

**WELL COMPLETION REPORT**  
**TUNA A31A**  
**GIPPSLAND BASIN, VICTORIA**

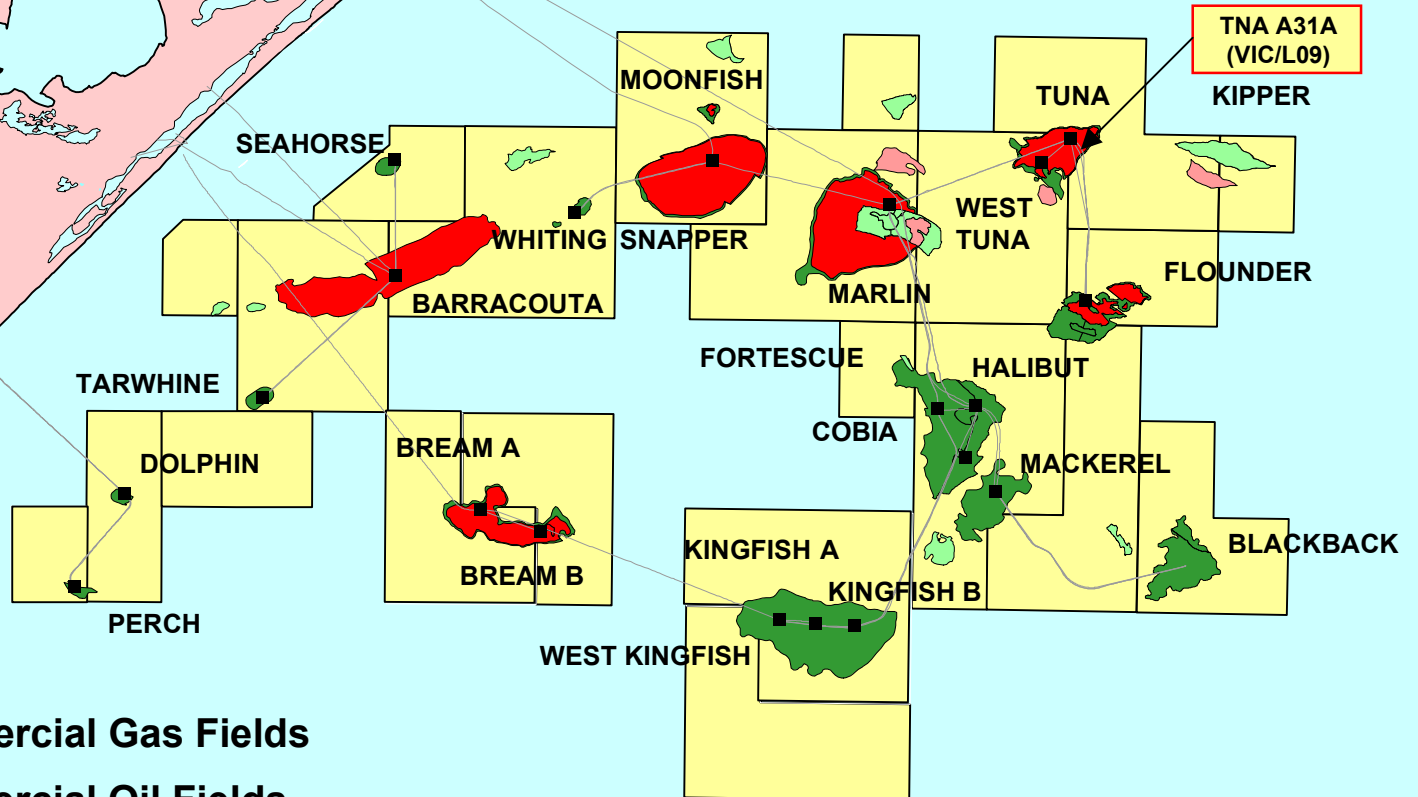
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July 2005

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VICTORIA

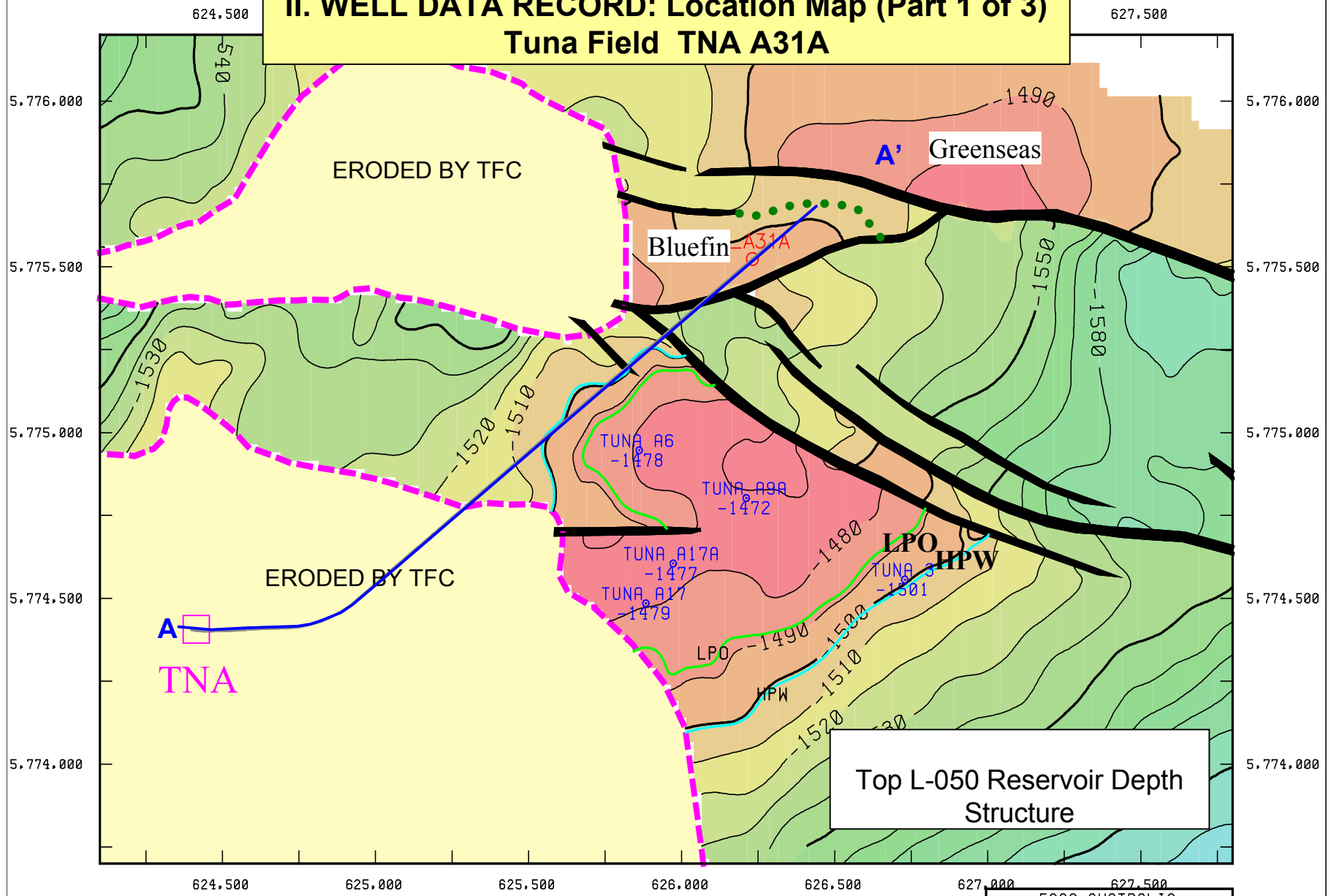
## I. TUNA FIELD LOCATION MAP



20 KM

## II. WELL DATA RECORD: Location Map (Part 1 of 3)

### Tuna Field TNA A31A



METERS 0 500 1000 METERS



ESSO AUSTRALIA

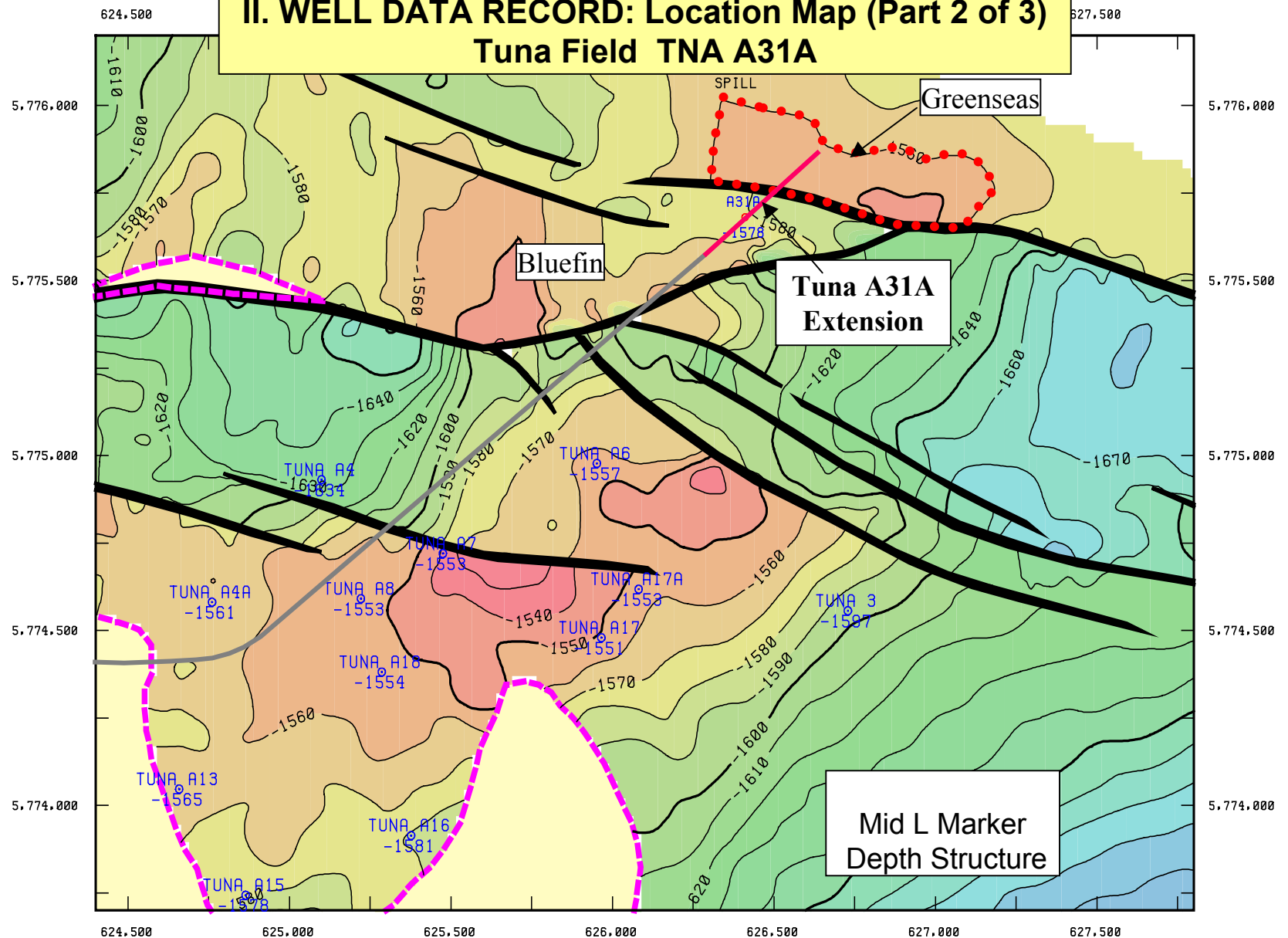
L-050 RESERVOIR

DEPTH STRUCTURE

1:20,000 C.L. KONYICK 15-JUL-2004

## II. WELL DATA RECORD: Location Map (Part 2 of 3)

### Tuna Field TNA A31A

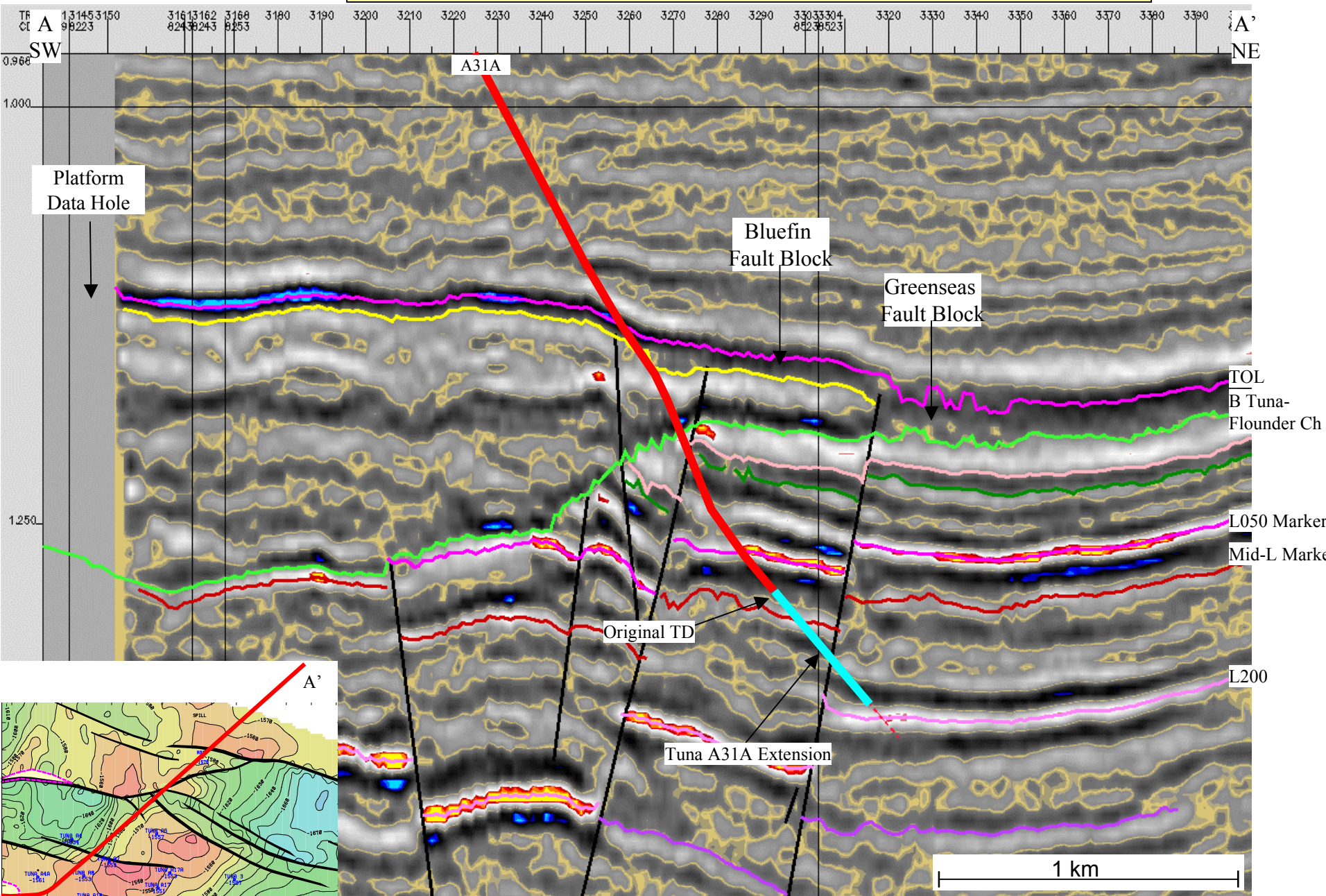


METERS 0 500 1000 METERS



ESSO AUSTRALIA
MID-L MARKER (^L065)
DEPTH STRUCTURE
1:120,000
C.L. KONTICKA
5-JUN-2004

## II. WELL DATA RECORD: TUNA A31A Seismic Profile (Part 3 of 3) Tuna Field TNA A31A



## II. WELL DATA RECORD (cont.)

### LOCATION

<b>Field</b>	<b>Tuna</b>	<b>Conductor #31 Surface Coordinates</b>	
<b>Well Name</b>	<b>A31a</b> (Loc CS)	(GDA94 ) X	624,343.51mE
<b>Conductor Number</b>	Slot 31	(MGA94) Y	5,774,411.33mN
<b>State</b>	Victoria	Latitude	38°10' 10.687"S
<b>Permit/Licence</b>	Vic/L9	Longitude	148°25'10.192"E
<b>Geological Basin</b>	Gippsland	<b>Perforations</b> (driller)	2618.0- 2621.0m MDRT
<b>Top of M-1</b>	2584.2 m MDRT		1413.6 – 1414.7m TVDRT
	1401.1m TVDRT		
MGA94 X	625984.10m E	<b>Datum</b>	GDA94 (GRS80)
MGA94 Y	5775324.55m N	<b>Projection</b>	MGA94/UTM Zone 55 (S)
<b>Top of L-050</b>	2919.4m MDRT		
	1521.8m TVDRT		
MGA94 X	626225.43 m E		
MGA94 Y	5775523.33 m N		

### ELEVATIONS & DEPTHS

<b>Water Depth</b>	59.4m
<b>Top Wellhead to MSL</b>	25.9 m
<b>Main Deck Rel to MSL</b>	24.4 m
<b>RT Relative to MSL</b>	31.32m
<b>Average Well Angle</b>	68.5°
<b>Total Depth</b>	3406.0m MDRT
	1693.9m TVDRT
<b>Plug Back Depth</b>	3090m MDRT

### DATES

<b>Skid Rig</b>	30/12/2004
<b>Kicked Off</b>	31/12/2004
<b>Development Rig Days</b>	25.1
<b>NPT Days</b>	2.34
<b>Rig Released</b>	25/01/2005
<b>I.P. Established</b>	28/01/2005

### MISCELLANEOUS

<b>Operator</b>	Esso Australia Pty Ltd	<b>Contractor</b>	International Sea Drilling Ltd
<b>Esso Interest</b>	50%	<b>Rig Name</b>	Nabors Rig 453
<b>Permittee/Licensee</b>	Esso/BHPP	<b>Equipment Type</b>	Platform
<b>Other Interest</b>	50% J.V. Interest	<b>Completion Type</b>	Tandem
<b>Overriding Royalty</b>	2.5%	<b>Completion Size</b>	3-1/2"
<b>Drilling AFE No.</b>	L0562E004		

### WELL CLASSIFICATION

<b>Before Drilling</b>	Oil Development	<b>After Drilling</b>	Cased and Completed
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## II. WELL DATA RECORD (cont.)

### CASING RECORD

Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Intermediate	9 <sup>5</sup> / <sub>8</sub>	47	L-80	LTC	828.7
Production	7	26	L-80	LTC	3117.0

### CEMENTING RECORD

Casing details	Cement Type	Dry Cement Volume (sx)	Cement Additives	Mix Water (bbls)	Slurry Volume (bbls)	Slurry Density (ppg)	Cement to/from (mMDRT)	Casing Pressure Test (psi)
LEAD	ABC	200	HALAD 413L 30 gal / 10 bbl  Gascon 50 gal / 10 bbl  NF-6 0.25 gal / 10 bbl  CFR-3L 5 gal / 10 bbl  SCR-100L 5 gal / 10 bbl	44	61	13.5	2100 m to 2500 m	2500 psi
TAIL	ABC	634	HALAD 413L 30 gal / 10 bbl  NF-6 0.25 gal / 10 bbl  CFR-3L 3 gal / 10 bbl  SCR-100L 1 gal / 10 bbl	78	131	15.8	2500 m to 3117 m	2500 psi

## II. WELL DATA RECORD (cont.)

### DRILLING PERFORMANCE

TNA A31A - Final Well Report

### GENERAL

Platform:	Tuna	Rig:	453	Reservoir:	M-1/L050 Sands
Well:	A31A	Well Slot:	#31	RT-MSL (Rig453)	31.32m
Drilling Complexity Index	3.1	Completion Complexity Index	2.8		

DEPTH		PERFORMANCE		MUD	
m MDRT	3,406.00	20" Cond. Hole	N/A	Max Wt (ppg)	10.25
m TVDRT	1,693.87	12-1/4" Surf. Hole	N/A	Type (Surf. Hole)	N/A
Vert. Section (m)	2,634.57	8-1/2" Prod. Hole	338 m/day	Type (Inter. Hole)	N/A
INCLINATION		6" Liner Hole	N/A	Type (Prod. Hole)	KCl/PHPA/Poly/Glycol
Max (deg) / Ave (deg)	71.2/ 68.5(Tang)	* time to drill interval, incl's Connections & NPT.		Type (Liner Hole)	N/A

Comments: New hole drilled: 829m to 3,406mMDRT (2,577 MDRT drilled). Well was deepened from 3048m to 3406m due to change in geologic objectives.

### TIME ANALYSIS

Start Date:	31/12/2004, 0930hrs	Finish Date:	25/01/2005, 1100hrs		
Target Days (P10):	18.2	Total Days:	25.1	% Under Target:	37.9% (over)
AFE Days (P50):	20.6	NPT Days:	2.34	% of Total Days:	9.4%
Supplementary AFE Days (P50):	N/A				

### COSTS (based on projected)

AFE No.:	L0562E004	Revisions:	--	\$ per m	A \$2.14 k / metre (new hole)
\$ per day:	A\$ 220 k/day	\$ per day (excl. T + L) * Equipment, LWD & Reeves	A\$ 182 k/day		A\$ 1.62 k / metre* * based on TD not new hole

	Equipment	Materials	Contracts	Allocations	Contingency	Total
AFE (Original)	840,000	626,500	2,343,218	762,082	168,200	A\$4,740,000
AFE (Supplement)	880,000	648,028	2,886,500	917,272	208,200	A\$5,540,000
Projected	790,000	776,000	2,783,000	911,000	255,000	A\$5,515,000

### CASING (all depths herein are based on Rig 453 elevations: RT-MSL=31.32m)

	Size / Weight / Grade / Thread	m MDRT	m TVDRT	PIT (ppg)
Conductor Casing *	20"	167	167	N/A
Surface Casing *	9-5/8", 47.0 ppf, L80, LTC	828.7	657	13.0
Prod Casing	7", 26.0ppf, L80, LTC	3,117	1,693	N/A

Comments: \* Pre-existing casing strings.

