertheless the water cut increase has slowed substantially and the sand continues to produce strongly with oil rates currently in the 60-65 kl/d range.

Immediately below the base of P1.2 is a thin 2mTVD oil-bearing M1.2Upper (M1.2UMD) section. This interval is poor quality with only 0.2mTVD probable net oil pay of average porosity 10.7% and water saturation 78% in the upper half, and a non-net shaly base.

The objective M1.2L sand was encountered 0.6m high at -2277.4mTVDSS and is of very good reservoir quality with average porosity 18%, however the sand is swept, with a residual oil zone averaging 61% water saturation. The reservoir quality of the M1.2L progradational package at W31A deteriorates with depth and it is interpreted that this causes the slightly increased resistivity in the lower part, so it is believed that the whole sand package is effectively wet. It is thought that the M1.2L sand may have been swept via a link to the M1.2U reservoir which has been produced updip at W28 to the southwest. The better than expected sand quality of the M1.2L has probably assisted the sweep.

A thin 0.7mTVD gross (0.1m net) zone in the upper-most part of the M1.3U (PS7) is interpreted to be oil-bearing, however due to the thin column and poor reservoir quality it is doubtful the zone would be productive.

Following depletion of the P1.2 reservoir in the future, it is anticipated that the well will be re-completed upwards to P1.1.

**APPENDIX 1a**

**WEST KINGFISH W31A**

**Survey Data**





## WKF W-31A Final Geodetic Survey

Report Date: July 6, 2006	Survey / DLS Computation Method: Minimum Curvature / Lubinski
Client: Esso Australia Pty Ltd	Vertical Section Azimuth: 294.280°
Field: Kingfish GDA 94	Vertical Section Origin: S 3.290 m, E 1.990 m
Structure / Slot: West Kingfish / 31	TVD Reference Datum: RKB
Well: 31	TVD Reference Elevation: 33.4 m relative to MSL
Borehole: WKF W-31A	Sea Bed / Ground Level Elevation: -76.130 m relative to MSL
UWI/API#:	Magnetic Declination: 13.249°
Survey Name / Date: WKF W-31A Final / June 23, 2006	Total Field Strength: 60122.099 nT
Tort / AHD / DDI / ERD ratio: 142.839° / 2349.51 m / 6.204 / 0.990	Magnetic Dip: -69.062°
Grid Coordinate System: GDA94/MGA94 Zone 55	Declination Date: June 23, 2006
Location Lat/Long: S 38 35 34.800, E 148 6 19.408	Magnetic Declination Model: BGGM 2005
Location Grid N/E Y/X: N 5727807.761 m, E 596265.029 m	North Reference: Grid North
Grid Convergence Angle: -0.68957833°	Total Corr Mag North -> Grid North: +13.939°
Grid Scale Factor: 0.99971412	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	-3.29	1.99	0.00	5727807.76	596265.03	S 38 35 34.800	E 148 6 19.408
	56.03	0.00	255.39	56.03	0.00	-3.29	1.99	0.00	5727807.76	596265.03	S 38 35 34.800	E 148 6 19.408
	111.03	0.34	281.74	111.03	0.16	-3.26	1.83	0.19	5727807.79	596264.87	S 38 35 34.799	E 148 6 19.401
	121.03	0.80	273.73	121.03	0.25	-3.25	1.73	1.40	5727807.80	596264.77	S 38 35 34.799	E 148 6 19.397
	131.03	1.31	269.00	131.03	0.42	-3.24	1.55	1.55	5727807.81	596264.59	S 38 35 34.799	E 148 6 19.390
	141.03	1.77	268.07	141.02	0.66	-3.25	1.28	1.38	5727807.80	596264.32	S 38 35 34.799	E 148 6 19.379
	151.03	2.28	265.71	151.02	0.98	-3.27	0.93	1.55	5727807.78	596263.97	S 38 35 34.800	E 148 6 19.364
	161.03	2.84	265.30	161.01	1.37	-3.31	0.48	1.68	5727807.74	596263.52	S 38 35 34.802	E 148 6 19.346
	172.03	3.31	268.11	171.99	1.89	-3.34	-0.11	1.35	5727807.71	596262.93	S 38 35 34.803	E 148 6 19.321
	191.03	4.65	267.10	190.95	3.07	-3.40	-1.43	2.12	5727807.65	596261.61	S 38 35 34.805	E 148 6 19.267
	221.03	7.36	267.06	220.78	5.86	-3.56	-4.56	2.71	5727807.49	596258.48	S 38 35 34.812	E 148 6 19.138
	251.03	9.85	266.57	250.44	9.84	-3.81	-9.04	2.49	5727807.24	596254.00	S 38 35 34.822	E 148 6 18.952
	281.03	11.96	269.05	279.89	14.93	-4.01	-14.71	2.16	5727807.04	596248.33	S 38 35 34.830	E 148 6 18.718
	311.03	14.64	270.85	309.09	21.22	-4.01	-21.61	2.71	5727807.04	596241.44	S 38 35 34.833	E 148 6 18.433
	341.03	17.21	270.49	337.93	28.76	-3.91	-29.84	2.57	5727807.14	596233.21	S 38 35 34.833	E 148 6 18.093
	371.03	20.61	270.29	366.31	37.65	-3.85	-39.56	3.40	5727807.20	596223.49	S 38 35 34.835	E 148 6 17.691
	401.03	23.76	270.73	394.09	48.01	-3.75	-50.89	3.15	5727807.31	596212.17	S 38 35 34.836	E 148 6 17.223
	431.03	26.07	272.11	421.29	59.66	-3.43	-63.52	2.38	5727807.62	596199.54	S 38 35 34.830	E 148 6 16.701
	461.03	28.50	272.30	447.95	72.40	-2.90	-77.26	2.43	5727808.15	596185.80	S 38 35 34.819	E 148 6 16.133
	491.03	30.59	271.80	474.05	86.10	-2.37	-92.04	2.10	5727808.68	596171.02	S 38 35 34.807	E 148 6 15.522
	511.03	31.80	272.06	491.16	95.68	-2.02	-102.40	1.83	5727809.03	596160.67	S 38 35 34.800	E 148 6 15.094
	541.03	33.88	271.75	516.36	110.72	-1.48	-118.66	2.09	5727809.57	596144.42	S 38 35 34.789	E 148 6 14.422
	571.03	36.05	271.52	540.95	126.58	-0.99	-135.84	2.17	5727810.06	596127.24	S 38 35 34.780	E 148 6 13.712
	601.03	38.16	270.87	564.87	143.23	-0.62	-153.93	2.15	5727810.43	596109.15	S 38 35 34.775	E 148 6 12.964
	631.03	40.27	270.47	588.11	160.61	-0.40	-172.90	2.13	5727810.65	596090.19	S 38 35 34.775	E 148 6 12.180
	661.03	42.33	269.99	610.65	178.69	-0.32	-192.70	2.08	5727810.73	596070.40	S 38 35 34.780	E 148 6 11.362
	691.03	44.17	269.24	632.50	197.37	-0.46	-213.25	1.91	5727810.59	596049.85	S 38 35 34.793	E 148 6 10.513
	721.03	46.00	269.32	653.68	216.62	-0.72	-234.49	1.83	5727810.33	596028.61	S 38 35 34.809	E 148 6 9.635
	751.03	47.72	269.59	674.19	236.49	-0.93	-256.38	1.73	5727810.12	596006.73	S 38 35 34.825	E 148 6 8.731
	781.03	49.81	269.49	693.97	256.98	-1.11	-278.94	2.09	5727809.94	595984.18	S 38 35 34.839	E 148 6 7.799
	811.03	51.76	269.71	712.93	278.10	-1.28	-302.18	1.96	5727809.77	595960.94	S 38 35 34.854	E 148 6 6.839
	841.03	54.80	269.59	730.87	299.95	-1.42	-326.23	3.04	5727809.63	595936.91	S 38 35 34.868	E 148 6 5.846
	871.03	55.26	269.85	748.06	322.31	-1.54	-350.81	0.51	5727809.51	595912.33	S 38 35 34.881	E 148 6 4.830
	901.03	54.56	269.98	765.31	344.67	-1.58	-375.36	0.71	5727809.47	595887.79	S 38 35 34.892	E 148 6 3.816
	931.03	56.21	269.79	782.35	367.16	-1.63	-400.04	1.66	5727809.42	595863.11	S 38 35 34.903	E 148 6 2.795
	961.03	58.36	268.94	798.56	390.05	-1.91	-425.28	2.27	5727809.14	595837.88	S 38 35 34.922	E 148 6 1.753
	991.03	57.94	269.12	814.39	413.09	-2.34	-450.76	0.45	5727808.71	595812.41	S 38 35 34.946	E 148 6 0.700
	1011.03	57.63	268.93	825.06	428.40	-2.63	-467.68	0.52	5727808.42	595795.49	S 38 35 34.962	E 148 6 0.001
	1021.03	58.12	270.70	830.37	436.11	-2.66	-476.15	4.73	5727808.39	595787.03	S 38 35 34.966	E 148 5 59.651
	1031.03	58.11	270.33	835.66	443.88	-2.58	-484.64	0.94	5727808.47	595778.54	S 38 35 34.967	E 148 5 59.301
	1061.03	59.91	265.51	851.11	466.90	-3.52	-510.33	4.51	5727807.53	595752.86	S 38 35 35.008	E 148 5 58.240
	1091.03	59.86	269.59	866.17	490.07	-4.63	-536.25	3.53	5727806.42	595726.95	S 38 35 35.054	E 148 5 57.169
	1121.03	59.08	269.61	881.40	513.55	-4.81	-562.09	0.78	5727806.24	595701.12	S 38 35 35.069	E 148 5 56.102
	1151.03	58.12	270.08	897.03	536.87	-4.88	-587.69	1.04	5727806.17	595675.52	S 38 35 35.082	E 148 5 55.044
	1181.03	57.76	269.45	912.96	560.00	-4.99	-613.12	0.64	5727806.06	595650.10	S 38 35 35.095	E 148 5 53.993
	1211.03	59.92	268.81	928.48	583.24	-5.38	-638.78	2.23	5727805.67	595624.44	S 38 35 35.117	E 148 5 52.933
	1241.03	58.76	269.10	943.78	606.56	-5.85	-664.58	1.19	5727805.20	595598.65	S 38 35 35.143	E 148 5 51.867
	1271.03	57.87	269.60	959.54	629.71	-6.14	-690.11	0.99	5727804.91	595573.13	S 38 35 35.162	E 148 5 50.812

1300.00	57.11	269.74	975.11	651.92	-6.28	-714.54	0.80	5727804.77	595548.70	S 38 35 35.176	E 148 5 49.803
1336.19	52.77	278.83	995.92	679.68	-4.13	-744.03	7.14	5727806.92	595519.23	S 38 35 35.118	E 148 5 48.584
1365.80	52.20	282.53	1013.95	702.50	0.21	-767.10	3.03	5727811.26	595496.16	S 38 35 34.986	E 148 5 47.628
1394.73	51.00	285.10	1031.93	724.79	5.62	-789.11	2.43	5727816.67	595474.15	S 38 35 34.819	E 148 5 46.716
1422.96	50.80	288.55	1049.73	746.51	11.96	-810.08	2.85	5727823.01	595453.19	S 38 35 34.622	E 148 5 45.846
1452.01	50.51	293.22	1068.16	768.92	19.96	-831.06	3.74	5727831.01	595432.22	S 38 35 34.370	E 148 5 44.976
1480.72	51.01	300.69	1086.33	791.11	30.04	-850.85	6.07	5727841.08	595412.43	S 38 35 34.051	E 148 5 44.153
1509.86	50.52	305.10	1104.77	813.41	42.29	-869.80	3.55	5727853.32	595393.49	S 38 35 33.661	E 148 5 43.364
1536.36	50.50	305.15	1121.62	833.50	54.05	-886.52	0.05	5727865.09	595376.77	S 38 35 33.286	E 148 5 42.667
1565.10	50.07	305.80	1139.99	855.19	66.88	-904.53	0.69	5727877.91	595358.77	S 38 35 32.877	E 148 5 41.917
1596.20	49.60	306.00	1160.05	878.47	80.82	-923.78	0.48	5727891.84	595339.53	S 38 35 32.433	E 148 5 41.115
1625.29	49.39	306.13	1178.94	900.12	93.84	-941.66	0.24	5727904.86	595321.65	S 38 35 32.017	E 148 5 40.369
1654.10	48.92	306.07	1197.78	921.45	106.68	-959.27	0.49	5727917.70	595304.05	S 38 35 31.608	E 148 5 39.635
1682.18	49.74	307.10	1216.08	942.26	119.37	-976.37	1.21	5727930.39	595286.95	S 38 35 31.203	E 148 5 38.923
1710.86	49.37	307.23	1234.69	963.53	132.56	-993.76	0.40	5727943.57	595269.56	S 38 35 30.782	E 148 5 38.198
1738.95	48.77	307.19	1253.09	984.22	145.39	-1010.66	0.64	5727956.40	595252.67	S 38 35 30.372	E 148 5 37.493
1768.12	49.94	306.42	1272.09	1005.82	158.65	-1028.38	1.34	5727969.66	595234.95	S 38 35 29.949	E 148 5 36.754
1796.79	49.75	306.27	1290.58	1027.25	171.64	-1046.03	0.23	5727982.64	595217.30	S 38 35 29.535	E 148 5 36.018
1825.70	49.88	306.80	1309.23	1048.84	184.79	-1063.78	0.44	5727995.78	595199.56	S 38 35 29.115	E 148 5 35.279
1854.30	49.93	306.86	1327.65	1070.19	197.90	-1081.29	0.07	5728008.89	595182.06	S 38 35 28.697	E 148 5 34.549
1882.82	49.33	306.67	1346.13	1091.41	210.91	-1098.70	0.65	5728021.90	595164.66	S 38 35 28.282	E 148 5 33.823
1912.05	49.60	306.76	1365.12	1113.10	224.19	-1116.51	0.29	5728035.17	595146.85	S 38 35 27.858	E 148 5 33.081
1940.64	49.02	306.70	1383.76	1134.27	237.15	-1133.88	0.61	5728048.13	595129.48	S 38 35 27.444	E 148 5 32.357
1969.31	48.73	306.61	1402.62	1155.36	250.05	-1151.21	0.31	5728061.02	595112.16	S 38 35 27.033	E 148 5 31.634
1998.03	48.40	306.48	1421.62	1176.40	262.87	-1168.50	0.36	5728073.84	595094.87	S 38 35 26.624	E 148 5 30.913
2026.83	49.21	307.25	1440.59	1197.55	275.87	-1185.84	1.04	5728086.84	595077.54	S 38 35 26.209	E 148 5 30.191
2055.39	48.96	307.38	1459.30	1218.58	288.95	-1203.01	0.28	5728099.92	595060.38	S 38 35 25.791	E 148 5 29.475
2083.60	49.73	306.46	1477.68	1239.46	301.81	-1220.12	1.11	5728112.77	595043.27	S 38 35 25.381	E 148 5 28.762
2113.01	49.51	306.37	1496.73	1261.36	315.11	-1238.15	0.24	5728126.07	595025.25	S 38 35 24.956	E 148 5 28.010
2141.81	49.17	306.11	1515.50	1282.74	328.02	-1255.77	0.41	5728138.98	595007.63	S 38 35 24.544	E 148 5 27.276
2170.51	49.05	306.30	1534.28	1303.97	340.84	-1273.27	0.20	5728151.79	594990.13	S 38 35 24.136	E 148 5 26.546
2199.15	48.82	306.15	1553.10	1325.09	353.60	-1290.69	0.27	5728164.55	594972.72	S 38 35 23.728	E 148 5 25.820
2228.17	48.79	306.25	1572.21	1346.46	366.49	-1308.31	0.08	5728177.44	594955.10	S 38 35 23.317	E 148 5 25.086
2256.96	48.86	306.07	1591.16	1367.66	379.28	-1325.81	0.16	5728190.22	594937.61	S 38 35 22.909	E 148 5 24.357
2286.00	48.98	306.44	1610.25	1389.08	392.23	-1343.46	0.31	5728203.16	594919.96	S 38 35 22.496	E 148 5 23.621
2314.77	49.03	306.52	1629.12	1410.30	405.14	-1360.92	0.08	5728216.07	594902.51	S 38 35 22.084	E 148 5 22.893
2343.36	49.15	307.22	1647.84	1431.39	418.10	-1378.21	0.57	5728229.03	594885.23	S 38 35 21.670	E 148 5 22.173
2372.31	49.07	307.34	1666.79	1452.71	431.36	-1395.62	0.13	5728242.28	594867.82	S 38 35 21.247	E 148 5 21.447
2400.92	49.08	307.58	1685.54	1473.76	444.50	-1412.78	0.19	5728255.43	594850.66	S 38 35 20.828	E 148 5 20.731
2429.82	50.11	307.35	1704.27	1495.19	457.89	-1430.25	1.08	5728268.81	594833.20	S 38 35 20.400	E 148 5 20.003
2458.44	49.78	307.28	1722.69	1516.53	471.17	-1447.67	0.35	5728282.08	594815.78	S 38 35 19.976	E 148 5 19.277
2487.55	49.36	307.30	1741.56	1538.12	484.59	-1465.30	0.43	5728295.51	594798.16	S 38 35 19.548	E 148 5 18.542
2516.05	48.95	307.52	1760.20	1559.11	497.69	-1482.42	0.47	5728308.60	594781.04	S 38 35 19.130	E 148 5 17.828
2544.63	48.63	307.57	1779.03	1580.04	510.79	-1499.47	0.34	5728321.70	594764.00	S 38 35 18.711	E 148 5 17.117
2573.46	49.23	307.06	1797.97	1601.22	523.97	-1516.76	0.74	5728334.87	594746.72	S 38 35 18.291	E 148 5 16.396
2602.09	48.82	306.99	1816.75	1622.30	536.99	-1534.01	0.43	5728347.88	594729.46	S 38 35 17.875	E 148 5 15.677
2630.74	48.35	307.15	1835.70	1643.25	549.94	-1551.16	0.51	5728360.83	594712.33	S 38 35 17.462	E 148 5 14.962
2659.33	49.48	306.27	1854.49	1664.30	562.82	-1568.43	1.37	5728373.71	594695.05	S 38 35 17.051	E 148 5 14.242
2688.04	49.16	306.25	1873.20	1685.59	575.69	-1585.99	0.33	5728386.58	594677.50	S 38 35 16.640	E 148 5 13.511
2717.04	49.63	305.71	1892.08	1707.15	588.63	-1603.81	0.65	5728399.51	594659.69	S 38 35 16.227	E 148 5 12.768
2745.60	49.37	305.68	1910.62	1728.44	601.30	-1621.44	0.27	5728412.18	594642.06	S 38 35 15.823	E 148 5 12.033
2774.72	49.18	305.78	1929.62	1750.07	614.19	-1639.36	0.21	5728425.06	594624.15	S 38 35 15.412	E 148 5 11.287
2803.78	49.96	305.78	1948.47	1771.75	627.12	-1657.30	0.81	5728437.99	594606.21	S 38 35 15.000	E 148 5 10.539
2832.31	49.50	305.25	1966.91	1793.10	639.77	-1675.02	0.64	5728450.63	594588.50	S 38 35 14.596	E 148 5 9.801
2861.11	48.72	305.24	1985.76	1814.47	652.33	-1692.80	0.81	5728463.19	594570.72	S 38 35 14.196	E 148 5 9.060
2889.66	49.20	305.47	2004.51	1835.60	664.79	-1710.37	0.54	5728475.65	594553.16	S 38 35 13.798	E 148 5 8.328
2918.51	48.85	306.13	2023.43	1856.95	677.53	-1728.03	0.63	5728488.39	594535.50	S 38 35 13.392	E 148 5 7.592
2946.57	48.71	307.42	2041.92	1877.55	690.17	-1744.94	1.05	5728501.02	594518.60	S 38 35 12.989	E 148 5 6.888
2974.93	49.27	306.73	2060.53	1898.42	703.07	-1762.01	0.81	5728513.92	594501.53	S 38 35 12.577	E 148 5 6.176
3004.03	49.85	306.59	2079.40	1920.05	716.29	-1779.78	0.61	5728527.14	594483.77	S 38 35 12.155	E 148 5 5.435
3033.97	50.42	307.45	2098.59	1942.47	730.13	-1798.13	0.87	5728540.97	594465.43	S 38 35 11.713	E 148 5 4.671
3061.52	49.76	307.07	2116.27	1963.06	742.92	-1814.94	0.79	5728553.76	594448.61	S 38 35 11.305	E 148 5 3.970
3091.30	49.63	308.10	2135.53	1985.16	756.77	-1832.94	0.80	5728567.61	594430.62	S 38 35 10.862	E 148 5 3.219
3119.52	49.20	308.24	2153.89	2005.97	770.02	-1849.79	0.47	5728580.85	594413.78	S 38 35 10.439	E 148 5 2.517
3148.61	49.20	307.48	2172.90	2027.37	783.53	-1867.18	0.59	5728594.36	594396.40	S 38 35 10.008	E 148 5 1.792
3177.53	49.48	306.87	2191.74	2048.76	796.79	-1884.66	0.56	5728607.61	594378.92	S 38 35 9.585	E 148 5 1.063
3206.43	48.69	307.27	2210.67	2070.05	809.95	-1902.08	0.88	5728620.77	594361.50	S 38 35 9.164	E 148 5 0.337

3234.80	48.43	307.17	2229.45	2090.78	822.82	-1919.02	0.29	5728633.63	594344.57	S 38 35 8.754	E 148 4 59.631
3263.45	48.49	306.40	2248.45	2111.72	835.66	-1936.19	0.61	5728646.47	594327.40	S 38 35 8.344	E 148 4 58.915
3292.15	47.52	306.67	2267.65	2132.56	848.35	-1953.33	1.04	5728659.16	594310.27	S 38 35 7.939	E 148 4 58.201
3320.67	47.20	306.95	2286.97	2153.04	860.93	-1970.13	0.40	5728671.73	594293.48	S 38 35 7.537	E 148 4 57.501
3348.60	47.60	306.81	2305.87	2173.10	873.26	-1986.57	0.44	5728684.06	594277.03	S 38 35 7.144	E 148 4 56.815
3377.27	48.03	306.89	2325.12	2193.84	886.00	-2003.57	0.45	5728696.80	594260.04	S 38 35 6.737	E 148 4 56.107
3406.09	48.50	306.62	2344.31	2214.84	898.87	-2020.80	0.53	5728709.67	594242.81	S 38 35 6.326	E 148 4 55.388
3428.95	48.87	306.54	2359.40	2231.61	909.11	-2034.59	0.49	5728719.90	594229.03	S 38 35 6.000	E 148 4 54.814
3450.00	49.15	306.85	2373.21	2247.13	918.60	-2047.33	0.52	5728729.39	594216.29	S 38 35 5.697	E 148 4 54.283

**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	109.56	Act-Stns	SLB_CNSG+CASING-Depth Only	WKF W-31A -> WKF W-31A Final
109.56	1300.00	Act-Stns	SLB_CNSG+CASING	WKF W-31A -> WKF W-31A Final
1300.00	3450.00	Act-Stns	SLB_MWD-STD	WKF W-31A -> WKF W-31A Final

**APPENDIX 1b**

**WEST KINGFISH W31A**

**Survey Data Listing**

Report Date:	1 November 2006
Well:	West Kingfish W31A
Structure / Slot:	NABORS Rig 453
TVD Reference Datum:	Drillsite Elevation
TVD Reference Elevation:	33.43 m relative to MSL
Sea Bed / Ground Level Elevation:	76.13 m relative to MSL
Grid Coordinate System:	GDA94/MGA94 Zone 55
Location Lat/Long:	S -38 35' 34.800", E 148 6' 19.408"
Location Grid N/E:	N 5727807.761 m, E 596265.029 m
Survey Azimuth Reference:	Grid North

\*Dnorth and Deast are with respect to top of conductor W31, whereas NS and EW offsets on Anadrill/Schlumberger survey data are with respect to No. 1 conductor. Northings and Eastings are absolute grid coordinates.

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
0	0	360	0	33.43	0	0	5727807.76	596265.03
5	0	350.66	5	28.43	0	0	5727807.76	596265.03
10	0	341.33	10	23.43	0	0	5727807.76	596265.03
15	0	331.99	15	18.43	0	0	5727807.76	596265.03
20	0	322.66	20	13.43	0	0	5727807.76	596265.03
25	0	313.32	25	8.43	0	0	5727807.76	596265.03
30	0.00	303.99	30.00	3.43	0	0	5727807.76	596265.03
35	0.00	294.65	35.00	-1.57	0	0	5727807.76	596265.03
40	0.00	285.32	40.00	-6.57	0	0	5727807.76	596265.03
45	0.00	275.98	45.00	-11.57	0	0	5727807.76	596265.03
50	0.00	266.65	50.00	-16.57	0	0	5727807.76	596265.03
55	0.00	257.31	55.00	-21.57	0	0	5727807.76	596265.03
60	0.02	257.29	60.00	-26.57	0	0	5727807.76	596265.03
65	0.06	259.69	65.00	-31.57	0	0	5727807.76	596265.03
70	0.09	262.08	70.00	-36.57	0.00	-0.01	5727807.76	596265.02
75	0.12	264.48	75.00	-41.57	0.00	-0.02	5727807.76	596265.01
80	0.15	266.87	80.00	-46.57	0.01	-0.03	5727807.77	596265.00
85	0.18	269.27	85.00	-51.57	0.01	-0.04	5727807.77	596264.99
90	0.21	271.66	90.00	-56.57	0.01	-0.06	5727807.77	596264.97
95	0.24	274.06	95.00	-61.57	0.02	-0.08	5727807.78	596264.95
100	0.27	276.46	100.00	-66.57	0.02	-0.10	5727807.78	596264.93
105	0.30	278.85	105.00	-71.57	0.03	-0.13	5727807.79	596264.91
110	0.33	281.25	110.00	-76.57	0.03	-0.15	5727807.79	596264.88
115	0.52	278.56	115.00	-81.57	0.04	-0.19	5727807.80	596264.84
120	0.75	274.56	120.00	-86.57	0.04	-0.24	5727807.80	596264.79
125	1.00	271.85	125.00	-91.57	0.05	-0.32	5727807.81	596264.71
130	1.26	269.49	130.00	-96.57	0.05	-0.42	5727807.81	596264.61
135	1.49	268.63	135.00	-101.57	0.04	-0.54	5727807.80	596264.49
140	1.72	268.17	139.99	-106.56	0.04	-0.68	5727807.80	596264.35
145	1.97	267.13	144.99	-111.56	0.03	-0.84	5727807.79	596264.19
150	2.23	265.95	149.99	-116.56	0.02	-1.02	5727807.78	596264.01
155	2.50	265.55	154.98	-121.55	0.01	-1.23	5727807.77	596263.80
160	2.78	265.34	159.98	-126.55	-0.01	-1.46	5727807.75	596263.57
165	3.01	266.31	164.97	-131.54	-0.03	-1.71	5727807.73	596263.32
170	3.22	267.59	169.97	-136.54	-0.04	-1.98	5727807.72	596263.05
175	3.52	267.95	174.96	-141.53	-0.05	-2.27	5727807.71	596262.76
180	3.87	267.69	179.95	-146.52	-0.07	-2.60	5727807.69	596262.44
185	4.22	267.42	184.93	-151.50	-0.08	-2.95	5727807.68	596262.08
190	4.58	267.15	189.92	-156.49	-0.10	-3.33	5727807.66	596261.70
195	5.01	267.09	194.90	-161.47	-0.12	-3.75	5727807.64	596261.28
200	5.46	267.09	199.88	-166.45	-0.15	-4.20	5727807.61	596260.83
205	5.91	267.08	204.86	-171.43	-0.17	-4.70	5727807.59	596260.33
210	6.36	267.07	209.83	-176.40	-0.20	-5.23	5727807.56	596259.80
215	6.82	267.07	214.79	-181.36	-0.23	-5.80	5727807.53	596259.23
220	7.27	267.06	219.76	-186.33	-0.26	-6.42	5727807.50	596258.62
225	7.69	267.00	224.71	-191.28	-0.29	-7.07	5727807.47	596257.97
230	8.10	266.91	229.67	-196.24	-0.33	-7.75	5727807.43	596257.28