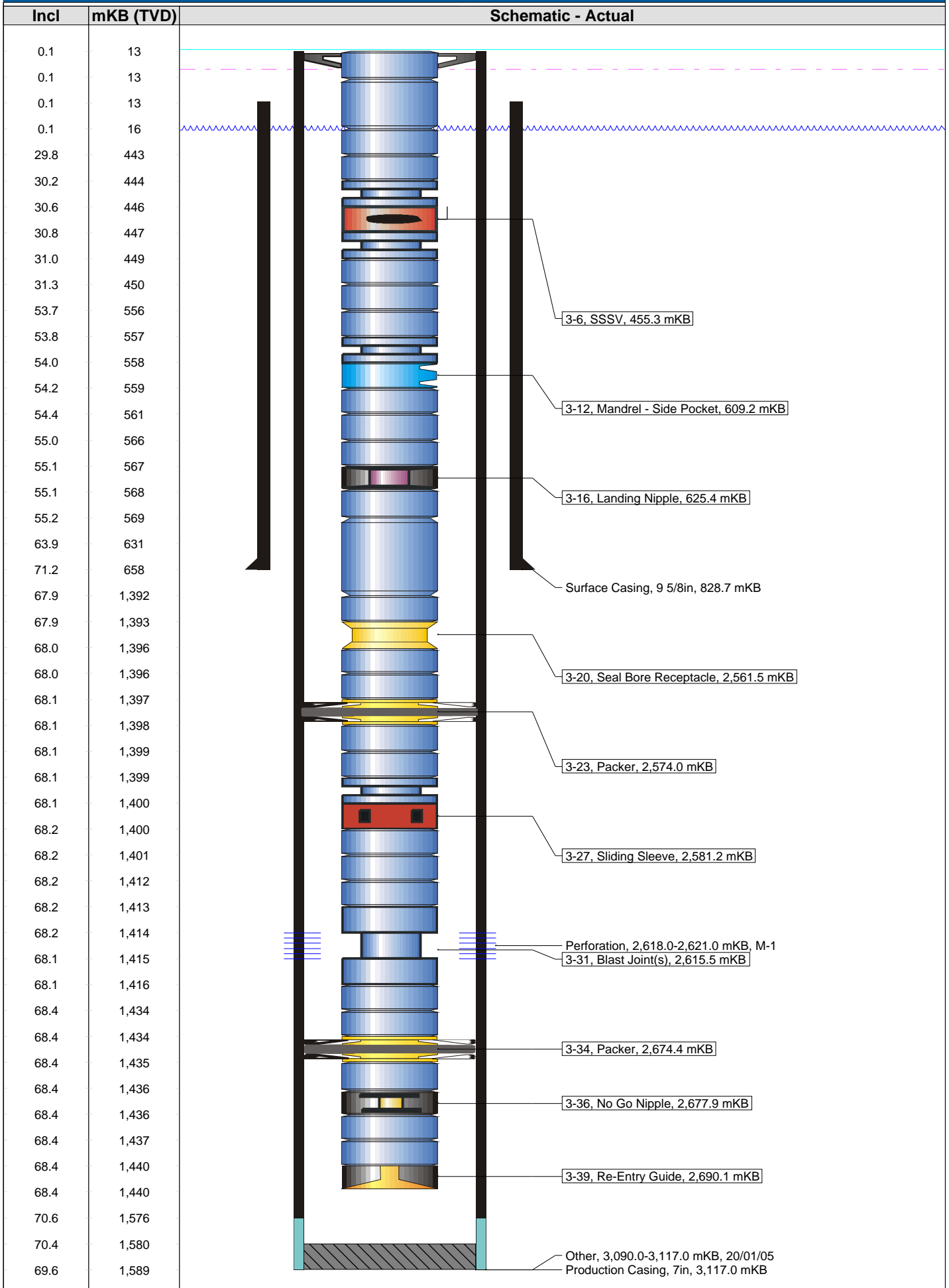
### COMPLETION

	Size / Weight / Grade / Thread	MMDRT	MTVDR	Type
Completion	3-1/2", 9.2ppf, 13Cr80, Vam Ace	2677.9	1435	Tandem oil

	Upper Interval [m MDRT]	Upper Interval [m TVDRT]	Lower Interval [mMDRT]	Lower Interval [mTVDRT]	Gun Type
Perforation Interval:	2618-2621 (M1 sand)	1413-1414.6	NA	NA	4-1/2" HSD

Comments: Completion was 3-1/2" 13Cr80 with TR-SSSV and 1 SPM for gas lift, two packers set at 2574m MDRT and 2674m MDRT and a sliding sleeve set at 2581mMDRT.

# Tuna A31A: Existing Schematic



### III. SAMPLES

#### CUTTINGS

The cuttings sampling programme for TUNA A31A are detailed in the following table:

Interval	Formation	Sampling Details
Surface Casing to 150m above Top of Latrobe (TOL) 830 m - 2310 m	Gippsland Limestone & Lakes Entrance	30 m sampling interval  Spot samples
150 m above TOL to the Top of the M1 Sand.  2310 m – 2470 m	Latrobe Group	10 m sampling interval  Three sets of washed and oven dried cuttings.
TOL to Total Depth (TD)  2470 m – 3406 m (TD)	Latrobe Group	5 m sampling interval  Three sets of washed and oven dried cuttings.

Detailed cuttings descriptions for the interval 1710 mMDRT to 3406 mMDRT (TD) are contained in Appendix 3a.

#### CONVENTIONAL CORING

No conventional cores were cut in Tuna A31A.

#### SIDEWALL CORING

No sidewall core samples were shot in Tuna A31A.

## IV. LOGS AND SURVEYS

<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	829.0	3048.0
Run 1: Compact Logging MCG-MDN-MPD-MSS-MDL	Reeves Well Shuttle	829.0	3031.2
MWD Run 2, Powerpulse (Directional & GR)	Schlumberger/Anadrill	3048.0	3101.0
MWD Run 3, Powerpulse (Directional & GR)	Schlumberger/Anadrill	3101.0	3385.2
Run 2: Compact Logging MCG-MDN-MPD-MSS-MDL	Reeves Well Shuttle	2930.0	3388.8

## V. FORMATION RESERVOIR TOPS

Zone	m TVDSS			M MDRT	m TVT Gross HC Column	
	Predicted	Actual	Diff.		Predicted	Actual
Lakes Entrance	1045.7	1046.8	1.1 low	1752.0	6m oil	3.1m oil
Top of Latrobe	1327.0	1322.6	4.4 high	2461.3		
TCC (Top of M-1)	1372.8	1369.7	3.1 high	2584.2		
M-1 GOC	1379.0	1380.5	1.5 low	2611.8		
M-1 LPO		1383.6		2620.2		
M-1 OWC	1385.0					
Base of Tuna Flounder Channel	1414.9	1412.8	2.1 high	2700.6		
Fault	1432.0	1434.8	2.8 low	2760.6	-	3.0m gas 1.8m oil
M-230	-	1440.1	-	2775.6		
M-2 GOC	-	1443.1	-	2784.0		
M-2 OWC	-	1445.0	-	2789.1		
M-230C	-	1459.7	-	2830.9	-	3.9m gas
L-040	-	1472.1	-	2866.5	-	2.3m oil
L-045	-	1482.4	-	2896.2	-	2m gas
L-046	-	1485.0	-	2903.5	-	0.8m gas 1.6 oil
L-050	1496.0	1490.5	5.5 high	2919.4	7m oil	5.7m oil
L-050 Base	1507.0	1500.4	6.6 high	2947.8	-	5.3m oil
L-055	-	1507.0	-	2967.3		
TD (before extension)	1560.3	1534.3	5.3 low	3048.0		
Mid L Sand	1578.3	1573.9	4.4 high	3163.6		
L-095	1598.9	1607.9	9.0 low	3259.9	-	
Fault	1602.0	1603.5	1.5 low	3247.8		
L-100	1602.0	1617.7	15.7 low	3287.7		
L-110	1609.0	1638.8	29.8 low	3343.5		
L-150	1624.0	-	-	-		
L-160	1634.7	-	-	-		
L-200	1655.3	-	-	-		
Total Depth	1662.2	1662.6	0.4 low	3406.0		

## VI. GEOLOGICAL ANALYSIS - TUNA A31A

### Objectives

Tuna A31A (pre-drill Location CS) is the second well in a series of 4 wells to be drilled from the Tuna A platform during the 2004-2005 Tuna Infill Drilling program using " Rig 453". Tuna A31A was designed and planned to enhance recovery through reduced well spacing on the north-eastern flank of the M-1 reservoir (primary objective) with a higher-risk test of the M-230 to L-050 reservoirs (secondary objective) in a combination structural and stratigraphic trap (Bluefin fault block) beneath the Tuna Flounder Channel. The well was positioned primarily to maximise reservoir quality in the M-1 and also to avoid the toe of the Tuna A34 horizontal well. The tail of this well, which tested the Bluefin fault block, was considered a near field wildcat penetration.

After the initial TD of the well below the L-055 oil sand in the Bluefin fault block, no water bearing sand have yet been encountered before or at TD. The decision was made to extend the well to complete testing the Bluefin fault block (i.e. to drill to beyond structural closure) and to test the Greenseas fault block to the northeast of Bluefin.

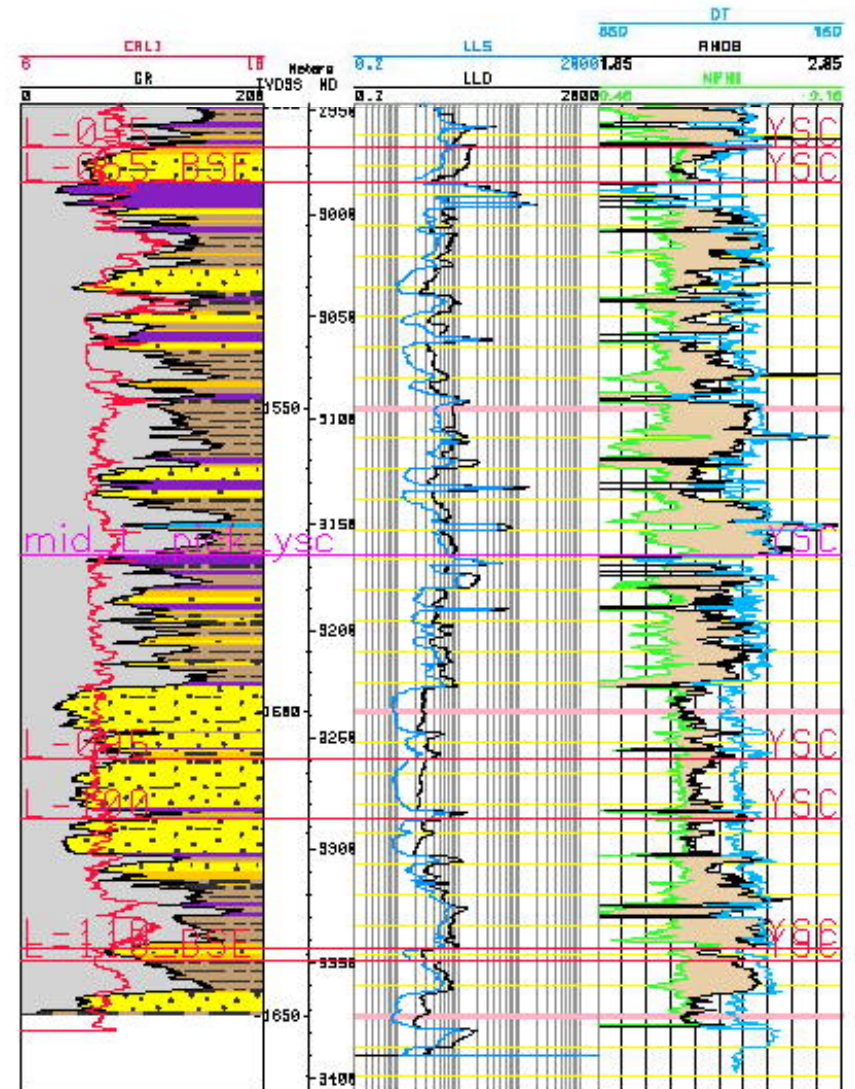
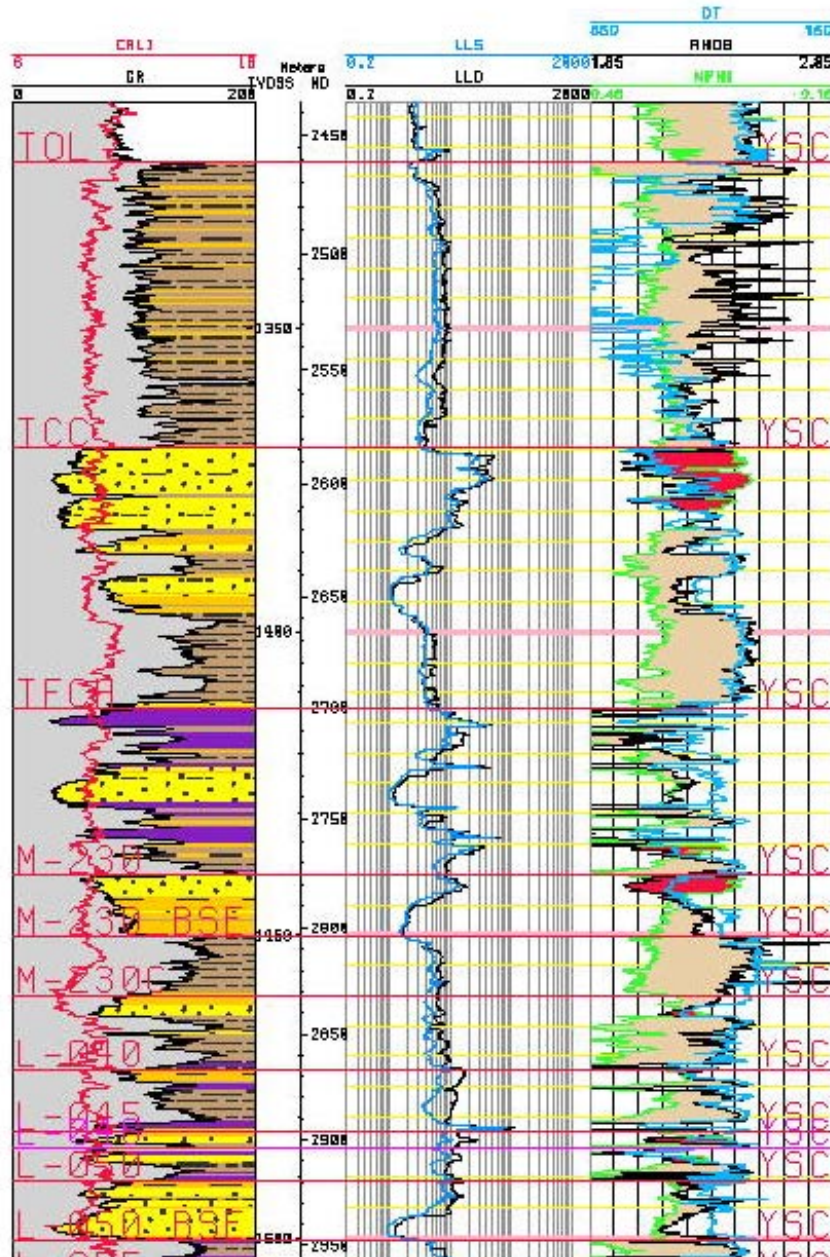
### Results

Tuna A31A was drilled to TD after kicking-off from the Tuna A31 original wellbore at 829m MDRT and logged via Reeves Shuttle on drillpipe. This well was extended to 3406m MDRT (1662.6m TVDSS) from 3028m MDRT (1529m TVDSS, as per original program in Location CS DWP).

This well intersected the TCC at 1369.8m TVDSS and M-1 GOC at 1380m TVDSS which is 3m and 1m TVD higher than prognosed, respectively. Net oil intersected in the M-1 is 3.2m TVT versus 6m TVT prognosed.

There are several hydrocarbon bearing sands encountered in the M-230 to L-055 interval in the Bluefin fault block (refer to Formation Reservoir Tops table above) with the L-055 sand having the thickest gross oil column. However, sands below the L-055 are all wet. The sands encountered in the Greenseas fault block (after crossing fault at approximately 1603.5m TVDSS) are all wet as well.

# Geological Analysis: TNA A31A Well Log with Stratigraphic Picks



## **APPENDIX 1a**

### **TUNA A31A**

#### **Survey Data**



## Tuna A-31A Surveys

Report Date: January 14, 2005	Survey / DLS Computation Method: Minimum Curvature / Lubinski
Client: Esso Australia Pty Ltd	Vertical Section Azimuth: 59.210°
Field: Tuna A GDA 94	Vertical Section Origin: N 1.860 m, E 6.340 m
Structure / Slot: Tuna A Rig 453 / 31	TVD Reference Datum: Drillsite Elevation
Well: 31	TVD Reference Elevation: 31.3 m relative to MSL
Borehole: A-31A	Sea Bed / Ground Level Elevation: -59.400 m relative to MSL
UWI/API#:	Magnetic Declination: 13.225°
Survey Name / Date: A-31A Final Surveys / December 30, 2004	Total Field Strength: 59911.009 nT
Tort / AHD / DDI / ERD ratio: 185.905° / 2714.66 m / 6.006 / 1.603	Magnetic Dip: -68.654°
Grid Coordinate System: GDA94/MGA94 Zone 55	Declination Date: January 13, 2005
Location Lat/Long: S 38 10 10.687, E 148 25 10.192	Magnetic Declination Model: BGGM 2004
Location Grid N/E Y/X: N 5774411.330 m, E 624343.510 m	North Reference: Grid North
Grid Convergence Angle: -0.87735030°	Total Corr Mag North -> Grid North: +14.102°
Grid Scale Factor: 0.99979042	Local Coordinates Referenced To: Structure Reference Point

Comments	Measured Depth (m)	Inclination (deg)	Azimuth (deg)	TVD (m)	Vertical Section (m)	NS (m)	EW (m)	Closure (m)	Closure Azimuth (deg)	DLS (deg/30 m)	Tool Face (deg)
Tie-In	0.00	0.00	0.00	0.00	0.00	1.86	6.34	0.00	73.65	0.00	-125.36M
	5.00	0.03	234.64	5.00	0.00	1.86	6.34	0.00	73.65	0.18	-125.36M
	10.00	0.06	234.64	10.00	0.00	1.86	6.34	0.00	73.66	0.18	-125.36M
	15.00	0.09	234.64	15.00	-0.01	1.85	6.33	0.01	73.68	0.18	-125.36M
	20.00	0.12	234.64	20.00	-0.02	1.85	6.32	0.02	73.71	0.18	-124.51M
	25.00	0.15	235.49	25.00	-0.03	1.84	6.31	0.03	73.74	0.18	-83.34M
	30.00	0.17	276.66	30.00	-0.04	1.84	6.30	0.04	73.73	0.68	-86.37M
	35.00	0.17	273.63	35.00	-0.06	1.84	6.29	0.06	73.69	0.05	-84.86M
	40.00	0.16	275.14	40.00	-0.07	1.84	6.27	0.07	73.64	0.07	-92.06M
	45.00	0.17	267.94	45.00	-0.08	1.84	6.26	0.08	73.60	0.14	-77.58M
	50.00	0.17	282.42	50.00	-0.09	1.84	6.24	0.10	73.56	0.26	-57.32M
	55.00	0.20	302.68	55.00	-0.10	1.85	6.23	0.11	73.47	0.43	-115.60M
	60.00	0.11	244.40	60.00	-0.11	1.85	6.22	0.12	73.41	1.02	-162.28M
	65.00	0.23	197.72	65.00	-0.12	1.84	6.21	0.13	73.49	1.04	154.63M
	70.00	0.22	154.63	70.00	-0.13	1.82	6.21	0.13	73.65	0.99	141.74M
	75.00	0.31	141.74	75.00	-0.13	1.80	6.22	0.13	73.85	0.64	136.58M
	80.00	0.59	136.58	80.00	-0.12	1.77	6.25	0.13	74.16	1.70	122.93M
	85.00	0.67	122.93	85.00	-0.10	1.74	6.29	0.13	74.55	1.02	117.52M
	90.00	0.98	117.52	90.00	-0.07	1.70	6.35	0.16	75.00	1.92	115.85M
	95.00	1.25	115.85	95.00	-0.02	1.66	6.44	0.22	75.55	1.63	113.40M
	100.00	1.69	113.40	100.00	0.06	1.61	6.56	0.33	76.24	2.67	108.32M
	105.00	2.08	108.32	104.99	0.16	1.55	6.71	0.49	77.01	2.54	107.40M
	110.00	2.55	107.40	109.99	0.29	1.49	6.90	0.68	77.85	2.83	102.70M
	115.00	2.85	102.70	114.98	0.46	1.43	7.13	0.90	78.69	2.24	102.35M
	120.00	3.24	102.35	119.98	0.65	1.37	7.39	1.16	79.51	2.34	100.20M
	125.00	3.82	100.20	124.97	0.88	1.31	7.69	1.46	80.34	3.57	98.76M
	130.00	4.41	98.76	129.95	1.15	1.25	8.05	1.81	81.17	3.59	98.97M
	135.00	4.55	98.97	134.94	1.45	1.19	8.43	2.20	81.97	0.85	98.21M
	140.00	4.56	98.21	139.92	1.76	1.13	8.83	2.59	82.70	0.37	98.81M
	145.00	4.41	98.81	144.91	2.06	1.07	9.21	2.98	83.36	0.94	100.58M
	150.00	4.16	100.58	149.89	2.35	1.01	9.58	3.35	83.98	1.70	101.71M
	155.00	3.88	101.71	154.88	2.61	0.94	9.92	3.70	84.57	1.75	103.38M
	160.00	3.73	103.38	159.87	2.85	0.87	10.25	4.03	85.14	1.12	104.36M
	165.00	3.65	104.36	164.86	3.08	0.79	10.56	4.35	85.70	0.61	105.46M
	170.00	3.61	105.46	169.85	3.30	0.71	10.87	4.67	86.25	0.48	106.46M
	175.00	3.49	106.46	174.84	3.51	0.63	11.16	4.98	86.79	0.81	107.44M
	180.00	3.41	107.44	179.83	3.72	0.54	11.45	5.28	87.30	0.60	109.53M
	185.00	3.24	109.53	184.82	3.90	0.45	11.73	5.57	87.81	1.25	110.27M
	190.00	3.18	110.27	189.82	4.08	0.35	11.99	5.85	88.32	0.44	112.59M
	195.00	3.11	112.59	194.81	4.25	0.25	12.25	6.12	88.82	0.87	113.53M
	200.00	3.07	113.53	199.80	4.41	0.15	12.49	6.39	89.33	0.39	115.05M
	205.00	3.02	115.05	204.79	4.56	0.04	12.74	6.65	89.83	0.57	115.75M
	210.00	2.99	115.75	209.79	4.71	-0.08	12.97	6.91	90.33	0.28	119.38M
	215.00	2.98	119.38	214.78	4.84	-0.20	13.20	7.16	90.85	1.14	120.54M
	220.00	3.02	120.54	219.77	4.97	-0.33	13.43	7.42	91.39	0.44	122.56M