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
235	8.52	266.83	234.61	-201.18	-0.37	-8.47	5727807.39	596256.56
240	8.93	266.75	239.56	-206.13	-0.41	-9.23	5727807.35	596255.80
245	9.35	266.67	244.49	-211.06	-0.46	-10.02	5727807.30	596255.01
250	9.76	266.59	249.42	-215.99	-0.51	-10.85	5727807.25	596254.18
255	10.13	266.90	254.35	-220.92	-0.56	-11.72	5727807.20	596253.32
260	10.48	267.31	259.27	-225.84	-0.60	-12.61	5727807.16	596252.42
265	10.83	267.72	264.18	-230.75	-0.64	-13.53	5727807.12	596251.50
270	11.18	268.14	269.09	-235.66	-0.67	-14.49	5727807.09	596250.55
275	11.54	268.55	273.99	-240.56	-0.70	-15.47	5727807.06	596249.56
280	11.89	268.96	278.89	-245.46	-0.72	-16.48	5727807.04	596248.55
285	12.31	269.29	283.78	-250.35	-0.73	-17.53	5727807.03	596247.50
290	12.76	269.59	288.66	-255.23	-0.74	-18.62	5727807.02	596246.42
295	13.21	269.89	293.53	-260.10	-0.75	-19.74	5727807.01	596245.29
300	13.65	270.19	298.39	-264.96	-0.75	-20.90	5727807.01	596244.13
305	14.10	270.49	303.25	-269.82	-0.74	-22.10	5727807.02	596242.93
310	14.55	270.79	308.09	-274.66	-0.72	-23.34	5727807.04	596241.70
315	14.98	270.80	312.93	-279.50	-0.70	-24.61	5727807.06	596240.42
320	15.41	270.74	317.75	-284.32	-0.69	-25.92	5727807.07	596239.11
325	15.84	270.68	322.57	-289.14	-0.67	-27.26	5727807.09	596237.77
330	16.27	270.62	327.37	-293.94	-0.66	-28.65	5727807.10	596236.38
335	16.69	270.56	332.17	-298.74	-0.64	-30.07	5727807.12	596234.97
340	17.12	270.50	336.95	-303.52	-0.63	-31.52	5727807.13	596233.51
345	17.66	270.46	341.72	-308.29	-0.61	-33.01	5727807.15	596232.02
350	18.23	270.43	346.48	-313.05	-0.60	-34.55	5727807.16	596230.48
355	18.79	270.40	351.22	-317.79	-0.59	-36.14	5727807.17	596228.89
360	19.36	270.36	355.94	-322.51	-0.58	-37.77	5727807.18	596227.26
365	19.93	270.33	360.65	-327.22	-0.57	-39.45	5727807.19	596225.58
370	20.49	270.30	365.35	-331.92	-0.56	-41.18	5727807.20	596223.85
375	21.03	270.35	370.02	-336.59	-0.55	-42.95	5727807.21	596222.08
380	21.55	270.42	374.68	-341.25	-0.54	-44.77	5727807.22	596220.27
385	22.08	270.49	379.32	-345.89	-0.52	-46.62	5727807.24	596218.41
390	22.60	270.57	383.95	-350.52	-0.51	-48.52	5727807.25	596216.51
395	23.13	270.64	388.55	-355.12	-0.48	-50.47	5727807.28	596214.57
400	23.65	270.71	393.14	-359.71	-0.46	-52.45	5727807.30	596212.58
405	24.07	270.91	397.71	-364.29	-0.43	-54.47	5727807.33	596210.56
410	24.45	271.14	402.27	-368.84	-0.39	-56.53	5727807.37	596208.51
415	24.84	271.37	406.82	-373.39	-0.35	-58.61	5727807.41	596206.42
420	25.22	271.60	411.35	-377.92	-0.29	-60.72	5727807.47	596204.31
425	25.61	271.83	415.87	-382.44	-0.23	-62.87	5727807.53	596202.16
430	25.99	272.06	420.37	-386.94	-0.15	-65.04	5727807.61	596199.99
435	26.39	272.14	424.85	-391.42	-0.07	-67.25	5727807.69	596197.78
440	26.80	272.17	429.32	-395.89	0.01	-69.48	5727807.77	596195.55
445	27.20	272.20	433.78	-400.35	0.10	-71.75	5727807.86	596193.28
450	27.61	272.23	438.22	-404.79	0.19	-74.05	5727807.95	596190.98
455	28.01	272.26	442.64	-409.21	0.28	-76.38	5727808.04	596188.65
460	28.42	272.29	447.05	-413.62	0.37	-78.74	5727808.13	596186.29
465	28.78	272.23	451.44	-418.01	0.47	-81.13	5727808.23	596183.90
470	29.12	272.15	455.81	-422.38	0.56	-83.55	5727808.32	596181.48
475	29.47	272.07	460.17	-426.74	0.65	-86.00	5727808.41	596179.04
480	29.82	271.98	464.52	-431.09	0.74	-88.47	5727808.50	596176.57
485	30.17	271.90	468.85	-435.42	0.82	-90.97	5727808.58	596174.07
490	30.52	271.82	473.16	-439.73	0.90	-93.49	5727808.66	596171.54
495	30.83	271.85	477.46	-444.03	0.98	-96.04	5727808.74	596168.99
500	31.13	271.92	481.75	-448.32	1.07	-98.61	5727808.83	596166.42
505	31.44	271.98	486.02	-452.59	1.16	-101.21	5727808.92	596163.83
510	31.74	272.05	490.28	-456.85	1.25	-103.82	5727809.01	596161.21
515	32.08	272.02	494.53	-461.10	1.34	-106.46	5727809.10	596158.57
520	32.42	271.97	498.76	-465.33	1.44	-109.13	5727809.20	596155.91
525	32.77	271.92	502.97	-469.54	1.53	-111.82	5727809.29	596153.21

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
530	33.12	271.86	507.16	-473.73	1.62	-114.54	5727809.38	596150.50
535	33.46	271.81	511.34	-477.91	1.70	-117.28	5727809.46	596147.75
540	33.81	271.76	515.51	-482.08	1.79	-120.05	5727809.55	596144.99
545	34.17	271.72	519.65	-486.22	1.88	-122.84	5727809.64	596142.19
550	34.53	271.68	523.78	-490.35	1.96	-125.66	5727809.72	596139.37
555	34.89	271.64	527.89	-494.46	2.04	-128.50	5727809.80	596136.53
560	35.25	271.60	531.98	-498.55	2.12	-131.37	5727809.88	596133.66
565	35.61	271.57	536.06	-502.63	2.20	-134.27	5727809.96	596130.76
570	35.98	271.53	540.11	-506.68	2.28	-137.19	5727810.04	596127.84
575	36.33	271.43	544.15	-510.72	2.36	-140.14	5727810.12	596124.89
580	36.68	271.33	548.17	-514.74	2.43	-143.11	5727810.19	596121.92
585	37.03	271.22	552.17	-518.74	2.50	-146.11	5727810.26	596118.92
590	37.38	271.11	556.15	-522.72	2.56	-149.14	5727810.32	596115.90
595	37.74	271.00	560.12	-526.69	2.61	-152.18	5727810.37	596112.85
600	38.09	270.89	564.06	-530.63	2.66	-155.25	5727810.42	596109.78
605	38.44	270.82	567.99	-534.56	2.71	-158.35	5727810.47	596106.68
610	38.79	270.75	571.89	-538.46	2.75	-161.47	5727810.51	596103.56
615	39.14	270.68	575.78	-542.35	2.79	-164.61	5727810.55	596100.42
620	39.49	270.62	579.65	-546.22	2.83	-167.78	5727810.59	596097.25
625	39.85	270.55	583.50	-550.07	2.86	-170.97	5727810.62	596094.06
630	40.20	270.48	587.33	-553.90	2.89	-174.18	5727810.65	596090.85
635	40.54	270.41	591.14	-557.71	2.91	-177.42	5727810.67	596087.61
640	40.89	270.33	594.93	-561.50	2.93	-180.68	5727810.69	596084.35
645	41.23	270.25	598.70	-565.27	2.95	-183.97	5727810.71	596081.07
650	41.57	270.17	602.45	-569.02	2.96	-187.27	5727810.72	596077.76
655	41.92	270.09	606.18	-572.75	2.97	-190.60	5727810.73	596074.43
660	42.26	270.01	609.89	-576.46	2.97	-193.95	5727810.73	596071.08
665	42.57	269.89	613.58	-580.15	2.97	-197.32	5727810.73	596067.71
670	42.88	269.77	617.25	-583.82	2.96	-200.72	5727810.72	596064.32
675	43.19	269.64	620.91	-587.48	2.94	-204.13	5727810.70	596060.91
680	43.49	269.52	624.54	-591.11	2.91	-207.56	5727810.67	596057.47
685	43.80	269.39	628.16	-594.73	2.88	-211.01	5727810.64	596054.02
690	44.11	269.27	631.76	-598.33	2.84	-214.48	5727810.60	596050.56
695	44.41	269.25	635.34	-601.91	2.79	-217.97	5727810.55	596047.07
700	44.72	269.26	638.90	-605.47	2.75	-221.47	5727810.51	596043.56
705	45.02	269.28	642.45	-609.02	2.70	-225.00	5727810.46	596040.03
710	45.33	269.29	645.97	-612.54	2.66	-228.55	5727810.42	596036.49
715	45.63	269.30	649.48	-616.05	2.61	-232.11	5727810.37	596032.92
720	45.94	269.32	652.97	-619.53	2.57	-235.69	5727810.33	596029.34
725	46.23	269.36	656.43	-623.00	2.53	-239.29	5727810.29	596025.74
730	46.51	269.40	659.88	-626.45	2.49	-242.91	5727810.25	596022.12
735	46.80	269.45	663.32	-629.88	2.45	-246.55	5727810.21	596018.49
740	47.09	269.49	666.73	-633.30	2.42	-250.20	5727810.18	596014.83
745	47.37	269.54	670.12	-636.69	2.39	-253.87	5727810.15	596011.16
750	47.66	269.58	673.50	-640.07	2.36	-257.56	5727810.12	596007.48
755	48.00	269.58	676.86	-643.43	2.33	-261.26	5727810.09	596003.77
760	48.34	269.56	680.19	-646.76	2.30	-264.98	5727810.06	596000.05
765	48.69	269.54	683.50	-650.07	2.27	-268.73	5727810.03	595996.30
770	49.04	269.53	686.79	-653.36	2.24	-272.50	5727810.00	595992.54
775	49.39	269.51	690.06	-656.63	2.21	-276.28	5727809.97	595988.75
780	49.74	269.49	693.30	-659.87	2.18	-280.09	5727809.94	595984.95
785	50.07	269.52	696.52	-663.09	2.15	-283.91	5727809.91	595981.12
790	50.39	269.56	699.72	-666.29	2.11	-287.75	5727809.87	595977.28
795	50.72	269.59	702.90	-669.47	2.08	-291.61	5727809.85	595973.42
800	51.04	269.63	706.05	-672.62	2.06	-295.49	5727809.82	595969.54
805	51.37	269.67	709.18	-675.75	2.04	-299.39	5727809.80	595965.65
810	51.69	269.70	712.29	-678.87	2.01	-303.30	5727809.77	595961.73
815	52.16	269.69	715.38	-681.95	1.99	-307.23	5727809.75	595957.80
820	52.67	269.67	718.43	-685.00	1.97	-311.20	5727809.73	595953.84



MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
825	53.18	269.65	721.44	-688.01	1.95	-315.18	5727809.71	595949.85
830	53.68	269.63	724.42	-690.99	1.92	-319.20	5727809.68	595945.83
835	54.19	269.61	727.37	-693.94	1.90	-323.24	5727809.66	595941.79
840	54.70	269.59	730.27	-696.84	1.87	-327.31	5727809.63	595937.73
845	54.86	269.62	733.15	-699.73	1.84	-331.39	5727809.60	595933.64
850	54.94	269.67	736.03	-702.60	1.81	-335.48	5727809.57	595929.55
855	55.01	269.71	738.90	-705.47	1.79	-339.58	5727809.55	595925.46
860	55.09	269.75	741.76	-708.33	1.77	-343.67	5727809.53	595921.36
865	55.17	269.80	744.62	-711.19	1.75	-347.78	5727809.51	595917.26
870	55.24	269.84	747.48	-714.04	1.74	-351.88	5727809.50	595913.15
875	55.17	269.87	750.33	-716.90	1.73	-355.99	5727809.49	595909.05
880	55.05	269.89	753.19	-719.76	1.72	-360.09	5727809.48	595904.94
885	54.93	269.91	756.06	-722.63	1.72	-364.18	5727809.48	595900.85
890	54.82	269.93	758.93	-725.50	1.71	-368.27	5727809.47	595896.76
895	54.70	269.95	761.82	-728.39	1.71	-372.35	5727809.47	595892.68
900	54.58	269.98	764.71	-731.28	1.70	-376.43	5727809.46	595888.60
905	54.78	269.95	767.60	-734.17	1.70	-380.51	5727809.46	595884.52
910	55.05	269.92	770.48	-737.05	1.70	-384.60	5727809.46	595880.43
915	55.33	269.89	773.33	-739.90	1.69	-388.70	5727809.45	595876.33
920	55.60	269.86	776.17	-742.74	1.68	-392.82	5727809.44	595872.21
925	55.88	269.83	778.98	-745.55	1.67	-396.95	5727809.43	595868.08
930	56.15	269.80	781.78	-748.35	1.65	-401.10	5727809.41	595863.93
935	56.49	269.68	784.55	-751.12	1.63	-405.26	5727809.39	595859.77
940	56.85	269.54	787.30	-753.87	1.61	-409.44	5727809.37	595855.60
945	57.21	269.39	790.02	-756.59	1.57	-413.63	5727809.33	595851.40
950	57.57	269.25	792.71	-759.28	1.52	-417.84	5727809.28	595847.19
955	57.93	269.11	795.38	-761.95	1.46	-422.07	5727809.22	595842.97
960	58.29	268.97	798.02	-764.59	1.38	-426.31	5727809.14	595838.72
965	58.30	268.96	800.65	-767.22	1.31	-430.57	5727809.07	595834.47
970	58.23	268.99	803.28	-769.85	1.23	-434.82	5727808.99	595830.22
975	58.16	269.02	805.91	-772.48	1.16	-439.07	5727808.92	595825.97
980	58.09	269.05	808.55	-775.12	1.08	-443.31	5727808.84	595821.72
985	58.02	269.08	811.20	-777.77	1.02	-447.55	5727808.78	595817.48
990	57.95	269.11	813.85	-780.42	0.95	-451.79	5727808.71	595813.24
995	57.88	269.08	816.50	-783.07	0.88	-456.03	5727808.64	595809.01
1000	57.80	269.03	819.16	-785.73	0.81	-460.26	5727808.57	595804.78
1005	57.72	268.99	821.83	-788.40	0.74	-464.49	5727808.50	595800.55
1010	57.65	268.94	824.50	-791.07	0.66	-468.71	5727808.42	595796.32
1015	57.82	269.63	827.17	-793.75	0.60	-472.94	5727808.36	595792.10
1020	58.07	270.52	829.83	-796.40	0.61	-477.17	5727808.37	595787.86
1025	58.12	270.55	832.47	-799.04	0.66	-481.42	5727808.42	595783.62
1030	58.11	270.37	835.11	-801.68	0.69	-485.66	5727808.45	595779.37
1035	58.35	269.69	837.75	-804.32	0.69	-489.91	5727808.45	595775.12
1040	58.65	268.89	840.36	-806.93	0.64	-494.17	5727808.40	595770.86
1045	58.95	268.09	842.95	-809.52	0.53	-498.44	5727808.29	595766.59
1050	59.25	267.28	845.52	-812.09	0.35	-502.73	5727808.11	595762.30
1055	59.55	266.48	848.07	-814.64	0.11	-507.03	5727807.87	595758.01
1060	59.85	265.68	850.59	-817.16	-0.18	-511.33	5727807.58	595753.70
1065	59.90	266.05	853.10	-819.67	-0.50	-515.64	5727807.26	595749.39
1070	59.90	266.73	855.61	-822.18	-0.78	-519.96	5727806.98	595745.07
1075	59.89	267.41	858.12	-824.69	-1.00	-524.28	5727806.76	595740.75
1080	59.88	268.09	860.63	-827.20	-1.17	-528.60	5727806.59	595736.43
1085	59.87	268.77	863.14	-829.71	-1.29	-532.92	5727806.47	595732.11
1090	59.86	269.45	865.65	-832.22	-1.35	-537.24	5727806.41	595727.79
1095	59.76	269.59	868.16	-834.73	-1.39	-541.56	5727806.37	595723.47
1100	59.63	269.60	870.68	-837.26	-1.42	-545.88	5727806.34	595719.15
1105	59.50	269.60	873.22	-839.79	-1.45	-550.19	5727806.31	595714.84
1110	59.37	269.60	875.76	-842.33	-1.48	-554.49	5727806.28	595710.54
1115	59.24	269.61	878.31	-844.88	-1.51	-558.79	5727806.25	595706.24

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1120	59.11	269.61	880.88	-847.45	-1.54	-563.09	5727806.22	595701.95
1125	58.95	269.67	883.45	-850.02	-1.56	-567.37	5727806.20	595697.66
1130	58.79	269.75	886.03	-852.60	-1.59	-571.65	5727806.17	595693.38
1135	58.63	269.83	888.63	-855.20	-1.60	-575.92	5727806.16	595689.11
1140	58.47	269.91	891.24	-857.81	-1.61	-580.19	5727806.15	595684.84
1145	58.31	269.99	893.86	-860.43	-1.62	-584.45	5727806.14	595680.59
1150	58.15	270.06	896.49	-863.06	-1.61	-588.70	5727806.15	595676.34
1155	58.07	270.00	899.13	-865.70	-1.61	-592.94	5727806.15	595672.09
1160	58.01	269.89	901.78	-868.35	-1.62	-597.18	5727806.14	595667.85
1165	57.95	269.79	904.43	-871.00	-1.63	-601.42	5727806.13	595663.61
1170	57.89	269.68	907.09	-873.66	-1.65	-605.66	5727806.11	595659.37
1175	57.83	269.58	909.75	-876.32	-1.68	-609.89	5727806.08	595655.14
1180	57.77	269.47	912.41	-878.98	-1.71	-614.12	5727806.05	595650.91
1185	58.05	269.37	915.07	-881.64	-1.76	-618.35	5727806.00	595646.68
1190	58.41	269.26	917.70	-884.27	-1.81	-622.60	5727805.95	595642.43
1195	58.77	269.15	920.31	-886.88	-1.87	-626.87	5727805.89	595638.16
1200	59.13	269.05	922.89	-889.46	-1.93	-631.15	5727805.83	595633.88
1205	59.49	268.94	925.44	-892.01	-2.01	-635.45	5727805.75	595629.58
1210	59.85	268.83	927.96	-894.53	-2.10	-639.76	5727805.66	595625.27
1215	59.77	268.85	930.48	-897.05	-2.18	-644.09	5727805.58	595620.95
1220	59.57	268.90	933.00	-899.57	-2.27	-648.40	5727805.49	595616.63
1225	59.38	268.95	935.54	-902.11	-2.35	-652.71	5727805.41	595612.33
1230	59.19	268.99	938.09	-904.66	-2.43	-657.00	5727805.33	595608.03
1235	58.99	269.04	940.66	-907.23	-2.50	-661.29	5727805.26	595603.74
1240	58.80	269.09	943.25	-909.82	-2.57	-665.57	5727805.19	595599.46
1245	58.64	269.17	945.84	-912.41	-2.64	-669.84	5727805.12	595595.19
1250	58.49	269.25	948.45	-915.02	-2.70	-674.11	5727805.06	595590.92
1255	58.35	269.33	951.07	-917.64	-2.75	-678.37	5727805.01	595586.66
1260	58.20	269.42	953.70	-920.27	-2.80	-682.62	5727804.96	595582.41
1265	58.05	269.50	956.34	-922.91	-2.84	-686.86	5727804.92	595578.17
1270	57.90	269.58	958.99	-925.56	-2.87	-691.10	5727804.89	595573.93
1275	57.77	269.62	961.65	-928.22	-2.90	-695.34	5727804.86	595569.70
1280	57.63	269.64	964.32	-930.89	-2.93	-699.56	5727804.83	595565.47
1285	57.50	269.67	967.00	-933.57	-2.95	-703.78	5727804.81	595561.25
1290	57.37	269.69	969.70	-936.26	-2.98	-707.99	5727804.78	595557.04
1295	57.24	269.72	972.40	-938.97	-3.00	-712.20	5727804.76	595552.83
1300	57.11	269.74	975.11	-941.68	-3.02	-716.40	5727804.74	595548.63
1305	56.51	271.00	977.85	-944.41	-3.00	-720.58	5727804.76	595544.45
1310	55.91	272.25	980.63	-947.20	-2.89	-724.74	5727804.87	595540.30
1315	55.31	273.51	983.46	-950.03	-2.69	-728.85	5727805.07	595536.18
1320	54.71	274.76	986.33	-952.90	-2.40	-732.93	5727805.36	595532.10
1325	54.11	276.02	989.25	-955.82	-2.03	-736.98	5727805.73	595528.05
1330	53.51	277.28	992.20	-958.77	-1.57	-740.98	5727806.19	595524.05
1335	52.91	278.53	995.20	-961.77	-1.02	-744.95	5727806.74	595520.08
1340	52.70	279.31	998.23	-964.80	-0.40	-748.88	5727807.36	595516.15
1345	52.60	279.93	1001.26	-967.83	0.26	-752.80	5727808.02	595512.24
1350	52.50	280.56	1004.30	-970.87	0.97	-756.70	5727808.73	595508.33
1355	52.41	281.18	1007.35	-973.92	1.71	-760.59	5727809.47	595504.44
1360	52.31	281.81	1010.40	-976.97	2.50	-764.47	5727810.26	595500.56
1365	52.22	282.43	1013.46	-980.03	3.33	-768.34	5727811.09	595496.69
1370	52.03	282.90	1016.53	-983.10	4.20	-772.19	5727811.96	595492.84
1375	51.82	283.35	1019.62	-986.19	5.09	-776.02	5727812.85	595489.01
1380	51.61	283.79	1022.72	-989.29	6.01	-779.84	5727813.77	595485.20
1385	51.40	284.24	1025.83	-992.40	6.96	-783.63	5727814.72	595481.40
1390	51.20	284.68	1028.96	-995.53	7.93	-787.41	5727815.69	595477.62
1395	51.00	285.13	1032.10	-998.67	8.93	-791.17	5727816.69	595473.86
1400	50.96	285.74	1035.24	-1001.81	9.96	-794.91	5727817.72	595470.12
1405	50.93	286.36	1038.40	-1004.97	11.03	-798.64	5727818.79	595466.39
1410	50.89	286.97	1041.55	-1008.12	12.15	-802.36	5727819.91	595462.67

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1415	50.86	287.58	1044.70	-1011.28	13.30	-806.06	5727821.06	595458.97
1420	50.82	288.19	1047.86	-1014.43	14.49	-809.75	5727822.25	595455.28
1425	50.78	288.88	1051.02	-1017.59	15.72	-813.43	5727823.48	595451.61
1430	50.73	289.68	1054.19	-1020.76	16.99	-817.08	5727824.75	595447.95
1435	50.68	290.49	1057.36	-1023.93	18.32	-820.71	5727826.08	595444.32
1440	50.63	291.29	1060.53	-1027.10	19.70	-824.32	5727827.46	595440.71
1445	50.58	292.09	1063.70	-1030.27	21.13	-827.91	5727828.89	595437.12
1450	50.53	292.90	1066.88	-1033.45	22.60	-831.48	5727830.36	595433.55
1455	50.56	294.00	1070.06	-1036.63	24.13	-835.02	5727831.89	595430.01
1460	50.65	295.30	1073.23	-1039.80	25.74	-838.53	5727833.50	595426.50
1465	50.74	296.60	1076.40	-1042.97	27.44	-842.01	5727835.20	595423.03
1470	50.82	297.90	1079.57	-1046.14	29.21	-845.45	5727836.97	595419.59
1475	50.91	299.20	1082.73	-1049.30	31.06	-848.85	5727838.82	595416.18
1480	51.00	300.50	1085.88	-1052.45	32.99	-852.22	5727840.75	595412.82
1485	50.94	301.34	1089.03	-1055.60	34.99	-855.55	5727842.75	595409.49
1490	50.85	302.09	1092.18	-1058.75	37.03	-858.85	5727844.79	595406.18
1495	50.77	302.85	1095.34	-1061.91	39.11	-862.12	5727846.87	595402.92
1500	50.69	303.61	1098.51	-1065.08	41.23	-865.35	5727848.99	595399.68
1505	50.60	304.36	1101.68	-1068.25	43.39	-868.56	5727851.15	595396.47
1510	50.52	305.10	1104.86	-1071.43	45.59	-871.73	5727853.35	595393.30
1515	50.52	305.11	1108.04	-1074.61	47.81	-874.89	5727855.57	595390.14
1520	50.51	305.12	1111.22	-1077.79	50.02	-878.04	5727857.78	595386.99
1525	50.51	305.13	1114.40	-1080.97	52.24	-881.20	5727860.00	595383.83
1530	50.50	305.14	1117.58	-1084.15	54.46	-884.36	5727862.22	595380.68
1535	50.50	305.15	1120.76	-1087.33	56.68	-887.51	5727864.44	595377.52
1540	50.45	305.23	1123.94	-1090.51	58.90	-890.66	5727866.66	595374.37
1545	50.37	305.35	1127.13	-1093.69	61.13	-893.81	5727868.89	595371.22
1550	50.30	305.46	1130.32	-1096.89	63.36	-896.94	5727871.12	595368.09
1555	50.22	305.57	1133.51	-1100.08	65.59	-900.07	5727873.35	595364.96
1560	50.15	305.68	1136.71	-1103.29	67.83	-903.20	5727875.59	595361.84
1565	50.07	305.80	1139.92	-1106.49	70.07	-906.31	5727877.83	595358.72
1570	50.00	305.83	1143.13	-1109.70	72.31	-909.42	5727880.07	595355.62
1575	49.92	305.86	1146.35	-1112.92	74.55	-912.52	5727882.31	595352.51
1580	49.84	305.90	1149.57	-1116.14	76.79	-915.62	5727884.55	595349.42
1585	49.77	305.93	1152.80	-1119.37	79.03	-918.71	5727886.79	595346.32
1590	49.69	305.96	1156.03	-1122.60	81.27	-921.80	5727889.03	595343.23
1595	49.62	305.99	1159.27	-1125.84	83.51	-924.88	5727891.27	595340.15
1600	49.57	306.02	1162.51	-1129.08	85.75	-927.96	5727893.51	595337.07
1605	49.54	306.04	1165.75	-1132.32	87.98	-931.04	5727895.74	595333.99
1610	49.50	306.06	1169.00	-1135.57	90.22	-934.12	5727897.98	595330.92
1615	49.46	306.08	1172.25	-1138.82	92.46	-937.19	5727900.22	595327.84
1620	49.43	306.11	1175.50	-1142.07	94.70	-940.26	5727902.46	595324.78
1625	49.39	306.13	1178.75	-1145.32	96.93	-943.32	5727904.69	595321.71
1630	49.31	306.12	1182.01	-1148.58	99.17	-946.39	5727906.93	595318.64
1635	49.23	306.11	1185.27	-1151.84	101.40	-949.45	5727909.16	595315.58
1640	49.15	306.10	1188.54	-1155.11	103.63	-952.51	5727911.39	595312.53
1645	49.07	306.09	1191.81	-1158.38	105.86	-955.56	5727913.62	595309.47
1650	48.99	306.08	1195.09	-1161.66	108.08	-958.61	5727915.84	595306.42
1655	48.95	306.10	1198.37	-1164.94	110.30	-961.66	5727918.06	595303.37
1660	49.09	306.29	1201.65	-1168.22	112.53	-964.71	5727920.29	595300.33
1665	49.24	306.47	1204.92	-1171.49	114.77	-967.75	5727922.53	595297.28
1670	49.38	306.65	1208.18	-1174.75	117.03	-970.80	5727924.79	595294.24
1675	49.53	306.84	1211.43	-1178.00	119.30	-973.84	5727927.06	595291.19
1680	49.68	307.02	1214.67	-1181.24	121.59	-976.88	5727929.35	595288.15
1685	49.70	307.11	1217.91	-1184.47	123.89	-979.93	5727931.65	595285.11
1690	49.64	307.14	1221.14	-1187.71	126.19	-982.97	5727933.95	595282.07
1695	49.57	307.16	1224.38	-1190.95	128.49	-986.00	5727936.25	595279.03
1700	49.51	307.18	1227.63	-1194.19	130.79	-989.03	5727938.55	595276.00
1705	49.45	307.20	1230.87	-1197.44	133.08	-992.06	5727940.84	595272.97

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1710	49.38	307.23	1234.13	-1200.70	135.38	-995.08	5727943.14	595269.95
1715	49.28	307.22	1237.39	-1203.95	137.67	-998.11	5727945.43	595266.93
1720	49.17	307.22	1240.65	-1207.22	139.96	-1001.12	5727947.72	595263.91
1725	49.07	307.21	1243.92	-1210.49	142.25	-1004.13	5727950.01	595260.90
1730	48.96	307.20	1247.20	-1213.77	144.53	-1007.14	5727952.29	595257.90
1735	48.85	307.20	1250.49	-1217.06	146.81	-1010.14	5727954.57	595254.89
1740	48.81	307.16	1253.78	-1220.35	149.08	-1013.14	5727956.84	595251.90
1745	49.01	307.03	1257.07	-1223.64	151.35	-1016.14	5727959.11	595248.89
1750	49.21	306.90	1260.34	-1226.91	153.63	-1019.16	5727961.39	595245.87
1755	49.41	306.77	1263.60	-1230.17	155.90	-1022.20	5727963.66	595242.84
1760	49.61	306.63	1266.85	-1233.42	158.17	-1025.25	5727965.93	595239.79
1765	49.81	306.50	1270.08	-1236.65	160.44	-1028.31	5727968.20	595236.72
1770	49.93	306.41	1273.30	-1239.87	162.71	-1031.39	5727970.47	595233.65
1775	49.89	306.38	1276.52	-1243.09	164.98	-1034.47	5727972.74	595230.57
1780	49.86	306.36	1279.74	-1246.31	167.25	-1037.54	5727975.01	595227.49
1785	49.83	306.33	1282.97	-1249.54	169.51	-1040.62	5727977.27	595224.41
1790	49.79	306.31	1286.19	-1252.76	171.77	-1043.70	5727979.53	595221.33
1795	49.76	306.28	1289.42	-1255.99	174.03	-1046.78	5727981.79	595218.26
1800	49.76	306.33	1292.65	-1259.22	176.29	-1049.85	5727984.05	595215.18
1805	49.79	306.42	1295.88	-1262.45	178.56	-1052.93	5727986.32	595212.11
1810	49.81	306.51	1299.11	-1265.68	180.82	-1056.00	5727988.58	595209.03
1815	49.83	306.60	1302.33	-1268.90	183.10	-1059.07	5727990.86	595205.97
1820	49.85	306.70	1305.56	-1272.13	185.38	-1062.13	5727993.14	595202.90
1825	49.88	306.79	1308.78	-1275.35	187.67	-1065.20	5727995.43	595199.84
1830	49.89	306.81	1312.00	-1278.57	189.96	-1068.26	5727997.72	595196.78
1835	49.90	306.82	1315.22	-1281.79	192.25	-1071.32	5728000.01	595193.71
1840	49.91	306.83	1318.44	-1285.02	194.54	-1074.38	5728002.30	595190.65
1845	49.91	306.84	1321.67	-1288.23	196.83	-1077.44	5728004.59	595187.59
1850	49.92	306.85	1324.88	-1291.45	199.12	-1080.50	5728006.88	595184.53
1855	49.92	306.86	1328.10	-1294.67	201.42	-1083.56	5728009.18	595181.47
1860	49.81	306.82	1331.33	-1297.90	203.71	-1086.62	5728011.47	595178.41
1865	49.70	306.79	1334.56	-1301.13	206.00	-1089.68	5728013.76	595175.35
1870	49.60	306.76	1337.79	-1304.36	208.28	-1092.73	5728016.04	595172.30
1875	49.49	306.72	1341.04	-1307.61	210.55	-1095.78	5728018.31	595169.25
1880	49.39	306.69	1344.29	-1310.86	212.82	-1098.83	5728020.58	595166.21
1885	49.35	306.68	1347.55	-1314.12	215.09	-1101.87	5728022.85	595163.16
1890	49.40	306.69	1350.80	-1317.37	217.35	-1104.91	5728025.11	595160.12
1895	49.44	306.71	1354.05	-1320.62	219.62	-1107.96	5728027.38	595157.08
1900	49.49	306.72	1357.30	-1323.87	221.89	-1111.00	5728029.65	595154.03
1905	49.53	306.74	1360.55	-1327.12	224.17	-1114.05	5728031.93	595150.98
1910	49.58	306.75	1363.79	-1330.36	226.44	-1117.10	5728034.20	595147.93
1915	49.54	306.75	1367.04	-1333.61	228.72	-1120.15	5728036.48	595144.88
1920	49.44	306.74	1370.28	-1336.85	230.99	-1123.20	5728038.75	595141.83
1925	49.34	306.73	1373.54	-1340.11	233.26	-1126.24	5728041.02	595138.79
1930	49.24	306.72	1376.80	-1343.37	235.53	-1129.28	5728043.29	595135.76
1935	49.13	306.71	1380.07	-1346.64	237.79	-1132.31	5728045.55	595132.72
1940	49.03	306.70	1383.34	-1349.91	240.05	-1135.34	5728047.81	595129.69
1945	48.98	306.69	1386.62	-1353.19	242.31	-1138.36	5728050.07	595126.67
1950	48.93	306.67	1389.91	-1356.48	244.56	-1141.39	5728052.32	595123.64
1955	48.87	306.65	1393.19	-1359.76	246.81	-1144.41	5728054.57	595120.62
1960	48.82	306.64	1396.48	-1363.05	249.05	-1147.43	5728056.81	595117.60
1965	48.77	306.62	1399.78	-1366.35	251.30	-1150.45	5728059.06	595114.58
1970	48.72	306.61	1403.07	-1369.64	253.54	-1153.47	5728061.30	595111.56
1975	48.66	306.58	1406.37	-1372.94	255.78	-1156.48	5728063.54	595108.55
1980	48.61	306.56	1409.68	-1376.25	258.01	-1159.50	5728065.77	595105.53
1985	48.55	306.54	1412.99	-1379.56	260.24	-1162.51	5728068.00	595102.52
1990	48.49	306.52	1416.30	-1382.87	262.47	-1165.52	5728070.23	595099.51
1995	48.43	306.49	1419.61	-1386.18	264.70	-1168.53	5728072.46	595096.50
2000	48.46	306.53	1422.93	-1389.50	266.92	-1171.54	5728074.68	595093.50

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2005	48.60	306.67	1426.24	-1392.81	269.16	-1174.54	5728076.92	595090.49
2010	48.74	306.80	1429.55	-1396.12	271.40	-1177.55	5728079.16	595087.48
2015	48.88	306.93	1432.84	-1399.41	273.66	-1180.56	5728081.42	595084.47
2020	49.02	307.07	1436.12	-1402.69	275.93	-1183.57	5728083.69	595081.46
2025	49.16	307.20	1439.40	-1405.97	278.21	-1186.59	5728085.97	595078.45
2030	49.18	307.26	1442.66	-1409.23	280.50	-1189.60	5728088.26	595075.43
2035	49.14	307.29	1445.93	-1412.50	282.79	-1192.61	5728090.55	595072.42
2040	49.09	307.31	1449.21	-1415.78	285.08	-1195.62	5728092.84	595069.42
2045	49.05	307.33	1452.48	-1419.05	287.37	-1198.62	5728095.13	595066.41
2050	49.01	307.36	1455.76	-1422.33	289.66	-1201.62	5728097.42	595063.41
2055	48.96	307.38	1459.04	-1425.61	291.95	-1204.62	5728099.71	595060.41
2060	49.09	307.23	1462.32	-1428.89	294.23	-1207.62	5728101.99	595057.41
2065	49.22	307.07	1465.59	-1432.16	296.52	-1210.64	5728104.28	595054.39
2070	49.36	306.90	1468.85	-1435.42	298.80	-1213.67	5728106.56	595051.37
2075	49.50	306.74	1472.10	-1438.67	301.07	-1216.71	5728108.83	595048.33
2080	49.63	306.58	1475.35	-1441.92	303.34	-1219.76	5728111.10	595045.27
2085	49.72	306.46	1478.58	-1445.15	305.61	-1222.82	5728113.37	595042.21
2090	49.68	306.44	1481.82	-1448.39	307.87	-1225.89	5728115.63	595039.14
2095	49.64	306.43	1485.05	-1451.62	310.14	-1228.96	5728117.90	595036.07
2100	49.61	306.41	1488.29	-1454.86	312.40	-1232.02	5728120.16	595033.01
2105	49.57	306.39	1491.53	-1458.10	314.66	-1235.09	5728122.42	595029.94
2110	49.53	306.38	1494.78	-1461.35	316.91	-1238.15	5728124.67	595026.88
2115	49.49	306.35	1498.02	-1464.59	319.17	-1241.22	5728126.93	595023.82
2120	49.43	306.31	1501.27	-1467.84	321.42	-1244.28	5728129.18	595020.76
2125	49.37	306.26	1504.53	-1471.10	323.67	-1247.34	5728131.43	595017.70
2130	49.31	306.22	1507.79	-1474.36	325.91	-1250.40	5728133.67	595014.64
2135	49.25	306.17	1511.05	-1477.62	328.14	-1253.45	5728135.90	595011.58
2140	49.19	306.13	1514.31	-1480.88	330.38	-1256.51	5728138.14	595008.52
2145	49.16	306.13	1517.58	-1484.15	332.61	-1259.57	5728140.37	595005.47
2150	49.14	306.16	1520.85	-1487.42	334.83	-1262.62	5728142.60	595002.41
2155	49.11	306.20	1524.12	-1490.69	337.07	-1265.67	5728144.83	594999.36
2160	49.09	306.23	1527.40	-1493.97	339.30	-1268.72	5728147.06	594996.31
2165	49.07	306.26	1530.67	-1497.24	341.53	-1271.77	5728149.29	594993.26
2170	49.05	306.30	1533.95	-1500.52	343.77	-1274.82	5728151.53	594990.22
2175	49.01	306.28	1537.23	-1503.80	346.00	-1277.86	5728153.76	594987.17
2180	48.97	306.25	1540.51	-1507.08	348.23	-1280.90	5728155.99	594984.13
2185	48.93	306.22	1543.79	-1510.36	350.46	-1283.94	5728158.22	594981.09
2190	48.89	306.20	1547.08	-1513.65	352.69	-1286.98	5728160.45	594978.05
2195	48.85	306.17	1550.37	-1516.93	354.91	-1290.02	5728162.67	594975.01
2200	48.82	306.15	1553.66	-1520.23	357.13	-1293.06	5728164.89	594971.97
2205	48.81	306.17	1556.95	-1523.52	359.35	-1296.10	5728167.11	594968.93
2210	48.81	306.19	1560.24	-1526.81	361.57	-1299.14	5728169.33	594965.89
2215	48.80	306.20	1563.53	-1530.10	363.79	-1302.18	5728171.55	594962.86
2220	48.80	306.22	1566.83	-1533.40	366.01	-1305.21	5728173.77	594959.82
2225	48.79	306.24	1570.12	-1536.69	368.24	-1308.24	5728176.00	594956.79
2230	48.79	306.24	1573.42	-1539.99	370.46	-1311.28	5728178.22	594953.75
2235	48.81	306.21	1576.71	-1543.28	372.68	-1314.31	5728180.44	594950.72
2240	48.82	306.18	1580.00	-1546.57	374.90	-1317.35	5728182.66	594947.68
2245	48.83	306.14	1583.29	-1549.86	377.12	-1320.39	5728184.88	594944.64
2250	48.84	306.11	1586.58	-1553.15	379.34	-1323.43	5728187.10	594941.60
2255	48.86	306.08	1589.88	-1556.44	381.56	-1326.47	5728189.32	594938.56
2260	48.87	306.11	1593.16	-1559.73	383.78	-1329.52	5728191.54	594935.52
2265	48.89	306.17	1596.45	-1563.02	386.00	-1332.56	5728193.76	594932.47
2270	48.91	306.24	1599.74	-1566.31	388.22	-1335.60	5728195.98	594929.43
2275	48.93	306.30	1603.02	-1569.59	390.45	-1338.64	5728198.21	594926.39
2280	48.96	306.36	1606.31	-1572.88	392.69	-1341.68	5728200.45	594923.36
2285	48.98	306.43	1609.59	-1576.16	394.92	-1344.71	5728202.68	594920.32
2290	48.99	306.45	1612.87	-1579.44	397.16	-1347.75	5728204.92	594917.28
2295	49.00	306.47	1616.15	-1582.72	399.40	-1350.78	5728207.16	594914.25

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2300	49.00	306.48	1619.43	-1586.00	401.65	-1353.82	5728209.41	594911.22
2305	49.01	306.49	1622.71	-1589.28	403.89	-1356.85	5728211.65	594908.18
2310	49.02	306.51	1625.99	-1592.56	406.14	-1359.89	5728213.90	594905.15
2315	49.03	306.53	1629.27	-1595.84	408.38	-1362.92	5728216.14	594902.11
2320	49.05	306.65	1632.55	-1599.12	410.63	-1365.95	5728218.39	594899.08
2325	49.07	306.77	1635.82	-1602.39	412.89	-1368.98	5728220.65	594896.05
2330	49.09	306.89	1639.10	-1605.67	415.15	-1372.01	5728222.91	594893.03
2335	49.11	307.02	1642.37	-1608.94	417.42	-1375.03	5728225.18	594890.01
2340	49.14	307.14	1645.65	-1612.21	419.70	-1378.04	5728227.46	594886.99
2345	49.15	307.23	1648.92	-1615.48	421.99	-1381.06	5728229.75	594883.98
2350	49.13	307.25	1652.19	-1618.76	424.28	-1384.07	5728232.04	594880.97
2355	49.12	307.27	1655.46	-1622.03	426.56	-1387.08	5728234.32	594877.96
2360	49.10	307.29	1658.73	-1625.30	428.85	-1390.08	5728236.61	594874.95
2365	49.09	307.31	1662.01	-1628.58	431.14	-1393.09	5728238.90	594871.94
2370	49.08	307.33	1665.28	-1631.85	433.43	-1396.10	5728241.19	594868.94
2375	49.07	307.36	1668.56	-1635.13	435.72	-1399.10	5728243.48	594865.93
2380	49.07	307.40	1671.83	-1638.40	438.02	-1402.10	5728245.78	594862.93
2385	49.07	307.45	1675.11	-1641.68	440.31	-1405.10	5728248.07	594859.93
2390	49.08	307.49	1678.38	-1644.95	442.61	-1408.10	5728250.37	594856.93
2395	49.08	307.53	1681.66	-1648.23	444.91	-1411.10	5728252.67	594853.94
2400	49.08	307.57	1684.93	-1651.50	447.21	-1414.09	5728254.97	594850.94
2405	49.23	307.55	1688.20	-1654.77	449.52	-1417.09	5728257.28	594847.94
2410	49.40	307.51	1691.46	-1658.03	451.82	-1420.10	5728259.58	594844.93
2415	49.58	307.47	1694.71	-1661.28	454.14	-1423.11	5728261.90	594841.92
2420	49.76	307.43	1697.95	-1664.52	456.46	-1426.14	5728264.22	594838.89
2425	49.94	307.39	1701.17	-1667.74	458.78	-1429.18	5728266.54	594835.86
2430	50.11	307.35	1704.38	-1670.95	461.10	-1432.22	5728268.86	594832.81
2435	50.05	307.34	1707.59	-1674.16	463.43	-1435.27	5728271.19	594829.76
2440	49.99	307.33	1710.80	-1677.37	465.75	-1438.32	5728273.51	594826.71
2445	49.93	307.31	1714.02	-1680.59	468.07	-1441.36	5728275.83	594823.67
2450	49.88	307.30	1717.24	-1683.81	470.39	-1444.41	5728278.15	594820.63
2455	49.82	307.29	1720.46	-1687.04	472.70	-1447.45	5728280.46	594817.59
2460	49.76	307.28	1723.69	-1690.26	475.02	-1450.49	5728282.78	594814.55
2465	49.69	307.28	1726.93	-1693.49	477.33	-1453.52	5728285.09	594811.51
2470	49.61	307.29	1730.16	-1696.73	479.63	-1456.55	5728287.39	594808.48
2475	49.54	307.29	1733.41	-1699.97	481.94	-1459.58	5728289.70	594805.45
2480	49.47	307.29	1736.65	-1703.22	484.24	-1462.61	5728292.00	594802.43
2485	49.40	307.30	1739.90	-1706.47	486.54	-1465.63	5728294.30	594799.40
2490	49.32	307.32	1743.16	-1709.73	488.84	-1468.65	5728296.60	594796.39
2495	49.25	307.36	1746.42	-1712.99	491.14	-1471.66	5728298.90	594793.37
2500	49.18	307.40	1749.69	-1716.26	493.44	-1474.67	5728301.20	594790.36
2505	49.11	307.43	1752.96	-1719.53	495.73	-1477.67	5728303.49	594787.36
2510	49.04	307.47	1756.23	-1722.80	498.03	-1480.67	5728305.79	594784.36
2515	48.97	307.51	1759.51	-1726.08	500.33	-1483.67	5728308.09	594781.37
2520	48.91	307.53	1762.80	-1729.37	502.62	-1486.66	5728310.38	594778.38
2525	48.85	307.54	1766.09	-1732.66	504.92	-1489.65	5728312.68	594775.39
2530	48.79	307.54	1769.38	-1735.95	507.21	-1492.63	5728314.97	594772.40
2535	48.74	307.55	1772.67	-1739.24	509.50	-1495.61	5728317.26	594769.42
2540	48.68	307.56	1775.97	-1742.54	511.79	-1498.59	5728319.55	594766.44
2545	48.64	307.56	1779.28	-1745.85	514.08	-1501.57	5728321.84	594763.47
2550	48.74	307.48	1782.58	-1749.15	516.36	-1504.54	5728324.12	594760.49
2555	48.85	307.39	1785.87	-1752.44	518.65	-1507.53	5728326.41	594757.50
2560	48.95	307.30	1789.16	-1755.73	520.93	-1510.53	5728328.69	594754.50
2565	49.05	307.21	1792.44	-1759.01	523.22	-1513.53	5728330.98	594751.50
2570	49.16	307.12	1795.71	-1762.28	525.50	-1516.54	5728333.26	594748.49
2575	49.21	307.06	1798.98	-1765.55	527.78	-1519.56	5728335.54	594745.47
2580	49.14	307.04	1802.25	-1768.82	530.06	-1522.58	5728337.82	594742.45
2585	49.06	307.03	1805.52	-1772.09	532.34	-1525.60	5728340.10	594739.43
2590	48.99	307.02	1808.80	-1775.37	534.61	-1528.62	5728342.37	594736.42

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2595	48.92	307.01	1812.08	-1778.65	536.88	-1531.63	5728344.64	594733.41
2600	48.85	307.00	1815.37	-1781.94	539.15	-1534.64	5728346.91	594730.40
2605	48.77	307.01	1818.66	-1785.23	541.41	-1537.64	5728349.17	594727.39
2610	48.69	307.03	1821.96	-1788.53	543.67	-1540.64	5728351.43	594724.39
2615	48.61	307.06	1825.26	-1791.83	545.93	-1543.64	5728353.69	594721.39
2620	48.53	307.09	1828.57	-1795.14	548.19	-1546.63	5728355.95	594718.40
2625	48.44	307.12	1831.89	-1798.46	550.45	-1549.62	5728358.21	594715.42
2630	48.36	307.15	1835.21	-1801.78	552.71	-1552.60	5728360.47	594712.43
2635	48.52	307.02	1838.53	-1805.10	554.96	-1555.58	5728362.72	594709.45
2640	48.72	306.86	1841.83	-1808.40	557.21	-1558.58	5728364.97	594706.45
2645	48.91	306.71	1845.12	-1811.69	559.47	-1561.60	5728367.23	594703.44
2650	49.11	306.56	1848.40	-1814.97	561.72	-1564.62	5728369.48	594700.41
2655	49.31	306.40	1851.67	-1818.24	563.97	-1567.67	5728371.73	594697.36
2660	49.47	306.27	1854.92	-1821.49	566.22	-1570.73	5728373.98	594694.30
2665	49.42	306.27	1858.17	-1824.74	568.46	-1573.79	5728376.22	594691.24
2670	49.36	306.26	1861.43	-1828.00	570.71	-1576.85	5728378.47	594688.18
2675	49.31	306.26	1864.69	-1831.26	572.95	-1579.91	5728380.71	594685.12
2680	49.25	306.26	1867.95	-1834.52	575.19	-1582.97	5728382.95	594682.07
2685	49.19	306.25	1871.21	-1837.78	577.43	-1586.02	5728385.19	594679.01
2690	49.19	306.21	1874.48	-1841.05	579.67	-1589.07	5728387.43	594675.96
2695	49.27	306.12	1877.75	-1844.32	581.90	-1592.13	5728389.66	594672.90
2700	49.35	306.03	1881.01	-1847.58	584.13	-1595.20	5728391.89	594669.84
2705	49.43	305.93	1884.26	-1850.83	586.36	-1598.27	5728394.12	594666.77
2710	49.52	305.84	1887.51	-1854.08	588.59	-1601.35	5728396.35	594663.69
2715	49.60	305.75	1890.75	-1857.32	590.82	-1604.43	5728398.58	594660.60
2720	49.60	305.71	1893.99	-1860.56	593.04	-1607.53	5728400.80	594657.51
2725	49.56	305.70	1897.23	-1863.81	595.26	-1610.62	5728403.02	594654.41
2730	49.51	305.70	1900.48	-1867.05	597.48	-1613.71	5728405.24	594651.33
2735	49.47	305.69	1903.73	-1870.30	599.69	-1616.80	5728407.45	594648.24
2740	49.42	305.69	1906.98	-1873.55	601.91	-1619.88	5728409.67	594645.15
2745	49.38	305.68	1910.23	-1876.80	604.12	-1622.97	5728411.88	594642.07
2750	49.34	305.70	1913.49	-1880.06	606.34	-1626.05	5728414.10	594638.98
2755	49.31	305.71	1916.75	-1883.32	608.55	-1629.13	5728416.31	594635.90
2760	49.28	305.73	1920.01	-1886.58	610.76	-1632.21	5728418.52	594632.83
2765	49.24	305.75	1923.27	-1889.84	612.97	-1635.28	5728420.73	594629.75
2770	49.21	305.76	1926.54	-1893.11	615.19	-1638.35	5728422.95	594626.68
2775	49.19	305.78	1929.81	-1896.38	617.40	-1641.43	5728425.16	594623.61
2780	49.32	305.78	1933.07	-1899.64	619.61	-1644.50	5728427.37	594620.53
2785	49.46	305.78	1936.32	-1902.89	621.83	-1647.58	5728429.59	594617.45
2790	49.59	305.78	1939.57	-1906.14	624.05	-1650.66	5728431.81	594614.37
2795	49.72	305.78	1942.81	-1909.38	626.28	-1653.76	5728434.04	594611.28
2800	49.86	305.78	1946.03	-1912.60	628.51	-1656.85	5728436.27	594608.18
2805	49.94	305.76	1949.25	-1915.82	630.75	-1659.96	5728438.51	594605.07
2810	49.86	305.66	1952.47	-1919.04	632.98	-1663.07	5728440.74	594601.97
2815	49.78	305.57	1955.70	-1922.27	635.21	-1666.17	5728442.97	594598.86
2820	49.70	305.48	1958.93	-1925.50	637.42	-1669.28	5728445.18	594595.76
2825	49.62	305.39	1962.17	-1928.74	639.63	-1672.38	5728447.39	594592.65
2830	49.54	305.29	1965.41	-1931.98	641.83	-1675.49	5728449.59	594589.54
2835	49.43	305.25	1968.66	-1935.23	644.02	-1678.59	5728451.78	594586.44
2840	49.29	305.25	1971.92	-1938.48	646.21	-1681.69	5728453.97	594583.34
2845	49.16	305.25	1975.18	-1941.75	648.40	-1684.78	5728456.16	594580.25
2850	49.02	305.24	1978.45	-1945.03	650.58	-1687.87	5728458.34	594577.16
2855	48.89	305.24	1981.74	-1948.31	652.75	-1690.95	5728460.51	594574.08
2860	48.75	305.24	1985.03	-1951.60	654.92	-1694.03	5728462.68	594571.01
2865	48.79	305.27	1988.33	-1954.90	657.09	-1697.10	5728464.85	594567.94
2870	48.87	305.31	1991.62	-1958.19	659.27	-1700.17	5728467.03	594564.86
2875	48.95	305.35	1994.91	-1961.47	661.45	-1703.24	5728469.21	594561.79
2880	49.04	305.39	1998.18	-1964.76	663.63	-1706.32	5728471.39	594558.71
2885	49.12	305.43	2001.46	-1968.03	665.82	-1709.40	5728473.58	594555.63



MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2890	49.20	305.48	2004.73	-1971.30	668.01	-1712.48	5728475.77	594552.55
2895	49.14	305.59	2008.00	-1974.57	670.21	-1715.56	5728477.97	594549.47
2900	49.07	305.71	2011.27	-1977.84	672.41	-1718.63	5728480.17	594546.40
2905	49.01	305.82	2014.55	-1981.12	674.62	-1721.70	5728482.38	594543.33
2910	48.95	305.94	2017.83	-1984.40	676.83	-1724.76	5728484.59	594540.28
2915	48.89	306.05	2021.12	-1987.69	679.04	-1727.80	5728486.80	594537.23
2920	48.84	306.20	2024.41	-1990.98	681.26	-1730.85	5728489.02	594534.19
2925	48.82	306.43	2027.70	-1994.27	683.49	-1733.88	5728491.25	594531.15
2930	48.79	306.66	2030.99	-1997.56	685.73	-1736.90	5728493.49	594528.13
2935	48.77	306.89	2034.29	-2000.86	687.98	-1739.92	5728495.74	594525.11
2940	48.74	307.12	2037.58	-2004.15	690.24	-1742.92	5728498.00	594522.11
2945	48.72	307.35	2040.88	-2007.45	692.51	-1745.91	5728500.27	594519.12
2950	48.78	307.34	2044.18	-2010.75	694.80	-1748.90	5728502.56	594516.13
2955	48.88	307.21	2047.47	-2014.04	697.08	-1751.90	5728504.84	594513.14
2960	48.98	307.09	2050.76	-2017.33	699.35	-1754.90	5728507.11	594510.13
2965	49.07	306.97	2054.03	-2020.60	701.62	-1757.91	5728509.38	594507.12
2970	49.17	306.85	2057.31	-2023.88	703.89	-1760.94	5728511.65	594504.10
2975	49.27	306.73	2060.57	-2027.14	706.16	-1763.97	5728513.92	594501.06
2980	49.37	306.71	2063.83	-2030.40	708.43	-1767.01	5728516.19	594498.02
2985	49.47	306.68	2067.08	-2033.65	710.69	-1770.06	5728518.46	594494.98
2990	49.57	306.66	2070.33	-2036.90	712.97	-1773.11	5728520.73	594491.93
2995	49.67	306.63	2073.57	-2040.14	715.24	-1776.16	5728523.00	594488.87
3000	49.77	306.61	2076.80	-2043.37	717.51	-1779.23	5728525.27	594485.81
3005	49.87	306.62	2080.03	-2046.60	719.79	-1782.29	5728527.55	594482.74
3010	49.96	306.76	2083.25	-2049.82	722.08	-1785.36	5728529.84	594479.67
3015	50.06	306.91	2086.46	-2053.03	724.37	-1788.43	5728532.13	594476.60
3020	50.15	307.05	2089.67	-2056.24	726.68	-1791.49	5728534.44	594473.54
3025	50.25	307.19	2092.87	-2059.44	729.00	-1794.56	5728536.76	594470.48
3030	50.34	307.34	2096.06	-2062.63	731.32	-1797.62	5728539.08	594467.41
3035	50.40	307.44	2099.25	-2065.82	733.66	-1800.68	5728541.42	594464.35
3040	50.28	307.37	2102.44	-2069.01	736.00	-1803.74	5728543.76	594461.29
3045	50.16	307.30	2105.64	-2072.21	738.33	-1806.79	5728546.09	594458.24
3050	50.04	307.23	2108.85	-2075.42	740.65	-1809.85	5728548.41	594455.19
3055	49.92	307.16	2112.06	-2078.63	742.97	-1812.90	5728550.73	594452.14
3060	49.80	307.09	2115.29	-2081.86	745.27	-1815.95	5728553.03	594449.09
3065	49.74	307.19	2118.52	-2085.09	747.58	-1818.99	5728555.34	594446.04
3070	49.72	307.36	2121.75	-2088.32	749.89	-1822.03	5728557.65	594443.01
3075	49.70	307.54	2124.98	-2091.55	752.20	-1825.05	5728559.96	594439.98
3080	49.68	307.71	2128.22	-2094.79	754.53	-1828.08	5728562.29	594436.96
3085	49.66	307.88	2131.45	-2098.02	756.87	-1831.09	5728564.63	594433.95
3090	49.64	308.06	2134.69	-2101.26	759.21	-1834.09	5728566.97	594430.94
3095	49.57	308.12	2137.93	-2104.50	761.56	-1837.09	5728569.32	594427.94
3100	49.50	308.14	2141.18	-2107.74	763.91	-1840.08	5728571.67	594424.95
3105	49.42	308.17	2144.43	-2110.99	766.25	-1843.07	5728574.01	594421.96
3110	49.35	308.19	2147.68	-2114.25	768.60	-1846.06	5728576.36	594418.98
3115	49.27	308.22	2150.94	-2117.51	770.94	-1849.04	5728578.70	594416.00
3120	49.20	308.23	2154.20	-2120.78	773.29	-1852.01	5728581.05	594413.02
3125	49.20	308.10	2157.47	-2124.04	775.63	-1854.99	5728583.39	594410.05
3130	49.20	307.97	2160.74	-2127.31	777.96	-1857.97	5728585.72	594407.06
3135	49.20	307.84	2164.01	-2130.58	780.28	-1860.96	5728588.04	594404.08
3140	49.20	307.70	2167.27	-2133.84	782.60	-1863.95	5728590.36	594401.08
3145	49.20	307.57	2170.54	-2137.11	784.91	-1866.95	5728592.67	594398.09
3150	49.21	307.45	2173.81	-2140.38	787.21	-1869.95	5728594.97	594395.08
3155	49.26	307.35	2177.07	-2143.64	789.51	-1872.96	5728597.27	594392.07
3160	49.31	307.24	2180.33	-2146.90	791.81	-1875.98	5728599.57	594389.06
3165	49.36	307.13	2183.59	-2150.16	794.10	-1879.00	5728601.86	594386.03
3170	49.41	307.03	2186.85	-2153.42	796.39	-1882.03	5728604.15	594383.01
3175	49.46	306.92	2190.10	-2156.67	798.67	-1885.06	5728606.43	594379.97
3180	49.41	306.90	2193.35	-2159.92	800.95	-1888.10	5728608.71	594376.93