225.00	3.10	122.56	224.77	5.09	-0.47	13.66	7.68	91.95	0.81	123.66M
230.00	3.13	123.66	229.76	5.21	-0.61	13.88	7.94	92.53	0.40	125.99M
235.00	3.33	125.99	234.75	5.33	-0.78	14.12	8.21	93.14	1.44	126.48M
240.00	3.52	126.48	239.74	5.45	-0.95	14.36	8.50	93.79	1.15	127.78M
245.00	3.86	127.78	244.73	5.57	-1.15	14.61	8.80	94.49	2.10	126.21M
250.00	4.04	126.21	249.72	5.70	-1.35	14.89	9.13	95.19	1.26	123.44M
255.00	4.36	123.44	254.71	5.85	-1.56	15.19	9.49	95.87	2.27	120.73M
260.00	4.56	120.73	259.69	6.03	-1.77	15.52	9.87	96.50	1.74	116.60M
265.00	4.79	116.60	264.67	6.23	-1.96	15.88	10.27	97.05	2.45	113.22M
270.00	4.93	113.22	269.66	6.47	-2.14	16.26	10.70	97.50	1.91	108.50M
275.00	5.08	108.50	274.64	6.74	-2.30	16.67	11.13	97.85	2.63	-67.75G
280.00	5.33	102.64	279.62	7.06	-2.42	17.10	11.58	98.05	3.52	-66.36G
285.00	5.61	96.77	284.59	7.42	-2.50	17.57	12.05	98.09	3.75	-59.30G
290.00	6.01	90.84	289.57	7.84	-2.53	18.08	12.53	97.97	4.33	-54.60G
295.00	6.57	84.44	294.54	8.32	-2.51	18.62	13.04	97.66	5.38	-44.28G
300.00	7.34	78.82	299.50	8.88	-2.42	19.22	13.57	97.17	6.16	-28.02G
305.00	8.15	75.82	304.46	9.52	-2.27	19.88	14.15	96.51	5.43	-10.53G
310.00	9.39	74.41	309.40	10.25	-2.07	20.62	14.81	95.74	7.55	-1.94G
315.00	10.23	74.25	314.32	11.07	-1.84	21.44	15.54	94.91	5.04	0.00G
320.00	11.37	74.26	319.24	11.98	-1.59	22.34	16.36	94.06	6.84	7.26G
325.00	11.99	74.64	324.13	12.95	-1.32	23.31	17.27	93.23	3.75	30.45G
330.00	12.74	76.62	329.02	13.98	-1.05	24.35	18.24	92.47	5.17	48.00G
335.00	13.14	78.54	333.89	15.04	-0.81	25.44	19.29	91.82	3.52	40.24G
340.00	13.72	80.58	338.75	16.13	-0.60	26.59	20.39	91.29	4.49	46.83G
345.00	14.24	82.79	343.60	17.25	-0.43	27.78	21.56	90.88	4.47	42.92G
350.00	14.86	85.00	348.44	18.39	-0.29	29.03	22.79	90.58	4.99	46.24G
355.00	15.13	86.07	353.27	19.55	-0.19	30.32	24.07	90.36	2.32	43.49G
360.00	15.58	87.64	358.09	20.72	-0.12	31.64	25.38	90.22	3.68	42.52G
365.00	15.89	88.67	362.91	21.91	-0.08	33.00	26.73	90.13	2.50	35.23G
370.00	16.49	90.15	367.71	23.11	-0.06	34.39	28.12	90.10	4.37	36.85G
375.00	16.90	91.20	372.50	24.34	-0.08	35.83	29.55	90.13	3.05	41.16G
380.00	17.68	93.41	377.27	25.58	-0.14	37.31	31.03	90.21	6.12	37.34G
385.00	18.17	94.60	382.03	26.85	-0.25	38.85	32.57	90.36	3.67	26.95G
390.00	18.94	95.80	386.77	28.13	-0.39	40.43	34.16	90.56	5.16	29.98G
395.00	19.48	96.73	391.49	29.44	-0.57	42.07	35.81	90.78	3.72	28.77G
400.00	20.28	97.99	396.19	30.78	-0.79	43.75	37.50	91.03	5.44	14.98G
405.00	21.13	98.62	400.87	32.15	-1.05	45.50	39.27	91.32	5.27	10.22G
410.00	22.09	99.08	405.52	33.57	-1.33	47.32	41.10	91.61	5.85	10.91G
415.00	22.94	99.50	410.14	35.04	-1.64	49.21	43.01	91.91	5.19	-1.68G
420.00	23.91	99.43	414.73	36.55	-1.96	51.17	44.99	92.20	5.82	2.92G
425.00	24.73	99.53	419.28	38.12	-2.30	53.20	47.05	92.48	4.93	-5.00G
430.00	25.67	99.34	423.81	39.75	-2.65	55.30	49.17	92.75	5.66	-14.54G
435.00	26.55	98.83	428.30	41.44	-3.00	57.47	51.36	92.99	5.45	-6.18G
440.00	27.71	98.56	432.75	43.20	-3.34	59.73	53.64	93.21	7.00	-5.46G
445.00	28.56	98.39	437.15	45.02	-3.69	62.06	56.00	93.40	5.12	-14.27G
450.00	29.55	97.88	441.53	46.91	-4.04	64.46	58.42	93.58	6.12	-21.81G
455.00	30.53	97.11	445.85	48.88	-4.36	66.95	60.92	93.73	6.32	4.53G
460.00	31.25	97.22	450.14	50.90	-4.68	69.49	63.49	93.85	4.33	-16.43G
465.00	32.34	96.62	454.39	52.99	-5.00	72.11	66.12	93.97	6.81	-20.53G
470.00	33.34	95.94	458.60	55.15	-5.30	74.80	68.84	94.05	6.39	-21.51G
475.00	34.30	95.27	462.75	57.39	-5.57	77.57	71.62	94.11	6.18	-24.43G
480.00	35.19	94.57	466.86	59.70	-5.81	80.41	74.47	94.13	5.85	-30.85G
485.00	36.02	93.73	470.92	62.09	-6.02	83.31	77.38	94.13	5.78	-30.26G
490.00	36.94	92.84	474.94	64.55	-6.19	86.28	80.35	94.10	6.37	-28.08G
495.00	37.71	92.17	478.92	67.09	-6.32	89.31	83.37	94.05	5.22	-23.23G
500.00	38.45	91.66	482.85	69.68	-6.43	92.39	86.45	93.98	4.82	-28.27G
505.00	39.24	90.99	486.75	72.34	-6.50	95.53	89.58	93.89	5.37	-14.19G
510.00	39.90	90.73	490.60	75.05	-6.55	98.71	92.75	93.79	4.08	-26.58G
515.00	40.75	90.08	494.42	77.82	-6.57	101.95	95.98	93.69	5.69	-9.94G
520.00	41.43	89.90	498.18	80.64	-6.57	105.23	99.25	93.57	4.14	-12.66G
525.00	42.33	89.60	501.91	83.51	-6.55	108.57	102.58	93.45	5.53	-18.48G
530.00	42.88	89.33	505.59	86.44	-6.52	111.96	105.95	93.33	3.48	-13.96G
535.00	43.63	89.06	509.23	89.41	-6.48	115.38	109.36	93.21	4.63	-14.46G
540.00	44.28	88.82	512.83	92.42	-6.41	118.85	112.82	93.09	4.03	-22.05G
545.00	45.21	88.29	516.38	95.49	-6.32	122.37	116.32	92.96	6.01	-15.49G
550.00	45.91	88.02	519.88	98.61	-6.21	125.94	119.87	92.82	4.36	-11.37G

Tie-In

555.00	46.78	87.78	523.33	101.79	-6.07	129.55	123.47	92.68	5.32	-14.77G
560.00	47.31	87.59	526.74	105.00	-5.93	133.21	127.11	92.55	3.29	-5.82G
565.00	48.04	87.49	530.10	108.26	-5.77	136.90	130.79	92.41	4.40	20.55G
570.00	48.54	87.74	533.43	111.54	-5.61	140.63	134.50	92.29	3.20	15.11G
575.00	49.10	87.94	536.72	114.84	-5.47	144.39	138.25	92.17	3.48	0.70G
580.00	49.72	87.95	539.98	118.17	-5.33	148.19	142.03	92.06	3.72	20.38G
585.00	50.51	88.33	543.18	121.53	-5.21	152.02	145.85	91.96	5.05	10.39G
590.00	51.19	88.49	546.34	124.91	-5.10	155.90	149.72	91.87	4.15	8.13G
595.00	52.13	88.66	549.44	128.33	-5.00	159.82	153.63	91.79	5.70	-10.86G
600.00	52.92	88.47	552.48	131.79	-4.91	163.79	157.59	91.72	4.83	0.66G
605.00	53.62	88.48	555.47	135.29	-4.80	167.79	161.59	91.64	4.20	-1.01G
610.00	54.08	88.47	558.42	138.81	-4.69	171.83	165.62	91.56	2.76	-26.04G
615.00	54.48	88.23	561.34	142.35	-4.57	175.89	169.67	91.49	2.67	-13.35G
620.00	54.79	88.14	564.24	145.92	-4.45	179.96	173.74	91.42	1.91	-53.90G
625.00	55.09	87.64	567.11	149.51	-4.29	184.05	177.82	91.34	3.04	-48.32G
630.00	55.31	87.34	569.96	153.13	-4.11	188.15	181.91	91.25	1.98	-51.07G
635.00	55.49	87.07	572.80	156.76	-3.91	192.26	186.01	91.17	1.72	-60.17G
640.00	55.80	86.42	575.62	160.42	-3.68	196.38	190.13	91.07	3.72	-38.10G
645.00	56.15	86.09	578.42	164.11	-3.41	200.52	194.25	90.97	2.67	-15.28G
650.00	56.67	85.92	581.19	167.83	-3.12	204.67	198.40	90.87	3.23	-23.80G
655.00	57.30	85.59	583.91	171.58	-2.81	208.86	202.57	90.77	4.13	-14.36G
660.00	58.23	85.31	586.58	175.37	-2.47	213.07	206.78	90.66	5.76	1.24G
665.00	59.02	85.33	589.18	179.21	-2.12	217.33	211.02	90.56	4.74	-31.64G
670.00	59.75	84.81	591.73	183.08	-1.75	221.61	215.30	90.45	5.14	16.71G
675.00	60.30	85.00	594.23	186.98	-1.37	225.93	219.61	90.35	3.44	-9.16G
680.00	61.06	84.86	596.67	190.91	-0.98	230.27	223.95	90.25	4.62	20.55G
685.00	61.60	85.09	599.07	194.86	-0.60	234.64	228.31	90.15	3.46	18.78G
690.00	62.12	85.29	601.43	198.82	-0.23	239.03	232.70	90.06	3.29	5.39G
695.00	62.59	85.34	603.75	202.80	0.13	243.45	237.11	89.97	2.83	26.30G
700.00	62.77	85.44	606.05	206.79	0.49	247.88	241.54	89.89	1.20	143.84G
705.00	62.60	85.58	608.34	210.77	0.84	252.30	245.97	89.81	1.26	-168.33G
710.00	62.30	85.51	610.65	214.74	1.18	256.72	250.38	89.74	1.84	109.81G
715.00	62.17	85.92	612.98	218.70	1.51	261.14	254.80	89.67	2.31	138.57G
720.00	62.01	86.08	615.32	222.65	1.82	265.54	259.20	89.61	1.28	-35.25G
725.00	62.06	86.04	617.67	226.59	2.12	269.95	263.61	89.55	0.37	138.64G
730.00	61.80	86.30	620.02	230.52	2.42	274.35	268.01	89.50	2.08	-33.22G
735.00	62.07	86.10	622.37	234.45	2.71	278.75	272.42	89.44	1.94	1.13G
740.00	62.52	86.11	624.70	238.40	3.01	283.17	276.83	89.39	2.70	45.10G
745.00	62.92	86.56	626.99	242.35	3.29	287.61	281.27	89.34	3.39	-36.84G
750.00	63.47	86.10	629.24	246.33	3.58	292.06	285.72	89.30	4.12	-14.20G
755.00	64.11	85.92	631.45	250.33	3.89	296.53	290.20	89.25	3.96	60.02G
760.00	64.64	86.93	633.61	254.34	4.17	301.03	294.70	89.21	6.32	-21.14G
765.00	65.44	86.59	635.72	258.36	4.43	305.56	299.23	89.17	5.14	23.00G
770.00	66.26	86.97	637.77	262.40	4.69	310.11	303.79	89.13	5.34	39.06G
775.00	67.01	87.63	639.75	266.45	4.90	314.70	308.37	89.11	5.78	-14.34G
780.00	67.88	87.39	641.67	270.52	5.10	319.31	312.99	89.08	5.39	12.84G
785.00	68.78	87.61	643.52	274.61	5.30	323.95	317.63	89.06	5.54	33.55G
790.00	69.43	88.07	645.30	278.71	5.48	328.62	322.30	89.04	4.68	-7.76G
795.00	70.19	87.96	647.03	282.82	5.64	333.31	326.99	89.03	4.60	43.34G
800.00	70.51	88.28	648.71	286.94	5.80	338.02	331.70	89.02	2.64	-61.76G
805.00	70.80	87.71	650.36	291.08	5.96	342.73	336.42	89.00	3.67	-51.23G
810.00	70.99	87.46	652.00	295.24	6.16	347.45	341.14	88.98	1.82	87.80G
815.00	71.01	87.99	653.63	299.39	6.35	352.18	345.87	88.97	3.01	11.87G
820.00	71.10	88.01	655.25	303.53	6.51	356.90	350.59	88.95	0.55	70.67G
825.00	71.25	88.46	656.86	307.67	6.66	361.63	355.33	88.94	2.71	-98.52G
829.20	71.17	87.89	658.22	311.15	6.79	365.61	359.30	88.94	3.90	-146.75G
839.90	68.11	85.72	661.94	320.04	7.34	375.62	369.32	88.88	10.30	-116.31G
844.80	67.85	85.15	663.78	324.11	7.71	380.15	373.86	88.84	3.61	-132.82G
849.90	67.73	85.01	665.70	328.36	8.11	384.85	378.57	88.79	1.04	24.84G
854.90	67.81	85.05	667.60	332.53	8.51	389.47	383.18	88.75	0.53	-39.50G
860.00	67.99	84.89	669.52	336.78	8.93	394.17	387.90	88.70	1.37	-84.35G
865.00	68.05	84.25	671.39	340.97	9.36	398.79	392.52	88.65	3.58	-58.05G
868.50	68.44	83.58	672.68	343.93	9.71	402.02	395.76	88.62	6.29	-71.19G
876.03	68.93	82.06	675.42	350.35	10.59	408.98	402.73	88.52	5.97	-90.83G
904.37	68.92	78.38	685.61	375.04	15.08	435.03	428.90	88.02	3.63	-106.26G
932.96	67.71	73.65	696.18	400.46	21.49	460.80	454.89	87.33	4.78	-99.58G

961.75	67.15	69.75	707.24	426.41	29.83	486.04	480.51	86.49	3.80	-99.76G
990.16	66.79	67.36	718.35	452.20	39.39	510.37	505.43	85.59	2.35	-120.64G
1018.78	64.90	63.76	730.07	478.15	50.19	534.14	530.01	84.63	3.97	-94.93G
1047.37	64.58	58.43	742.27	503.98	62.68	556.77	553.78	83.58	5.07	-73.67G
1076.21	65.54	54.98	754.44	530.10	77.03	578.62	577.20	82.42	3.40	-106.56G
1105.06	64.64	51.48	766.59	556.12	92.69	599.58	600.15	81.21	3.43	-132.14G
1133.70	64.08	50.79	778.99	581.68	108.89	619.68	622.61	80.03	0.88	-165.44G
1162.83	63.46	50.61	791.86	607.52	125.44	639.90	645.50	78.91	0.66	27.31G
1191.32	64.51	51.21	804.36	632.86	141.58	659.77	668.21	77.89	1.24	62.52G
1220.04	65.26	52.78	816.55	658.65	157.60	680.26	691.68	76.96	1.68	95.14G
1248.61	65.19	53.67	828.52	684.45	173.12	701.04	715.50	76.13	0.85	-127.78G
1277.97	64.24	52.30	841.06	710.84	189.11	722.24	739.98	75.33	1.60	-57.81G
1306.42	64.97	51.03	853.26	736.32	205.05	742.40	763.59	74.56	1.43	99.25G
1334.98	64.90	51.51	865.36	761.94	221.23	762.58	787.41	73.82	0.46	-156.33G
1363.60	64.10	51.12	877.68	787.53	237.38	782.74	811.34	73.13	0.92	90.00G
1392.02	64.10	51.60	890.10	812.85	253.34	802.71	835.14	72.48	0.46	175.33G
1420.82	63.01	51.70	902.92	838.42	269.34	822.93	859.29	71.88	1.14	166.94G
1449.63	58.28	52.99	917.04	863.34	284.68	842.80	882.98	71.34	5.06	-178.79G
1478.39	57.09	52.96	932.42	887.50	299.32	862.21	906.09	70.86	1.24	-32.56G
1507.31	58.13	52.18	947.91	911.76	314.16	881.60	929.31	70.39	1.28	-144.53G
1535.98	57.34	51.51	963.21	935.80	329.14	900.66	952.33	69.93	1.02	-67.91G
1564.73	57.68	50.53	978.66	959.80	344.39	919.51	975.30	69.47	0.93	-0.93G
1593.34	58.73	50.51	993.73	983.84	359.85	938.28	998.34	69.02	1.10	92.84G
1622.06	58.70	51.27	1008.64	1008.12	375.33	957.33	1021.69	68.59	0.68	160.29G
1650.74	57.92	51.60	1023.71	1032.30	390.55	976.41	1045.04	68.20	0.87	50.69G
1679.53	58.22	52.03	1038.94	1056.53	405.65	995.61	1068.51	67.83	0.49	172.10G
1708.26	57.25	52.19	1054.27	1080.64	420.57	1014.79	1091.92	67.49	1.02	-142.56G
1736.96	56.77	51.75	1069.90	1104.52	435.40	1033.75	1115.13	67.16	0.63	-26.14G
1765.75	58.14	50.96	1085.39	1128.56	450.56	1052.70	1138.51	66.83	1.59	19.67G
1794.53	58.45	51.09	1100.51	1152.80	465.96	1071.74	1162.09	66.50	0.34	5.67G
1823.43	61.37	51.42	1115.00	1177.56	481.61	1091.24	1186.24	66.19	3.05	8.16G
1852.14	65.17	52.02	1127.91	1202.98	497.49	1111.36	1211.08	65.88	4.01	7.92G
1880.83	67.63	52.39	1139.40	1229.07	513.60	1132.14	1236.65	65.60	2.60	-22.83G
1909.82	68.76	51.88	1150.17	1255.78	530.12	1153.39	1262.84	65.32	1.27	-164.40G
1938.41	67.70	51.56	1160.77	1282.10	546.57	1174.23	1288.67	65.04	1.16	70.06G
1966.95	67.93	52.24	1171.55	1308.32	562.87	1195.02	1314.42	64.78	0.70	-59.62G
1995.71	68.39	51.40	1182.24	1334.79	579.37	1216.01	1340.46	64.52	0.94	28.92G
2024.24	68.88	51.69	1192.64	1361.12	595.90	1236.82	1366.36	64.28	0.59	160.08G
2052.78	68.70	51.76	1202.96	1387.50	612.38	1257.70	1392.35	64.04	0.20	121.65G
2081.24	68.21	52.62	1213.42	1413.77	628.61	1278.62	1418.27	63.82	0.99	18.21G
2109.70	68.72	52.80	1223.86	1440.08	644.65	1299.68	1444.26	63.62	0.57	-165.50G
2138.33	68.11	52.63	1234.39	1466.53	660.77	1320.86	1470.42	63.42	0.66	24.36G
2166.99	68.48	52.81	1244.99	1492.99	676.90	1342.05	1496.59	63.23	0.43	-91.28G
2195.90	68.47	52.29	1255.60	1519.70	693.25	1363.40	1523.03	63.05	0.50	-12.37G
2224.99	68.81	52.21	1266.20	1546.59	709.84	1384.82	1549.66	62.86	0.36	-120.63G
2253.25	68.59	51.81	1276.46	1572.71	726.05	1405.57	1575.53	62.68	0.46	102.66G
2281.77	68.54	52.05	1286.88	1599.05	742.42	1426.47	1601.62	62.50	0.24	123.98G
2310.52	68.29	52.45	1297.46	1625.58	758.78	1447.61	1627.94	62.34	0.47	-34.35G
2339.19	68.96	51.96	1307.91	1652.08	775.15	1468.70	1654.23	62.18	0.85	-166.91G
2368.10	68.48	51.84	1318.40	1678.80	791.77	1489.90	1680.75	62.01	0.51	180.00G
2396.83	68.05	51.84	1329.04	1705.27	808.26	1510.89	1707.03	61.86	0.45	-176.86G
2425.39	67.21	51.79	1339.91	1731.46	824.58	1531.65	1733.04	61.70	0.88	153.32G
2453.53	67.10	51.85	1350.84	1757.18	840.61	1552.03	1758.60	61.56	0.13	163.41G
2482.32	66.73	51.97	1362.12	1783.45	856.95	1572.87	1784.72	61.42	0.40	-18.03G
2511.09	67.24	51.79	1373.37	1809.71	873.30	1593.71	1810.84	61.28	0.56	0.00G
2539.55	67.67	51.79	1384.28	1835.77	889.56	1614.36	1836.77	61.14	0.45	37.01G
2568.21	67.99	52.05	1395.10	1862.10	905.93	1635.25	1862.98	61.01	0.42	-38.12G
2596.73	68.31	51.78	1405.71	1888.36	922.25	1656.09	1889.12	60.89	0.43	-106.71G
2625.69	68.10	51.02	1416.47	1915.00	939.03	1677.10	1915.66	60.75	0.76	-24.95G
2654.52	68.46	50.84	1427.14	1941.50	955.91	1697.90	1942.05	60.62	0.41	121.58G
2683.23	68.42	50.91	1437.69	1967.92	972.76	1718.61	1968.38	60.49	0.08	-161.85G
2711.74	68.25	50.85	1448.21	1994.14	989.48	1739.17	1994.51	60.36	0.19	-44.26G
2740.28	68.70	50.38	1458.68	2020.39	1006.32	1759.69	2020.69	60.24	0.66	-49.71G
2769.49	68.89	50.14	1469.25	2047.29	1023.73	1780.63	2047.52	60.10	0.30	-34.23G
2798.25	69.22	49.90	1479.53	2073.80	1040.99	1801.21	2073.97	59.97	0.42	39.05G
2826.73	69.59	50.22	1489.55	2100.12	1058.11	1821.65	2100.24	59.85	0.50	-63.37G