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3185	49.28	306.97	2196.61	-2163.18	803.23	-1891.13	5728610.99	594373.90
3190	49.14	307.04	2199.87	-2166.44	805.51	-1894.16	5728613.27	594370.88
3195	49.00	307.11	2203.15	-2169.72	807.79	-1897.17	5728615.55	594367.86
3200	48.87	307.18	2206.43	-2173.00	810.06	-1900.18	5728617.82	594364.86
3205	48.73	307.25	2209.73	-2176.30	812.34	-1903.17	5728620.10	594361.86
3210	48.66	307.26	2213.03	-2179.60	814.61	-1906.16	5728622.37	594358.87
3215	48.61	307.24	2216.33	-2182.90	816.88	-1909.15	5728624.64	594355.88
3220	48.57	307.22	2219.64	-2186.21	819.15	-1912.14	5728626.91	594352.90
3225	48.52	307.20	2222.95	-2189.52	821.41	-1915.12	5728629.17	594349.91
3230	48.47	307.19	2226.26	-2192.83	823.68	-1918.11	5728631.44	594346.93
3235	48.43	307.16	2229.58	-2196.15	825.94	-1921.09	5728633.70	594343.95
3240	48.44	307.03	2232.90	-2199.47	828.19	-1924.07	5728635.95	594340.96
3245	48.45	306.90	2236.21	-2202.78	830.44	-1927.06	5728638.20	594337.97
3250	48.46	306.76	2239.53	-2206.10	832.69	-1930.06	5728640.45	594334.97
3255	48.47	306.63	2242.84	-2209.42	834.92	-1933.06	5728642.68	594331.97
3260	48.48	306.49	2246.16	-2212.73	837.15	-1936.07	5728644.91	594328.96
3265	48.44	306.41	2249.47	-2216.04	839.37	-1939.08	5728647.13	594325.95
3270	48.27	306.46	2252.80	-2219.37	841.59	-1942.09	5728649.35	594322.95
3275	48.10	306.51	2256.13	-2222.70	843.81	-1945.08	5728651.57	594319.95
3280	47.93	306.56	2259.47	-2226.05	846.02	-1948.07	5728653.78	594316.96
3285	47.76	306.60	2262.83	-2229.40	848.23	-1951.05	5728655.99	594313.98
3288	47.66	306.63	2264.85	-2231.42	849.55	-1952.83	5728657.31	594312.20
3289	47.63	306.64	2265.52	-2232.09	849.99	-1953.42	5728657.75	594311.61
3290	47.59	306.65	2266.20	-2232.77	850.43	-1954.02	5728658.19	594311.02
3291	47.56	306.66	2266.87	-2233.44	850.87	-1954.61	5728658.63	594310.42
3292	47.53	306.67	2267.55	-2234.12	851.31	-1955.20	5728659.07	594309.83
3293	47.51	306.68	2268.22	-2234.79	851.75	-1955.79	5728659.51	594309.24
3294	47.50	306.69	2268.90	-2235.47	852.19	-1956.38	5728659.95	594308.65
3295	47.49	306.70	2269.57	-2236.14	852.63	-1956.97	5728660.39	594308.06
3296	47.48	306.71	2270.25	-2236.82	853.07	-1957.57	5728660.83	594307.47
3297	47.47	306.72	2270.93	-2237.49	853.51	-1958.16	5728661.27	594306.88
3298	47.45	306.73	2271.60	-2238.17	853.96	-1958.75	5728661.72	594306.29
3299	47.44	306.74	2272.28	-2238.85	854.40	-1959.34	5728662.16	594305.70
3300	47.43	306.75	2272.95	-2239.52	854.84	-1959.93	5728662.60	594305.10
3301	47.42	306.76	2273.63	-2240.20	855.28	-1960.52	5728663.04	594304.51
3302	47.41	306.77	2274.31	-2240.88	855.72	-1961.11	5728663.48	594303.92
3303	47.40	306.78	2274.98	-2241.55	856.16	-1961.70	5728663.92	594303.33
3304	47.39	306.79	2275.66	-2242.23	856.60	-1962.29	5728664.36	594302.74
3305	47.38	306.80	2276.34	-2242.91	857.04	-1962.88	5728664.80	594302.16
3306	47.36	306.81	2277.01	-2243.59	857.48	-1963.47	5728665.24	594301.57
3307	47.35	306.82	2277.69	-2244.26	857.92	-1964.06	5728665.68	594300.98
3308	47.34	306.83	2278.37	-2244.94	858.36	-1964.64	5728666.12	594300.39
3309	47.33	306.84	2279.05	-2245.62	858.80	-1965.23	5728666.56	594299.80
3310	47.32	306.85	2279.73	-2246.30	859.24	-1965.82	5728667.00	594299.21
3311	47.31	306.86	2280.40	-2246.97	859.68	-1966.41	5728667.44	594298.62
3312	47.30	306.86	2281.08	-2247.65	860.12	-1967.00	5728667.88	594298.03
3313	47.29	306.87	2281.76	-2248.33	860.56	-1967.59	5728668.32	594297.45
3314	47.27	306.88	2282.44	-2249.01	861.01	-1968.17	5728668.77	594296.86
3315	47.26	306.89	2283.12	-2249.69	861.45	-1968.76	5728669.21	594296.27
3316	47.25	306.90	2283.80	-2250.37	861.89	-1969.35	5728669.65	594295.68
3317	47.24	306.91	2284.47	-2251.04	862.33	-1969.94	5728670.09	594295.10
3318	47.23	306.92	2285.15	-2251.72	862.77	-1970.52	5728670.53	594294.51
3319	47.22	306.93	2285.83	-2252.40	863.21	-1971.11	5728670.97	594293.92
3320	47.21	306.94	2286.51	-2253.08	863.65	-1971.70	5728671.41	594293.34
3321	47.20	306.95	2287.19	-2253.76	864.09	-1972.28	5728671.85	594292.75
3322	47.22	306.94	2287.87	-2254.44	864.53	-1972.87	5728672.29	594292.16
3323	47.23	306.94	2288.55	-2255.12	864.97	-1973.46	5728672.73	594291.57
3324	47.25	306.93	2289.23	-2255.80	865.41	-1974.04	5728673.17	594290.99
3325	47.26	306.93	2289.91	-2256.48	865.85	-1974.63	5728673.61	594290.40

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3326	47.28	306.92	2290.59	-2257.16	866.30	-1975.22	5728674.06	594289.81
3327	47.29	306.92	2291.26	-2257.83	866.74	-1975.81	5728674.50	594289.23
3328	47.30	306.91	2291.94	-2258.51	867.18	-1976.39	5728674.94	594288.64
3329	47.32	306.91	2292.62	-2259.19	867.62	-1976.98	5728675.38	594288.05
3330	47.33	306.90	2293.30	-2259.87	868.06	-1977.57	5728675.82	594287.46
3331	47.35	306.90	2293.98	-2260.55	868.50	-1978.16	5728676.26	594286.87
3332	47.36	306.89	2294.65	-2261.22	868.95	-1978.75	5728676.71	594286.29
3333	47.38	306.89	2295.33	-2261.90	869.39	-1979.34	5728677.15	594285.70
3334	47.39	306.88	2296.01	-2262.58	869.83	-1979.92	5728677.59	594285.11
3335	47.41	306.88	2296.68	-2263.26	870.27	-1980.51	5728678.03	594284.52
3336	47.42	306.87	2297.36	-2263.93	870.71	-1981.10	5728678.47	594283.93
3337	47.43	306.87	2298.04	-2264.61	871.15	-1981.69	5728678.91	594283.34
3338	47.45	306.86	2298.71	-2265.28	871.60	-1982.28	5728679.36	594282.75
3339	47.46	306.86	2299.39	-2265.96	872.04	-1982.87	5728679.80	594282.16
3340	47.48	306.85	2300.07	-2266.64	872.48	-1983.46	5728680.24	594281.57
3341	47.49	306.85	2300.74	-2267.31	872.92	-1984.05	5728680.68	594280.98
3342	47.51	306.84	2301.42	-2267.99	873.36	-1984.64	5728681.12	594280.39
3343	47.52	306.84	2302.09	-2268.66	873.80	-1985.23	5728681.56	594279.80
3344	47.53	306.83	2302.77	-2269.34	874.25	-1985.82	5728682.01	594279.21
3345	47.55	306.83	2303.44	-2270.01	874.69	-1986.41	5728682.45	594278.62
3346	47.56	306.82	2304.12	-2270.69	875.13	-1987.00	5728682.89	594278.03
3347	47.58	306.82	2304.79	-2271.36	875.57	-1987.59	5728683.33	594277.44
3348	47.59	306.81	2305.47	-2272.04	876.02	-1988.18	5728683.78	594276.85
3349	47.61	306.81	2306.14	-2272.71	876.46	-1988.78	5728684.22	594276.26
3350	47.62	306.81	2306.82	-2273.39	876.90	-1989.37	5728684.66	594275.67
3351	47.64	306.82	2307.49	-2274.06	877.34	-1989.96	5728685.10	594275.07
3352	47.65	306.82	2308.16	-2274.73	877.79	-1990.55	5728685.55	594274.48
3353	47.67	306.82	2308.84	-2275.41	878.23	-1991.14	5728685.99	594273.89
3354	47.68	306.83	2309.51	-2276.08	878.67	-1991.73	5728686.43	594273.30
3355	47.70	306.83	2310.18	-2276.75	879.11	-1992.33	5728686.88	594272.71
3356	47.71	306.83	2310.86	-2277.43	879.56	-1992.92	5728687.32	594272.11
3357	47.73	306.83	2311.53	-2278.10	880.00	-1993.51	5728687.76	594271.52
3358	47.74	306.84	2312.20	-2278.77	880.44	-1994.10	5728688.20	594270.93
3359	47.76	306.84	2312.87	-2279.44	880.89	-1994.70	5728688.65	594270.34
3360	47.77	306.84	2313.55	-2280.12	881.33	-1995.29	5728689.09	594269.74
3361	47.79	306.84	2314.22	-2280.79	881.78	-1995.88	5728689.54	594269.15
3362	47.80	306.85	2314.89	-2281.46	882.22	-1996.47	5728689.98	594268.56
3363	47.82	306.85	2315.56	-2282.13	882.66	-1997.07	5728690.42	594267.96
3364	47.83	306.85	2316.23	-2282.80	883.11	-1997.66	5728690.87	594267.37
3365	47.85	306.86	2316.91	-2283.47	883.55	-1998.25	5728691.31	594266.78
3366	47.86	306.86	2317.58	-2284.15	884.00	-1998.85	5728691.76	594266.18
3367	47.88	306.86	2318.25	-2284.82	884.44	-1999.44	5728692.20	594265.59
3368	47.89	306.86	2318.92	-2285.49	884.89	-2000.03	5728692.65	594265.00
3369	47.91	306.87	2319.59	-2286.16	885.33	-2000.63	5728693.09	594264.40
3370	47.92	306.87	2320.26	-2286.83	885.78	-2001.22	5728693.54	594263.81
3371	47.94	306.87	2320.93	-2287.50	886.22	-2001.82	5728693.98	594263.22
3372	47.95	306.88	2321.60	-2288.17	886.67	-2002.41	5728694.43	594262.62
3373	47.97	306.88	2322.27	-2288.84	887.11	-2003.01	5728694.87	594262.03
3374	47.98	306.88	2322.94	-2289.51	887.56	-2003.60	5728695.32	594261.43
3375	48.00	306.88	2323.61	-2290.18	888.01	-2004.19	5728695.77	594260.84
3376	48.01	306.89	2324.28	-2290.84	888.45	-2004.79	5728696.21	594260.24
3377	48.03	306.89	2324.94	-2291.51	888.90	-2005.38	5728696.66	594259.65
3378	48.04	306.88	2325.61	-2292.18	889.34	-2005.98	5728697.10	594259.05
3379	48.06	306.87	2326.28	-2292.85	889.79	-2006.57	5728697.55	594258.46
3380	48.07	306.86	2326.95	-2293.52	890.24	-2007.17	5728698.00	594257.86
3381	48.09	306.86	2327.62	-2294.19	890.68	-2007.76	5728698.44	594257.27
3382	48.11	306.85	2328.29	-2294.86	891.13	-2008.36	5728698.89	594256.67
3383	48.12	306.84	2328.95	-2295.52	891.58	-2008.96	5728699.34	594256.08
3384	48.14	306.83	2329.62	-2296.19	892.02	-2009.55	5728699.78	594255.48

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3385	48.16	306.82	2330.29	-2296.86	892.47	-2010.15	5728700.23	594254.88
3386	48.17	306.81	2330.95	-2297.53	892.91	-2010.74	5728700.67	594254.29
3387	48.19	306.80	2331.62	-2298.19	893.36	-2011.34	5728701.12	594253.69
3388	48.20	306.79	2332.29	-2298.86	893.81	-2011.94	5728701.57	594253.09
3389	48.22	306.78	2332.95	-2299.53	894.25	-2012.54	5728702.01	594252.50
3390	48.24	306.77	2333.62	-2300.19	894.70	-2013.13	5728702.46	594251.90
3391	48.25	306.76	2334.29	-2300.86	895.15	-2013.73	5728702.91	594251.30
3392	48.27	306.75	2334.95	-2301.52	895.59	-2014.33	5728703.35	594250.70
3393	48.29	306.74	2335.62	-2302.19	896.04	-2014.93	5728703.80	594250.11
3394	48.30	306.73	2336.28	-2302.85	896.49	-2015.53	5728704.25	594249.51
3395	48.32	306.72	2336.95	-2303.52	896.93	-2016.13	5728704.69	594248.91
3396	48.34	306.71	2337.61	-2304.18	897.38	-2016.72	5728705.14	594248.31
3397	48.35	306.71	2338.28	-2304.85	897.82	-2017.32	5728705.58	594247.71
3398	48.37	306.70	2338.94	-2305.51	898.27	-2017.92	5728706.03	594247.11
3399	48.38	306.69	2339.61	-2306.18	898.72	-2018.52	5728706.48	594246.51
3400	48.40	306.68	2340.27	-2306.84	899.16	-2019.12	5728706.92	594245.91
3401	48.42	306.67	2340.93	-2307.50	899.61	-2019.72	5728707.37	594245.31
3402	48.43	306.66	2341.60	-2308.17	900.06	-2020.32	5728707.82	594244.71
3403	48.45	306.65	2342.26	-2308.83	900.50	-2020.92	5728708.26	594244.11
3404	48.47	306.64	2342.92	-2309.49	900.95	-2021.52	5728708.71	594243.51
3405	48.48	306.63	2343.59	-2310.16	901.40	-2022.12	5728709.16	594242.91
3406	48.50	306.62	2344.25	-2310.82	901.84	-2022.73	5728709.60	594242.31
3407	48.51	306.62	2344.91	-2311.48	902.29	-2023.33	5728710.05	594241.71
3408	48.53	306.61	2345.57	-2312.15	902.74	-2023.93	5728710.50	594241.10
3409	48.55	306.61	2346.24	-2312.81	903.18	-2024.53	5728710.94	594240.50
3410	48.56	306.61	2346.90	-2313.47	903.63	-2025.13	5728711.39	594239.90
3411	48.58	306.60	2347.56	-2314.13	904.08	-2025.73	5728711.84	594239.30
3412	48.60	306.60	2348.22	-2314.79	904.52	-2026.34	5728712.28	594238.70
3413	48.61	306.60	2348.88	-2315.45	904.97	-2026.94	5728712.73	594238.09
3414	48.63	306.59	2349.55	-2316.11	905.42	-2027.54	5728713.18	594237.49
3415	48.64	306.59	2350.20	-2316.78	905.87	-2028.14	5728713.63	594236.89
3416	48.66	306.59	2350.87	-2317.44	906.31	-2028.75	5728714.07	594236.29
3417	48.68	306.58	2351.53	-2318.10	906.76	-2029.35	5728714.52	594235.68
3418	48.69	306.58	2352.19	-2318.76	907.21	-2029.95	5728714.97	594235.08
3419	48.71	306.57	2352.85	-2319.42	907.66	-2030.56	5728715.42	594234.48
3420	48.73	306.57	2353.51	-2320.08	908.10	-2031.16	5728715.86	594233.87
3421	48.74	306.57	2354.17	-2320.74	908.55	-2031.76	5728716.31	594233.27
3422	48.76	306.56	2354.82	-2321.40	909.00	-2032.37	5728716.76	594232.66
3423	48.77	306.56	2355.48	-2322.05	909.45	-2032.97	5728717.21	594232.06
3424	48.79	306.56	2356.14	-2322.71	909.89	-2033.58	5728717.65	594231.46
3425	48.81	306.55	2356.80	-2323.37	910.34	-2034.18	5728718.10	594230.85
3426	48.82	306.55	2357.46	-2324.03	910.79	-2034.79	5728718.55	594230.25
3427	48.84	306.55	2358.12	-2324.69	911.24	-2035.39	5728719.00	594229.64
3428	48.85	306.54	2358.78	-2325.35	911.69	-2036.00	5728719.45	594229.04
3429	48.87	306.54	2359.43	-2326.01	912.14	-2036.60	5728719.90	594228.43
3430	48.88	306.56	2360.09	-2326.66	912.58	-2037.21	5728720.34	594227.83
3431	48.90	306.57	2360.75	-2327.32	913.03	-2037.81	5728720.79	594227.22
3432	48.91	306.58	2361.41	-2327.98	913.48	-2038.42	5728721.24	594226.61
3433	48.92	306.60	2362.06	-2328.63	913.93	-2039.02	5728721.69	594226.01
3434	48.94	306.61	2362.72	-2329.29	914.38	-2039.63	5728722.14	594225.41
3435	48.95	306.63	2363.38	-2329.95	914.83	-2040.23	5728722.59	594224.80
3436	48.96	306.64	2364.03	-2330.61	915.28	-2040.84	5728723.04	594224.19
3437	48.98	306.66	2364.69	-2331.26	915.73	-2041.44	5728723.49	594223.59
3438	48.99	306.67	2365.35	-2331.92	916.18	-2042.05	5728723.94	594222.98
3439	49.00	306.69	2366.00	-2332.57	916.63	-2042.66	5728724.39	594222.38
3440	49.02	306.70	2366.66	-2333.23	917.08	-2043.26	5728724.84	594221.77
3441	49.03	306.72	2367.32	-2333.89	917.53	-2043.87	5728725.29	594221.17
3442	49.04	306.73	2367.97	-2334.54	917.99	-2044.47	5728725.75	594220.56
3443	49.06	306.75	2368.63	-2335.20	918.44	-2045.08	5728726.20	594219.96

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3444	49.07	306.76	2369.28	-2335.85	918.89	-2045.68	5728726.65	594219.35
3445	49.08	306.78	2369.94	-2336.51	919.34	-2046.29	5728727.10	594218.75
3446	49.10	306.79	2370.59	-2337.16	919.79	-2046.89	5728727.55	594218.14
3447	49.11	306.81	2371.25	-2337.82	920.25	-2047.50	5728728.01	594217.53
3448	49.12	306.82	2371.90	-2338.47	920.70	-2048.10	5728728.46	594216.93
3449	49.14	306.84	2372.55	-2339.13	921.15	-2048.71	5728728.91	594216.32
3450	49.15	306.85	2373.21	-2339.78	921.60	-2049.31	5728729.36	594215.72

**APPENDIX 2a**

**WEST KINGFISH W31A**

**Petrophysics Evaluation Summary**

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

**West Kingfish W31A**  
**Petrophysics Report**

**Petrophysicist: K.Kuttan**  
**September 2006**



## West Kingfish W31A Petrophysical Analysis

West Kingfish W-31A was designed to further develop oil reserves in P1.1 and M1.2 sandstone reservoirs in an area between Kingfish 7 and West Kingfish W28. West Kingfish W-31A was kicked off at 1300mMD out of the 13.375 inch surface casing of the abandoned W31 well. An 8.5 inch directional hole was drilled from 1300mMD to the total depth of 3450mMD. The well was logged with the Precision Energy Services compact shuttle system from 3441mMD (first sonic reading) to 1300mMD. After completing the logging operations, the well was completed with 7" production casing and 2 $\frac{7}{8}$ " tubing.

The Precision Energy Services Shuttle logs have been analysed for porosity, water saturation and net pay over the interval 3290-3419mMD.

Note that all depths 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)
Compact Gamma Ray - Compact Dual Neutron - Compact Photodensity - Compact Sonic - Compact Dual Laterolog- Compact Induction	1	Precision Energy Services	1300	3434 (resist.) 3441 (sonic)

### Deviation

The well angle over the West Kingfish reservoirs was 48 degrees.

### Mud Data

Mud Type : KCl/Glycol/PHPA  
Mud Weight: 9.7 ppg  
Rm: 0.117 @ 25 °C  
Rmf: 0.097 @ 25 °C  
Rmc: 0.205 @ 25 °C  
BHT: 89.4 °C

### Hole Size

1300- 3450 mMDRT      8.5 inches

### Data Acquisition & Log Quality

All log data were of acceptable quality.

### Data Processing

Because of the shaly and thinly bedded nature of the upper West Kingfish reservoirs a combination of unfiltered and filtered logs (both provided by Precision) as shown below were used in the interpretation. However, the unfiltered density log (DEN) provided by Precision was considered to be too “noisy” to be used in the interpretation. Hence a 3 point-equal-weighting filter was used to filter this log.

The deep and shallow resistivity (DDL and DSL), the filtered DEN and associated curves (photoelectric – PDPE, density correction-DCOR and caliper –CLDC), were depth-matched to the gamma ray (GRGC) which had been depth-matched and merged with LWD gamma ray (GRM1). The neutron porosity log (NPRL) was depth matched to the filtered and GR-depth-matched DEN. Similarly, the compressional sonic log (DT35) was depth matched to the DEN.

No environmental corrections other than those applied in the field were applied to the final logs.

Logs	Status
GRGC	filtered
DDLL	Unfiltered
DSLL	Unfiltered
DEN	3 point, equal weighting
NPRL	Unfiltered
PDPE	Filtered
DT35	Filtered

## INTERPRETATION

### Logs Used

The primary logs used in the interpretation were DDLL (deep resistivity), DEN (bulk density), NPRL (thermal neutron porosity in LPU), DT35 (compressional sonic) and U (photoelectric effect). U was generated from the photoelectric curve PDPE using the following relationship:

$$U = (PDPE - 0.13) * ((DEN + 0.1883) / 1.0704)$$

The reason for adjusting the formation photoelectric curve is the fact that measured values appear to be higher than the theoretical values in clean quartz sands (of the order of 2.1+ vs the theoretical value of 1.81)

Coal intervals were identified using a coal flag (Flag\_coal). A temperature log was created using the following data:

<u>Depth(mMD)</u>	<u>Temperature (deg. C)</u>
109.5	10
3434	99.4

The temperature at depth 109.5 mMD represents the temperature of the sea-bed and the temperature at 3434m mDRT (first reading of the Precision laterologs) is the estimated formation temperature –BHT +10 deg.

### 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 38000ppm NaCl equivalent. This salinity was used as the formation water salinity for all the sands.