	2855.37	69.67	50.05	1499.52	2126.64	1075.32	1842.26	2126.71	59.73	0.19	32.02G
	2883.98	69.70	50.07	1509.45	2153.13	1092.54	1862.83	2153.17	59.61	0.04	180.00G
	2912.56	69.40	50.07	1519.44	2179.57	1109.73	1883.36	2179.58	59.49	0.31	-42.65G
	2941.02	69.89	49.59	1529.33	2205.89	1126.94	1903.75	2205.90	59.38	0.70	-21.38G
	2969.59	70.01	49.54	1539.13	2232.35	1144.35	1924.18	2232.35	59.26	0.14	19.89G
	2998.37	70.14	49.59	1548.94	2259.03	1161.90	1944.77	2259.03	59.14	0.14	-59.22G
	3026.61	70.41	49.11	1558.47	2285.22	1179.21	1964.94	2285.23	59.03	0.56	91.04G
	3053.74	70.40	49.76	1567.57	2310.40	1195.83	1984.36	2310.44	58.93	0.68	5.39G
	3082.64	70.60	49.78	1577.21	2337.28	1213.43	2005.16	2337.34	58.82	0.21	-157.44G
	3114.05	69.63	49.35	1587.90	2366.40	1232.59	2027.64	2366.50	58.70	1.00	107.37G
	3142.62	69.49	49.83	1597.88	2392.79	1249.94	2048.02	2392.94	58.60	0.49	-50.32G
	3171.43	69.56	49.74	1607.95	2419.42	1267.37	2068.63	2419.62	58.51	0.11	51.34G
	3200.17	69.59	49.78	1617.98	2445.98	1284.77	2089.19	2446.25	58.41	0.05	178.09G
	3228.27	69.31	49.79	1627.85	2471.94	1301.75	2109.29	2472.27	58.32	0.30	174.80G
	3257.23	68.90	49.83	1638.18	2498.63	1319.21	2129.95	2499.03	58.23	0.43	-161.57G
	3285.70	68.37	49.64	1648.55	2524.78	1336.35	2150.18	2525.26	58.14	0.59	-130.55G
	3314.68	67.99	49.16	1659.32	2551.29	1353.86	2170.61	2551.86	58.05	0.61	105.12G
	3343.03	67.96	49.28	1669.95	2577.18	1371.02	2190.51	2577.83	57.96	0.12	151.85G
	3371.46	67.58	49.50	1680.71	2603.11	1388.15	2210.49	2603.86	57.87	0.45	-77.82G
	3385.16	67.61	49.35	1685.93	2615.59	1396.39	2220.11	2616.39	57.83	0.31	0.00G
Projection to bit	3406.00	67.61	49.35	1693.87	2634.57	1408.94	2234.73	2635.45	57.77	0.00	0.00G

**Survey Type:** Definitive Survey

**Survey Error Model:** SLB ISCWSA version 21 \*\*\* 3-D 95.00% Confidence 2.7955 sigma

**Surveying Prog:**

**MD From ( m )**

**MD To ( m )**

**EOU Freq** **Survey Tool Type**  
Act-Stns SLB\_CNKG+CASING  
Act-Stns SLB\_MWD-STD

## **APPENDIX 1b**

### **TUNA A31A**

#### **MD-TVD Survey Data Listing**

Report Date:	11 April 2005
Well:	TUNA A31A
Structure / Slot:	Tuna Rig 453 / 31
TVD Reference Datum:	Drillsite Elevation
TVD Reference Elevation:	31.30 m relative to MSL
Sea Bed / Ground Level Elevation:	-59.40 m relative to MSL
Grid Coordinate System:	GDA94/MGA94 Zone 55
Location Lat/Long:	S 38 10 10.687, E 148 25 10.192
Location Grid N/E:	N 5774411.33 m, E 624343.51 m
Survey Azimuth Reference:	Grid North

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
0	0.00	0.00	0.00	31.30	0.00	0.00	5774411.33	624343.51
5	0.03	234.64	5.00	26.30	0.00	0.00	5774411.33	624343.51
10	0.06	234.64	10.00	21.30	0.00	0.00	5774411.33	624343.50
15	0.09	234.64	15.00	16.30	-0.01	-0.01	5774411.32	624343.50
20	0.12	234.64	20.00	11.30	-0.01	-0.02	5774411.32	624343.49
25	0.15	235.49	25.00	6.30	-0.02	-0.03	5774411.31	624343.48
30	0.17	276.66	30.00	1.30	-0.02	-0.04	5774411.31	624343.47
35	0.17	273.63	35.00	-3.70	-0.02	-0.05	5774411.31	624343.45
40	0.16	275.14	40.00	-8.70	-0.02	-0.07	5774411.31	624343.44
45	0.17	267.94	45.00	-13.70	-0.02	-0.08	5774411.31	624343.42
50	0.17	282.42	50.00	-18.70	-0.02	-0.10	5774411.31	624343.41
55	0.20	302.68	55.00	-23.70	-0.01	-0.11	5774411.32	624343.40
60	0.11	244.40	60.00	-28.70	-0.01	-0.12	5774411.32	624343.38
65	0.23	197.72	65.00	-33.70	-0.02	-0.13	5774411.31	624343.38
70	0.22	154.63	70.00	-38.70	-0.04	-0.13	5774411.29	624343.38
75	0.31	141.74	75.00	-43.70	-0.06	-0.12	5774411.27	624343.39
80	0.59	136.58	80.00	-48.70	-0.09	-0.09	5774411.24	624343.42
85	0.67	122.93	85.00	-53.70	-0.12	-0.05	5774411.21	624343.46
90	0.98	117.52	90.00	-58.70	-0.16	0.01	5774411.17	624343.52
95	1.25	115.85	95.00	-63.70	-0.20	0.10	5774411.13	624343.61
100	1.69	113.40	100.00	-68.70	-0.25	0.22	5774411.07	624343.72
105	2.08	108.32	104.99	-73.69	-0.31	0.37	5774411.02	624343.88
110	2.55	107.40	109.99	-78.69	-0.37	0.56	5774410.96	624344.07
115	2.85	102.70	114.98	-83.68	-0.43	0.79	5774410.89	624344.30
120	3.24	102.35	119.98	-88.68	-0.49	1.05	5774410.84	624344.56
125	3.82	100.20	124.97	-93.67	-0.55	1.35	5774410.78	624344.86
130	4.41	98.76	129.95	-98.65	-0.61	1.71	5774410.72	624345.21
135	4.55	98.97	134.94	-103.64	-0.67	2.09	5774410.66	624345.60
140	4.56	98.21	139.92	-108.62	-0.73	2.48	5774410.60	624345.99
145	4.41	98.81	144.91	-113.61	-0.79	2.87	5774410.54	624346.38
150	4.16	100.58	149.89	-118.59	-0.85	3.24	5774410.48	624346.75
155	3.88	101.71	154.88	-123.58	-0.92	3.58	5774410.41	624347.09
160	3.73	103.38	159.87	-128.57	-0.99	3.91	5774410.34	624347.41
165	3.65	104.36	164.86	-133.56	-1.07	4.22	5774410.26	624347.73
170	3.61	105.46	169.85	-138.55	-1.15	4.52	5774410.18	624348.03
175	3.49	106.46	174.84	-143.54	-1.23	4.82	5774410.10	624348.33
180	3.41	107.44	179.83	-148.53	-1.32	5.11	5774410.01	624348.62
185	3.24	109.53	184.82	-153.52	-1.41	5.39	5774409.92	624348.89
190	3.18	110.27	189.81	-158.51	-1.51	5.65	5774409.82	624349.16
195	3.11	112.59	194.81	-163.51	-1.61	5.90	5774409.72	624349.41
200	3.07	113.53	199.80	-168.50	-1.71	6.15	5774409.61	624349.66
205	3.02	115.05	204.79	-173.49	-1.82	6.39	5774409.51	624349.90
210	2.99	115.75	209.79	-178.49	-1.94	6.63	5774409.39	624350.14
215	2.98	119.38	214.78	-183.48	-2.06	6.86	5774409.27	624350.37
220	3.02	120.54	219.77	-188.47	-2.19	7.09	5774409.14	624350.60
225	3.10	122.56	224.77	-193.47	-2.33	7.32	5774409.00	624350.82
230	3.13	123.66	229.76	-198.46	-2.47	7.54	5774408.85	624351.05
235	3.33	125.99	234.75	-203.45	-2.64	7.77	5774408.69	624351.28
240	3.52	126.48	239.74	-208.44	-2.81	8.01	5774408.52	624351.52
245	3.86	127.78	244.73	-213.43	-3.01	8.27	5774408.32	624351.78
250	4.04	126.21	249.72	-218.42	-3.21	8.55	5774408.11	624352.05
255	4.36	123.44	254.71	-223.41	-3.42	8.85	5774407.91	624352.36
260	4.56	120.73	259.69	-228.39	-3.63	9.18	5774407.70	624352.68

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
265	4.79	116.60	264.67	-233.37	-3.82	9.53	5774407.50	624353.04
270	4.93	113.22	269.66	-238.36	-4.00	9.92	5774407.33	624353.43
275	5.08	108.50	274.64	-243.34	-4.16	10.33	5774407.17	624353.83
280	5.33	102.64	279.62	-248.32	-4.28	10.76	5774407.05	624354.27
285	5.61	96.77	284.59	-253.29	-4.36	11.23	5774406.97	624354.74
290	6.01	90.84	289.57	-258.27	-4.39	11.74	5774406.94	624355.24
295	6.57	84.44	294.54	-263.24	-4.37	12.28	5774406.96	624355.79
300	7.34	78.82	299.50	-268.20	-4.28	12.88	5774407.05	624356.39
305	8.15	75.82	304.46	-273.16	-4.13	13.54	5774407.20	624357.04
310	9.39	74.41	309.40	-278.10	-3.93	14.27	5774407.40	624357.78
315	10.23	74.25	314.32	-283.02	-3.70	15.09	5774407.63	624358.60
320	11.37	74.26	319.24	-287.94	-3.45	16.00	5774407.88	624359.50
325	11.99	74.64	324.13	-292.83	-3.18	16.97	5774408.15	624360.48
330	12.74	76.62	329.02	-297.72	-2.91	18.01	5774408.42	624361.52
335	13.14	78.54	333.89	-302.59	-2.67	19.10	5774408.66	624362.61
340	13.72	80.58	338.75	-307.45	-2.46	20.24	5774408.87	624363.75
345	14.24	82.79	343.60	-312.30	-2.29	21.44	5774409.04	624364.95
350	14.86	85.00	348.44	-317.14	-2.15	22.69	5774409.18	624366.20
355	15.13	86.07	353.27	-321.97	-2.05	23.98	5774409.28	624367.48
360	15.58	87.64	358.10	-326.80	-1.98	25.30	5774409.35	624368.81
365	15.89	88.67	362.91	-331.61	-1.94	26.65	5774409.39	624370.16
370	16.49	90.15	367.71	-336.41	-1.92	28.05	5774409.41	624371.56
375	16.90	91.20	372.50	-341.20	-1.94	29.48	5774409.39	624372.99
380	17.68	93.41	377.27	-345.97	-2.00	30.97	5774409.33	624374.48
385	18.17	94.60	382.03	-350.73	-2.11	32.50	5774409.22	624376.01
390	18.94	95.80	386.77	-355.47	-2.25	34.09	5774409.08	624377.60
395	19.48	96.73	391.49	-360.19	-2.43	35.72	5774408.90	624379.23
400	20.28	97.99	396.19	-364.89	-2.65	37.41	5774408.68	624380.92
405	21.13	98.62	400.87	-369.57	-2.91	39.16	5774408.42	624382.67
410	22.09	99.08	405.52	-374.22	-3.19	40.98	5774408.14	624384.49
415	22.94	99.50	410.14	-378.84	-3.50	42.87	5774407.83	624386.38
420	23.91	99.43	414.73	-383.43	-3.82	44.83	5774407.50	624388.34
425	24.73	99.53	419.28	-387.98	-4.16	46.86	5774407.16	624390.37
430	25.67	99.34	423.81	-392.51	-4.51	48.96	5774406.82	624392.47
435	26.55	98.83	428.30	-397.00	-4.86	51.13	5774406.47	624394.64
440	27.71	98.56	432.75	-401.45	-5.20	53.39	5774406.12	624396.89
445	28.56	98.39	437.15	-405.85	-5.55	55.72	5774405.78	624399.23
450	29.55	97.88	441.53	-410.23	-5.90	58.12	5774405.43	624401.63
455	30.53	97.11	445.85	-414.55	-6.22	60.60	5774405.11	624404.11
460	31.25	97.22	450.14	-418.84	-6.54	63.15	5774404.79	624406.66
465	32.34	96.62	454.39	-423.09	-6.86	65.77	5774404.47	624409.27
470	33.34	95.94	458.60	-427.30	-7.16	68.46	5774404.17	624411.97
475	34.30	95.27	462.75	-431.45	-7.43	71.23	5774403.90	624414.74
480	35.19	94.57	466.86	-435.56	-7.67	74.07	5774403.66	624417.58
485	36.02	93.73	470.92	-439.62	-7.88	76.97	5774403.45	624420.48
490	36.94	92.84	474.94	-443.64	-8.05	79.94	5774403.28	624423.45
495	37.71	92.17	478.92	-447.62	-8.19	82.97	5774403.14	624426.48
500	38.45	91.66	482.86	-451.56	-8.29	86.05	5774403.04	624429.56
505	39.24	90.99	486.75	-455.45	-8.36	89.19	5774402.97	624432.69
510	39.90	90.73	490.60	-459.30	-8.41	92.37	5774402.92	624435.88
515	40.75	90.08	494.42	-463.12	-8.43	95.61	5774402.90	624439.11
520	41.43	89.90	498.18	-466.88	-8.43	98.89	5774402.90	624442.40
525	42.33	89.60	501.91	-470.61	-8.42	102.23	5774402.91	624445.74
530	42.88	89.33	505.59	-474.29	-8.38	105.62	5774402.94	624449.12
535	43.63	89.06	509.23	-477.93	-8.34	109.04	5774402.99	624452.55
540	44.28	88.82	512.83	-481.53	-8.27	112.51	5774403.06	624456.02
545	45.21	88.29	516.38	-485.08	-8.18	116.03	5774403.15	624459.54
550	45.91	88.02	519.88	-488.58	-8.07	119.60	5774403.26	624463.11
555	46.78	87.78	523.33	-492.03	-7.93	123.21	5774403.39	624466.72
560	47.31	87.59	526.74	-495.44	-7.79	126.87	5774403.54	624470.38
565	48.04	87.49	530.11	-498.81	-7.63	130.56	5774403.70	624474.07
570	48.54	87.74	533.43	-502.13	-7.47	134.29	5774403.86	624477.80
575	49.10	87.94	536.72	-505.42	-7.33	138.05	5774404.00	624481.56
580	49.72	87.95	539.98	-508.68	-7.19	141.85	5774404.13	624485.35
585	50.51	88.33	543.18	-511.88	-7.07	145.68	5774404.26	624489.19
590	51.19	88.49	546.34	-515.04	-6.96	149.56	5774404.37	624493.06

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
595	52.13	88.66	549.44	-518.14	-6.87	153.48	5774404.46	624496.99
600	52.92	88.47	552.48	-521.18	-6.77	157.44	5774404.56	624500.95
605	53.62	88.48	555.47	-524.17	-6.66	161.45	5774404.67	624504.96
610	54.08	88.47	558.42	-527.12	-6.55	165.49	5774404.78	624508.99
615	54.48	88.23	561.34	-530.04	-6.44	169.54	5774404.89	624513.05
620	54.79	88.14	564.24	-532.94	-6.31	173.62	5774405.02	624517.13
625	55.09	87.64	567.11	-535.81	-6.16	177.71	5774405.17	624521.22
630	55.31	87.34	569.96	-538.66	-5.98	181.81	5774405.35	624525.32
635	55.49	87.07	572.80	-541.50	-5.77	185.92	5774405.55	624529.43
640	55.80	86.42	575.62	-544.32	-5.54	190.04	5774405.79	624533.55
645	56.15	86.09	578.42	-547.12	-5.27	194.18	5774406.06	624537.69
650	56.67	85.92	581.19	-549.89	-4.98	198.33	5774406.35	624541.84
655	57.30	85.59	583.91	-552.61	-4.67	202.51	5774406.66	624546.02
660	58.23	85.31	586.58	-555.28	-4.33	206.73	5774407.00	624550.24
665	59.02	85.33	589.18	-557.88	-3.99	210.98	5774407.34	624554.49
670	59.75	84.81	591.73	-560.43	-3.62	215.27	5774407.71	624558.78
675	60.30	85.00	594.23	-562.93	-3.23	219.59	5774408.10	624563.09
680	61.06	84.86	596.67	-565.37	-2.85	223.93	5774408.48	624567.44
685	61.60	85.09	599.07	-567.77	-2.46	228.30	5774408.87	624571.81
690	62.12	85.29	601.43	-570.13	-2.09	232.69	5774409.24	624576.20
695	62.59	85.34	603.75	-572.45	-1.73	237.11	5774409.60	624580.61
700	62.77	85.44	606.05	-574.75	-1.37	241.53	5774409.96	624585.04
705	62.60	85.58	608.34	-577.04	-1.02	245.96	5774410.30	624589.47
710	62.30	85.51	610.65	-579.35	-0.68	250.38	5774410.65	624593.89
715	62.17	85.92	612.98	-581.68	-0.35	254.79	5774410.98	624598.30
720	62.01	86.08	615.32	-584.02	-0.04	259.20	5774411.29	624602.71
725	62.06	86.04	617.67	-586.37	0.26	263.61	5774411.59	624607.12
730	61.80	86.30	620.02	-588.72	0.56	268.01	5774411.89	624611.52
735	62.07	86.10	622.37	-591.07	0.85	272.41	5774412.18	624615.92
740	62.52	86.11	624.70	-593.40	1.15	276.83	5774412.48	624620.34
745	62.92	86.56	626.99	-595.69	1.43	281.26	5774412.76	624624.77
750	63.47	86.10	629.24	-597.94	1.72	285.72	5774413.05	624629.22
755	64.11	85.92	631.45	-600.15	2.03	290.19	5774413.36	624633.70
760	64.64	86.93	633.61	-602.31	2.31	294.69	5774413.64	624638.20
765	65.44	86.59	635.72	-604.42	2.57	299.22	5774413.90	624642.72
770	66.26	86.97	637.77	-606.47	2.82	303.77	5774414.15	624647.28
775	67.01	87.63	639.75	-608.45	3.04	308.36	5774414.37	624651.87
780	67.88	87.39	641.67	-610.37	3.24	312.97	5774414.57	624656.48
785	68.78	87.61	643.52	-612.22	3.44	317.61	5774414.77	624661.12
790	69.43	88.07	645.30	-614.00	3.62	322.28	5774414.95	624665.79
795	70.19	87.96	647.02	-615.73	3.78	326.97	5774415.11	624670.48
800	70.51	88.28	648.71	-617.41	3.94	331.68	5774415.27	624675.18
805	70.80	87.71	650.36	-619.06	4.10	336.39	5774415.43	624679.90
810	70.99	87.46	652.00	-620.70	4.30	341.11	5774415.63	624684.62
815	71.01	87.99	653.63	-622.33	4.49	345.84	5774415.82	624689.34
820	71.10	88.01	655.25	-623.95	4.65	350.56	5774415.98	624694.07
825	71.25	88.46	656.86	-625.56	4.80	355.29	5774416.13	624698.80
830	70.94	87.73	658.50	-627.20	4.97	360.02	5774416.30	624703.52
835	69.51	86.71	660.24	-628.94	5.23	364.69	5774416.56	624708.20
840	68.10	85.71	661.98	-630.68	5.49	369.37	5774416.82	624712.88
845	67.85	85.14	663.85	-632.55	5.86	373.99	5774417.19	624717.50
850	67.73	85.01	665.74	-634.44	6.26	378.61	5774417.59	624722.11
855	67.81	85.05	667.63	-636.33	6.66	383.22	5774417.99	624726.72
860	67.99	84.89	669.51	-638.22	7.07	387.83	5774418.39	624731.34
865	68.05	84.25	671.39	-640.09	7.50	392.45	5774418.83	624735.95
870	68.54	83.28	673.23	-641.93	8.02	397.07	5774419.35	624740.57
875	68.86	82.27	675.05	-643.75	8.61	401.69	5774419.93	624745.19
880	68.93	81.54	676.85	-645.55	9.36	406.29	5774420.68	624749.80
885	68.93	80.90	678.65	-647.35	10.15	410.89	5774421.48	624754.39
890	68.93	80.25	680.45	-649.15	10.94	415.48	5774422.27	624758.99
895	68.92	79.60	682.24	-650.94	11.73	420.08	5774423.06	624763.59
900	68.92	78.95	684.04	-652.74	12.52	424.68	5774423.85	624768.18
905	68.89	78.28	685.85	-654.55	13.36	429.26	5774424.69	624772.77
910	68.68	77.45	687.70	-656.40	14.48	433.77	5774425.81	624777.27
915	68.47	76.62	689.54	-658.24	15.60	438.27	5774426.93	624781.78
920	68.26	75.79	691.39	-660.09	16.72	442.78	5774428.05	624786.29