### Hydrocarbon Type Identification

In West Kingfish the only hydrocarbons to be found is oil

### Shale Volume, Porosity and Water Saturation

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

## ELAN+ MODEL

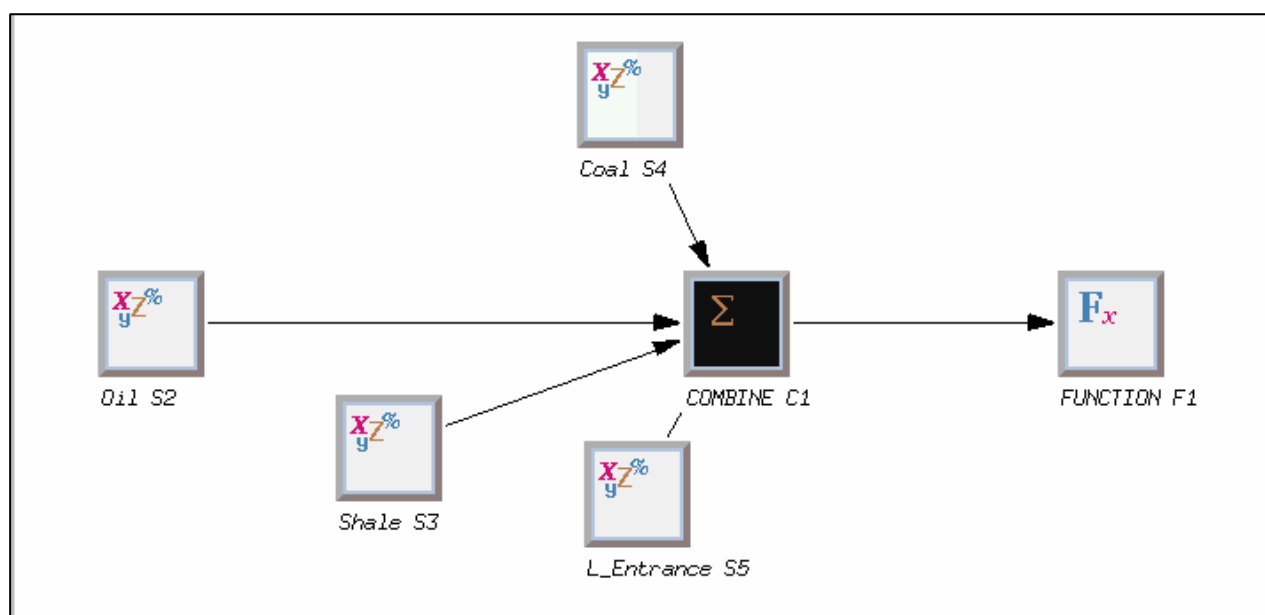


Figure 1: Elan + Model and Module Configuration

## ELAN Input Channels

Log Curve Selector	Selector Options	
	Compound Name Spec	WEST KINGFISH W31A
TEMP_CH	TEMP;*	TEMP TEMP TEMP@Elan_Input;4 [A1780409]
RHOB_IFAC_CH	IFRH;*	
NPHI_IFAC_CH	INPH;*	
RHOB_CH	DEN:BPB;*	DEN DEN DEN@Elan_Input;13 [A1780373]
NPHI_CH	NPRL:BPB;*	NPRL NPRL NPRL@Elan_Input;12 [A1780379]
DT_CH	DT35:BPB;*	DT35 DT35 DT35@Elan_Input;10 [A1780397]
U_CH	U;*	U U U@Elan_Input;3 [A1780387]
CUDC_CH/RT_CH	DDLL:BPB;*	DDLL DDLL DDLL@Elan_Input;15 [A1780389]
PRB2_CH	DEPT:BPB;*	DEPT DEPT DEPT@Elan_Input;6 [A1780403]
<b>PRB3_CH</b>	<b>PRB3;*</b>	
PRB4_CH	FLAG_COAL;*	_COAL FLAG_COAL FLAG_COAL@Elan_Input;5
PRB5_CH	PRB5;*	
M_CH	MXP;*	
N_CH	SXP;*	

## ELAN Global Parameters

---

Reference Index	MD
Processing Interval	3290.9998(m) To 3419.0000(m)
Sampling Rate	0.1(m)
Uncertainty Channel	FALSE
Clay Input	DRY
Special Fluids	IMMOVABLE_HYDROCARBON

---

## ELAN Zone Definition

---

Name	Bottom To Top
Upper Latrobe	3290.0000(m) To 3325.0000(m)
No_GR	3325.0039(m) To 3434.0000(m)

---

## ELAN Process Definition

### Process SOLVE2 "Oil"

Equations	RHOB	NPHI	DT	U	CUDC_DWA	CT2		
Volumes	QUAR	ORTH	PYRI	ILLI	XWAT	UWAT	XOIL	UOIL
Constraint Zones	Bottom			Top				
UNDEFINED	3434.0039(m )			3290.0000(m )				
Constraints Applied								
UNDEFINED	- IrreducibleXWater							
UNDEFINED	- IrreducibleUWater							
UNDEFINED	- WaterBaseMud_SXO_gt_SW							

### Process SOLVE3 "Shale"

Equations	RHOB	NPHI	U	CUDC_DWA	
Volumes	QUAR	PYRI	ILLI	XWAT	UWAT
Constraint Zones	Bottom		Top		
UNDEFINED	3434.0039(m )		3290.0000(m )		

---

### Process SOLVE4 "Coal"

Equations	RHOB	
Volumes	COAL	
Constraint Zones	Bottom	Top
UNDEFINED	3434.0039(m )	3290.0000(m )

---

**Process SOLVE5 "L\_Entrance"**

Equations RHOB  
Volumes ILLI

Constraint Zones Bottom Top  
UNDEFINED 3434.0039(m ) 3290.0000(m )

---

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

**Combine Method**

"L\_Entrance " 3249.8 - 3293.04 (m ) **Sol.5**  
"Coarse Clast" 3293 - 3434.0 **Internal Average**

**Probability Functions**

```
probability(SOL.4, PRB4_CH)  
prob3 = linear(ILLI_VOL.SOL.3, 0.2, 0, 0.6, 1)  
probability(SOL.3, prob3)
```

---

**Process FUNCTION 1 "FUNCTION"**

Outputs VCL SXWI SWT SUWI PIGN PHIT

**User-defined Function**

```
swt_cmp=if((PRB4_CH > 0),1,(UWAT_VOL + XBWA_VOL)/(UWAT_VOL + XBWA_VOL + UOIL_VOL))  
output(SWT, swt_cmp)
```

---

## RESULTS AND DISCUSSION

A summary of the petrophysical analysis is detailed in Table 1 and illustrated in Fig. 2.

Interval 3328.5-3350mMD (P1.1Oil and P1.1Water)

It is clear from the quantitative interpretation that the interval 3328.5-3335mMD is oil bearing with a current OWC at 3335mMD

Interval 3350 – 3353.0mMD(P1.2Oil)

The petrophysical analysis indicates this zone to be clearly oil bearing with no evidence of any OWC contact. However, on perforating the zone (perforation interval 3350-3353mMD), it came in with an oil rate of 184 kld and 13% water cut (31Jul06). The water cut has steadily increased and the well test at 12Sep06 indicated a water cut of 64% with an oil rate of 82 kl/d. It is postulated that OWC for this sand when it was drilled was probably just below the sand.

Intervals 3353 – 3354.5mMD (M1.2UOil)

This interval has a thin sand which may be oil bearing. The reservoir quality of this sand is poor in comparison to the sands above and below it. Most of the better quality sands (M1.2L, M1.3) below it have now been swept and it is likely that water has bypassed it. Because of the poor quality of this sand it is possible that it may not be productive.

### Interval 3356.0 – 3419mMD

Except for the thin and shaley PS7Oil sand, the bulk of the sands in this interval have all been swept. The PS7Oil sand is postulated to be oil-bearing on the basis of its poor reservoir quality (similar to the M1.2UOil sand). Because of its poor reservoir quality, the PS7Oil is not likely to be productive.

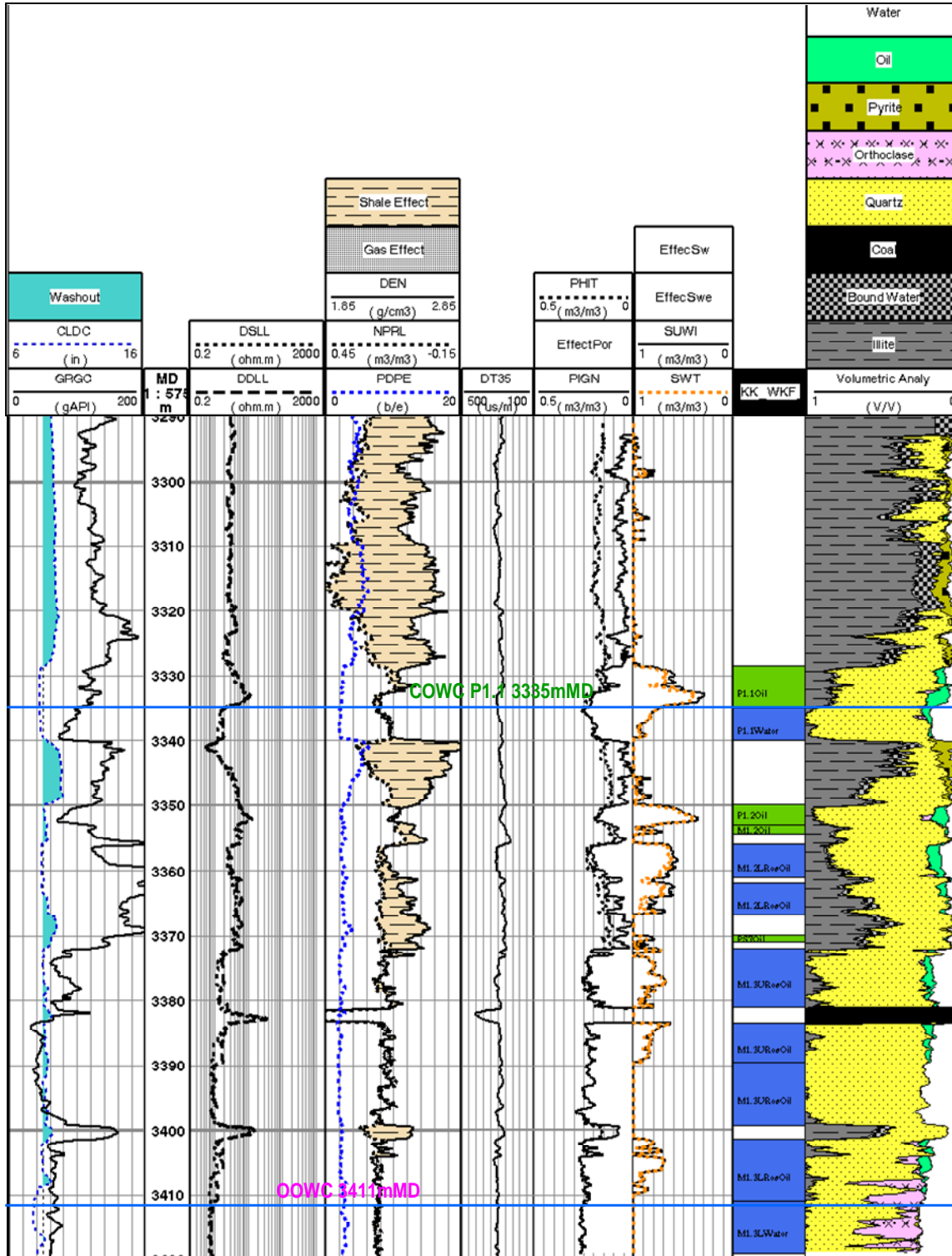


Fig. 2 West Kingfish W31A Interval 3290.0 – 3419 mMD

## West Kingfish W31A

Petrophysical Summary 3328.0 - 3419.0m MD

Depth Reference:

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

Primary: mDKB

0.10 for oil & 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
P1.1Oil	3328.5	2258.8	3335.0	2263.2	6.5	4.4	0.90	0.19	0.167	0.51	Oil bearing	5.9	4.0
P1.1Water	3335.0	2263.2	3340.0	2266.6	5.0	3.4	1.00	0.04	0.205	0.87	Water bearing, residual oil, COWC 3335mMD		
P1.2Oil	3350.0	2273.4	3353.0	2275.4	3.0	2.0	0.92	0.08	0.158	0.47	Oil bearing	2.8	1.8
M1.2Oil	3353.0	2275.4	3354.5	2276.4	1.5	1.0	0.23	0.18	0.107	0.78	Probably oil bearing, poor reservoir quality	0.4	0.2
M1.2LResOil	3356.0	2277.4	3361.1	2280.8	5.1	3.4	1.00	0.20	0.184	0.61	Water bearing, residual oil		
M1.2LResOil	3362.0	2281.4	3366.8	2284.6	4.8	3.2	0.56	0.29	0.128	0.64	Water bearing, residual oil		
PS7Oil	3370.0	2286.8	3371.0	2287.5	1.0	0.7	0.19	0.37	0.104	0.79	Probably oil bearing, poor reservoir quality	0.2	0.1
M1.3UResOil	3372.0	2288.2	3381.1	2294.2	9.1	6.1	0.98	0.08	0.205	0.81	Water bearing, residual oil		
M1.3UResOil	3383.6	2295.9	3389.6	2299.9	6.0	4.0	1.00	0.03	0.214	0.82	Water bearing, residual oil		
M1.3UResOil	3389.6	2299.9	3399.4	2306.4	9.8	6.5	1.00	0.02	0.226	1.00	Water bearing, residual oil		
M1.3LResOil	3401.4	2307.7	3411.0	2314.1	9.6	6.4	1.00	0.06	0.235	0.85	Water bearing, residual oil		
M1.3LWater	3411.0	2314.1	3419.0	2319.4	8.0	5.3	1.00	0.00	0.254	1.00	Water bearing, OOWC 3411mMD		

Table 1



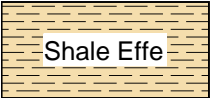
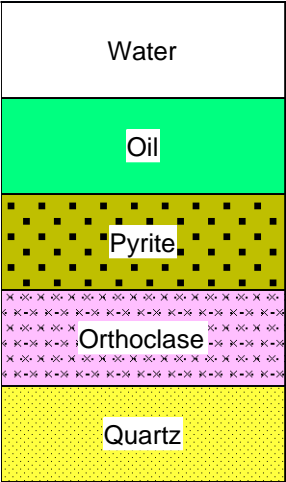
ExxonMobil

# WEST KINGFISH W31A

## Petrophysical Analysis

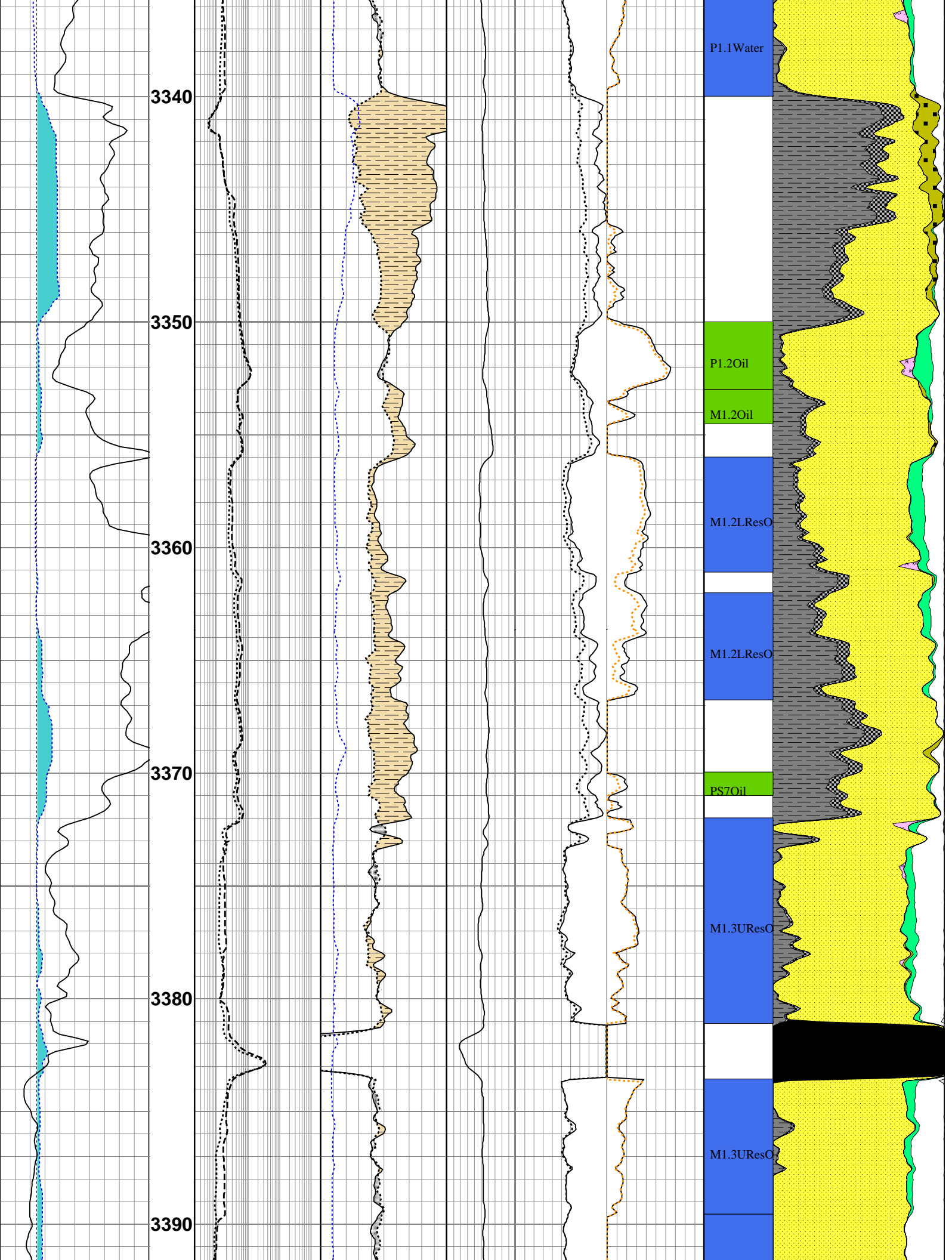
COMPANY:	Esso Australia Pty. Ltd.
WELL:	WEST KINGFISH W31A
BOREHOLE:	
FIELD:	WEST KINGFISH
STATE:	Victoria
COUNTRY:	AUSTRALIA
PETROPHYSICIST:	KUMAR KUTTAN

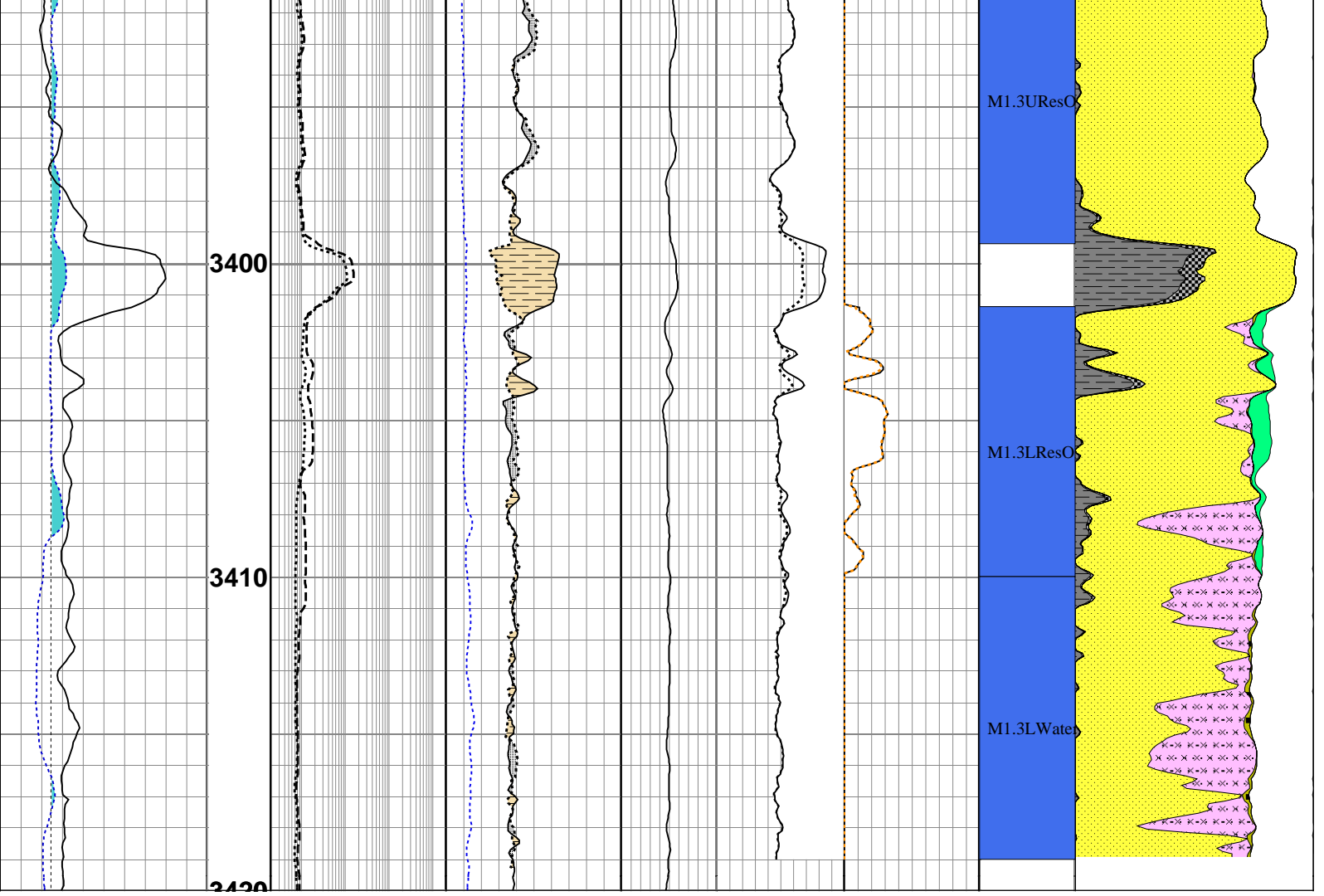
Date Logged:	10-Jun-06	Date of Analysis:	September 2006
Well Location:	<FL>		
Elevations:	K.B. 33.43 m	D.F. <DF>	
Latitude:	<LATI>	G.L. <GL>	
Longitude:	<LONG>		





Washout				Gas Effect				Effec Sw		Coal	
CLDC				DEN				PHIT		Bound Water	
6 (in) 16				1.85 (g/cm3) 2.85				0.5 (m3/m3) 0			
GRGC		Shallow Re		NPRL				Effect		SUWI	
0 (gAPI) 200		0.2 (ohm.m) 2000		0.45 (m3/m3) 0.15						1 (m3/m3) 0	
		Deep Resis		PDPE		DT35		PIGN		SWT	
		0.2 (ohm.m) 2000		0 (b/e) 20		500 100 (us/m)		0.5 (m3/m3) 0		1 (m3/m3) 0	
		MD : 20 m								KK_WK	
										Volumetric Ana	
										1 (V/V) 0	
		3290									
		3300									
		3310									
		3320									
		3330								P1.1Oil	





**APPENDIX 3a**

**WEST KINGFISH W31A**

**Lithology/Show Descriptions**

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
<b>Geologist on rig at 1600 hrs, 22 June 2006 at 1419.0 mMDRT / 1047.2 mTVDRT.</b>			
<b>30 metre spot samples from 1367.0 to 3120.0 mMDRT.</b>			
1367	1380	100	CALCILUTITE: very light grey to light grey, silty in part, trace fossil fragments, dispersive, soft, amorphous to sub-blocky. 40% cement contamination.
1380	1410	100	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace fossil fragments, dispersive, soft, amorphous to sub-blocky. 40% cement contamination.
1410	1440	70	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace fossil fragments, dispersive, soft, amorphous to sub-blocky. 15% cement contamination.
		30	CALCISILTITE: medium grey to light brownish grey, arenaceous in part, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
1440	1470	40	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace fossil fragments, dispersive, soft, amorphous to sub-blocky. 5% cement contamination.
		60	CALCISILTITE: medium grey to light brownish grey, arenaceous in part, trace carbonaceous material, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
<b>Midnight Depth 22 June 2006 = 1473.0 mMDRT / 1081.5 mTVDRT.</b>			
1470	1500	50	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace fossil fragments, dispersive, soft, amorphous to sub-blocky. 2% cement contamination.
		50	CALCISILTITE: light brownish grey to occasionally medium grey, arenaceous in part grading to very fine CALCARENITE, trace carbonaceous material, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
1500	1530	60	CALCILUTITE: as above.
		40	CALCISILTITE: as above.
1530	1560	40	CALCILUTITE: as above.
		60	CALCISILTITE: as above.
1560	1590	30	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace fossil fragments, dispersive, soft to firm, amorphous to sub-blocky.
		70	CALCISILTITE: light brownish grey to occasionally medium grey, arenaceous in part grading to very fine CALCARENITE, trace carbonaceous material, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
1590	1620	40	CALCILUTITE: as above.
		60	CALCISILTITE: as above, sub-fissile to sub-blocky.
1620	1650	60	CALCILUTITE: as above.
		40	CALCISILTITE: as above + trace disseminated pyrite.
1650	1680	70	CALCILUTITE: as above.
		30	CALCISILTITE: as above.
1680	1710	60	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace fossil fragments, dispersive, soft to firm, amorphous to sub-blocky.
		40	CALCISILTITE: light brownish grey to occasionally medium grey, arenaceous in part grading to very fine CALCARENITE, trace carbonaceous material, trace disseminated pyrite, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
1710	1740	50	CALCILUTITE: as above.

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
1740	1770	50	CALCISILTITE: as above.
		60	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace fossil fragments, dispersive, soft to firm, amorphous to sub-blocky.
		40	CALCISILTITE: light brownish grey to medium grey, arenaceous in part grading to very fine CALCARENITE, trace carbonaceous material, trace lithics, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
1770	1800	70	CALCILUTITE: as above.
		30	CALCISILTITE: as above.
1800	1830	70	CALCILUTITE: as above, trace glauconite.
		30	CALCISILTITE: as above.
1830	1860	80	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace glauconite, trace fossil fragments, dispersive, soft to firm, amorphous to sub-blocky.
		20	CALCISILTITE: light brownish grey to medium grey, arenaceous in part grading to very fine CALCARENITE, trace carbonaceous material, trace lithics, trace disseminated pyrite, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
1860	1890	90	CALCILUTITE: as above.
		10	CALCISILTITE: as above.
1890	1920	80	CALCILUTITE: as above.
		20	CALCISILTITE: as above.
1920	1950	70	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace glauconite, trace fossil fragments, dispersive, soft to firm, amorphous to sub-blocky.
		30	CALCISILTITE: light brownish grey to medium grey, arenaceous in part grading to very fine CALCARENITE, trace carbonaceous material, trace lithics, trace disseminated pyrite, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
1950	1980	70	CALCILUTITE: as above.
		30	CALCISILTITE: as above.
1980	2010	60	CALCILUTITE: very light grey to light grey, silty in part, trace carbonaceous material, trace glauconite, trace fossil fragments, dispersive, soft to firm, amorphous to sub-blocky.
		40	CALCISILTITE: light brownish grey to medium grey, arenaceous in part grading to very fine CALCARENITE, trace carbonaceous material, trace lithics, trace disseminated pyrite, trace fossil fragments, firm to moderately hard, sub-fissile to sub-blocky.
<b>Base of Miocene High Velocity Channel</b> <b>= 2016.0 mMDRT/ 1433.5 mTVDRT / -1400.1 mTVDSS.</b>			
2010	2040	80	CALCILUTITE: medium light grey to light olive grey, occasionally light greenish grey, silty in part, trace glauconite, trace fossil fragments, firm, sub-blocky.
		20	CALCISILTITE: as above.
2040	2070	90	CALCILUTITE: as above.
		10	CALCISILTITE: as above.
2070	2100	100	CALCILUTITE: medium light grey to light olive grey, occasionally light greenish grey, silty in part, trace glauconite, trace fossil fragments, firm, sub-blocky.
2100	2130	100	CALCILUTITE: as above + trace disseminated pyrite.
2130	2160	100	CALCILUTITE: medium light grey to light olive grey, light brownish grey, silty in part, trace glauconite, trace disseminated pyrite, trace pyrite nodules, trace fossil fragments, trace gastropods, soft to firm, sub-blocky.
2160	2220	100	CALCILUTITE: as above, no pyrite nodules.
2220	2250	100	CALCILUTITE: as above, + pyrite nodules.
2250	2280	100	CALCILUTITE: medium light grey to light olive grey, light brownish grey, silty in part, trace glauconite, trace disseminated pyrite, trace pyrite nodules, trace carbonaceous material, trace lithics, trace fossil fragments, soft to firm, sub-blocky.

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2280	2310	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace glauconite, trace disseminated pyrite, trace pyrite nodules, trace carbonaceous material, trace gastropods, trace fossil fragments, soft to firm, sub-blocky.
2310	2340	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace glauconite, trace disseminated pyrite, trace carbonaceous material, trace gastropods, trace fossil fragments, soft to firm, sub-blocky.
2340	2370	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace glauconite, trace disseminated pyrite, trace lithics, trace gastropods, trace fossil fragments, soft to firm, sub-blocky.
2370	2400	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace glauconite, trace disseminated pyrite, trace lithics, trace fossil fragments, soft to firm, sub-blocky.
2400	2430	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace disseminated pyrite, trace lithics, trace fossil fragments, soft to firm, sub-blocky.
2430	2460	100	CALCILUTITE: as above.
2460	2490	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace disseminated pyrite, trace lithics, trace pyritized fossil fragments, trace fossil fragments, soft to firm, sub-blocky.
2490	2520	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace disseminated pyrite, trace lithics, trace fossil fragments, soft to firm, sub-blocky.
2520	2550	100	CALCILUTITE: medium light grey to light olive grey, occasionally light greenish grey, silty in part, trace disseminated pyrite, trace glauconite, trace lithics, trace fossil fragments, soft to firm occasionally moderately hard, sub-blocky.
2550	2580	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace disseminated pyrite, trace lithics, trace fossil fragments, soft to firm, occasionally moderately hard, sub-blocky.
2580	2610	100	CALCILUTITE: as above.
2610	2640	100	CALCILUTITE: medium light grey to light olive grey, silty in part, trace disseminated pyrite, trace lithics, trace fossil fragments, soft to firm occasionally moderately hard, sub-blocky.
2640	2670	100	CALCILUTITE: light olive grey to light brownish grey, occasionally medium light grey silty in part, trace disseminated pyrite, trace lithics, trace fossil fragments, soft to firm occasionally moderately hard, sub-blocky.
2670	2700	100	CALCILUTITE: as above + trace nodular pyrite.
2700	2730	100	CALCILUTITE: light olive grey to light brownish grey, occasionally medium light grey silty in part, trace disseminated pyrite, trace lithics, trace fossil fragments, soft to firm occasionally moderately hard, sub-blocky.
2730	2760	100	CALCILUTITE: as above.
2760	2790	100	CALCILUTITE: light olive grey to occasionally light grey, light greenish grey, silty in part, trace disseminated pyrite, trace glauconite, trace lithics, trace fossil fragments, soft to firm occasionally moderately hard, sub-blocky.
2790	2794	100	CALCILUTITE: as above. <b>POOH at 2794.0 mMDRT (1942.3 mTVDR) to the casing shoe to change the saver sub and make up 5" DP.</b>



## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
<p>Attempt to RIH from 1300.0 mMDRT. Unable to pass due to obstruction (probable cement cavings) from within the 13.375" casing.</p> <p>On getting through, after drilling one stand to 1328.0 mMDRT, the samples contained 50% cement and 50% new formation (20% old and 30% new formation). A survey taken at 1328.0 mMDRT confirmed that the well had been sidetracked.</p> <p>POOH to set a cement plug with the TOC at 1242.0 mMDRT.</p> <p>Change over from WKF_W31A to WKF_W31A_ST at 0500 hrs on 28 June 2006. Decision taken to revert back to the original WKF_W31A well name after encountering the original hole.</p>			
2794	2820	100	CALCILUTITE: light olive grey to light brownish grey, light greenish grey, silty in part, trace glauconite, trace lithics, trace fossil fragments, firm to moderately hard, sub-blocky.
2820	2850	100	CALCILUTITE: as above, + occasionally very light grey, soft, amorphous.
2850	2880	100	CALCILUTITE: light olive grey to light brownish grey, greenish grey, silty in part, trace glauconite, trace disseminated pyrite, trace lithics, trace fossil fragments, firm to moderately hard, sub-blocky.
2880	2910	100	CALCILUTITE: light olive grey to light brownish grey, greenish grey, silty in part, trace glauconite, trace disseminated pyrite, trace lithics, trace fossil fragments, firm to moderately hard, sub-blocky.
<b>Top of Lakes Entrance = 2935.5 mMDRT/2034.6 mTVDRT/-2001.2 mTVDSS.</b>			
2910	2940	100 Trace	CALCILUTITE: as above. CALCAREOUS CLAYSTONE: medium light grey to medium grey, silty, moderately calcareous, trace disseminated pyrite, moderately hard, sub-blocky.
2940	2970	60  40	CALCILUTITE: light olive grey to light brownish grey, greenish grey, silty in part, trace glauconite, trace disseminated pyrite, trace lithics, trace fossil fragments, firm to moderately hard, sub-blocky. CALCAREOUS CLAYSTONE: medium light grey to medium olive grey, trace light brownish grey, silty, moderately calcareous, trace disseminated pyrite, soft to moderately hard, sub-blocky.
2970	3000	30 70	CALCILUTITE: as above. CALCAREOUS CLAYSTONE: as above.
3000	3030	20  80	CALCILUTITE: light olive grey to light brownish grey, greenish grey, silty in part, trace glauconite, trace disseminated pyrite, trace lithics, trace fossil fragments, firm to moderately hard, sub-blocky. CALCAREOUS CLAYSTONE: as above.
3030	3060	100	CALCAREOUS CLAYSTONE: medium light grey to medium grey, light brownish grey, silty in part, moderately calcareous, trace fossil fragments, soft to moderately hard, dispersive, amorphous to sub-blocky.
3060	3090	100	CALCAREOUS CLAYSTONE: as above, trace disseminated pyrite.
3090	3120	100	CALCAREOUS CLAYSTONE: medium light grey to medium grey, light brownish grey, silty in part, moderately calcareous, trace fossil fragments, trace lithics, soft to moderately hard, dispersive, amorphous to sub-blocky.
<b>10 metre bagged samples from 3130 to 3270.0 mMDRT.</b>			



## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3120	3130	100	CALCAREOUS CLAYSTONE: medium light grey to medium grey, light brownish grey, silty in part, moderately calcareous, trace disseminated pyrite, trace fossil fragments, trace lithics, soft to moderately hard, dispersive, amorphous to sub-blocky.
3130	3140	100	CALCAREOUS CLAYSTONE: as above.
3140	3150	100	CALCAREOUS CLAYSTONE: as above.
3150	3160	100	CALCAREOUS CLAYSTONE: medium light grey to medium grey, light brownish grey, silty in part, moderately calcareous, trace disseminated pyrite, trace fossil fragments, trace lithics, soft to moderately hard, dispersive, amorphous to sub-blocky. <b>Carbide Lag check at 3169.0 mMDRT:</b> <b>Theoretical in/out strokes: 11320</b> <b>Actual in/out strokes: 12817</b> <b>Difference = 1497strokes.</b> <b>Hole overgauge by 30%.</b> <b>Average hole size = 9.8 inches.</b>
3160	3170	100	CALCAREOUS CLAYSTONE: as above.
3170	3180	100	CALCAREOUS CLAYSTONE: light brownish grey, medium light grey to medium grey, silty in part, moderately calcareous, trace disseminated pyrite, trace fossil fragments, trace lithics, soft to moderately hard, dispersive, amorphous to sub-blocky.
3180	3190	100	CALCAREOUS CLAYSTONE: as above. <b>Baracarb at a concentration of 5 ppb, added to the Mud system at 3198.0 mMDRT (2205.1 mTVDRT / -2171.7 mTVDSS).</b> <b>Baracarb seen in samples from 3200.0 mMDRT to 3450.0 mMDRT (TD).</b>
3190	3200	100	CALCAREOUS CLAYSTONE: light brownish grey, medium light grey to medium grey, silty in part, moderately calcareous, trace disseminated pyrite, trace fossil fragments, trace lithics, soft to moderately hard, dispersive, amorphous to sub-blocky.
3200	3210	100	CALCAREOUS CLAYSTONE: as above.
3210	3220	100	CALCAREOUS CLAYSTONE: as above.
3220	3230	100	CALCAREOUS CLAYSTONE: light brownish grey, medium light grey to medium grey, silty in part, moderately calcareous, trace fossil fragments, trace lithics, soft to moderately hard, dispersive, amorphous to dominantly sub-blocky.
3230	3240	100	CALCAREOUS CLAYSTONE: as above.
3240	3250	100	CALCAREOUS CLAYSTONE: light brownish grey, medium light grey to medium grey, silty in part, moderately calcareous, trace disseminated pyrite, trace lithics, soft to moderately hard, amorphous to sub-blocky. <b>Radiagreen EME Salt added to the Mud system at 3325.0 mMDRT (2242.8 mTVDRT / -2209.4 mTVDSS).</b> <b>A 2% concentration of Radiagreen in the Mud system was achieved at 3397.0 mMDRT (2338.3 mTVDRT / -2304.9 mTVDSS).</b>
3250	3260	100	CALCAREOUS CLAYSTONE: as above, trace rock flour.
3260	3270	100	CALCAREOUS CLAYSTONE: as above, common rock flour. <b>5 metre bagged samples from 3270.0 mMDRT to 3450.0 mMDRT (TD).</b>
3270	3275	100	CALCAREOUS CLAYSTONE: as above, common rock flour.
3275	3280	100	CALCAREOUS CLAYSTONE: as above.
3280	3285	100	CALCAREOUS CLAYSTONE: as above. <b>Top of Latrobe = 3288.0 mMDRT / 2264.9 mTVDRT / -2231.5 mTVDSS.</b>
3285	3290	90	CALCAREOUS CLAYSTONE: light brownish grey, medium light grey, silty in part, moderately calcareous, trace disseminated pyrite, soft to moderately hard, amorphous to sub-blocky, trace rock flour.

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3290	3295	5	SILTSTONE: pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, trace glauconite, firm to moderately hard, sub-fissile to sub-blocky.
		5	SANDSTONE: white to pale green, dominantly very fine to fine, moderately well sorted, sub-angular to sub-rounded, trace glauconite matrix, hard aggregates, common rock flour, tight inferred and visual porosity. No fluorescence.
		85	CALCAREOUS CLAYSTONE: 15%, as above. CLAYSTONE: 70%, off white to very light green, trace glauconite pellets, soft to firm, dispersive, amorphous.
		5	SILTSTONE: as above.
		10	SANDSTONE: as above. No fluorescence.
3295	3300	85	CALCAREOUS CLAYSTONE: 10%, as above. CLAYSTONE: 75%, as above.
		5	SILTSTONE: as above.
		10	SANDSTONE: as above. No fluorescence.
3300	3305	80	CALCAREOUS CLAYSTONE: 5%, as above. CLAYSTONE: 75%, as above.
		10	SILTSTONE: pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, trace glauconite, firm to moderately hard, sub-fissile to sub-blocky.
		10	SANDSTONE: white to pale green, dominantly very fine to fine, moderately well sorted, sub-angular to sub-rounded, trace glauconite matrix, hard aggregates, common rock flour, tight inferred and visual porosity. No fluorescence.
		85	CALCAREOUS CLAYSTONE: 5%, as above. CLAYSTONE: 80%, as above.
3305	3310	10	SILTSTONE: as above.
		5	SANDSTONE: as above. No fluorescence.
		75	CLAYSTONE 1: 60%, off white to very light green, trace glauconite pellets, soft to firm, dispersive, amorphous, common rock flour. CLAYSTONE 2: 15%, light olive brown to medium olive brown, soft, dispersive, amorphous, common rock flour.
3310	3315	15	SILTSTONE: as above.
		10	SANDSTONE: as above. No fluorescence.
		70	CLAYSTONE 1: 50%, as above. CLAYSTONE 2: 20%, as above.
3315	3320	20	SILTSTONE: pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, trace glauconite, firm to moderately hard, common rock flour, sub-fissile to sub-blocky.
		10	SANDSTONE: white to pale green, dominantly very fine to fine, moderately well sorted, sub-angular to sub-rounded, trace glauconite matrix, hard aggregates, common rock flour, tight inferred and visual porosity. No fluorescence.

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3320	3325	75	CLAYSTONE 1: 45%, as above. CLAYSTONE 2: 30%, as above.
		20	SILTSTONE: as above.
		5	SANDSTONE: as above. No fluorescence.
			<b>Top of P 1.1 sand = 3328.0 mMDRT / 2291.9 mTVDRT / -2258.5 mTVDSS.</b>
3325	3330	70	CLAYSTONE 1: 40%, off white to very light green, trace glauconite pellets, soft to firm, dispersive, amorphous, common rock flour. CLAYSTONE 2: 30%, light olive brown to medium olive brown, soft, dispersive, amorphous, common rock flour.
		25	SILTSTONE 1: 15%, pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, trace glauconite, firm to moderately hard, common rock flour, sub-fissile to sub-blocky. SILTSTONE 2: 10%, medium grey to medium dark grey, very arenaceous grading to very fine Sandstone, common micropyrte, moderately hard to hard, common rock flour, sub-fissile to sub-blocky.
		5	SANDSTONE: white to pale green, dominantly very fine to fine, moderately well sorted, sub-angular to sub-rounded, trace glauconite matrix, hard aggregates, common rock flour, tight inferred and visual porosity. No fluorescence.
3330	3335	60	CLAYSTONE 1: 40%, as above. CLAYSTONE 2: 20%, as above.
		30	SILTSTONE 1: 15%, as above. SILTSTONE 2: 15%, as above.
		10	SANDSTONE: clear to translucent, fine to rare very coarse, poorly sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, occasionally hard aggregates, dominantly loose, generally clean, occasionally fractured quartz grains, poor to fair inferred and visual porosity. No fluorescence.
			<b>Base of P 1.1 Sand = 3340.0 mMDRT / 2300.0 mTVDRT / -2266.6 mTVDSS.</b>
3335	3340	40	CLAYSTONE 1: 20%, as above. CLAYSTONE 2: 20%, as above.
		20	SILTSTONE 1: 10%, as above. SILTSTONE 2: 10%, as above.
		40	SANDSTONE: clear to translucent, medium to occasionally very coarse, dominantly coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, dominantly loose, generally clean, fair inferred and visual porosity. No fluorescence.
3340	3345	60	CLAYSTONE 1: 50%, off white to very light green, trace glauconite pellets, soft to firm, dispersive, amorphous, common rock flour. CLAYSTONE 2: 10%, light olive brown to medium olive brown, soft, dispersive, amorphous, common rock flour.
		30	SILTSTONE 1: 25%, pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, trace glauconite, firm to moderately hard, common rock flour, sub-fissile to sub-blocky. SILTSTONE 2: 5%, medium grey to medium dark grey, very arenaceous grading to very fine Sandstone, common micropyrte, moderately hard to hard, common rock flour, sub-fissile to sub-blocky.

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3345	3350	10	SANDSTONE: clear to translucent, coarse to dominantly very coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, dominantly loose, generally clean, fair inferred and visual porosity. No fluorescence.
			<b>Top P 1.2 = 3349.5 mMDRT / 2306.5 mTVDRT / -2273.1 mTVDSS.</b>
		30	CLAYSTONE 1: 25%, as above.
			CLAYSTONE 2: 5%, as above.
		60	SILTSTONE 1: 10%, as above.
3350	3355		SILTSTONE 2: 60%, as above.
		10	SANDSTONE: as above, coarse to dominantly very coarse. No fluorescence.
		20	CLAYSTONE 1: 10%, as above.
			CLAYSTONE 2: 10%, as above.
		50	SILTSTONE 1: 10%, as above.
3355	3360		SILTSTONE 2: 40%, as above.
		30	SANDSTONE: clear to translucent, fine to very coarse, occasionally fractured quartz grains, poorly sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, occasionally hard aggregates, poor to fair inferred and visual porosity. No fluorescence.
			<b>Top M 1.2 L = 3356.0 mMDRT / 2310.8 mTVDRT / -2277.4 mTVDSS.</b>
		35	CLAYSTONE 1: 25%, off white to very light green, trace glauconite, soft to firm, dispersive, amorphous, common rock flour.
			CLAYSTONE 2: 10%, light olive brown to medium olive brown, soft, dispersive, amorphous, common rock flour.
3360	3365	40	SILTSTONE 1: 10%, pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, trace glauconite, firm to moderately hard, common rock flour, sub-fissile to sub-blocky.
			SILTSTONE 2: 30%, medium grey to medium dark grey, very arenaceous grading to very fine Sandstone, common micropyrrite, moderately hard to hard, common rock flour, sub-fissile to sub-blocky.
		25	SANDSTONE: clear to translucent, fine to occasionally very coarse, poorly sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, occasionally hard aggregates, dominantly loose, poor inferred and visual porosity.
			<b>FLUORESCENCE: Trace, dull, pinpoint, greenish yellow fluorescence, no direct cut, very slow diffusive crush cut, thin greenish yellow film residue.</b>
			<b>Base M 1.2 L = 3361.0 mMDRT / 2314.2 mTVDRT / -2280.8 mTVDSS.</b>
3365	3370	40	CLAYSTONE 1: 30%, as above.
			CLAYSTONE 2: 10%, as above.
		50	SILTSTONE 1: 10%, as above.
			SILTSTONE 2: 40%, as above.
		10	SANDSTONE: clear to translucent, fine to coarse, poorly sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, occasionally hard aggregates, dominantly loose, poor inferred and visual porosity. No fluorescence.
3365	3370	35	CLAYSTONE 1: 20%, off white to very light green, trace glauconite, soft to firm, dispersive, amorphous, common rock flour.
			CLAYSTONE 2: 15%, light olive brown to medium olive brown, soft, dispersive, amorphous, common rock flour.

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3370	3375	40	SILTSTONE 1: 10%, as above.
			SILTSTONE 2: 30%, as above.
		25	SANDSTONE: as above. No fluorescence.
			<b>Top M 1.3 = 3372.0 mMDRT / 2321.6 mTVDRT / -2288.2 mTVDSS.</b>
		20	CLAYSTONE 1: 15%, as above.
3375	3380		CLAYSTONE 2: 5%, as above.
		20	SILTSTONE 1: 5%, as above.
			SILTSTONE 2: 15%, as above.
		60	SANDSTONE: clear to translucent, medium to very coarse, dominantly medium, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, dominantly loose, generally clean, poor to fair inferred and visual porosity. <b>FLUORESCENCE: Trace, dull, pinpoint, greenish yellow fluorescence, very slow diffusive direct cut, thin greenish yellow film residue.</b>
			<b>Top PS5 Sand = 3379.0 mMDRT / 2326.3 mTVDRT / -2292.9 mTVDSS.</b>
3380	3385	5	COAL: dusky brown, earthy, moderately hard, angular, blocky, woody texture.
		15	CLAYSTONE 1: 10%, off white to very light green, trace glauconite, soft to firm, dispersive, amorphous, common rock flour.
			CLAYSTONE 2: 5%, light olive brown to medium olive brown, soft, dispersive, amorphous, common rock flour.
		15	SILTSTONE 1: 5%, pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, trace glauconite, firm to moderately hard, common rock flour, sub-fissile to sub-blocky.
			SILTSTONE 2: 10%, medium grey to medium dark grey, very arenaceous grading to very fine Sandstone, common micropyrte, moderately hard to hard, common rock flour, sub-fissile to sub-blocky.
3385	3390	65	SANDSTONE: clear to translucent, fine to very coarse, dominantly medium, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, dominantly loose, generally clean, poor to fair inferred and visual porosity. <b>FLUORESCENCE: Trace, dull, pinpoint, greenish yellow fluorescence, very slow diffusive direct cut, thin greenish yellow film residue.</b>
			<b>Top PS4 Sand = 3383.0 mMDRT / 2328.9 mTVDRT / -2295.5 mTVDSS.</b>
		15	CLAYSTONE: off white to very light green, trace glauconite, soft to firm, dispersive, amorphous.
		15	SILTSTONE: medium light grey, non calcareous, trace micromicaceous, moderately hard to hard, sub-blocky to blocky.
		70	SANDSTONE: clear to translucent, dominantly medium to very coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, dominantly loose, generally clean, fair inferred and visual porosity. <b>FLUORESCENCE: Trace, dull, pinpoint, greenish yellow fluorescence, very slow diffusive direct cut, thin greenish yellow film residue.</b>
3390	3395	10	CLAYSTONE: as above.
		10	SILTSTONE: as above.
		80	SANDSTONE: clear to translucent, fine to very coarse, poorly sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, dominantly loose, generally clean, fair inferred and visual porosity. <b>FLUORESCENCE: Trace 2%, dull, pinpoint, greenish yellow fluorescence, no direct cut, no crush cut.</b>

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3390	3395	15	CLAYSTONE: off white to very light green, trace glauconite, soft to firm, dispersive, amorphous.
		15	SILTSTONE: medium light grey, non calcareous, trace micromicaceous, moderately hard to hard, sub-blocky to blocky.
		70	SANDSTONE: clear to translucent, fine to very coarse, poorly sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, dominantly loose, generally clean, fair inferred and visual porosity. No fluorescence.
3395	3400	15	CLAYSTONE: off white to very pale orange, firm to moderately hard, sub-blocky.
		30	SILTSTONE 1: 15%, medium light grey, trace micromicaceous, moderately hard to hard, sub-blocky to blocky. SILTSTONE 2: 15%, pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, firm to moderately hard, trace rock flour, sub-fissile to sub-blocky.
		55	SANDSTONE: clear to translucent, fine to occasionally very coarse, poorly sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, dominantly loose, generally clean, poor to fair inferred and visual porosity. <b>FLUORESCENCE: Trace, dull, pinpoint, greenish yellow fluorescence, very slow diffusive direct cut, thin greenish yellow ring residue.</b> <b>Top M 1.3 L = 3401.5 mMDRT / 2341.3 mTVDRT / -2307.9 mTVDSS.</b>
3400	3405	15	CLAYSTONE: as above.
		25	SILTSTONE 1: 15%, as above. SILTSTONE 2: 10%, as above.
		60	SANDSTONE: clear to translucent, fine to occasionally very coarse, poorly sorted, sub-angular to sub-rounded, trace pyrite nodules, dominantly loose, generally clean, poor to fair inferred and visual porosity. No fluorescence.
3405	3410	10	CLAYSTONE: as above.
		15	SILTSTONE 1: 10%, as above. SILTSTONE 2: 5%, as above.
		75	SANDSTONE: clear to translucent, medium to very coarse, dominantly coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, loose, clean, fair inferred and visual porosity. <b>FLUORESCENCE: Trace, dull, pinpoint, greenish yellow fluorescence, very slow diffusive direct cut, no residue.</b>
3410	3415	10	CLAYSTONE: off white to very pale orange, firm to moderately hard, sub-blocky.
		20	SILTSTONE 1: 15%, medium light grey, trace micromicaceous, moderately hard to hard, sub-blocky to blocky. SILTSTONE 2: 5%, pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, firm to moderately hard, trace rock flour, sub-fissile to sub-blocky.
		70	SANDSTONE: as above. No fluorescence.
3415	3420	10	CLAYSTONE: as above.
		15	SILTSTONE 1: 10%, as above. SILTSTONE 2: 5%, as above.

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3420	3425	75	SANDSTONE: clear to translucent, fine to very coarse, dominantly medium to coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, loose, clean, poor to fair inferred and visual porosity. No fluorescence.
		20	CLAYSTONE: off white to very pale orange, firm to moderately hard, sub-blocky.
		20	SILTSTONE 1: 15%, as above. SILTSTONE 2: 5%, as above.
		60	SANDSTONE: clear to translucent, medium to very coarse, dominantly coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, loose, clean, poor to fair inferred and visual porosity. No fluorescence.
3425	3430		<b>Top 1.4 Coals = 3428.0 mMDRT / 2358.8 mTVDRT / -2325.4 mTVDSS.</b>
		5	COAL: dusky brown, earthy, firm to moderately hard, uneven, sub-blocky, woody texture.
		15	CLAYSTONE: as above.
		15	SILTSTONE 1: 10%, medium light grey, trace micromicaceous, moderately hard to hard, sub-blocky to blocky. SILTSTONE 2: 5%, pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, firm to moderately hard, trace rock flour, sub-fissile to sub-blocky.
3430	3435	65	SANDSTONE: clear to translucent, medium to dominantly very coarse, moderately well sorted, sub-angular to sub-rounded, occasionally fractured quartz grains, weak pyrite cement, trace pyrite nodules, loose, clean, poor to fair inferred and visual porosity. No fluorescence.
		15	CLAYSTONE: off white to very pale orange, firm to moderately hard, sub-blocky.
		15	SILTSTONE 1: 10%, as above. SILTSTONE 2: 5%, as above.
		70	SANDSTONE: clear to translucent, medium to dominantly very coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, loose, clean, fair inferred and visual porosity. No fluorescence.
3435	3440	5	COAL: dusky brown, earthy, silty in part grading to CARBONACEOUS SILTSTONE, firm to moderately hard, sub-fissile to sub-blocky.
		10	CLAYSTONE: as above.
		15	SILTSTONE 1: 10%, as above. SILTSTONE 2: 5%, as above.
		70	SANDSTONE: clear to translucent, medium to very coarse, dominantly coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, trace off- white argillaceous matrix, dominantly loose, generally clean, poor to fair inferred and visual porosity. No fluorescence.
3440	3445	5	COAL: dusky brown, earthy, silty in part grading to CARBONACEOUS SILTSTONE, firm to moderately hard, sub-fissile to sub-blocky.
		30	CLAYSTONE: as above.
		40	SILTSTONE 1: 35%, as above. SILTSTONE 2: 5%, as above.
		25	SANDSTONE: as above.
			No fluorescence.
3445	3450	30	CLAYSTONE: off white to very pale orange, firm to moderately hard, sub-blocky.

## West Kingfish W31A Lithology / Show Descriptions

Interval (m) From      To		%	Lithology / Show Description
<b>TD</b>		30	SILTSTONE 1: 25%, medium light grey, trace micromicaceous, moderately hard to hard, sub-blocky to blocky. SILTSTONE 2: 5%, pale brown to dark yellowish brown, very arenaceous grading to very fine Sandstone, trace micromicaceous, firm to moderately hard, trace rock flour, sub-fissile to sub-blocky.
		40	SANDSTONE: clear to translucent, medium to dominantly very coarse, moderately well sorted, sub-angular to sub-rounded, weak pyrite cement, trace pyrite nodules, trace off-white argillaceous matrix, dominantly loose, generally clean, poor to fair inferred and visual porosity. No fluorescence.
<b>WKF W31A reached a TD of 3450.0 mMDRT = 2373.2 mTVDRT (-2339.8 mTVDSS) at 2330 hrs on 03 July 2006.</b>			