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
925	68.05	74.97	693.24	-661.94	17.84	447.29	5774429.17	624790.80
930	67.84	74.14	695.09	-663.79	18.97	451.80	5774430.29	624795.30
935	67.67	73.37	696.97	-665.67	20.22	456.25	5774431.55	624799.76
940	67.57	72.70	698.89	-667.59	21.67	460.63	5774433.00	624804.14
945	67.48	72.02	700.81	-669.51	23.12	465.02	5774434.45	624808.52
950	67.38	71.34	702.73	-671.43	24.57	469.40	5774435.90	624812.91
955	67.28	70.66	704.65	-673.35	26.02	473.78	5774437.35	624817.29
960	67.18	69.99	706.57	-675.27	27.47	478.16	5774438.80	624821.67
965	67.11	69.48	708.51	-677.21	29.07	482.48	5774440.40	624825.99
970	67.05	69.06	710.46	-679.16	30.75	486.76	5774442.08	624830.27
975	66.98	68.64	712.42	-681.12	32.43	491.05	5774443.76	624834.55
980	66.92	68.21	714.38	-683.08	34.11	495.33	5774445.44	624838.84
985	66.86	67.79	716.33	-685.03	35.80	499.61	5774447.12	624843.12
990	66.79	67.37	718.29	-686.99	37.48	503.89	5774448.81	624847.40
995	66.47	66.75	720.33	-689.03	39.36	508.05	5774450.69	624851.56
1000	66.14	66.12	722.38	-691.08	41.24	512.20	5774452.57	624855.71
1005	65.81	65.49	724.43	-693.13	43.13	516.36	5774454.46	624859.86
1010	65.48	64.86	726.47	-695.17	45.02	520.51	5774456.34	624864.02
1015	65.15	64.24	728.52	-697.22	46.90	524.66	5774458.23	624868.17
1020	64.89	63.53	730.59	-699.29	48.86	528.77	5774460.19	624872.27
1025	64.83	62.60	732.72	-701.42	51.04	532.72	5774462.37	624876.23
1030	64.77	61.67	734.86	-703.56	53.23	536.68	5774464.56	624880.19
1035	64.72	60.74	736.99	-705.69	55.41	540.64	5774466.74	624884.14
1040	64.66	59.80	739.13	-707.83	57.60	544.59	5774468.93	624888.10
1045	64.61	58.87	741.26	-709.96	59.78	548.55	5774471.11	624892.06
1050	64.67	58.12	743.38	-712.08	62.13	552.42	5774473.46	624895.93
1055	64.83	57.52	745.49	-714.19	64.62	556.21	5774475.94	624899.72
1060	65.00	56.92	747.60	-716.30	67.10	560.00	5774478.43	624903.50
1065	65.17	56.32	749.71	-718.41	69.59	563.78	5774480.92	624907.29
1070	65.33	55.72	751.82	-720.52	72.08	567.57	5774483.41	624911.08
1075	65.50	55.12	753.93	-722.63	74.57	571.36	5774485.90	624914.87
1080	65.42	54.52	756.03	-724.73	77.23	575.03	5774488.56	624918.54
1085	65.27	53.91	758.14	-726.84	79.94	578.66	5774491.27	624922.17
1090	65.11	53.31	760.25	-728.95	82.66	582.30	5774493.99	624925.80
1095	64.95	52.70	762.35	-731.05	85.37	585.93	5774496.70	624929.44
1100	64.80	52.09	764.46	-733.16	88.08	589.56	5774499.41	624933.07
1105	64.64	51.49	766.57	-735.27	90.80	593.19	5774502.13	624936.70
1110	64.54	51.36	768.73	-737.43	93.62	596.70	5774504.95	624940.21
1115	64.45	51.24	770.89	-739.59	96.45	600.21	5774507.78	624943.72
1120	64.35	51.12	773.06	-741.76	99.28	603.72	5774510.61	624947.23
1125	64.25	51.00	775.22	-743.92	102.11	607.23	5774513.44	624950.74
1130	64.15	50.88	777.38	-746.08	104.94	610.74	5774516.27	624954.25
1135	64.05	50.78	779.56	-748.26	107.77	614.24	5774519.10	624957.75
1140	63.95	50.75	781.77	-750.47	110.61	617.71	5774521.94	624961.22
1145	63.84	50.72	783.98	-752.68	113.45	621.18	5774524.78	624964.69
1150	63.73	50.69	786.19	-754.89	116.29	624.65	5774527.62	624968.16
1155	63.63	50.66	788.40	-757.10	119.13	628.12	5774530.46	624971.63
1160	63.52	50.63	790.61	-759.31	121.97	631.60	5774533.30	624975.10
1165	63.54	50.66	792.81	-761.51	124.81	635.07	5774536.14	624978.58
1170	63.72	50.76	795.01	-763.71	127.64	638.56	5774538.97	624982.07
1175	63.91	50.87	797.20	-765.90	130.48	642.05	5774541.81	624985.56
1180	64.09	50.97	799.39	-768.09	133.31	645.54	5774544.64	624989.04
1185	64.28	51.08	801.58	-770.28	136.14	649.02	5774547.47	624992.53
1190	64.46	51.18	803.78	-772.48	138.98	652.51	5774550.31	624996.02
1195	64.61	51.41	805.92	-774.62	141.78	656.06	5774553.11	624999.57
1200	64.74	51.68	808.04	-776.74	144.56	659.63	5774555.89	625003.13
1205	64.87	51.96	810.16	-778.86	147.35	663.19	5774558.68	625006.70
1210	65.00	52.23	812.29	-780.99	150.14	666.76	5774561.47	625010.27
1215	65.13	52.50	814.41	-783.11	152.93	670.33	5774564.25	625013.83
1220	65.26	52.78	816.53	-785.23	155.71	673.89	5774567.04	625017.40
1225	65.25	52.93	818.63	-787.33	158.43	677.53	5774569.76	625021.04
1230	65.24	53.09	820.72	-789.42	161.15	681.17	5774572.48	625024.67
1235	65.22	53.25	822.82	-791.52	163.87	684.80	5774575.20	625028.31
1240	65.21	53.40	824.91	-793.61	166.58	688.44	5774577.91	625031.95
1245	65.20	53.56	827.01	-795.71	169.30	692.07	5774580.63	625035.58
1250	65.15	53.61	829.11	-797.81	172.02	695.70	5774583.35	625039.21

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1255	64.98	53.37	831.25	-799.95	174.74	699.31	5774586.07	625042.82
1260	64.82	53.14	833.38	-802.08	177.46	702.92	5774588.79	625046.43
1265	64.66	52.91	835.52	-804.22	180.19	706.53	5774591.51	625050.04
1270	64.50	52.67	837.66	-806.36	182.91	710.14	5774594.24	625053.65
1275	64.34	52.44	839.79	-808.49	185.63	713.75	5774596.96	625057.26
1280	64.29	52.21	841.93	-810.63	188.38	717.34	5774599.71	625060.84
1285	64.42	51.99	844.07	-812.77	191.18	720.88	5774602.51	625064.39
1290	64.55	51.76	846.22	-814.92	193.99	724.42	5774605.31	625067.93
1295	64.68	51.54	848.36	-817.06	196.79	727.96	5774608.12	625071.47
1300	64.81	51.32	850.51	-819.21	199.59	731.51	5774610.92	625075.02
1305	64.93	51.09	852.65	-821.35	202.39	735.05	5774613.72	625078.56
1310	64.96	51.09	854.78	-823.48	205.22	738.59	5774616.54	625082.09
1315	64.95	51.17	856.90	-825.60	208.05	742.12	5774619.38	625085.63
1320	64.94	51.26	859.01	-827.71	210.88	745.65	5774622.21	625089.16
1325	64.92	51.34	861.13	-829.83	213.72	749.19	5774625.05	625092.69
1330	64.91	51.43	863.25	-831.95	216.55	752.72	5774627.88	625096.23
1335	64.90	51.51	865.37	-834.07	219.38	756.25	5774630.71	625099.76
1340	64.76	51.44	867.52	-836.22	222.20	759.77	5774633.53	625103.28
1345	64.62	51.37	869.67	-838.37	225.02	763.30	5774636.35	625106.81
1350	64.48	51.31	871.83	-840.53	227.85	766.82	5774639.17	625110.33
1355	64.34	51.24	873.98	-842.68	230.67	770.34	5774641.99	625113.85
1360	64.20	51.17	876.13	-844.83	233.49	773.87	5774644.82	625117.37
1365	64.10	51.14	878.29	-846.99	236.30	777.39	5774647.63	625120.89
1370	64.10	51.23	880.48	-849.18	239.11	780.90	5774650.44	625124.41
1375	64.10	51.31	882.66	-851.36	241.92	784.41	5774653.25	625127.92
1380	64.10	51.40	884.85	-853.55	244.73	787.93	5774656.06	625131.43
1385	64.10	51.48	887.03	-855.73	247.54	791.44	5774658.87	625134.95
1390	64.10	51.57	889.21	-857.91	250.35	794.95	5774661.68	625138.46
1395	63.99	51.61	891.42	-860.12	253.14	798.46	5774664.47	625141.97
1400	63.80	51.63	893.65	-862.35	255.91	801.97	5774667.24	625145.48
1405	63.61	51.65	895.88	-864.58	258.69	805.49	5774670.02	625148.99
1410	63.42	51.66	898.10	-866.80	261.47	809.00	5774672.80	625152.50
1415	63.23	51.68	900.33	-869.03	264.25	812.51	5774675.58	625156.01
1420	63.04	51.70	902.56	-871.26	267.03	816.02	5774678.35	625159.53
1425	62.32	51.89	904.97	-873.67	269.71	819.48	5774681.04	625162.98
1430	61.50	52.11	907.42	-876.12	272.37	822.92	5774683.70	625166.43
1435	60.68	52.33	909.87	-878.57	275.03	826.37	5774686.36	625169.88
1440	59.86	52.56	912.32	-881.02	277.69	829.82	5774689.02	625173.33
1445	59.04	52.78	914.77	-883.47	280.36	833.27	5774691.68	625176.78
1450	58.26	52.99	917.24	-885.94	283.01	836.71	5774694.34	625180.22
1455	58.06	52.98	919.91	-888.61	285.55	840.09	5774696.88	625183.59
1460	57.85	52.98	922.58	-891.28	288.10	843.46	5774699.43	625186.97
1465	57.64	52.97	925.26	-893.96	290.64	846.83	5774701.97	625190.34
1470	57.44	52.97	927.93	-896.63	293.19	850.21	5774704.52	625193.71
1475	57.23	52.96	930.60	-899.30	295.73	853.58	5774707.06	625197.09
1480	57.15	52.92	933.28	-901.98	298.28	856.95	5774709.61	625200.46
1485	57.33	52.78	935.96	-904.66	300.85	860.30	5774712.18	625203.81
1490	57.51	52.65	938.63	-907.33	303.42	863.65	5774714.74	625207.16
1495	57.69	52.51	941.31	-910.01	305.98	867.00	5774717.31	625210.51
1500	57.87	52.38	943.99	-912.69	308.55	870.36	5774719.88	625213.86
1505	58.05	52.24	946.67	-915.37	311.11	873.71	5774722.44	625217.22
1510	58.06	52.12	949.34	-918.04	313.71	877.05	5774725.03	625220.55
1515	57.92	52.00	952.01	-920.71	316.32	880.37	5774727.65	625223.88
1520	57.78	51.88	954.68	-923.38	318.93	883.70	5774730.26	625227.20
1525	57.64	51.77	957.35	-926.05	321.54	887.02	5774732.87	625230.53
1530	57.50	51.65	960.02	-928.72	324.15	890.35	5774735.48	625233.85
1535	57.37	51.53	962.69	-931.39	326.77	893.67	5774738.09	625237.18
1540	57.39	51.37	965.37	-934.07	329.41	896.96	5774740.74	625240.47
1545	57.45	51.20	968.06	-936.76	332.06	900.24	5774743.39	625243.74
1550	57.51	51.03	970.74	-939.44	334.72	903.51	5774746.04	625247.02
1555	57.56	50.86	973.43	-942.13	337.37	906.79	5774748.70	625250.30
1560	57.62	50.69	976.11	-944.81	340.02	910.07	5774751.35	625253.58
1565	57.69	50.53	978.80	-947.50	342.68	913.35	5774754.01	625256.86
1570	57.87	50.53	981.43	-950.13	345.38	916.63	5774756.71	625260.14
1575	58.06	50.52	984.07	-952.77	348.08	919.91	5774759.41	625263.42
1580	58.24	50.52	986.70	-955.40	350.78	923.19	5774762.11	625266.70

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1585	58.42	50.52	989.33	-958.03	353.48	926.47	5774764.81	625269.98
1590	58.61	50.51	991.97	-960.67	356.19	929.75	5774767.52	625273.26
1595	58.73	50.55	994.59	-963.29	358.89	933.04	5774770.22	625276.55
1600	58.72	50.69	997.19	-965.89	361.58	936.36	5774772.91	625279.87
1605	58.72	50.82	999.78	-968.48	364.28	939.67	5774775.61	625283.18
1610	58.71	50.95	1002.38	-971.08	366.97	942.99	5774778.30	625286.50
1615	58.71	51.08	1004.98	-973.68	369.67	946.30	5774781.00	625289.81
1620	58.70	51.22	1007.57	-976.27	372.36	949.62	5774783.69	625293.13
1625	58.62	51.30	1010.19	-978.89	375.03	952.94	5774786.36	625296.45
1630	58.48	51.36	1012.81	-981.51	377.69	956.27	5774789.01	625299.78
1635	58.35	51.42	1015.44	-984.14	380.34	959.60	5774791.67	625303.10
1640	58.21	51.48	1018.07	-986.77	382.99	962.92	5774794.32	625306.43
1645	58.08	51.53	1020.69	-989.39	385.64	966.25	5774796.97	625309.76
1650	57.94	51.59	1023.32	-992.02	388.30	969.57	5774799.62	625313.08
1655	57.96	51.66	1025.96	-994.66	390.92	972.91	5774802.25	625316.42
1660	58.02	51.74	1028.61	-997.31	393.55	976.24	5774804.87	625319.75
1665	58.07	51.81	1031.25	-999.95	396.17	979.58	5774807.50	625323.09
1670	58.12	51.89	1033.90	-1002.60	398.79	982.92	5774810.12	625326.42
1675	58.17	51.96	1036.54	-1005.24	401.42	986.25	5774812.74	625329.76
1680	58.20	52.03	1039.19	-1007.89	404.04	989.59	5774815.37	625333.09
1685	58.04	52.06	1041.86	-1010.56	406.63	992.92	5774817.96	625336.43
1690	57.87	52.09	1044.53	-1013.23	409.23	996.26	5774820.56	625339.77
1695	57.70	52.12	1047.19	-1015.89	411.83	999.60	5774823.16	625343.10
1700	57.53	52.14	1049.86	-1018.56	414.42	1002.93	5774825.75	625346.44
1705	57.36	52.17	1052.53	-1021.23	417.02	1006.27	5774828.35	625349.78
1710	57.22	52.16	1055.22	-1023.92	419.61	1009.59	5774830.94	625353.10
1715	57.14	52.09	1057.94	-1026.64	422.20	1012.90	5774833.52	625356.40
1720	57.05	52.01	1060.67	-1029.37	424.78	1016.20	5774836.11	625359.71
1725	56.97	51.93	1063.39	-1032.09	427.36	1019.50	5774838.69	625363.01
1730	56.89	51.86	1066.11	-1034.81	429.95	1022.81	5774841.28	625366.32
1735	56.80	51.78	1068.83	-1037.53	432.53	1026.11	5774843.86	625369.62
1740	56.91	51.67	1071.54	-1040.24	435.14	1029.41	5774846.47	625372.92
1745	57.15	51.53	1074.23	-1042.93	437.78	1032.70	5774849.10	625376.21
1750	57.39	51.39	1076.92	-1045.62	440.41	1035.99	5774851.74	625379.50
1755	57.63	51.25	1079.60	-1048.30	443.04	1039.28	5774854.37	625382.79
1760	57.87	51.12	1082.29	-1050.99	445.67	1042.57	5774857.00	625386.08
1765	58.10	50.98	1084.98	-1053.68	448.30	1045.87	5774859.63	625389.37
1770	58.19	50.98	1087.62	-1056.32	450.97	1049.17	5774862.30	625392.68
1775	58.24	51.00	1090.25	-1058.95	453.65	1052.48	5774864.98	625395.99
1780	58.29	51.02	1092.88	-1061.58	456.32	1055.78	5774867.65	625399.29
1785	58.35	51.05	1095.50	-1064.20	459.00	1059.09	5774870.33	625402.60
1790	58.40	51.07	1098.13	-1066.83	461.68	1062.40	5774873.00	625405.91
1795	58.50	51.10	1100.75	-1069.45	464.35	1065.71	5774875.68	625409.22
1800	59.00	51.15	1103.26	-1071.96	467.06	1069.09	5774878.39	625412.59
1805	59.51	51.21	1105.76	-1074.46	469.77	1072.46	5774881.10	625415.97
1810	60.01	51.27	1108.27	-1076.97	472.48	1075.83	5774883.80	625419.34
1815	60.52	51.32	1110.77	-1079.47	475.18	1079.21	5774886.51	625422.71
1820	61.02	51.38	1113.28	-1081.98	477.89	1082.58	5774889.22	625426.09
1825	61.58	51.45	1115.71	-1084.41	480.62	1086.00	5774891.94	625429.50
1830	62.24	51.56	1117.96	-1086.66	483.38	1089.50	5774894.71	625433.01
1835	62.90	51.66	1120.20	-1088.90	486.15	1093.01	5774897.48	625436.51
1840	63.56	51.77	1122.45	-1091.15	488.91	1096.51	5774900.24	625440.02
1845	64.22	51.87	1124.70	-1093.40	491.68	1100.02	5774903.01	625443.52
1850	64.89	51.98	1126.95	-1095.65	494.44	1103.52	5774905.77	625447.03
1855	65.42	52.06	1129.06	-1097.76	497.23	1107.09	5774908.56	625450.60
1860	65.84	52.12	1131.06	-1099.76	500.04	1110.71	5774911.37	625454.22
1865	66.27	52.19	1133.06	-1101.76	502.85	1114.33	5774914.18	625457.84
1870	66.70	52.25	1135.06	-1103.76	505.66	1117.95	5774916.98	625461.46
1875	67.13	52.31	1137.06	-1105.76	508.46	1121.57	5774919.79	625465.08
1880	67.56	52.38	1139.06	-1107.76	511.27	1125.20	5774922.60	625468.70
1885	67.79	52.32	1140.95	-1109.65	514.11	1128.85	5774925.44	625472.36
1890	67.99	52.23	1142.80	-1111.50	516.96	1132.52	5774928.29	625476.02
1895	68.18	52.14	1144.66	-1113.36	519.81	1136.18	5774931.14	625479.69
1900	68.38	52.05	1146.52	-1115.22	522.66	1139.85	5774933.99	625483.35
1905	68.57	51.96	1148.37	-1117.07	525.51	1143.51	5774936.84	625487.02
1910	68.75	51.88	1150.23	-1118.93	528.36	1147.18	5774939.69	625490.68

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
1915	68.57	51.82	1152.09	-1120.79	531.24	1150.82	5774942.57	625494.33
1920	68.38	51.77	1153.94	-1122.64	534.12	1154.47	5774945.44	625497.97
1925	68.20	51.71	1155.80	-1124.50	536.99	1158.11	5774948.32	625501.62
1930	68.01	51.65	1157.65	-1126.35	539.87	1161.76	5774951.20	625505.26
1935	67.83	51.60	1159.50	-1128.20	542.74	1165.40	5774954.07	625508.91
1940	67.71	51.60	1161.37	-1130.07	545.61	1169.05	5774956.94	625512.55
1945	67.75	51.72	1163.26	-1131.96	548.47	1172.69	5774959.80	625516.20
1950	67.79	51.84	1165.15	-1133.85	551.33	1176.33	5774962.66	625519.84
1955	67.83	51.96	1167.03	-1135.73	554.19	1179.98	5774965.51	625523.48
1960	67.87	52.07	1168.92	-1137.62	557.04	1183.62	5774968.37	625527.13
1965	67.91	52.19	1170.81	-1139.51	559.90	1187.26	5774971.23	625530.77
1970	67.98	52.15	1172.68	-1141.38	562.76	1190.91	5774974.09	625534.42
1975	68.06	52.00	1174.54	-1143.24	565.63	1194.56	5774976.96	625538.06
1980	68.14	51.86	1176.40	-1145.10	568.50	1198.20	5774979.83	625541.71
1985	68.22	51.71	1178.26	-1146.96	571.37	1201.85	5774982.70	625545.36
1990	68.30	51.57	1180.12	-1148.82	574.24	1205.50	5774985.57	625549.01
1995	68.38	51.42	1181.98	-1150.68	577.11	1209.15	5774988.44	625552.66
2000	68.46	51.44	1183.81	-1152.51	580.00	1212.80	5774991.33	625556.30
2005	68.55	51.49	1185.63	-1154.33	582.90	1216.44	5774994.22	625559.95
2010	68.64	51.55	1187.45	-1156.15	585.79	1220.09	5774997.12	625563.60
2015	68.72	51.60	1189.27	-1157.97	588.69	1223.73	5775000.02	625567.24
2020	68.81	51.65	1191.09	-1159.79	591.58	1227.38	5775002.91	625570.89
2025	68.88	51.69	1192.91	-1161.61	594.48	1231.03	5775005.81	625574.54
2030	68.84	51.70	1194.72	-1163.42	597.36	1234.69	5775008.69	625578.20
2035	68.81	51.72	1196.53	-1165.23	600.25	1238.35	5775011.58	625581.86
2040	68.78	51.73	1198.34	-1167.04	603.14	1242.01	5775014.47	625585.52
2045	68.75	51.74	1200.15	-1168.85	606.03	1245.67	5775017.36	625589.17
2050	68.72	51.75	1201.96	-1170.66	608.91	1249.33	5775020.24	625592.83
2055	68.66	51.83	1203.78	-1172.48	611.79	1252.99	5775023.11	625596.50
2060	68.58	51.98	1205.62	-1174.32	614.64	1256.67	5775025.96	625600.17
2065	68.49	52.13	1207.45	-1176.15	617.49	1260.34	5775028.82	625603.85
2070	68.40	52.28	1209.29	-1177.99	620.34	1264.01	5775031.67	625607.52
2075	68.32	52.43	1211.12	-1179.82	623.19	1267.69	5775034.52	625611.20
2080	68.23	52.58	1212.96	-1181.66	626.04	1271.36	5775037.37	625614.87
2085	68.28	52.64	1214.80	-1183.50	628.87	1275.06	5775040.19	625618.56
2090	68.37	52.68	1216.63	-1185.33	631.68	1278.76	5775043.01	625622.26
2095	68.46	52.71	1218.47	-1187.17	634.50	1282.46	5775045.83	625625.96
2100	68.55	52.74	1220.30	-1189.00	637.32	1286.16	5775048.65	625629.66
2105	68.64	52.77	1222.14	-1190.84	640.14	1289.86	5775051.47	625633.37
2110	68.71	52.80	1223.97	-1192.67	642.95	1293.56	5775054.28	625637.07
2115	68.61	52.77	1225.81	-1194.51	645.77	1297.26	5775057.10	625640.76
2120	68.50	52.74	1227.65	-1196.35	648.59	1300.96	5775059.92	625644.46
2125	68.39	52.71	1229.49	-1198.19	651.40	1304.66	5775062.73	625648.16
2130	68.29	52.68	1231.33	-1200.03	654.22	1308.35	5775065.55	625651.86
2135	68.18	52.65	1233.17	-1201.87	657.04	1312.05	5775068.37	625655.56
2140	68.13	52.64	1235.01	-1203.71	659.85	1315.75	5775071.18	625659.26
2145	68.20	52.67	1236.86	-1205.56	662.67	1319.45	5775074.00	625662.96
2150	68.26	52.70	1238.71	-1207.41	665.48	1323.14	5775076.81	625666.65
2155	68.33	52.73	1240.56	-1209.26	668.29	1326.84	5775079.62	625670.35
2160	68.39	52.77	1242.41	-1211.11	671.11	1330.54	5775082.44	625674.04
2165	68.45	52.80	1244.26	-1212.96	673.92	1334.23	5775085.25	625677.74
2170	68.48	52.76	1246.10	-1214.80	676.74	1337.93	5775088.07	625681.44
2175	68.48	52.67	1247.93	-1216.63	679.57	1341.62	5775090.90	625685.13
2180	68.48	52.58	1249.77	-1218.47	682.40	1345.31	5775093.73	625688.82
2185	68.47	52.49	1251.60	-1220.30	685.23	1349.01	5775096.56	625692.51
2190	68.47	52.40	1253.44	-1222.14	688.06	1352.70	5775099.39	625696.21
2195	68.47	52.31	1255.27	-1223.97	690.89	1356.39	5775102.21	625699.90
2200	68.52	52.28	1257.09	-1225.79	693.73	1360.07	5775105.06	625703.58
2205	68.58	52.26	1258.92	-1227.62	696.58	1363.76	5775107.91	625707.26
2210	68.63	52.25	1260.74	-1229.44	699.43	1367.44	5775110.76	625710.95
2215	68.69	52.24	1262.56	-1231.26	702.28	1371.12	5775113.61	625714.63
2220	68.75	52.22	1264.38	-1233.08	705.14	1374.80	5775116.46	625718.31
2225	68.81	52.21	1266.20	-1234.90	707.99	1378.48	5775119.32	625721.99
2230	68.77	52.14	1268.02	-1236.72	710.85	1382.15	5775122.18	625725.66
2235	68.73	52.07	1269.83	-1238.53	713.72	1385.83	5775125.05	625729.33
2240	68.69	52.00	1271.65	-1240.35	716.59	1389.50	5775127.92	625733.01