**APPENDIX 4a**

**WEST KINGFISH W31A**

**Mud Log**






































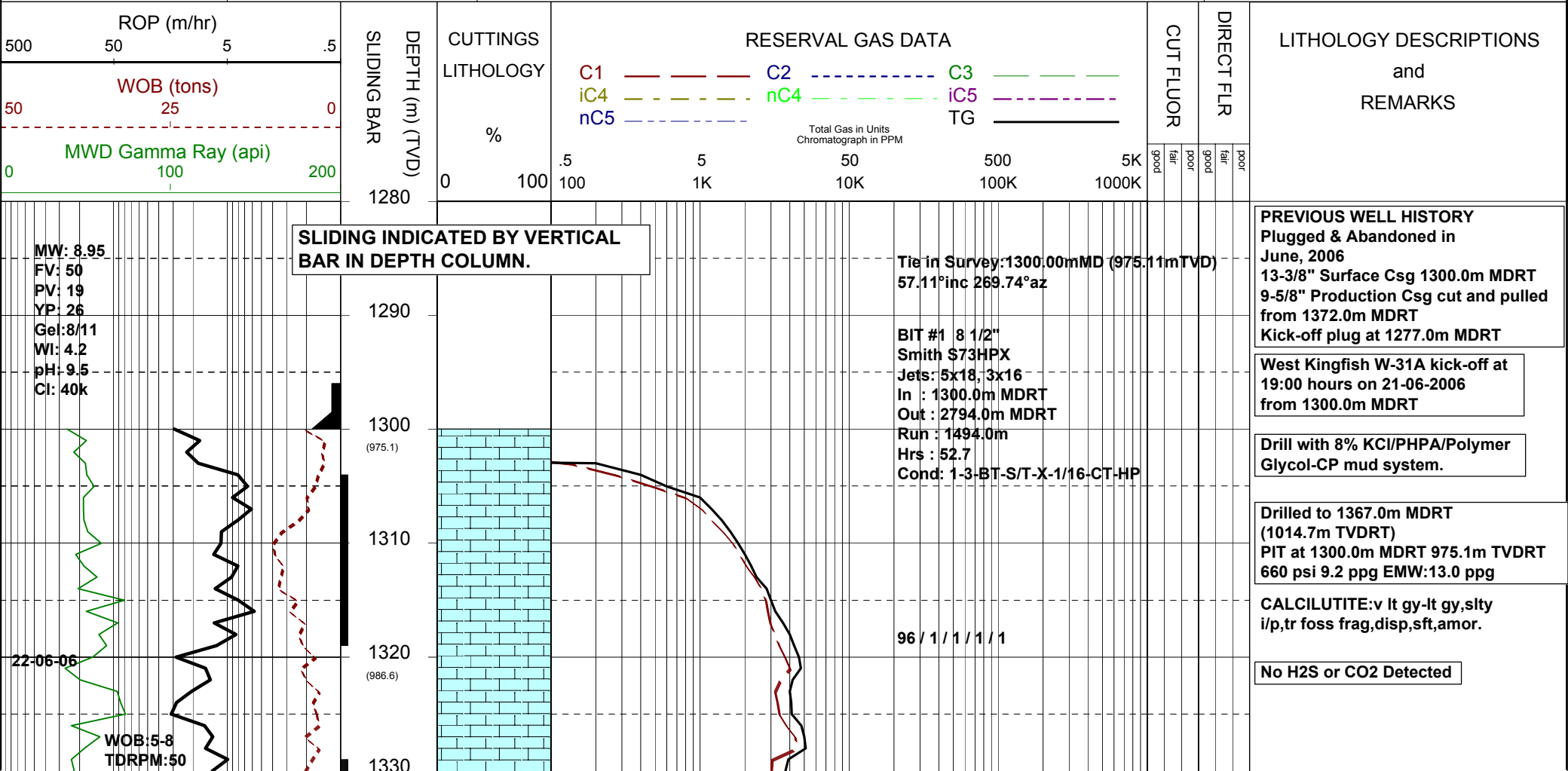
# MASTERLOG

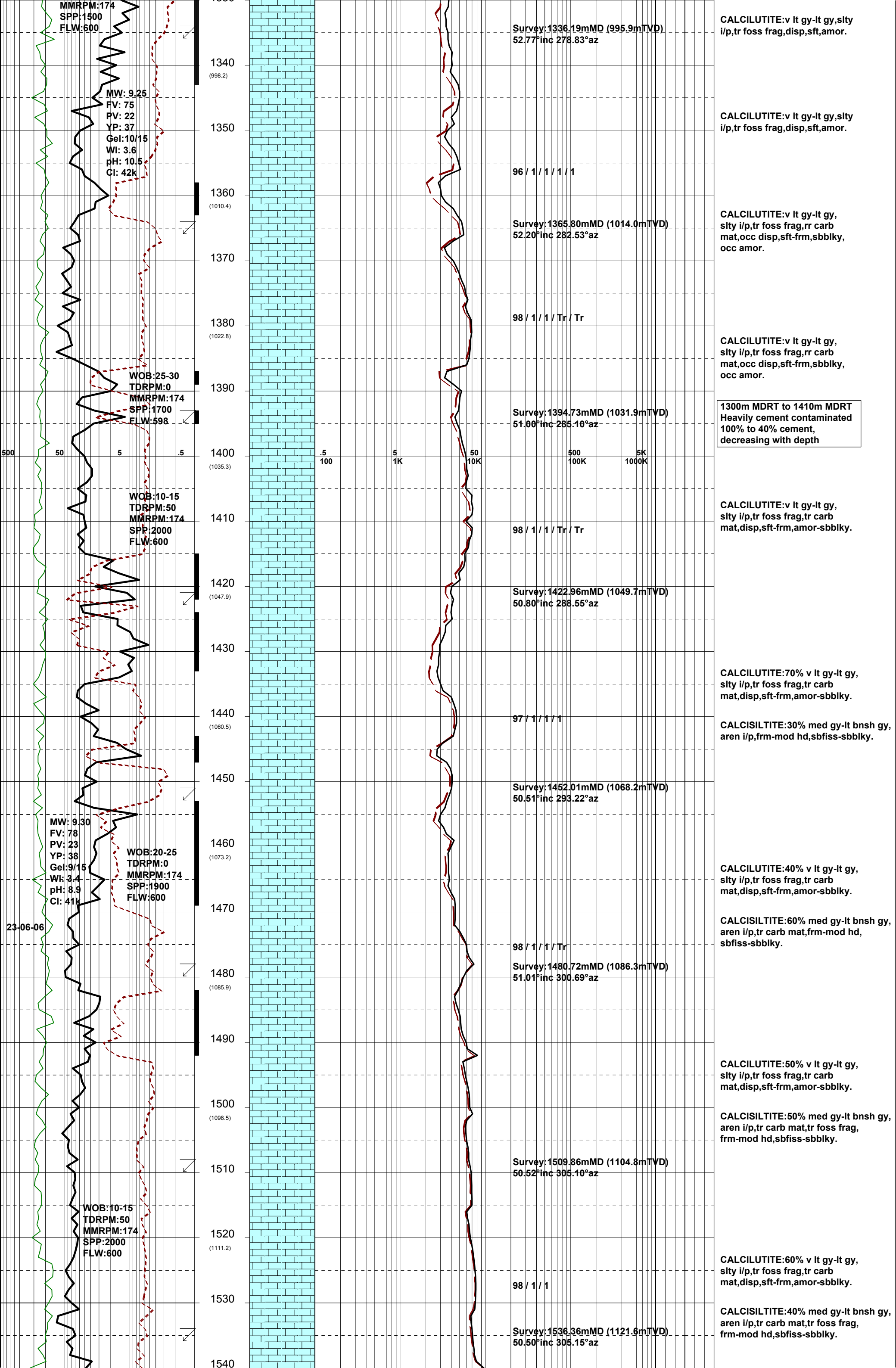
## WKF W-31A

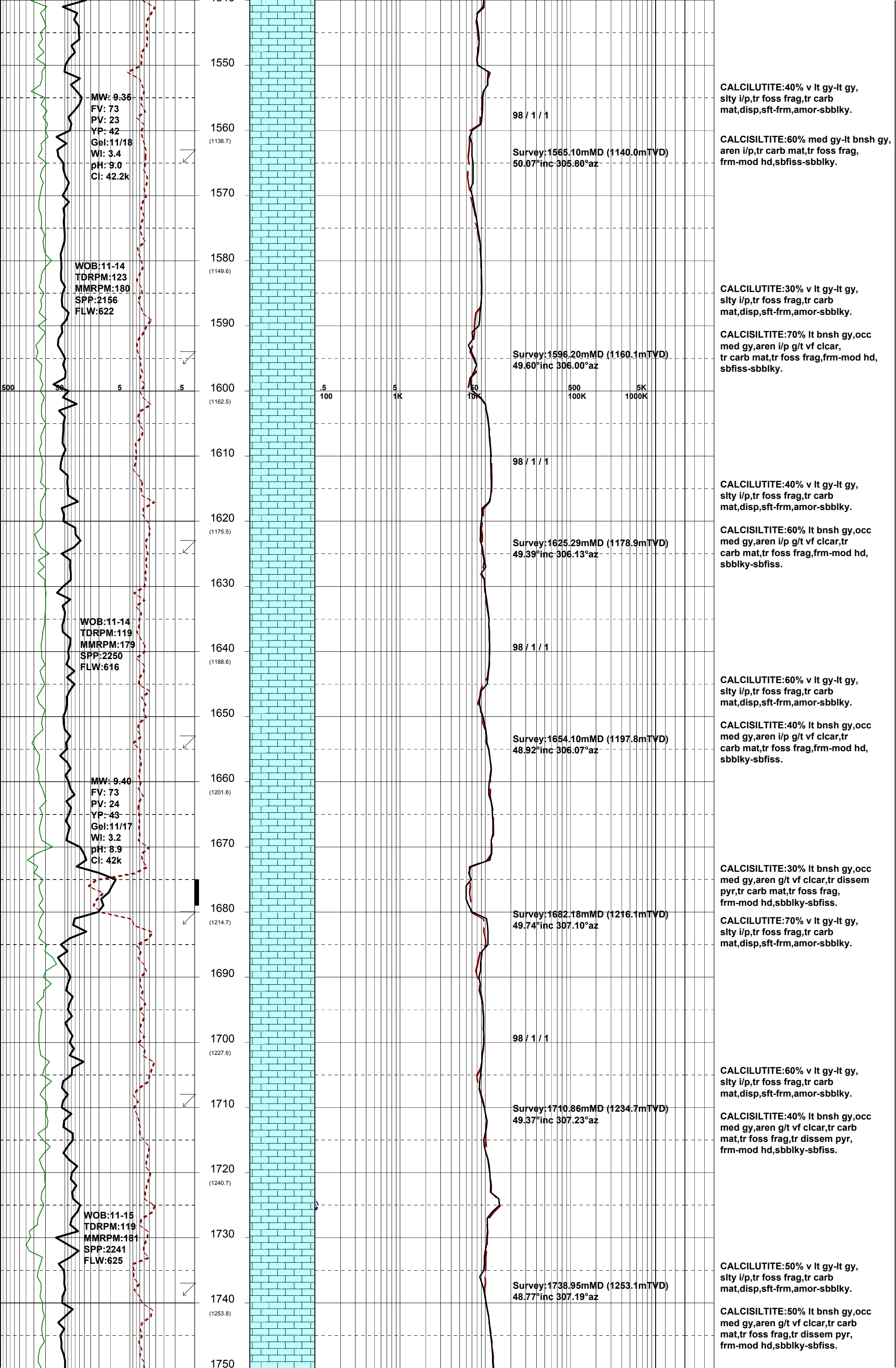


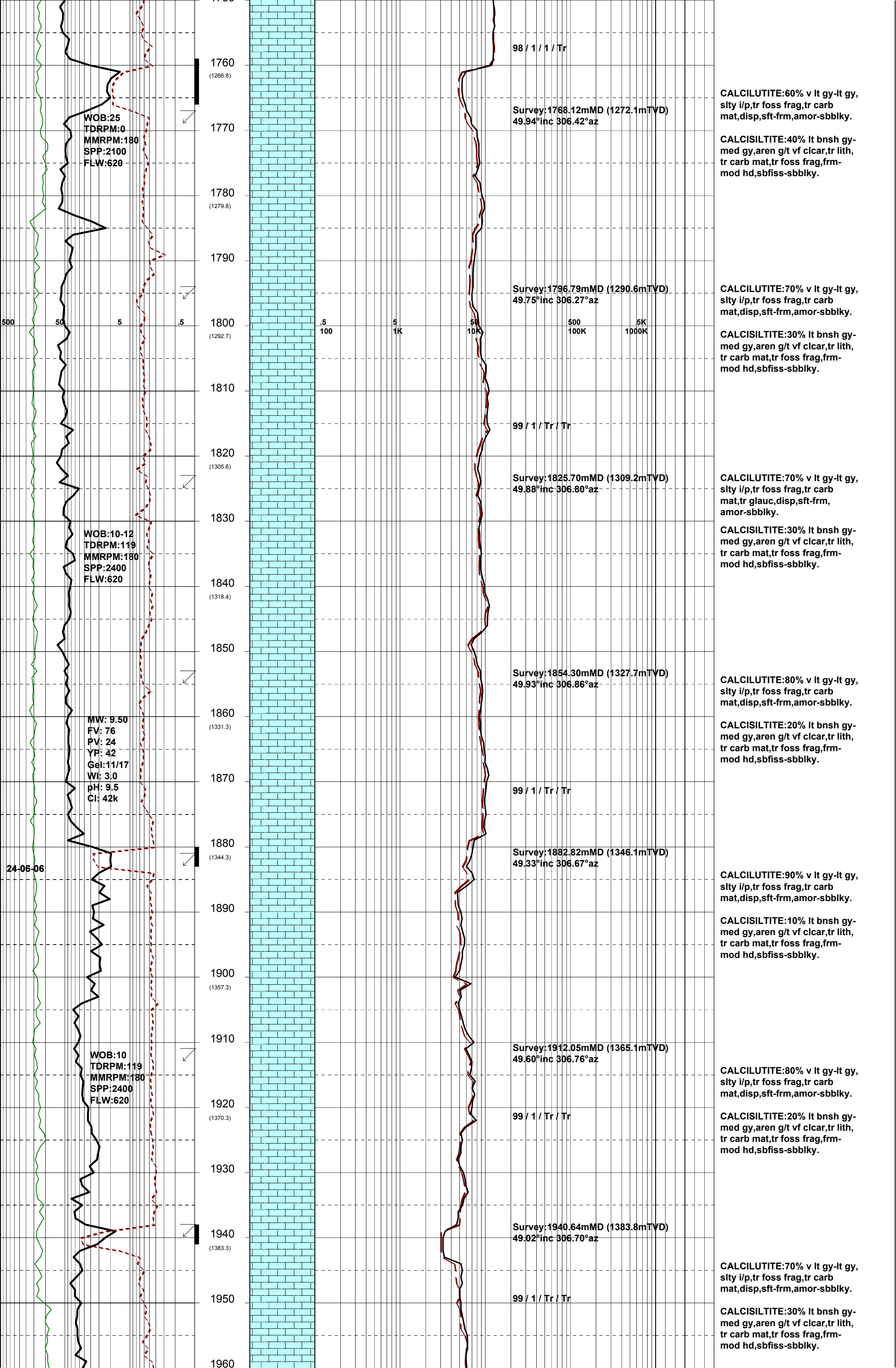
GENERAL	SURFACE POSITON	HOLE / CASING INFO	DATE / DEPTH	ENGINEERS
Country : AUSTRALIA Permit : VIC L8 Field : Kingfish Basin : GIPPSLAND Well Type : DEVELOPMENT Rig Name : NABORS 453	Longitude : 148 06 19.408E Latitude : 38 35 34.800S MGA Co-ord X : 596265.03mE MGA Co-ord Y : 5727807.76mN RT to MSL : 33.43m RT to Sea Bed : 109.56m	8-1/2" Hole to 3450.0m MDRT  13-3/8" Surface Csg at 1300.0m MDRT 7" Production Csg at 3443.0m MDRT	Spud Date : 21-06-2006 Total Depth Date : 03-07-2006 Total Depth : 3450.0m MDRT True Vertical Depth : 2373.2m TVDRT Log Scale : 1/ 500	Steve Oades Mark Smith Noel Elliott Nick Abolins

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

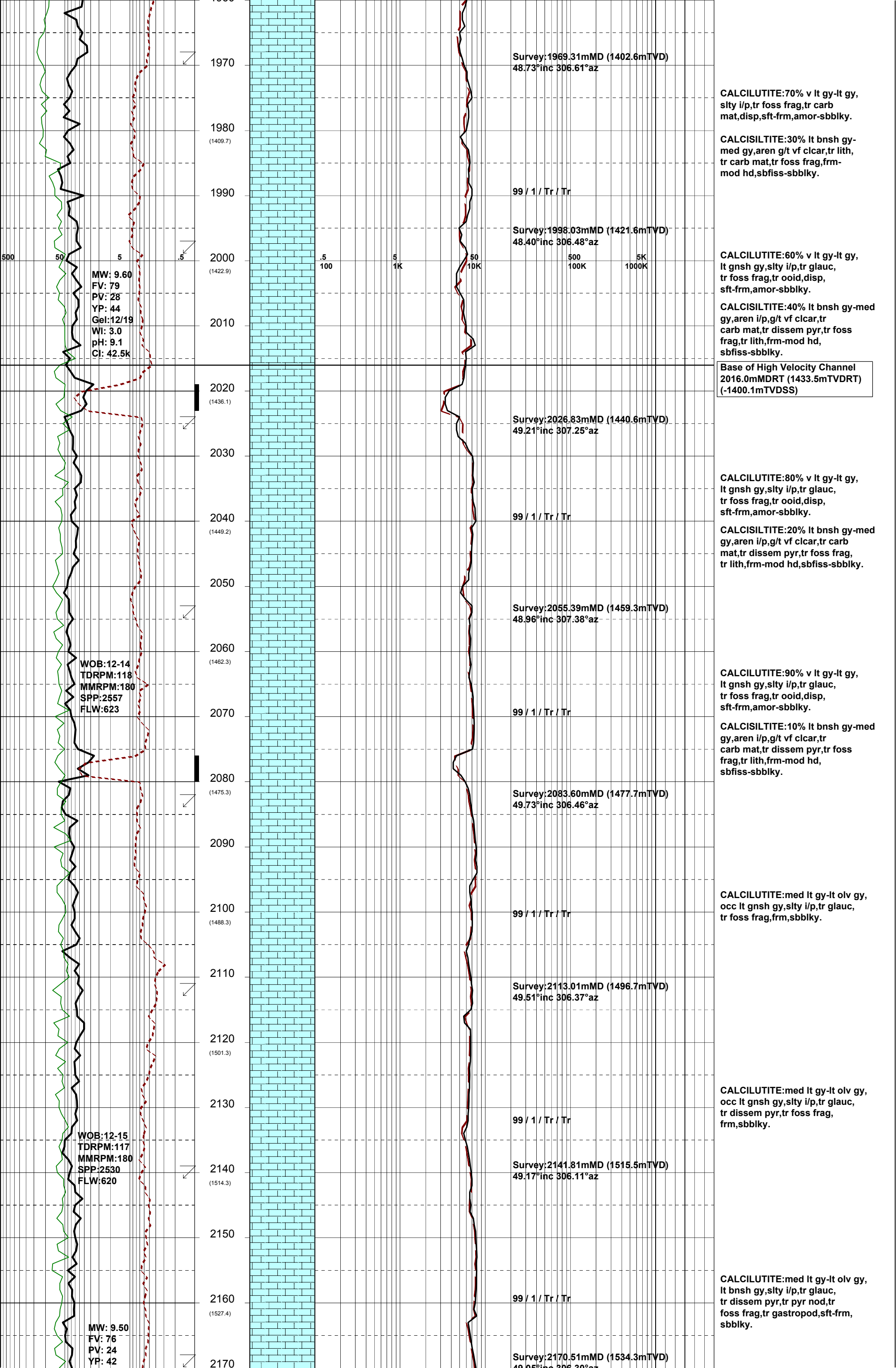


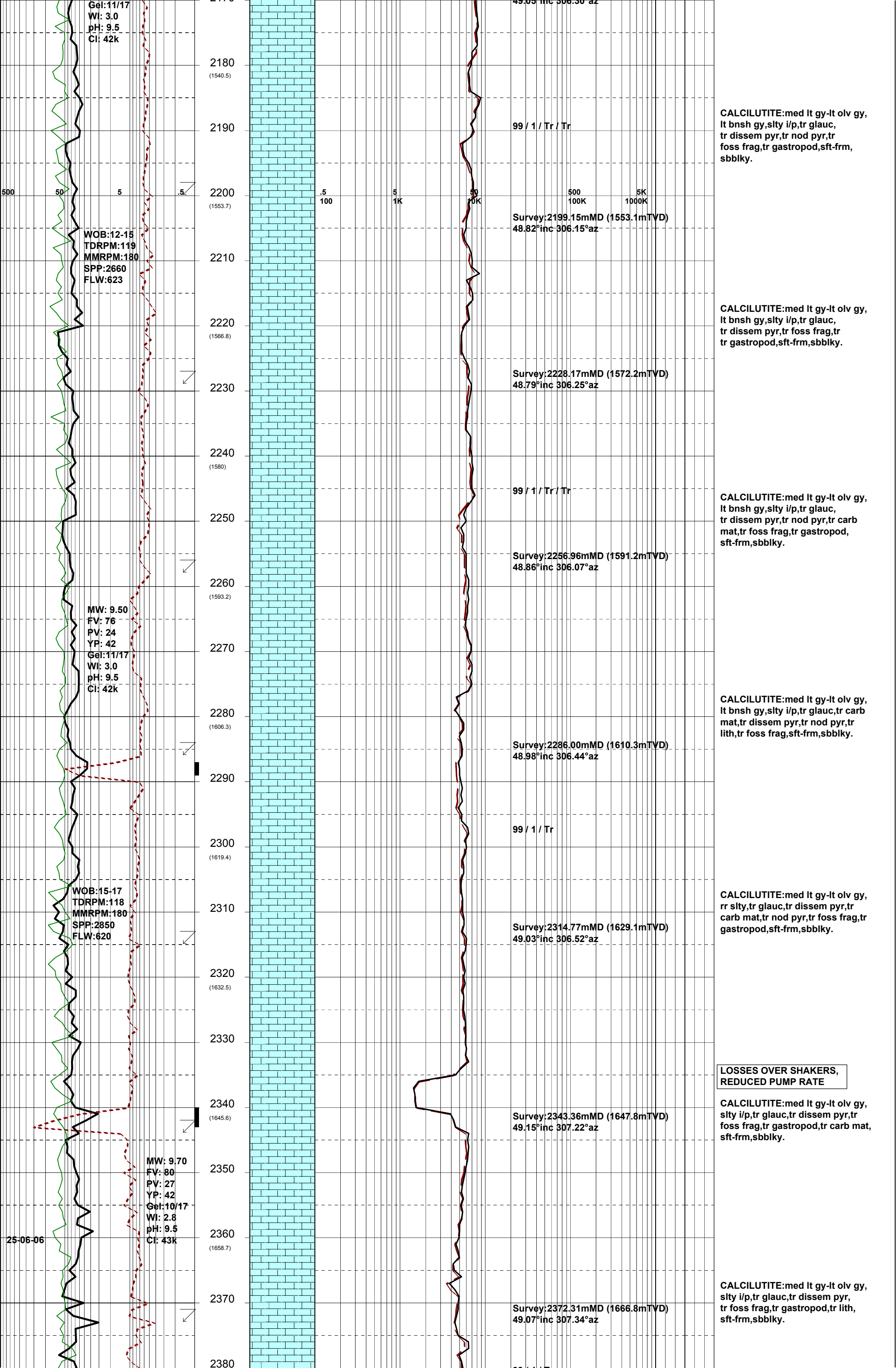


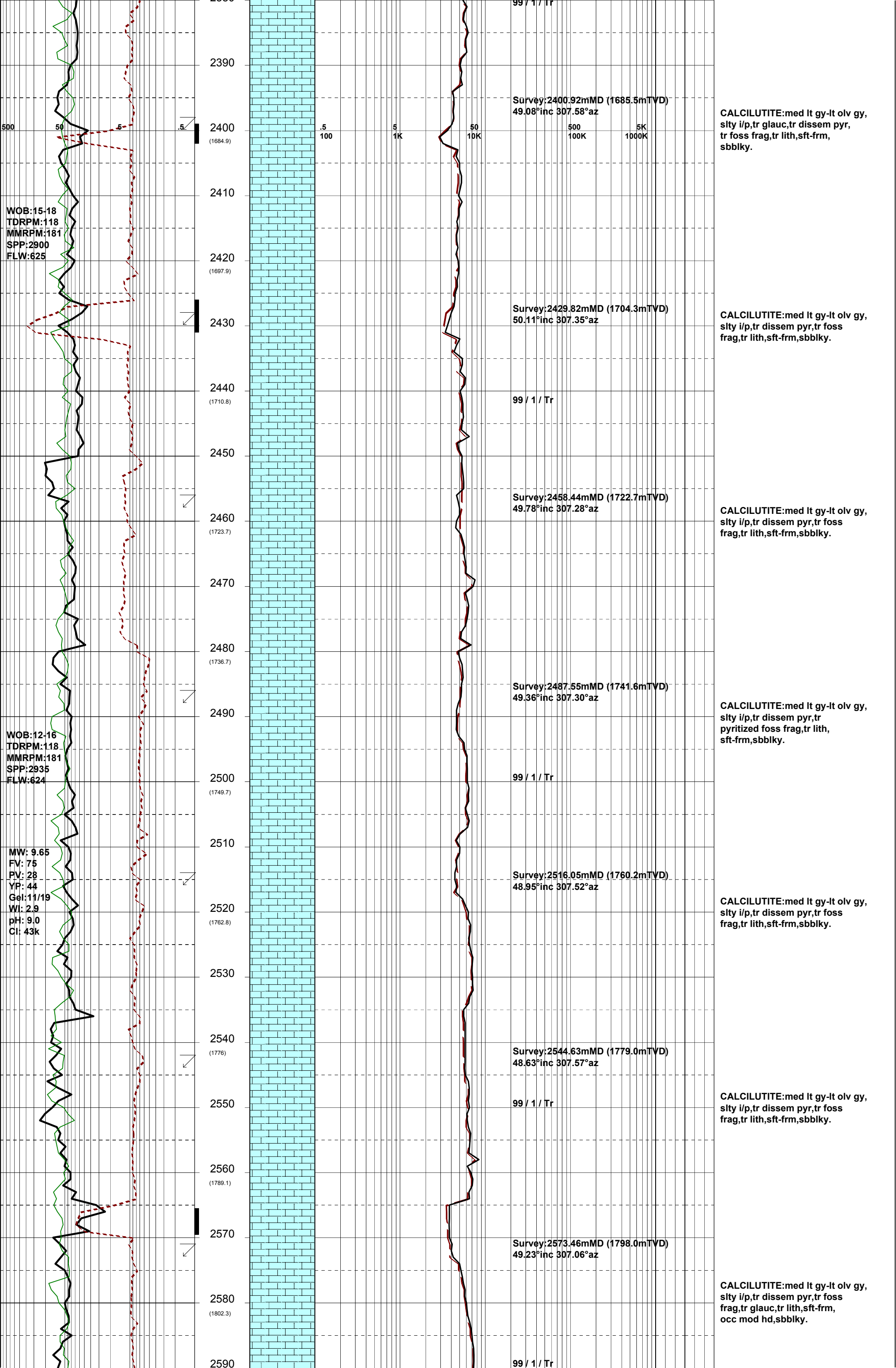




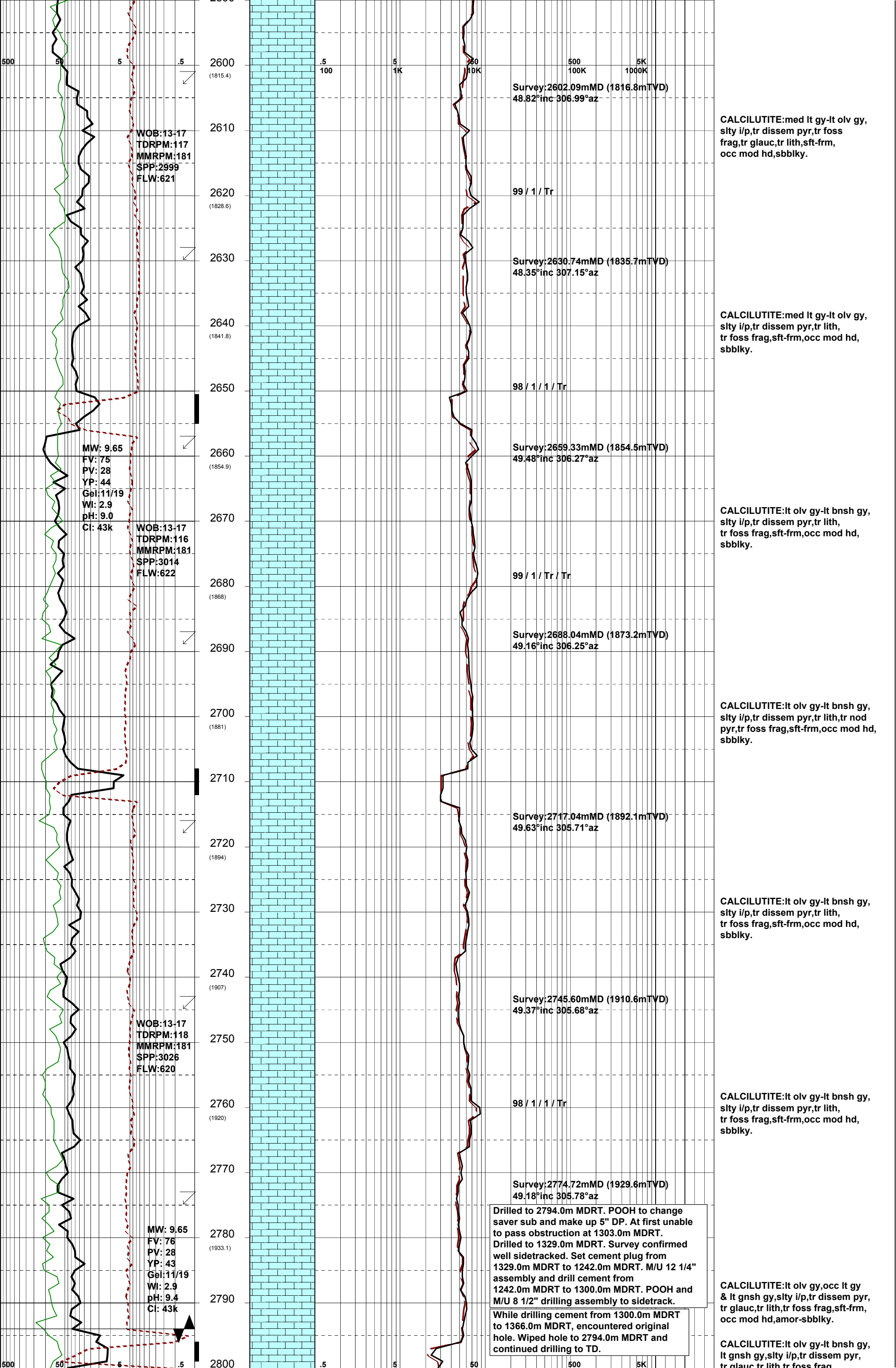


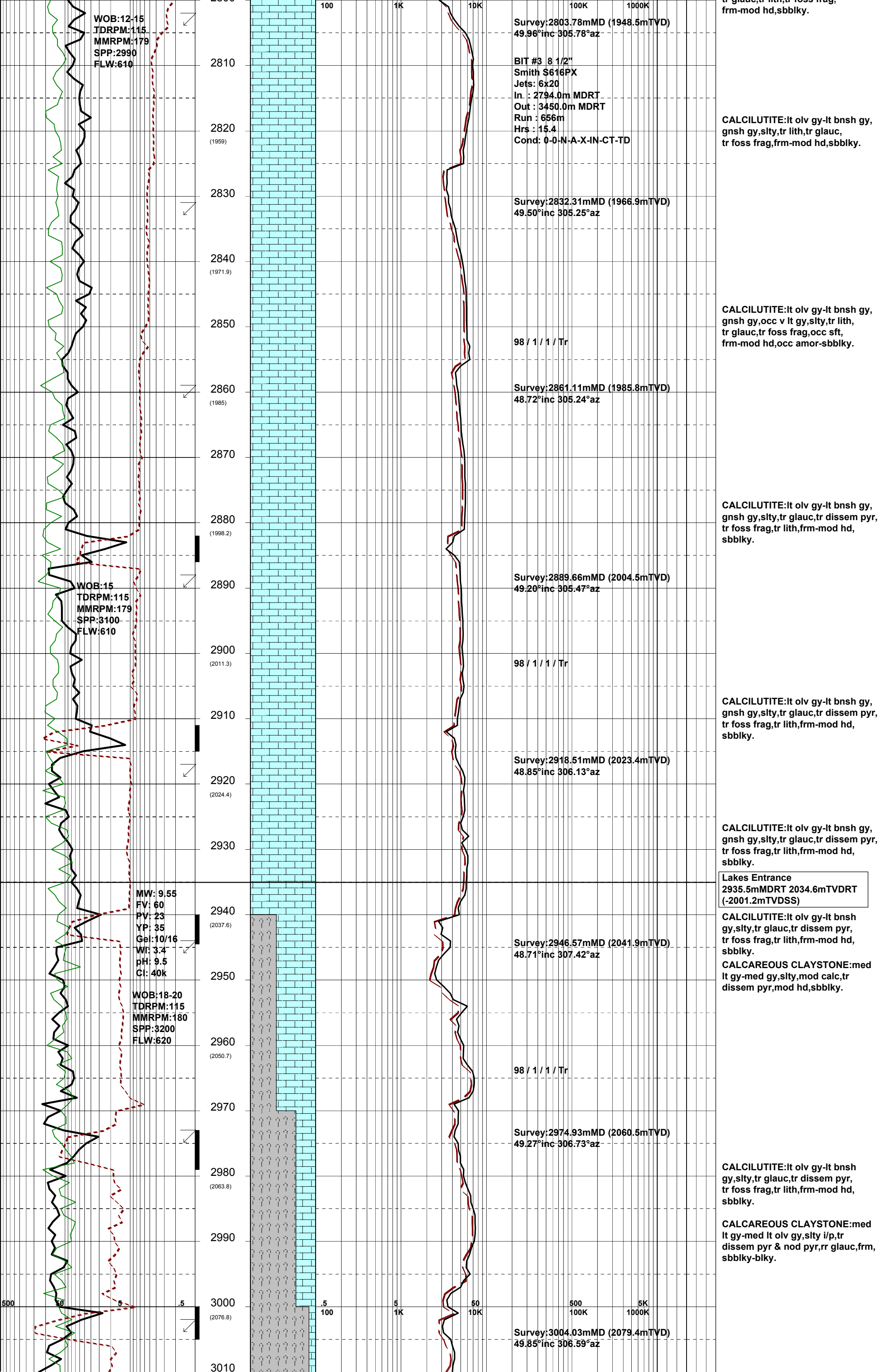


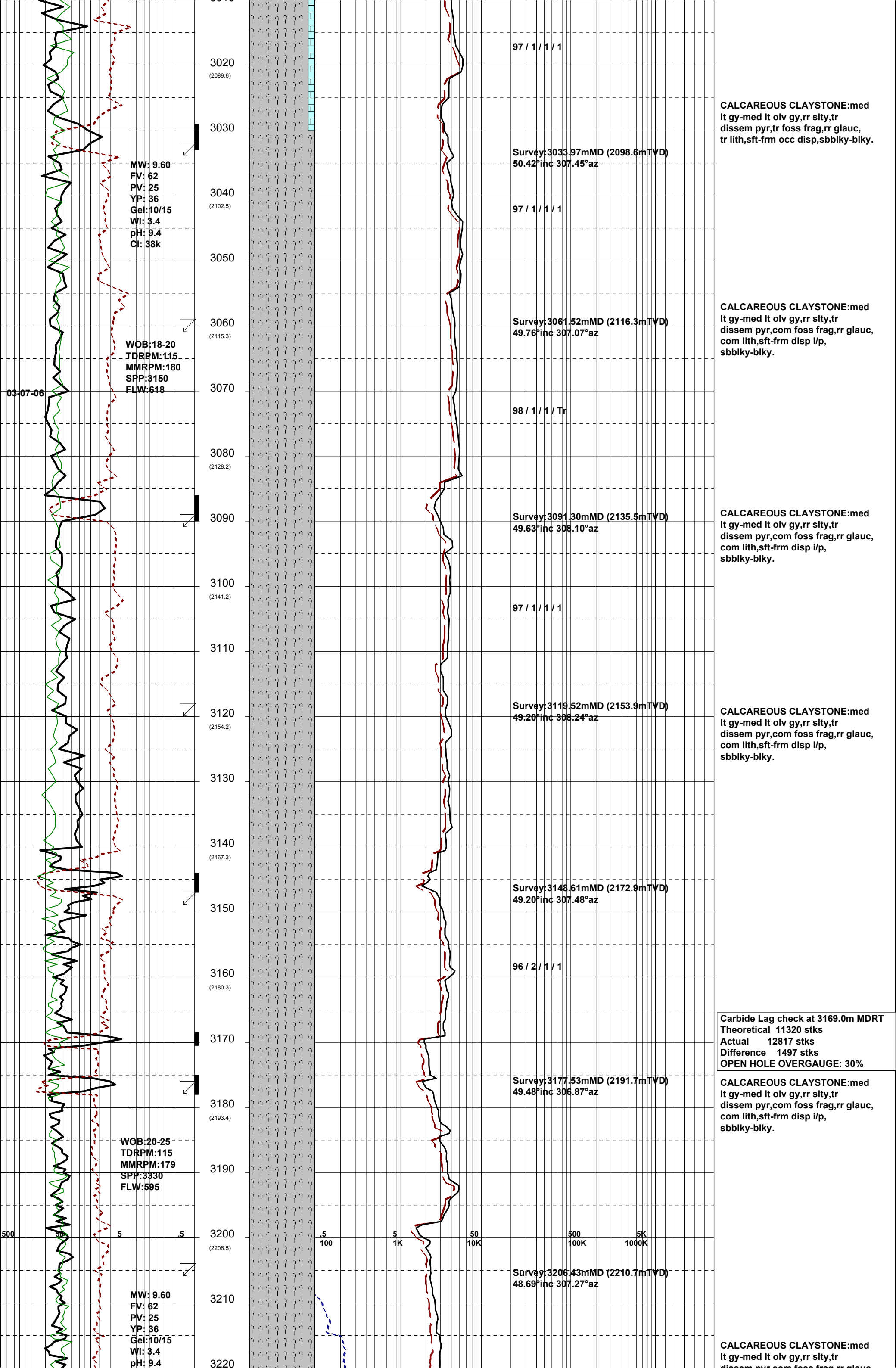




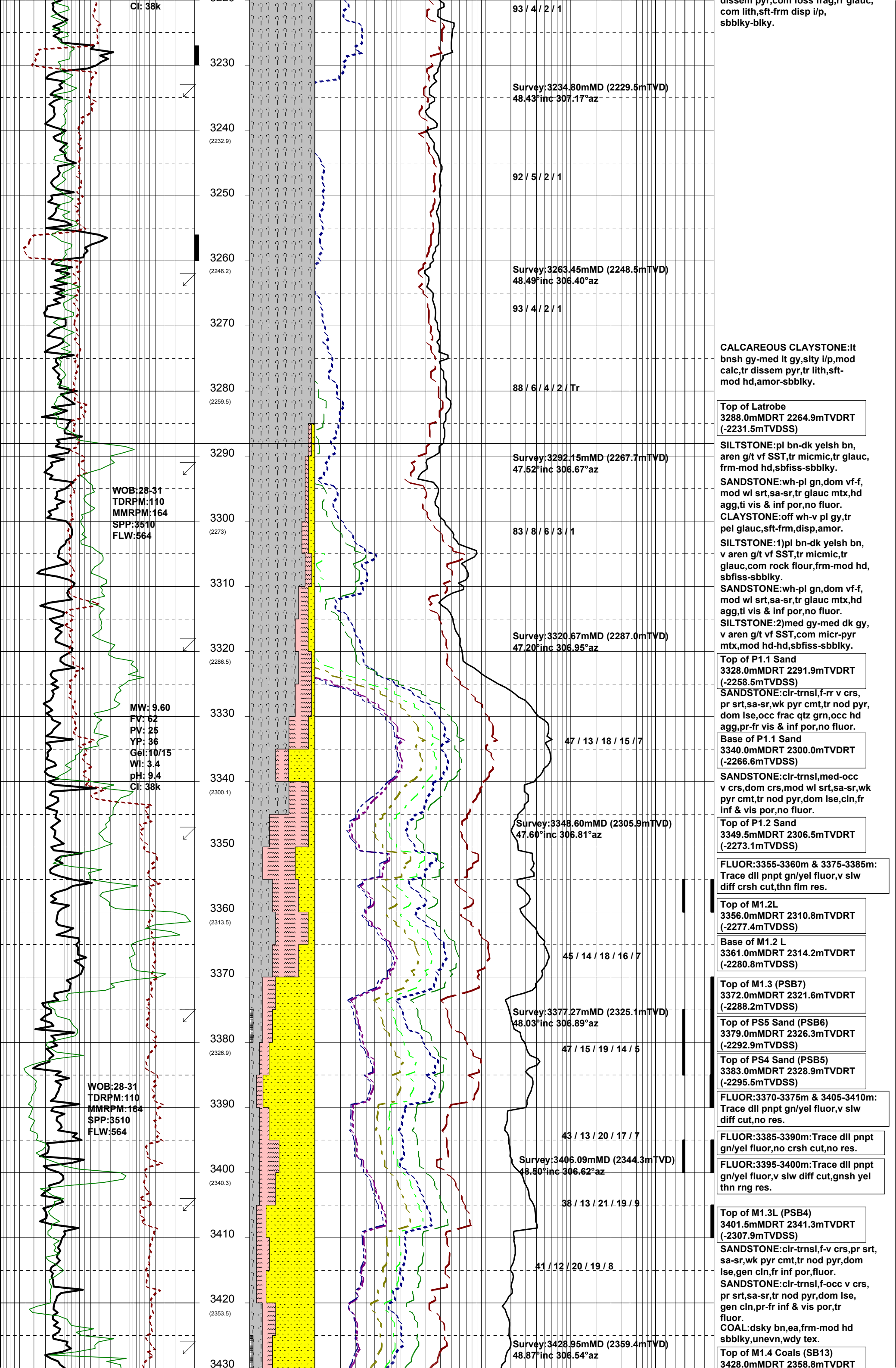


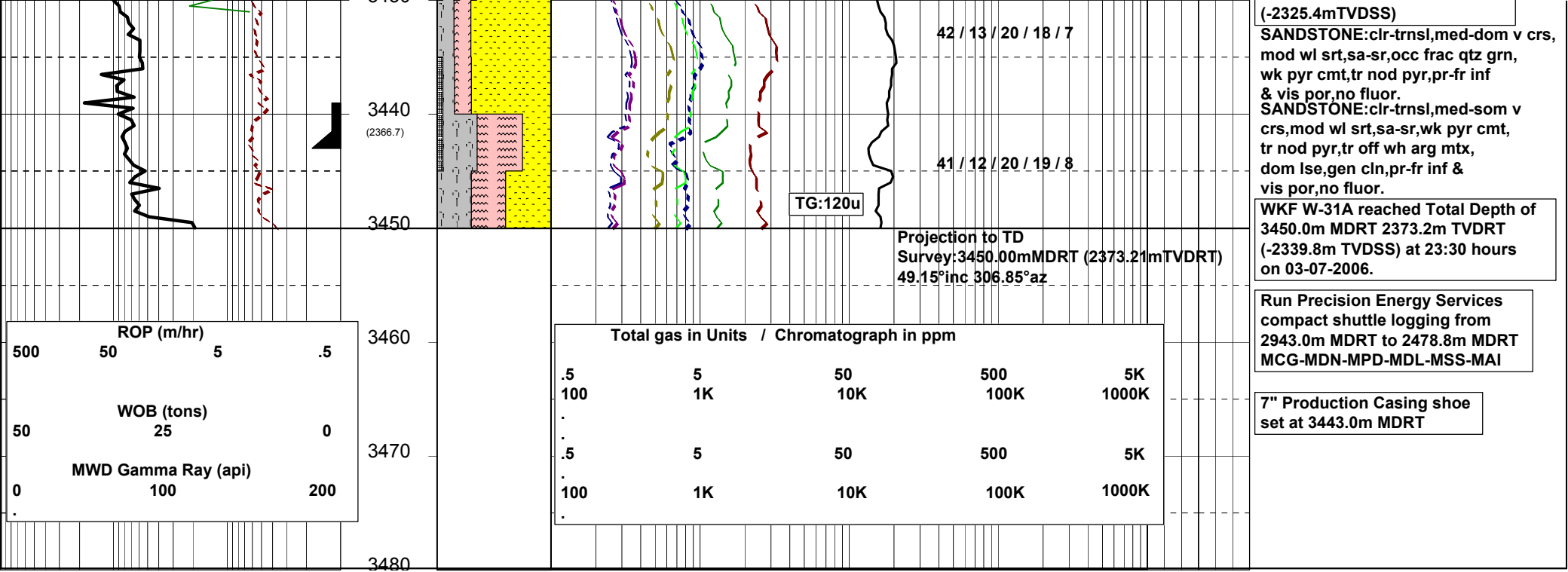












**APPENDIX 4b**

**WEST KINGFISH W31A**

**Well Completion Log**





















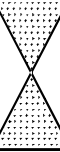










WELL COMPLETION LOG  
Scale – 1:200  
WEST KINGFISH W31A

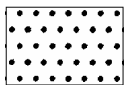
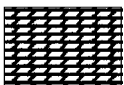



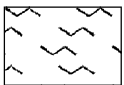



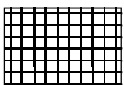

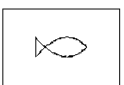
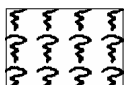

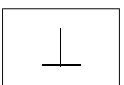
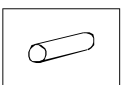
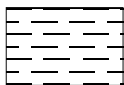

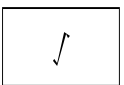



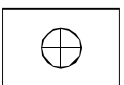

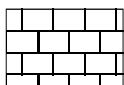
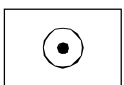
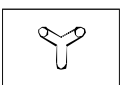
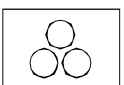
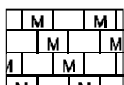
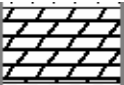
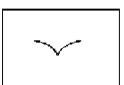

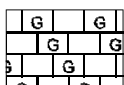
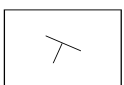

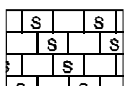
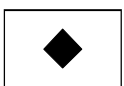
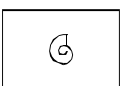
Gippsland Basin, Victoria  
Concession: VIC/L8

<b>POST-DRILL LOCATION:</b> <i>Top of Latrobe</i>	Latitude:	38° 35' 8.16" S	<b>COMPILED BY:</b>	Sheryl Sazenis
	Longitude:	148° 04' 58.44" E	<b>DRAFTED BY:</b>	Arnaldo Ribeiro
	MGA X:	594312.20 mE	<b>DRILL RIG:</b>	Nabors Rig 453
	MGA Y:	5728657.31 mN	<b>Datum:</b>	GRS80
	Depth:	3288.0 mMDRT 2264.8 mTVDR (-2231.4 mTVDS)	<b>Spheroid:</b>	GDA94
<b>ELEVATION:</b>	G.L.:	-76.13 m	<b>Projection:</b>	UTM
	R.T.:	33.43 m	<b>Map Grid/Cent Meridian</b>	MGA Zone 55 / 147 deg E
	Water Depth:	76.13 m	<b>TOTAL DEPTH:</b>	3450.0 mMDRT / 2373.2 mTVDR
			<b>PLUGGED BACK T.D.:</b>	3379.0m MDRT Actual wireline HUD. (3417.0m MDRT Original PBTD).
<b>DATES:</b>	Spudded:	21/06/2006	<b>CLASSIFICATION:</b>	Oil Development
	Rig Released:	15/07/2006	<b>STATUS:</b>	Cased and Completed – Oil well
	I.P. Established:	01/08/2006		
	<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 (Scientific Drilling Int.)		MUD LOGGING:	Geoservices Overseas S.A.
CORING:	n/a		PRESSURE RECORDING:	n/a
PIPE CONVEYED	Precision Energy Services (Compact Shuttle		WELL VELOCITY SURVEY:	n/a
LOGGING:	Logging System)			
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>No Rec.</div><div></div><div>Rec.</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>					
<div></div>					
<div> SST</div>					
<div></div>					
<div></div>					
<div> P2/11</div>					
<div> S11/2</div>					
<div> P2/40</div>					
<div></div>					
<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		Glauconite		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

Anadrill Schlumberger	Interval (mMDRT)	Precision Energy Services Logging	Interval (mMDRT)
MWD (Directional & GR) – 2 Runs	1300.0m – 3450m MDRT (GR 1300-3431.5m)	MCG-MDN-MPD-MSS-MDL-MAI – 1 Run (GR-Neutron-Density-Sonic-Induction resistivity-Dual Laterolog resistivity)	3441.0m - 1300.0m MDRT (Main log 3441 – 3138m MDRT)

WELL DATA

Date	21 June 2006 - 27 June 2006	29 June 2006 - 05 July 2006	05 June 2006 - 07 July 2006	
Run	MWD # 1	MWD # 2	Wireline Run #1 on shuttle	
Log	Powerpulse Directional & GR	Powerpulse Directional & GR	MCG-MDN-MPD-MSS-MDL	
Depth Driller	2794.0m MDRT	3450.0m MDRT	3450.0m MDRT	
Depth Logger	2794.0m MDRT	3450.0m MDRT	3450.0m MDRT	
Bottom Log Interval	2794.0m MDRT	3431.5m MDRT	3441.0m MDRT (Sonic)	
Top Log Interval	1300.0m MDRT	2794.0m MDRT	1300.0m MDRT	
Casing Driller	1300.0m MDRT	1300.0m MDRT	1300.0m MDRT	
Casing Logger	1300.0m MDRT	1300.0m MDRT	1300.0m MDRT	
Casing Size	13 .375"	13 .375"	13 .375"	
Casing Weight	68.0 ppf	68.0 ppf	68.0 ppf	
Bit Size	8.5"	8.5"	8.5"	
Type of Fluid in Hole	KCI/PHPA/GLYCOL	KCI/PHPA/GLYCOL	KCI/PHPA/GLYCOL	
Density	9.75 ppg	9.75 ppg	9.75 ppg	
Rm @ Measured Temp.	N/A	N/A	0.117 ohm-m @ 25°C	
Rmf @ Measured Temp.	N/A	N/A	0.097 ohm-m @ 25°C	
Rmc @ Measured Temp.	N/A	N/A	0.205 ohm-m @ 25°C	
Max. Recorded Temp.	66.00°C	86.00°C	89.40°C	
Equipment / Location	Sale	Sale	Sale	
Recorded By	R. Burns / C. Skiba	R. Burns / C. Skiba	B.Moss / R. Tench	
Witnessed By	Trevor Lobo	Trevor Lobo	Trevor Lobo	

CORES

From (mMDRT)	To (mMDRT)	Rec %	From (mMDRT)	To (mMDRT)	Gun Type
---	---		---	---	---
---	---		3350	3353	MaxR

CASING

PLUGS

Size	Set @ (mMDRT)	SX Cmt	Formation	From (mMDRT)	To (mMDRT)	SXCmt
13.375" *	1300.0	---	Gippsland Limestone			
7"	3443.0	485	Latrobe Group	3450.0 (TD)	3417.0 (PBTD) (3379m Wireline HUD)	--
2.875" tubing	3305.3					

\* Pre – existing casing

Gamma Ray	PH	LITHOLOGY	Deep Laterolog	Compensated Den	Effective Porosity	ST	DN	TA	SS	DN	SY	SE
-----------	----	-----------	----------------	-----------------	--------------------	----	----	----	----	----	----	----



[illegible]

3275  
(-2222.8)

3300  
(-2239.5)

3325  
(-2256.5)

3350  
(-2273.4)

Top of Latrobe  
3288m MDRT  
(-2231.4m TVDSS)

SBN3  
3320m MDRT  
(-2253.1m TVDSS)

FSP1 (Top P1.1)  
3328.5m MDRT  
(-2258.8m TVDSS)

Current OWC  
3335m MDRT  
(-2263.2m TVDSS)

SBP1  
3340m MDRT  
(-2266.6m TVDSS)

FP 12 (Top P1.2) 3350m MDRT  
(-2273.4m TVDSS)

Oil bearing  
5.9 MD Net  
4.0 TVD Net  
 $\varnothing = 16.7\%$   
Sw= 51%

Swept/residual oil  
 $\varnothing = 20.5\%$   
Sw=87 %

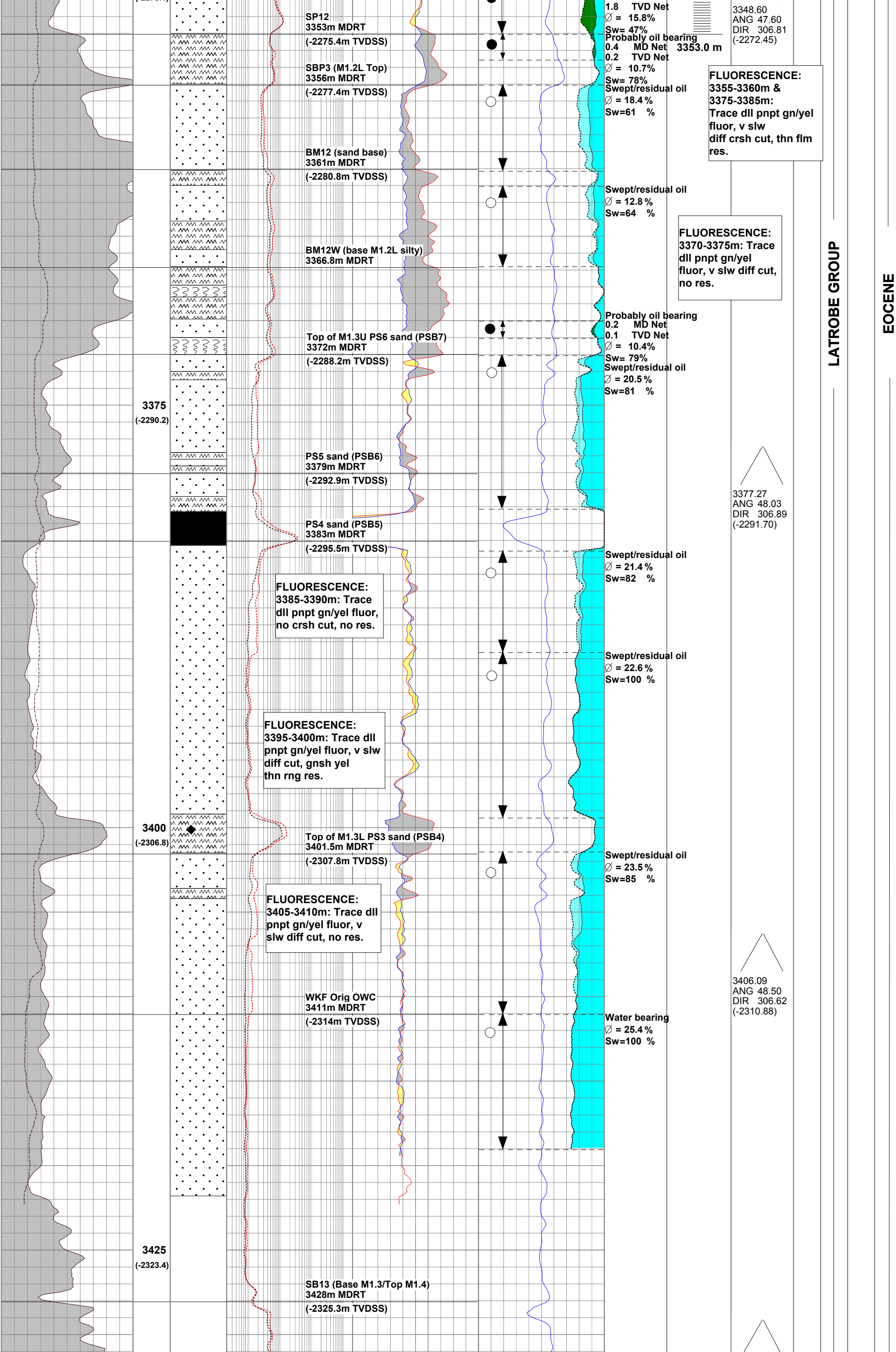
Oil bearing  
2.8 MD Net

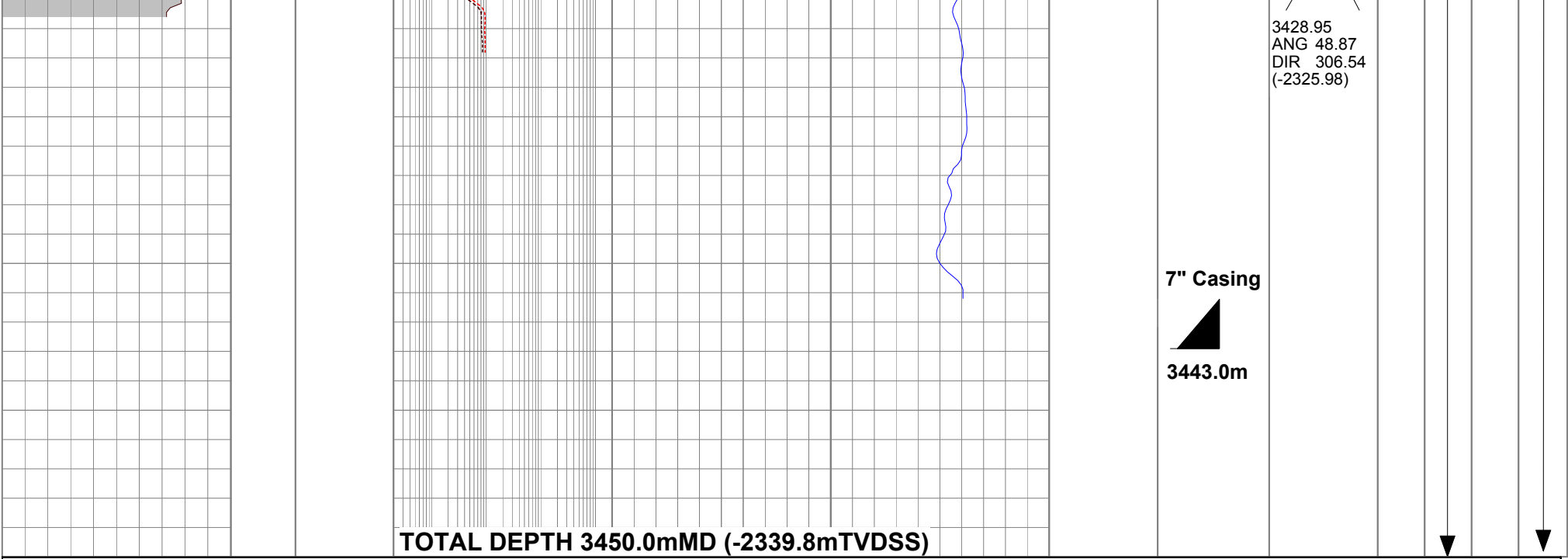
3292.15  
ANG 47.52  
DIR 306.67  
(-2234.22)

3320.67  
ANG 47.20  
DIR 306.95  
(-2253.54)

3329  
MW 9.6ppg  
FV 62sec/qt  
PV 25cP  
YP 36  
pH 9.4

3350.0 m





West Kingfish W31A  
Initial Production Date: 01/08/2006  
Production Zone: P1.2  
Initial Total Liquid Rate 211 kL/day  
Initial water cut: 13%  
Initial Oil rate: 184 kL/day