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2245	68.65	51.93	1273.47	-1242.17	719.46	1393.17	5775130.78	625736.68
2250	68.62	51.86	1275.28	-1243.98	722.32	1396.84	5775133.65	625740.35
2255	68.59	51.82	1277.10	-1245.80	725.19	1400.51	5775136.52	625744.02
2260	68.58	51.87	1278.93	-1247.63	728.06	1404.17	5775139.39	625747.68
2265	68.57	51.91	1280.76	-1249.46	730.93	1407.84	5775142.26	625751.35
2270	68.56	51.95	1282.58	-1251.28	733.80	1411.50	5775145.13	625755.01
2275	68.55	51.99	1284.41	-1253.11	736.67	1415.17	5775148.00	625758.67
2280	68.54	52.04	1286.24	-1254.94	739.54	1418.83	5775150.87	625762.34
2285	68.51	52.09	1288.07	-1256.77	742.40	1422.50	5775153.72	625766.01
2290	68.47	52.16	1289.91	-1258.61	745.24	1426.18	5775156.57	625769.69
2295	68.42	52.23	1291.75	-1260.45	748.09	1429.85	5775159.42	625773.36
2300	68.38	52.30	1293.59	-1262.29	750.94	1433.53	5775162.26	625777.04
2305	68.34	52.37	1295.43	-1264.13	753.78	1437.21	5775165.11	625780.71
2310	68.29	52.44	1297.27	-1265.97	756.63	1440.88	5775167.96	625784.39
2315	68.39	52.37	1299.09	-1267.79	759.48	1444.56	5775170.81	625788.07
2320	68.51	52.29	1300.92	-1269.62	762.33	1448.24	5775173.66	625791.75
2325	68.63	52.20	1302.74	-1271.44	765.19	1451.92	5775176.52	625795.43
2330	68.75	52.12	1304.56	-1273.26	768.04	1455.60	5775179.37	625799.11
2335	68.86	52.03	1306.38	-1275.08	770.89	1459.28	5775182.22	625802.79
2340	68.95	51.96	1308.20	-1276.90	773.75	1462.96	5775185.08	625806.46
2345	68.86	51.94	1310.02	-1278.72	776.63	1466.62	5775187.95	625810.13
2350	68.78	51.92	1311.83	-1280.53	779.50	1470.29	5775190.83	625813.80
2355	68.70	51.89	1313.65	-1282.35	782.38	1473.95	5775193.70	625817.46
2360	68.61	51.87	1315.46	-1284.16	785.25	1477.62	5775196.58	625821.13
2365	68.53	51.85	1317.28	-1285.98	788.13	1481.29	5775199.45	625824.79
2370	68.45	51.84	1319.11	-1287.81	791.00	1484.95	5775202.33	625828.46
2375	68.38	51.84	1320.96	-1289.66	793.87	1488.60	5775205.20	625832.11
2380	68.30	51.84	1322.81	-1291.51	796.74	1492.25	5775208.07	625835.76
2385	68.23	51.84	1324.66	-1293.36	799.61	1495.90	5775210.94	625839.41
2390	68.15	51.84	1326.51	-1295.21	802.48	1499.56	5775213.81	625843.06
2395	68.08	51.84	1328.36	-1297.06	805.35	1503.21	5775216.68	625846.72
2400	67.96	51.83	1330.25	-1298.95	808.21	1506.85	5775219.54	625850.36
2405	67.81	51.83	1332.15	-1300.85	811.07	1510.48	5775222.40	625853.99
2410	67.66	51.82	1334.05	-1302.75	813.93	1514.12	5775225.25	625857.62
2415	67.52	51.81	1335.96	-1304.66	816.78	1517.75	5775228.11	625861.26
2420	67.37	51.80	1337.86	-1306.56	819.64	1521.39	5775230.97	625864.89
2425	67.22	51.79	1339.76	-1308.46	822.50	1525.02	5775233.83	625868.53
2430	67.19	51.80	1341.70	-1310.40	825.35	1528.64	5775236.68	625872.15
2435	67.17	51.81	1343.64	-1312.34	828.20	1532.27	5775239.53	625875.77
2440	67.15	51.82	1345.58	-1314.28	831.05	1535.89	5775242.38	625879.39
2445	67.13	51.83	1347.52	-1316.22	833.89	1539.51	5775245.22	625883.02
2450	67.11	51.84	1349.47	-1318.17	836.74	1543.13	5775248.07	625886.64
2455	67.08	51.86	1351.41	-1320.11	839.59	1546.75	5775250.92	625890.26
2460	67.02	51.88	1353.37	-1322.07	842.43	1550.37	5775253.75	625893.88
2461	67.00	51.88	1353.77	-1322.47	842.99	1551.10	5775254.32	625894.60
2462	66.99	51.89	1354.16	-1322.86	843.56	1551.82	5775254.89	625895.33
2463	66.98	51.89	1354.55	-1323.25	844.13	1552.55	5775255.46	625896.05
2464	66.97	51.89	1354.94	-1323.64	844.70	1553.27	5775256.02	625896.78
2465	66.95	51.90	1355.33	-1324.03	845.26	1553.99	5775256.59	625897.50
2466	66.94	51.90	1355.73	-1324.43	845.83	1554.72	5775257.16	625898.22
2467	66.93	51.91	1356.12	-1324.82	846.40	1555.44	5775257.73	625898.95
2468	66.91	51.91	1356.51	-1325.21	846.97	1556.17	5775258.29	625899.67
2469	66.90	51.91	1356.90	-1325.60	847.53	1556.89	5775258.86	625900.40
2470	66.89	51.92	1357.29	-1325.99	848.10	1557.61	5775259.43	625901.12
2471	66.88	51.92	1357.69	-1326.39	848.67	1558.34	5775260.00	625901.84
2472	66.86	51.93	1358.08	-1326.78	849.24	1559.06	5775260.56	625902.57
2473	66.85	51.93	1358.47	-1327.17	849.80	1559.79	5775261.13	625903.29
2474	66.84	51.94	1358.86	-1327.56	850.37	1560.51	5775261.70	625904.02
2475	66.82	51.94	1359.25	-1327.95	850.94	1561.23	5775262.27	625904.74
2476	66.81	51.94	1359.65	-1328.35	851.51	1561.96	5775262.83	625905.46
2477	66.80	51.95	1360.04	-1328.74	852.07	1562.68	5775263.40	625906.19
2478	66.79	51.95	1360.43	-1329.13	852.64	1563.41	5775263.97	625906.91
2479	66.77	51.96	1360.82	-1329.52	853.21	1564.13	5775264.54	625907.64
2480	66.76	51.96	1361.22	-1329.92	853.78	1564.85	5775265.10	625908.36
2481	66.75	51.96	1361.61	-1330.31	854.34	1565.58	5775265.67	625909.09
2482	66.73	51.97	1362.00	-1330.70	854.91	1566.30	5775266.24	625909.81

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2483	66.74	51.97	1362.39	-1331.09	855.48	1567.03	5775266.81	625910.53
2484	66.76	51.96	1362.78	-1331.48	856.05	1567.75	5775267.38	625911.26
2485	66.78	51.95	1363.17	-1331.87	856.61	1568.47	5775267.94	625911.98
2486	66.80	51.95	1363.56	-1332.26	857.18	1569.20	5775268.51	625912.71
2487	66.81	51.94	1363.95	-1332.65	857.75	1569.92	5775269.08	625913.43
2488	66.83	51.93	1364.35	-1333.05	858.32	1570.65	5775269.65	625914.15
2489	66.85	51.93	1364.74	-1333.44	858.89	1571.37	5775270.22	625914.88
2490	66.87	51.92	1365.13	-1333.83	859.46	1572.09	5775270.78	625915.60
2491	66.88	51.92	1365.52	-1334.22	860.02	1572.82	5775271.35	625916.33
2492	66.90	51.91	1365.91	-1334.61	860.59	1573.54	5775271.92	625917.05
2493	66.92	51.90	1366.30	-1335.00	861.16	1574.27	5775272.49	625917.77
2494	66.94	51.90	1366.69	-1335.39	861.73	1574.99	5775273.06	625918.50
2495	66.95	51.89	1367.08	-1335.78	862.30	1575.71	5775273.62	625919.22
2496	66.97	51.88	1367.47	-1336.17	862.86	1576.44	5775274.19	625919.95
2497	66.99	51.88	1367.86	-1336.56	863.43	1577.16	5775274.76	625920.67
2498	67.01	51.87	1368.26	-1336.96	864.00	1577.89	5775275.33	625921.39
2499	67.03	51.87	1368.65	-1337.35	864.57	1578.61	5775275.90	625922.12
2500	67.04	51.86	1369.04	-1337.74	865.14	1579.33	5775276.47	625922.84
2501	67.06	51.85	1369.43	-1338.13	865.71	1580.06	5775277.03	625923.57
2502	67.08	51.85	1369.82	-1338.52	866.27	1580.78	5775277.60	625924.29
2503	67.10	51.84	1370.21	-1338.91	866.84	1581.51	5775278.17	625925.01
2504	67.11	51.83	1370.60	-1339.30	867.41	1582.23	5775278.74	625925.74
2505	67.13	51.83	1370.99	-1339.69	867.98	1582.96	5775279.31	625926.46
2506	67.15	51.82	1371.38	-1340.08	868.55	1583.68	5775279.87	625927.19
2507	67.17	51.82	1371.77	-1340.47	869.11	1584.40	5775280.44	625927.91
2508	67.19	51.81	1372.16	-1340.86	869.68	1585.13	5775281.01	625928.64
2509	67.20	51.80	1372.56	-1341.26	870.25	1585.85	5775281.58	625929.36
2510	67.22	51.80	1372.95	-1341.65	870.82	1586.58	5775282.15	625930.08
2511	67.24	51.79	1373.34	-1342.04	871.39	1587.30	5775282.72	625930.81
2512	67.25	51.79	1373.72	-1342.42	871.96	1588.03	5775283.29	625931.53
2513	67.27	51.79	1374.11	-1342.81	872.53	1588.75	5775283.86	625932.26
2514	67.28	51.79	1374.49	-1343.19	873.10	1589.48	5775284.43	625932.98
2515	67.30	51.79	1374.87	-1343.57	873.67	1590.20	5775285.00	625933.71
2516	67.31	51.79	1375.26	-1343.96	874.24	1590.93	5775285.57	625934.44
2517	67.33	51.79	1375.64	-1344.34	874.81	1591.65	5775286.14	625935.16
2518	67.34	51.79	1376.02	-1344.72	875.39	1592.38	5775286.71	625935.89
2519	67.36	51.79	1376.41	-1345.11	875.96	1593.11	5775287.29	625936.61
2520	67.37	51.79	1376.79	-1345.49	876.53	1593.83	5775287.86	625937.34
2521	67.39	51.79	1377.17	-1345.87	877.10	1594.56	5775288.43	625938.06
2522	67.40	51.79	1377.56	-1346.26	877.67	1595.28	5775289.00	625938.79
2523	67.42	51.79	1377.94	-1346.64	878.24	1596.01	5775289.57	625939.52
2524	67.44	51.79	1378.32	-1347.02	878.81	1596.73	5775290.14	625940.24
2525	67.45	51.79	1378.71	-1347.41	879.38	1597.46	5775290.71	625940.97
2526	67.47	51.79	1379.09	-1347.79	879.96	1598.19	5775291.28	625941.69
2527	67.48	51.79	1379.47	-1348.17	880.53	1598.91	5775291.86	625942.42
2528	67.50	51.79	1379.86	-1348.56	881.10	1599.64	5775292.43	625943.14
2529	67.51	51.79	1380.24	-1348.94	881.67	1600.36	5775293.00	625943.87
2530	67.53	51.79	1380.62	-1349.32	882.24	1601.09	5775293.57	625944.60
2531	67.54	51.79	1381.01	-1349.71	882.81	1601.81	5775294.14	625945.32
2532	67.56	51.79	1381.39	-1350.09	883.38	1602.54	5775294.71	625946.05
2533	67.57	51.79	1381.77	-1350.47	883.95	1603.26	5775295.28	625946.77
2534	67.59	51.79	1382.16	-1350.86	884.53	1603.99	5775295.85	625947.50
2535	67.60	51.79	1382.54	-1351.24	885.10	1604.72	5775296.43	625948.22
2536	67.62	51.79	1382.92	-1351.62	885.67	1605.44	5775297.00	625948.95
2537	67.63	51.79	1383.31	-1352.01	886.24	1606.17	5775297.57	625949.68
2538	67.65	51.79	1383.69	-1352.39	886.81	1606.89	5775298.14	625950.40
2539	67.66	51.79	1384.07	-1352.77	887.38	1607.62	5775298.71	625951.13
2540	67.68	51.79	1384.45	-1353.15	887.95	1608.35	5775299.28	625951.85
2541	67.69	51.80	1384.83	-1353.53	888.52	1609.08	5775299.85	625952.58
2542	67.70	51.81	1385.21	-1353.91	889.10	1609.80	5775300.42	625953.31
2543	67.71	51.82	1385.59	-1354.29	889.67	1610.53	5775301.00	625954.04
2544	67.72	51.83	1385.96	-1354.66	890.24	1611.26	5775301.57	625954.77
2545	67.73	51.84	1386.34	-1355.04	890.81	1611.99	5775302.14	625955.50
2546	67.74	51.85	1386.72	-1355.42	891.38	1612.72	5775302.71	625956.23
2547	67.75	51.86	1387.10	-1355.80	891.95	1613.45	5775303.28	625956.96
2548	67.76	51.87	1387.47	-1356.17	892.52	1614.18	5775303.85	625957.69

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2549	67.78	51.88	1387.85	-1356.55	893.09	1614.91	5775304.42	625958.41
2550	67.79	51.88	1388.23	-1356.93	893.67	1615.64	5775304.99	625959.14
2551	67.80	51.89	1388.61	-1357.31	894.24	1616.36	5775305.57	625959.87
2552	67.81	51.90	1388.98	-1357.68	894.81	1617.09	5775306.14	625960.60
2553	67.82	51.91	1389.36	-1358.06	895.38	1617.82	5775306.71	625961.33
2554	67.83	51.92	1389.74	-1358.44	895.95	1618.55	5775307.28	625962.06
2555	67.84	51.93	1390.12	-1358.82	896.52	1619.28	5775307.85	625962.79
2556	67.85	51.94	1390.49	-1359.19	897.09	1620.01	5775308.42	625963.52
2557	67.86	51.95	1390.87	-1359.57	897.66	1620.74	5775308.99	625964.25
2558	67.88	51.96	1391.25	-1359.95	898.24	1621.47	5775309.56	625964.98
2559	67.89	51.97	1391.62	-1360.32	898.81	1622.20	5775310.13	625965.70
2560	67.90	51.98	1392.00	-1360.70	899.38	1622.93	5775310.71	625966.43
2561	67.91	51.98	1392.38	-1361.08	899.95	1623.65	5775311.28	625967.16
2562	67.92	51.99	1392.76	-1361.46	900.52	1624.38	5775311.85	625967.89
2563	67.93	52.00	1393.13	-1361.83	901.09	1625.11	5775312.42	625968.62
2564	67.94	52.01	1393.51	-1362.21	901.66	1625.84	5775312.99	625969.35
2565	67.95	52.02	1393.89	-1362.59	902.23	1626.57	5775313.56	625970.08
2566	67.97	52.03	1394.27	-1362.97	902.80	1627.30	5775314.13	625970.81
2567	67.98	52.04	1394.64	-1363.34	903.38	1628.03	5775314.70	625971.54
2568	67.99	52.05	1395.02	-1363.72	903.95	1628.76	5775315.28	625972.26
2569	68.00	52.04	1395.39	-1364.09	904.52	1629.49	5775315.85	625972.99
2570	68.01	52.03	1395.77	-1364.47	905.09	1630.22	5775316.42	625973.73
2571	68.02	52.02	1396.14	-1364.84	905.66	1630.95	5775316.99	625974.46
2572	68.03	52.01	1396.51	-1365.21	906.24	1631.68	5775317.57	625975.19
2573	68.04	52.00	1396.88	-1365.58	906.81	1632.41	5775318.14	625975.92
2574	68.05	52.00	1397.25	-1365.95	907.38	1633.14	5775318.71	625976.65
2575	68.07	51.99	1397.63	-1366.33	907.95	1633.87	5775319.28	625977.38
2576	68.08	51.98	1398.00	-1366.70	908.53	1634.60	5775319.86	625978.11
2577	68.09	51.97	1398.37	-1367.07	909.10	1635.33	5775320.43	625978.84
2578	68.10	51.96	1398.74	-1367.44	909.67	1636.06	5775321.00	625979.57
2579	68.11	51.95	1399.12	-1367.82	910.24	1636.79	5775321.57	625980.30
2580	68.12	51.94	1399.49	-1368.19	910.82	1637.52	5775322.15	625981.03
2581	68.13	51.93	1399.86	-1368.56	911.39	1638.25	5775322.72	625981.76
2582	68.14	51.92	1400.23	-1368.93	911.96	1638.98	5775323.29	625982.49
2583	68.16	51.91	1400.60	-1369.30	912.53	1639.72	5775323.86	625983.22
2584	68.17	51.90	1400.98	-1369.68	913.11	1640.45	5775324.44	625983.95
2585	68.18	51.89	1401.35	-1370.05	913.68	1641.18	5775325.01	625984.68
2586	68.19	51.88	1401.72	-1370.42	914.25	1641.91	5775325.58	625985.41
2587	68.20	51.87	1402.09	-1370.79	914.82	1642.64	5775326.15	625986.14
2588	68.21	51.86	1402.47	-1371.17	915.40	1643.37	5775326.73	625986.88
2589	68.22	51.85	1402.84	-1371.54	915.97	1644.10	5775327.30	625987.61
2590	68.23	51.84	1403.21	-1371.91	916.54	1644.83	5775327.87	625988.34
2591	68.25	51.83	1403.58	-1372.28	917.11	1645.56	5775328.44	625989.07
2592	68.26	51.82	1403.95	-1372.65	917.69	1646.29	5775329.02	625989.80
2593	68.27	51.82	1404.33	-1373.03	918.26	1647.02	5775329.59	625990.53
2594	68.28	51.81	1404.70	-1373.40	918.83	1647.75	5775330.16	625991.26
2595	68.29	51.80	1405.07	-1373.77	919.40	1648.48	5775330.73	625991.99
2596	68.30	51.79	1405.44	-1374.14	919.98	1649.21	5775331.31	625992.72
2597	68.31	51.77	1405.81	-1374.51	920.55	1649.94	5775331.88	625993.45
2598	68.30	51.75	1406.19	-1374.89	921.13	1650.67	5775332.46	625994.17
2599	68.29	51.72	1406.56	-1375.26	921.71	1651.39	5775333.04	625994.90
2600	68.29	51.69	1406.93	-1375.63	922.29	1652.12	5775333.62	625995.63
2601	68.28	51.67	1407.30	-1376.00	922.87	1652.84	5775334.20	625996.35
2602	68.27	51.64	1407.67	-1376.37	923.45	1653.57	5775334.78	625997.08
2603	68.26	51.62	1408.04	-1376.74	924.03	1654.30	5775335.36	625997.80
2604	68.26	51.59	1408.41	-1377.11	924.61	1655.02	5775335.93	625998.53
2605	68.25	51.56	1408.78	-1377.48	925.19	1655.75	5775336.51	625999.25
2606	68.24	51.54	1409.16	-1377.86	925.76	1656.47	5775337.09	625999.98
2607	68.24	51.51	1409.53	-1378.23	926.34	1657.20	5775337.67	626000.71
2608	68.23	51.48	1409.90	-1378.60	926.92	1657.92	5775338.25	626001.43
2609	68.22	51.46	1410.27	-1378.97	927.50	1658.65	5775338.83	626002.16
2610	68.21	51.43	1410.64	-1379.34	928.08	1659.38	5775339.41	626002.88
2611	68.21	51.41	1411.01	-1379.71	928.66	1660.10	5775339.99	626003.61
2612	68.20	51.38	1411.38	-1380.08	929.24	1660.83	5775340.57	626004.33
2613	68.19	51.35	1411.76	-1380.46	929.82	1661.55	5775341.15	626005.06
2614	68.18	51.33	1412.13	-1380.83	930.40	1662.28	5775341.73	626005.79

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2615	68.18	51.30	1412.50	-1381.20	930.98	1663.00	5775342.31	626006.51
2616	68.17	51.27	1412.87	-1381.57	931.56	1663.73	5775342.89	626007.24
2617	68.16	51.25	1413.24	-1381.94	932.14	1664.46	5775343.46	626007.96
2618	68.16	51.22	1413.61	-1382.31	932.72	1665.18	5775344.04	626008.69
2619	68.15	51.20	1413.98	-1382.68	933.29	1665.91	5775344.62	626009.41
2620	68.14	51.17	1414.35	-1383.05	933.87	1666.63	5775345.20	626010.14
2621	68.13	51.14	1414.73	-1383.43	934.45	1667.36	5775345.78	626010.87
2622	68.13	51.12	1415.10	-1383.80	935.03	1668.08	5775346.36	626011.59
2623	68.12	51.09	1415.47	-1384.17	935.61	1668.81	5775346.94	626012.32
2624	68.11	51.06	1415.84	-1384.54	936.19	1669.53	5775347.52	626013.04
2625	68.11	51.04	1416.21	-1384.91	936.77	1670.26	5775348.10	626013.77
2626	68.10	51.02	1416.58	-1385.28	937.35	1670.98	5775348.68	626014.49
2627	68.12	51.01	1416.95	-1385.65	937.94	1671.71	5775349.27	626015.21
2628	68.13	51.01	1417.32	-1386.02	938.52	1672.43	5775349.85	626015.93
2629	68.14	51.00	1417.69	-1386.39	939.11	1673.15	5775350.44	626016.66
2630	68.15	50.99	1418.06	-1386.76	939.69	1673.87	5775351.02	626017.38
2631	68.17	50.99	1418.43	-1387.13	940.28	1674.59	5775351.61	626018.10
2632	68.18	50.98	1418.80	-1387.50	940.86	1675.31	5775352.19	626018.82
2633	68.19	50.97	1419.17	-1387.87	941.45	1676.03	5775352.78	626019.54
2634	68.20	50.97	1419.54	-1388.24	942.04	1676.75	5775353.36	626020.26
2635	68.22	50.96	1419.91	-1388.61	942.62	1677.48	5775353.95	626020.98
2636	68.23	50.96	1420.28	-1388.98	943.21	1678.20	5775354.54	626021.70
2637	68.24	50.95	1420.65	-1389.35	943.79	1678.92	5775355.12	626022.43
2638	68.25	50.94	1421.02	-1389.72	944.38	1679.64	5775355.71	626023.15
2639	68.27	50.94	1421.39	-1390.09	944.96	1680.36	5775356.29	626023.87
2640	68.28	50.93	1421.76	-1390.46	945.55	1681.08	5775356.88	626024.59
2641	68.29	50.92	1422.13	-1390.83	946.13	1681.80	5775357.46	626025.31
2642	68.30	50.92	1422.50	-1391.20	946.72	1682.52	5775358.05	626026.03
2643	68.32	50.91	1422.87	-1391.57	947.31	1683.25	5775358.63	626026.75
2644	68.33	50.91	1423.24	-1391.94	947.89	1683.97	5775359.22	626027.47
2645	68.34	50.90	1423.61	-1392.31	948.48	1684.69	5775359.81	626028.20
2646	68.35	50.89	1423.98	-1392.68	949.06	1685.41	5775360.39	626028.92
2647	68.37	50.89	1424.35	-1393.05	949.65	1686.13	5775360.98	626029.64
2648	68.38	50.88	1424.72	-1393.42	950.23	1686.85	5775361.56	626030.36
2649	68.39	50.87	1425.09	-1393.79	950.82	1687.57	5775362.15	626031.08
2650	68.40	50.87	1425.46	-1394.16	951.40	1688.29	5775362.73	626031.80
2651	68.42	50.86	1425.83	-1394.53	951.99	1689.02	5775363.32	626032.52
2652	68.43	50.86	1426.20	-1394.90	952.58	1689.74	5775363.90	626033.24
2653	68.44	50.85	1426.57	-1395.27	953.16	1690.46	5775364.49	626033.97
2654	68.45	50.84	1426.94	-1395.64	953.75	1691.18	5775365.07	626034.69
2655	68.46	50.84	1427.31	-1396.01	954.33	1691.90	5775365.66	626035.41
2656	68.46	50.84	1427.68	-1396.38	954.92	1692.62	5775366.25	626036.13
2657	68.46	50.85	1428.05	-1396.75	955.51	1693.34	5775366.83	626036.85
2658	68.46	50.85	1428.41	-1397.11	956.09	1694.06	5775367.42	626037.57
2659	68.45	50.85	1428.78	-1397.48	956.68	1694.79	5775368.01	626038.29
2660	68.45	50.85	1429.15	-1397.85	957.27	1695.51	5775368.60	626039.02
2661	68.45	50.86	1429.52	-1398.22	957.85	1696.23	5775369.18	626039.74
2662	68.45	50.86	1429.88	-1398.58	958.44	1696.95	5775369.77	626040.46
2663	68.45	50.86	1430.25	-1398.95	959.03	1697.67	5775370.36	626041.18
2664	68.45	50.86	1430.62	-1399.32	959.61	1698.39	5775370.94	626041.90
2665	68.45	50.87	1430.99	-1399.69	960.20	1699.12	5775371.53	626042.62
2666	68.44	50.87	1431.35	-1400.05	960.79	1699.84	5775372.12	626043.34
2667	68.44	50.87	1431.72	-1400.42	961.37	1700.56	5775372.70	626044.07
2668	68.44	50.87	1432.09	-1400.79	961.96	1701.28	5775373.29	626044.79
2669	68.44	50.88	1432.46	-1401.16	962.55	1702.00	5775373.88	626045.51
2670	68.44	50.88	1432.82	-1401.52	963.14	1702.72	5775374.46	626046.23
2671	68.44	50.88	1433.19	-1401.89	963.72	1703.44	5775375.05	626046.95
2672	68.44	50.88	1433.56	-1402.26	964.31	1704.17	5775375.64	626047.67
2673	68.43	50.89	1433.93	-1402.63	964.90	1704.89	5775376.22	626048.39
2674	68.43	50.89	1434.29	-1402.99	965.48	1705.61	5775376.81	626049.12
2675	68.43	50.89	1434.66	-1403.36	966.07	1706.33	5775377.40	626049.84
2676	68.43	50.89	1435.03	-1403.73	966.66	1707.05	5775377.99	626050.56
2677	68.43	50.89	1435.40	-1404.10	967.24	1707.77	5775378.57	626051.28
2678	68.43	50.90	1435.76	-1404.46	967.83	1708.49	5775379.16	626052.00
2679	68.43	50.90	1436.13	-1404.83	968.42	1709.22	5775379.75	626052.72
2680	68.42	50.90	1436.50	-1405.20	969.00	1709.94	5775380.33	626053.45

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2681	68.42	50.90	1436.87	-1405.57	969.59	1710.66	5775380.92	626054.17
2682	68.42	50.91	1437.23	-1405.93	970.18	1711.38	5775381.51	626054.89
2683	68.42	50.91	1437.60	-1406.30	970.76	1712.10	5775382.09	626055.61
2684	68.42	50.91	1437.97	-1406.67	971.35	1712.82	5775382.68	626056.33
2685	68.41	50.91	1438.34	-1407.04	971.94	1713.54	5775383.27	626057.05
2686	68.40	50.90	1438.71	-1407.41	972.52	1714.27	5775383.85	626057.77
2687	68.40	50.90	1439.08	-1407.78	973.11	1714.99	5775384.44	626058.49
2688	68.39	50.90	1439.45	-1408.15	973.70	1715.71	5775385.03	626059.22
2689	68.39	50.90	1439.82	-1408.52	974.28	1716.43	5775385.61	626059.94
2690	68.38	50.90	1440.19	-1408.89	974.87	1717.15	5775386.20	626060.66
2691	68.37	50.89	1440.55	-1409.25	975.46	1717.87	5775386.78	626061.38
2692	68.37	50.89	1440.92	-1409.62	976.04	1718.59	5775387.37	626062.10
2693	68.36	50.89	1441.29	-1409.99	976.63	1719.31	5775387.96	626062.82
2694	68.36	50.89	1441.66	-1410.36	977.22	1720.03	5775388.54	626063.54
2695	68.35	50.89	1442.03	-1410.73	977.80	1720.75	5775389.13	626064.26
2696	68.34	50.88	1442.40	-1411.10	978.39	1721.48	5775389.72	626064.98
2697	68.34	50.88	1442.77	-1411.47	978.97	1722.20	5775390.30	626065.70
2698	68.33	50.88	1443.14	-1411.84	979.56	1722.92	5775390.89	626066.43
2699	68.33	50.88	1443.51	-1412.21	980.15	1723.64	5775391.48	626067.15
2700	68.32	50.87	1443.88	-1412.58	980.73	1724.36	5775392.06	626067.87
2701	68.31	50.87	1444.25	-1412.95	981.32	1725.08	5775392.65	626068.59
2702	68.31	50.87	1444.62	-1413.32	981.91	1725.80	5775393.23	626069.31
2703	68.30	50.87	1444.99	-1413.69	982.49	1726.52	5775393.82	626070.03
2704	68.30	50.87	1445.35	-1414.05	983.08	1727.24	5775394.41	626070.75
2705	68.29	50.86	1445.72	-1414.42	983.67	1727.96	5775394.99	626071.47
2706	68.28	50.86	1446.09	-1414.79	984.25	1728.69	5775395.58	626072.19
2707	68.28	50.86	1446.46	-1415.16	984.84	1729.41	5775396.17	626072.91
2708	68.27	50.86	1446.83	-1415.53	985.42	1730.13	5775396.75	626073.64
2709	68.27	50.86	1447.20	-1415.90	986.01	1730.85	5775397.34	626074.36
2710	68.26	50.85	1447.57	-1416.27	986.60	1731.57	5775397.93	626075.08
2711	68.25	50.85	1447.94	-1416.64	987.18	1732.29	5775398.51	626075.80
2712	68.25	50.85	1448.31	-1417.01	987.77	1733.01	5775399.10	626076.52
2713	68.27	50.83	1448.67	-1417.37	988.36	1733.73	5775399.69	626077.24
2714	68.29	50.81	1449.04	-1417.74	988.95	1734.45	5775400.28	626077.96
2715	68.30	50.80	1449.41	-1418.11	989.54	1735.17	5775400.87	626078.68
2716	68.32	50.78	1449.77	-1418.47	990.13	1735.89	5775401.46	626079.40
2717	68.33	50.76	1450.14	-1418.84	990.72	1736.61	5775402.05	626080.11
2718	68.35	50.75	1450.51	-1419.21	991.31	1737.33	5775402.64	626080.83
2719	68.36	50.73	1450.88	-1419.58	991.90	1738.04	5775403.23	626081.55
2720	68.38	50.71	1451.24	-1419.94	992.49	1738.76	5775403.82	626082.27
2721	68.40	50.70	1451.61	-1420.31	993.08	1739.48	5775404.41	626082.99
2722	68.41	50.68	1451.98	-1420.68	993.67	1740.20	5775405.00	626083.71
2723	68.43	50.66	1452.34	-1421.04	994.26	1740.92	5775405.59	626084.43
2724	68.44	50.65	1452.71	-1421.41	994.85	1741.64	5775406.18	626085.15
2725	68.46	50.63	1453.08	-1421.78	995.44	1742.36	5775406.77	626085.87
2726	68.47	50.62	1453.44	-1422.14	996.03	1743.08	5775407.36	626086.59
2727	68.49	50.60	1453.81	-1422.51	996.63	1743.80	5775407.95	626087.30
2728	68.51	50.58	1454.18	-1422.88	997.22	1744.52	5775408.54	626088.02
2729	68.52	50.57	1454.54	-1423.24	997.81	1745.23	5775409.13	626088.74
2730	68.54	50.55	1454.91	-1423.61	998.40	1745.95	5775409.72	626089.46
2731	68.55	50.53	1455.28	-1423.98	998.99	1746.67	5775410.31	626090.18
2732	68.57	50.52	1455.65	-1424.35	999.58	1747.39	5775410.90	626090.90
2733	68.59	50.50	1456.01	-1424.71	1000.17	1748.11	5775411.50	626091.62
2734	68.60	50.48	1456.38	-1425.08	1000.76	1748.83	5775412.09	626092.34
2735	68.62	50.47	1456.75	-1425.45	1001.35	1749.55	5775412.68	626093.06
2736	68.63	50.45	1457.11	-1425.81	1001.94	1750.27	5775413.27	626093.78
2737	68.65	50.43	1457.48	-1426.18	1002.53	1750.99	5775413.86	626094.49
2738	68.66	50.42	1457.85	-1426.55	1003.12	1751.71	5775414.45	626095.21
2739	68.68	50.40	1458.21	-1426.91	1003.71	1752.42	5775415.04	626095.93
2740	68.70	50.38	1458.58	-1427.28	1004.30	1753.14	5775415.63	626096.65
2741	68.70	50.37	1458.94	-1427.64	1004.89	1753.86	5775416.22	626097.37
2742	68.71	50.37	1459.31	-1428.01	1005.49	1754.58	5775416.82	626098.09
2743	68.72	50.36	1459.67	-1428.37	1006.08	1755.29	5775417.41	626098.80
2744	68.72	50.35	1460.03	-1428.73	1006.68	1756.01	5775418.01	626099.52
2745	68.73	50.34	1460.39	-1429.09	1007.28	1756.73	5775418.61	626100.24
2746	68.74	50.33	1460.75	-1429.45	1007.87	1757.45	5775419.20	626100.95

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2747	68.74	50.32	1461.11	-1429.81	1008.47	1758.16	5775419.80	626101.67
2748	68.75	50.32	1461.48	-1430.18	1009.07	1758.88	5775420.39	626102.39
2749	68.76	50.31	1461.84	-1430.54	1009.66	1759.60	5775420.99	626103.10
2750	68.76	50.30	1462.20	-1430.90	1010.26	1760.31	5775421.59	626103.82
2751	68.77	50.29	1462.56	-1431.26	1010.85	1761.03	5775422.18	626104.54
2752	68.78	50.28	1462.92	-1431.62	1011.45	1761.75	5775422.78	626105.25
2753	68.78	50.28	1463.28	-1431.98	1012.05	1762.46	5775423.37	626105.97
2754	68.79	50.27	1463.65	-1432.35	1012.64	1763.18	5775423.97	626106.69
2755	68.80	50.26	1464.01	-1432.71	1013.24	1763.90	5775424.57	626107.40
2756	68.80	50.25	1464.37	-1433.07	1013.83	1764.61	5775425.16	626108.12
2757	68.81	50.24	1464.73	-1433.43	1014.43	1765.33	5775425.76	626108.84
2758	68.82	50.23	1465.09	-1433.79	1015.03	1766.05	5775426.35	626109.56
2759	68.82	50.23	1465.45	-1434.15	1015.62	1766.76	5775426.95	626110.27
2760	68.83	50.22	1465.82	-1434.52	1016.22	1767.48	5775427.55	626110.99
2761	68.83	50.21	1466.18	-1434.88	1016.81	1768.20	5775428.14	626111.71
2762	68.84	50.20	1466.54	-1435.24	1017.41	1768.92	5775428.74	626112.42
2763	68.85	50.19	1466.90	-1435.60	1018.01	1769.63	5775429.33	626113.14
2764	68.85	50.19	1467.26	-1435.96	1018.60	1770.35	5775429.93	626113.86
2765	68.86	50.18	1467.62	-1436.32	1019.20	1771.07	5775430.53	626114.57
2766	68.87	50.17	1467.99	-1436.69	1019.79	1771.78	5775431.12	626115.29
2767	68.87	50.16	1468.35	-1437.05	1020.39	1772.50	5775431.72	626116.01
2768	68.88	50.15	1468.71	-1437.41	1020.99	1773.22	5775432.31	626116.72
2769	68.89	50.14	1469.07	-1437.77	1021.58	1773.93	5775432.91	626117.44
2770	68.90	50.14	1469.43	-1438.13	1022.18	1774.65	5775433.51	626118.16
2771	68.91	50.13	1469.79	-1438.49	1022.78	1775.37	5775434.11	626118.87
2772	68.92	50.12	1470.15	-1438.85	1023.38	1776.08	5775434.71	626119.59
2773	68.93	50.11	1470.50	-1439.20	1023.98	1776.80	5775435.31	626120.30
2774	68.94	50.10	1470.86	-1439.56	1024.58	1777.51	5775435.91	626121.02
2775	68.95	50.09	1471.22	-1439.92	1025.18	1778.23	5775436.51	626121.74
2776	68.96	50.09	1471.58	-1440.28	1025.78	1778.94	5775437.11	626122.45
2777	68.98	50.08	1471.93	-1440.63	1026.38	1779.66	5775437.71	626123.17
2778	68.99	50.07	1472.29	-1440.99	1026.98	1780.37	5775438.31	626123.88
2779	69.00	50.06	1472.65	-1441.35	1027.58	1781.09	5775438.91	626124.60
2780	69.01	50.05	1473.01	-1441.71	1028.18	1781.81	5775439.51	626125.31
2781	69.02	50.04	1473.36	-1442.06	1028.78	1782.52	5775440.11	626126.03
2782	69.03	50.04	1473.72	-1442.42	1029.38	1783.24	5775440.71	626126.74
2783	69.05	50.03	1474.08	-1442.78	1029.98	1783.95	5775441.31	626127.46
2784	69.06	50.02	1474.44	-1443.14	1030.58	1784.67	5775441.91	626128.18
2785	69.07	50.01	1474.79	-1443.49	1031.18	1785.38	5775442.51	626128.89
2786	69.08	50.00	1475.15	-1443.85	1031.78	1786.10	5775443.11	626129.61
2787	69.09	49.99	1475.51	-1444.21	1032.38	1786.82	5775443.71	626130.32
2788	69.10	49.99	1475.87	-1444.57	1032.98	1787.53	5775444.31	626131.04
2789	69.11	49.98	1476.22	-1444.92	1033.58	1788.25	5775444.91	626131.75
2790	69.13	49.97	1476.58	-1445.28	1034.18	1788.96	5775445.51	626132.47
2791	69.14	49.96	1476.94	-1445.64	1034.78	1789.68	5775446.11	626133.19
2792	69.15	49.95	1477.29	-1445.99	1035.38	1790.39	5775446.71	626133.90
2793	69.16	49.94	1477.65	-1446.35	1035.98	1791.11	5775447.31	626134.62
2794	69.17	49.94	1478.01	-1446.71	1036.58	1791.83	5775447.91	626135.33
2795	69.18	49.93	1478.37	-1447.07	1037.18	1792.54	5775448.51	626136.05
2796	69.19	49.92	1478.72	-1447.42	1037.78	1793.26	5775449.11	626136.76
2797	69.21	49.91	1479.08	-1447.78	1038.38	1793.97	5775449.71	626137.48
2798	69.22	49.90	1479.44	-1448.14	1038.98	1794.69	5775450.31	626138.20
2799	69.23	49.91	1479.79	-1448.49	1039.58	1795.40	5775450.91	626138.91
2800	69.24	49.92	1480.14	-1448.84	1040.18	1796.12	5775451.51	626139.63
2801	69.26	49.93	1480.50	-1449.20	1040.78	1796.84	5775452.11	626140.35
2802	69.27	49.94	1480.85	-1449.55	1041.39	1797.56	5775452.71	626141.07
2803	69.28	49.95	1481.20	-1449.90	1041.99	1798.28	5775453.32	626141.78
2804	69.29	49.96	1481.55	-1450.25	1042.59	1798.99	5775453.92	626142.50
2805	69.31	49.98	1481.90	-1450.60	1043.19	1799.71	5775454.52	626143.22
2806	69.32	49.99	1482.26	-1450.96	1043.79	1800.43	5775455.12	626143.94
2807	69.33	50.00	1482.61	-1451.31	1044.39	1801.15	5775455.72	626144.65
2808	69.35	50.01	1482.96	-1451.66	1044.99	1801.86	5775456.32	626145.37
2809	69.36	50.02	1483.31	-1452.01	1045.59	1802.58	5775456.92	626146.09
2810	69.37	50.03	1483.66	-1452.36	1046.19	1803.30	5775457.52	626146.81
2811	69.39	50.04	1484.01	-1452.71	1046.79	1804.02	5775458.12	626147.52
2812	69.40	50.05	1484.37	-1453.07	1047.40	1804.74	5775458.72	626148.24

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2813	69.41	50.07	1484.72	-1453.42	1048.00	1805.45	5775459.32	626148.96
2814	69.42	50.08	1485.07	-1453.77	1048.60	1806.17	5775459.93	626149.68
2815	69.44	50.09	1485.42	-1454.12	1049.20	1806.89	5775460.53	626150.40
2816	69.45	50.10	1485.77	-1454.47	1049.80	1807.61	5775461.13	626151.11
2817	69.46	50.11	1486.13	-1454.83	1050.40	1808.32	5775461.73	626151.83
2818	69.48	50.12	1486.48	-1455.18	1051.00	1809.04	5775462.33	626152.55
2819	69.49	50.13	1486.83	-1455.53	1051.60	1809.76	5775462.93	626153.27
2820	69.50	50.14	1487.18	-1455.88	1052.20	1810.48	5775463.53	626153.98
2821	69.52	50.16	1487.53	-1456.23	1052.80	1811.19	5775464.13	626154.70
2822	69.53	50.17	1487.88	-1456.58	1053.40	1811.91	5775464.73	626155.42
2823	69.54	50.18	1488.24	-1456.94	1054.01	1812.63	5775465.33	626156.14
2824	69.55	50.19	1488.59	-1457.29	1054.61	1813.35	5775465.94	626156.86
2825	69.57	50.20	1488.94	-1457.64	1055.21	1814.07	5775466.54	626157.57
2826	69.58	50.21	1489.29	-1457.99	1055.81	1814.78	5775467.14	626158.29
2827	69.59	50.22	1489.64	-1458.34	1056.41	1815.50	5775467.74	626159.01
2828	69.59	50.21	1489.99	-1458.69	1057.01	1816.22	5775468.34	626159.73
2829	69.60	50.21	1490.34	-1459.04	1057.61	1816.94	5775468.94	626160.45
2830	69.60	50.20	1490.69	-1459.39	1058.21	1817.66	5775469.54	626161.17
2831	69.60	50.19	1491.03	-1459.73	1058.81	1818.38	5775470.14	626161.89
2832	69.60	50.19	1491.38	-1460.08	1059.41	1819.10	5775470.74	626162.61
2833	69.61	50.18	1491.73	-1460.43	1060.01	1819.82	5775471.34	626163.33
2834	69.61	50.18	1492.08	-1460.78	1060.62	1820.54	5775471.94	626164.05
2835	69.61	50.17	1492.43	-1461.13	1061.22	1821.26	5775472.55	626164.77
2836	69.62	50.16	1492.77	-1461.47	1061.82	1821.98	5775473.15	626165.48
2837	69.62	50.16	1493.12	-1461.82	1062.42	1822.70	5775473.75	626166.20
2838	69.62	50.15	1493.47	-1462.17	1063.02	1823.42	5775474.35	626166.92
2839	69.62	50.15	1493.82	-1462.52	1063.62	1824.14	5775474.95	626167.64
2840	69.63	50.14	1494.17	-1462.87	1064.22	1824.86	5775475.55	626168.36
2841	69.63	50.14	1494.52	-1463.22	1064.82	1825.57	5775476.15	626169.08
2842	69.63	50.13	1494.86	-1463.56	1065.42	1826.29	5775476.75	626169.80
2843	69.64	50.12	1495.21	-1463.91	1066.02	1827.01	5775477.35	626170.52
2844	69.64	50.12	1495.56	-1464.26	1066.62	1827.73	5775477.95	626171.24
2845	69.64	50.11	1495.91	-1464.61	1067.23	1828.45	5775478.55	626171.96
2846	69.64	50.11	1496.26	-1464.96	1067.83	1829.17	5775479.15	626172.68
2847	69.65	50.10	1496.60	-1465.30	1068.43	1829.89	5775479.76	626173.40
2848	69.65	50.09	1496.95	-1465.65	1069.03	1830.61	5775480.36	626174.12
2849	69.65	50.09	1497.30	-1466.00	1069.63	1831.33	5775480.96	626174.84
2850	69.66	50.08	1497.65	-1466.35	1070.23	1832.05	5775481.56	626175.56
2851	69.66	50.08	1498.00	-1466.70	1070.83	1832.77	5775482.16	626176.28
2852	69.66	50.07	1498.34	-1467.04	1071.43	1833.49	5775482.76	626177.00
2853	69.66	50.06	1498.69	-1467.39	1072.03	1834.21	5775483.36	626177.72
2854	69.67	50.06	1499.04	-1467.74	1072.63	1834.93	5775483.96	626178.44
2855	69.67	50.05	1499.39	-1468.09	1073.23	1835.65	5775484.56	626179.16
2856	69.67	50.05	1499.74	-1468.44	1073.84	1836.37	5775485.16	626179.88
2857	69.67	50.05	1500.08	-1468.78	1074.44	1837.09	5775485.77	626180.59
2858	69.67	50.05	1500.43	-1469.13	1075.04	1837.81	5775486.37	626181.31
2859	69.67	50.05	1500.78	-1469.48	1075.64	1838.52	5775486.97	626182.03
2860	69.67	50.05	1501.12	-1469.82	1076.24	1839.24	5775487.57	626182.75
2861	69.68	50.05	1501.47	-1470.17	1076.85	1839.96	5775488.17	626183.47
2862	69.68	50.05	1501.82	-1470.52	1077.45	1840.68	5775488.78	626184.19
2863	69.68	50.06	1502.17	-1470.87	1078.05	1841.40	5775489.38	626184.91
2864	69.68	50.06	1502.51	-1471.21	1078.65	1842.12	5775489.98	626185.63
2865	69.68	50.06	1502.86	-1471.56	1079.25	1842.84	5775490.58	626186.35
2866	69.68	50.06	1503.21	-1471.91	1079.86	1843.56	5775491.18	626187.07
2867	69.68	50.06	1503.55	-1472.25	1080.46	1844.28	5775491.79	626187.78
2868	69.68	50.06	1503.90	-1472.60	1081.06	1845.00	5775492.39	626188.50
2869	69.68	50.06	1504.25	-1472.95	1081.66	1845.72	5775492.99	626189.22
2870	69.69	50.06	1504.60	-1473.30	1082.26	1846.43	5775493.59	626189.94
2871	69.69	50.06	1504.94	-1473.64	1082.87	1847.15	5775494.20	626190.66
2872	69.69	50.06	1505.29	-1473.99	1083.47	1847.87	5775494.80	626191.38
2873	69.69	50.06	1505.64	-1474.34	1084.07	1848.59	5775495.40	626192.10
2874	69.69	50.06	1505.98	-1474.68	1084.67	1849.31	5775496.00	626192.82
2875	69.69	50.06	1506.33	-1475.03	1085.27	1850.03	5775496.60	626193.54
2876	69.69	50.06	1506.68	-1475.38	1085.88	1850.75	5775497.21	626194.26
2877	69.69	50.07	1507.03	-1475.73	1086.48	1851.47	5775497.81	626194.97
2878	69.69	50.07	1507.37	-1476.07	1087.08	1852.19	5775498.41	626195.69

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2879	69.69	50.07	1507.72	-1476.42	1087.68	1852.91	5775499.01	626196.41
2880	69.70	50.07	1508.07	-1476.77	1088.28	1853.62	5775499.61	626197.13
2881	69.70	50.07	1508.41	-1477.11	1088.89	1854.34	5775500.22	626197.85
2882	69.70	50.07	1508.76	-1477.46	1089.49	1855.06	5775500.82	626198.57
2883	69.70	50.07	1509.11	-1477.81	1090.09	1855.78	5775501.42	626199.29
2884	69.70	50.07	1509.46	-1478.16	1090.69	1856.50	5775502.02	626200.01
2885	69.69	50.07	1509.81	-1478.51	1091.29	1857.22	5775502.62	626200.73
2886	69.68	50.07	1510.15	-1478.85	1091.90	1857.94	5775503.22	626201.44
2887	69.67	50.07	1510.50	-1479.20	1092.50	1858.66	5775503.83	626202.16
2888	69.66	50.07	1510.85	-1479.55	1093.10	1859.37	5775504.43	626202.88
2889	69.65	50.07	1511.20	-1479.90	1093.70	1860.09	5775505.03	626203.60
2890	69.64	50.07	1511.55	-1480.25	1094.30	1860.81	5775505.63	626204.32
2891	69.63	50.07	1511.90	-1480.60	1094.90	1861.53	5775506.23	626205.04
2892	69.62	50.07	1512.25	-1480.95	1095.50	1862.25	5775506.83	626205.76
2893	69.61	50.07	1512.60	-1481.30	1096.11	1862.97	5775507.43	626206.47
2894	69.59	50.07	1512.95	-1481.65	1096.71	1863.69	5775508.04	626207.19
2895	69.58	50.07	1513.30	-1482.00	1097.31	1864.40	5775508.64	626207.91
2896	69.57	50.07	1513.65	-1482.35	1097.91	1865.12	5775509.24	626208.63
2897	69.56	50.07	1514.00	-1482.70	1098.51	1865.84	5775509.84	626209.35
2898	69.55	50.07	1514.35	-1483.05	1099.11	1866.56	5775510.44	626210.07
2899	69.54	50.07	1514.70	-1483.40	1099.71	1867.28	5775511.04	626210.79
2900	69.53	50.07	1515.05	-1483.75	1100.32	1868.00	5775511.64	626211.50
2901	69.52	50.07	1515.40	-1484.10	1100.92	1868.72	5775512.25	626212.22
2902	69.51	50.07	1515.75	-1484.45	1101.52	1869.43	5775512.85	626212.94
2903	69.50	50.07	1516.09	-1484.79	1102.12	1870.15	5775513.45	626213.66
2904	69.49	50.07	1516.44	-1485.14	1102.72	1870.87	5775514.05	626214.38
2905	69.48	50.07	1516.79	-1485.49	1103.32	1871.59	5775514.65	626215.10
2906	69.47	50.07	1517.14	-1485.84	1103.92	1872.31	5775515.25	626215.82
2907	69.46	50.07	1517.49	-1486.19	1104.53	1873.03	5775515.85	626216.53
2908	69.45	50.07	1517.84	-1486.54	1105.13	1873.74	5775516.46	626217.25
2909	69.44	50.07	1518.19	-1486.89	1105.73	1874.46	5775517.06	626217.97
2910	69.43	50.07	1518.54	-1487.24	1106.33	1875.18	5775517.66	626218.69
2911	69.42	50.07	1518.89	-1487.59	1106.93	1875.90	5775518.26	626219.41
2912	69.41	50.07	1519.24	-1487.94	1107.53	1876.62	5775518.86	626220.13
2913	69.41	50.06	1519.59	-1488.29	1108.14	1877.34	5775519.46	626220.84
2914	69.42	50.05	1519.94	-1488.64	1108.74	1878.05	5775520.07	626221.56
2915	69.44	50.03	1520.28	-1488.98	1109.34	1878.77	5775520.67	626222.28
2916	69.46	50.01	1520.63	-1489.33	1109.95	1879.49	5775521.28	626222.99
2917	69.48	50.00	1520.98	-1489.68	1110.55	1880.20	5775521.88	626223.71
2918	69.49	49.98	1521.33	-1490.03	1111.16	1880.92	5775522.49	626224.43
2919	69.51	49.96	1521.67	-1490.37	1111.76	1881.64	5775523.09	626225.14
2920	69.53	49.94	1522.02	-1490.72	1112.37	1882.35	5775523.70	626225.86
2921	69.55	49.93	1522.37	-1491.07	1112.97	1883.07	5775524.30	626226.58
2922	69.56	49.91	1522.72	-1491.42	1113.58	1883.78	5775524.91	626227.29
2923	69.58	49.89	1523.07	-1491.77	1114.18	1884.50	5775525.51	626228.01
2924	69.60	49.88	1523.41	-1492.11	1114.79	1885.22	5775526.12	626228.72
2925	69.61	49.86	1523.76	-1492.46	1115.39	1885.93	5775526.72	626229.44
2926	69.63	49.84	1524.11	-1492.81	1116.00	1886.65	5775527.33	626230.16
2927	69.65	49.83	1524.46	-1493.16	1116.60	1887.37	5775527.93	626230.87
2928	69.67	49.81	1524.81	-1493.51	1117.21	1888.08	5775528.54	626231.59
2929	69.68	49.79	1525.15	-1493.85	1117.81	1888.80	5775529.14	626232.31
2930	69.70	49.78	1525.50	-1494.20	1118.42	1889.52	5775529.75	626233.02
2931	69.72	49.76	1525.85	-1494.55	1119.02	1890.23	5775530.35	626233.74
2932	69.73	49.74	1526.20	-1494.90	1119.63	1890.95	5775530.95	626234.46
2933	69.75	49.73	1526.54	-1495.24	1120.23	1891.66	5775531.56	626235.17
2934	69.77	49.71	1526.89	-1495.59	1120.84	1892.38	5775532.16	626235.89
2935	69.79	49.69	1527.24	-1495.94	1121.44	1893.10	5775532.77	626236.61
2936	69.80	49.67	1527.59	-1496.29	1122.05	1893.81	5775533.37	626237.32
2937	69.82	49.66	1527.94	-1496.64	1122.65	1894.53	5775533.98	626238.04
2938	69.84	49.64	1528.28	-1496.98	1123.25	1895.25	5775534.58	626238.75
2939	69.86	49.62	1528.63	-1497.33	1123.86	1895.96	5775535.19	626239.47
2940	69.87	49.61	1528.98	-1497.68	1124.46	1896.68	5775535.79	626240.19
2941	69.89	49.59	1529.33	-1498.03	1125.07	1897.40	5775536.40	626240.90
2942	69.89	49.59	1529.67	-1498.37	1125.68	1898.11	5775537.01	626241.62
2943	69.90	49.59	1530.01	-1498.71	1126.29	1898.83	5775537.62	626242.33
2944	69.90	49.58	1530.36	-1499.06	1126.90	1899.54	5775538.23	626243.05

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
2945	69.91	49.58	1530.70	-1499.40	1127.51	1900.26	5775538.83	626243.76
2946	69.91	49.58	1531.04	-1499.74	1128.12	1900.97	5775539.44	626244.48
2947	69.92	49.58	1531.38	-1500.08	1128.72	1901.69	5775540.05	626245.19
2948	69.92	49.58	1531.73	-1500.43	1129.33	1902.40	5775540.66	626245.91
2949	69.92	49.58	1532.07	-1500.77	1129.94	1903.12	5775541.27	626246.62
2950	69.93	49.57	1532.41	-1501.11	1130.55	1903.83	5775541.88	626247.34
2951	69.93	49.57	1532.76	-1501.46	1131.16	1904.55	5775542.49	626248.05
2952	69.94	49.57	1533.10	-1501.80	1131.77	1905.26	5775543.10	626248.77
2953	69.94	49.57	1533.44	-1502.14	1132.38	1905.98	5775543.71	626249.48
2954	69.94	49.57	1533.78	-1502.48	1132.99	1906.69	5775544.32	626250.20
2955	69.95	49.57	1534.13	-1502.83	1133.60	1907.41	5775544.93	626250.91
2956	69.95	49.56	1534.47	-1503.17	1134.21	1908.12	5775545.54	626251.63
2957	69.96	49.56	1534.81	-1503.51	1134.82	1908.84	5775546.15	626252.34
2958	69.96	49.56	1535.16	-1503.86	1135.43	1909.55	5775546.76	626253.06
2959	69.97	49.56	1535.50	-1504.20	1136.04	1910.27	5775547.36	626253.77
2960	69.97	49.56	1535.84	-1504.54	1136.65	1910.98	5775547.97	626254.49
2961	69.97	49.56	1536.18	-1504.88	1137.25	1911.70	5775548.58	626255.20
2962	69.98	49.55	1536.53	-1505.23	1137.86	1912.41	5775549.19	626255.92
2963	69.98	49.55	1536.87	-1505.57	1138.47	1913.13	5775549.80	626256.63
2964	69.99	49.55	1537.21	-1505.91	1139.08	1913.84	5775550.41	626257.35
2965	69.99	49.55	1537.56	-1506.26	1139.69	1914.56	5775551.02	626258.06
2966	69.99	49.55	1537.90	-1506.60	1140.30	1915.27	5775551.63	626258.78
2967	70.00	49.54	1538.24	-1506.94	1140.91	1915.99	5775552.24	626259.49
2968	70.00	49.54	1538.58	-1507.28	1141.52	1916.70	5775552.85	626260.21
2969	70.01	49.54	1538.93	-1507.63	1142.13	1917.42	5775553.46	626260.92
2970	70.01	49.54	1539.27	-1507.97	1142.74	1918.13	5775554.07	626261.64
2971	70.02	49.54	1539.61	-1508.31	1143.35	1918.85	5775554.68	626262.35
2972	70.02	49.54	1539.95	-1508.65	1143.96	1919.56	5775555.29	626263.07
2973	70.03	49.55	1540.29	-1508.99	1144.57	1920.28	5775555.90	626263.79
2974	70.03	49.55	1540.63	-1509.33	1145.18	1920.99	5775556.51	626264.50
2975	70.03	49.55	1540.97	-1509.67	1145.79	1921.71	5775557.12	626265.22
2976	70.04	49.55	1541.31	-1510.01	1146.40	1922.43	5775557.73	626265.93
2977	70.04	49.55	1541.65	-1510.35	1147.01	1923.14	5775558.34	626266.65
2978	70.05	49.55	1542.00	-1510.70	1147.62	1923.86	5775558.95	626267.36
2979	70.05	49.56	1542.34	-1511.04	1148.23	1924.57	5775559.56	626268.08
2980	70.06	49.56	1542.68	-1511.38	1148.84	1925.29	5775560.16	626268.79
2981	70.06	49.56	1543.02	-1511.72	1149.45	1926.00	5775560.77	626269.51
2982	70.07	49.56	1543.36	-1512.06	1150.06	1926.72	5775561.38	626270.23
2983	70.07	49.56	1543.70	-1512.40	1150.67	1927.43	5775561.99	626270.94
2984	70.08	49.57	1544.04	-1512.74	1151.28	1928.15	5775562.60	626271.66
2985	70.08	49.57	1544.38	-1513.08	1151.88	1928.87	5775563.21	626272.37
2986	70.08	49.57	1544.72	-1513.42	1152.49	1929.58	5775563.82	626273.09
2987	70.09	49.57	1545.06	-1513.76	1153.10	1930.30	5775564.43	626273.80
2988	70.09	49.57	1545.40	-1514.10	1153.71	1931.01	5775565.04	626274.52
2989	70.10	49.57	1545.74	-1514.44	1154.32	1931.73	5775565.65	626275.23
2990	70.10	49.58	1546.08	-1514.78	1154.93	1932.44	5775566.26	626275.95
2991	70.11	49.58	1546.43	-1515.13	1155.54	1933.16	5775566.87	626276.67
2992	70.11	49.58	1546.77	-1515.47	1156.15	1933.87	5775567.48	626277.38
2993	70.12	49.58	1547.11	-1515.81	1156.76	1934.59	5775568.09	626278.10
2994	70.12	49.58	1547.45	-1516.15	1157.37	1935.31	5775568.70	626278.81
2995	70.12	49.58	1547.79	-1516.49	1157.98	1936.02	5775569.31	626279.53
2996	70.13	49.59	1548.13	-1516.83	1158.59	1936.74	5775569.92	626280.24
2997	70.13	49.59	1548.47	-1517.17	1159.20	1937.45	5775570.53	626280.96
2998	70.14	49.59	1548.81	-1517.51	1159.81	1938.17	5775571.14	626281.68
2999	70.15	49.58	1549.15	-1517.85	1160.42	1938.88	5775571.75	626282.39
3000	70.16	49.56	1549.49	-1518.19	1161.04	1939.60	5775572.37	626283.10
3001	70.17	49.55	1549.82	-1518.52	1161.65	1940.31	5775572.98	626283.82
3002	70.17	49.53	1550.16	-1518.86	1162.26	1941.02	5775573.59	626284.53
3003	70.18	49.51	1550.50	-1519.20	1162.88	1941.74	5775574.21	626285.25
3004	70.19	49.49	1550.84	-1519.54	1163.49	1942.45	5775574.82	626285.96
3005	70.20	49.48	1551.17	-1519.87	1164.10	1943.17	5775575.43	626286.67
3006	70.21	49.46	1551.51	-1520.21	1164.72	1943.88	5775576.04	626287.39
3007	70.22	49.44	1551.85	-1520.55	1165.33	1944.60	5775576.66	626288.10
3008	70.23	49.43	1552.19	-1520.89	1165.94	1945.31	5775577.27	626288.82
3009	70.24	49.41	1552.53	-1521.23	1166.56	1946.02	5775577.88	626289.53
3010	70.25	49.39	1552.86	-1521.56	1167.17	1946.74	5775578.50	626290.25

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3011	70.26	49.38	1553.20	-1521.90	1167.78	1947.45	5775579.11	626290.96
3012	70.27	49.36	1553.54	-1522.24	1168.40	1948.17	5775579.72	626291.67
3013	70.28	49.34	1553.88	-1522.58	1169.01	1948.88	5775580.34	626292.39
3014	70.29	49.32	1554.21	-1522.91	1169.62	1949.59	5775580.95	626293.10
3015	70.30	49.31	1554.55	-1523.25	1170.24	1950.31	5775581.56	626293.82
3016	70.31	49.29	1554.89	-1523.59	1170.85	1951.02	5775582.18	626294.53
3017	70.32	49.27	1555.23	-1523.93	1171.46	1951.74	5775582.79	626295.24
3018	70.33	49.26	1555.56	-1524.26	1172.07	1952.45	5775583.40	626295.96
3019	70.34	49.24	1555.90	-1524.60	1172.69	1953.17	5775584.02	626296.67
3020	70.35	49.22	1556.24	-1524.94	1173.30	1953.88	5775584.63	626297.39
3021	70.36	49.21	1556.58	-1525.28	1173.91	1954.59	5775585.24	626298.10
3022	70.37	49.19	1556.91	-1525.61	1174.53	1955.31	5775585.86	626298.82
3023	70.38	49.17	1557.25	-1525.95	1175.14	1956.02	5775586.47	626299.53
3024	70.39	49.15	1557.59	-1526.29	1175.75	1956.74	5775587.08	626300.24
3025	70.39	49.14	1557.93	-1526.63	1176.37	1957.45	5775587.70	626300.96
3026	70.40	49.12	1558.26	-1526.96	1176.98	1958.17	5775588.31	626301.67
3027	70.41	49.12	1558.60	-1527.30	1177.59	1958.88	5775588.92	626302.39
3028	70.41	49.14	1558.94	-1527.64	1178.21	1959.60	5775589.53	626303.10
3029	70.41	49.17	1559.27	-1527.97	1178.82	1960.31	5775590.15	626303.82
3030	70.41	49.19	1559.61	-1528.31	1179.43	1961.03	5775590.76	626304.53
3031	70.41	49.22	1559.94	-1528.64	1180.04	1961.74	5775591.37	626305.25
3032	70.41	49.24	1560.28	-1528.98	1180.66	1962.46	5775591.99	626305.97
3033	70.41	49.26	1560.61	-1529.31	1181.27	1963.17	5775592.60	626306.68
3034	70.41	49.29	1560.95	-1529.65	1181.88	1963.89	5775593.21	626307.40
3035	70.41	49.31	1561.28	-1529.98	1182.49	1964.61	5775593.82	626308.11
3036	70.41	49.33	1561.62	-1530.32	1183.11	1965.32	5775594.44	626308.83
3037	70.41	49.36	1561.95	-1530.65	1183.72	1966.04	5775595.05	626309.54
3038	70.41	49.38	1562.29	-1530.99	1184.33	1966.75	5775595.66	626310.26
3039	70.41	49.41	1562.62	-1531.32	1184.95	1967.47	5775596.27	626310.98
3040	70.41	49.43	1562.96	-1531.66	1185.56	1968.18	5775596.89	626311.69
3041	70.40	49.45	1563.29	-1531.99	1186.17	1968.90	5775597.50	626312.41
3042	70.40	49.48	1563.63	-1532.33	1186.78	1969.61	5775598.11	626313.12
3043	70.40	49.50	1563.97	-1532.67	1187.40	1970.33	5775598.72	626313.84
3044	70.40	49.53	1564.30	-1533.00	1188.01	1971.05	5775599.34	626314.55
3045	70.40	49.55	1564.64	-1533.34	1188.62	1971.76	5775599.95	626315.27
3046	70.40	49.57	1564.97	-1533.67	1189.23	1972.48	5775600.56	626315.98
3047	70.40	49.60	1565.31	-1534.01	1189.85	1973.19	5775601.17	626316.70
3048	70.40	49.62	1565.64	-1534.34	1190.46	1973.91	5775601.79	626317.42
3049	70.40	49.65	1565.98	-1534.68	1191.07	1974.62	5775602.40	626318.13
3050	70.40	49.67	1566.31	-1535.01	1191.68	1975.34	5775603.01	626318.85
3051	70.40	49.69	1566.65	-1535.35	1192.30	1976.06	5775603.63	626319.56
3052	70.40	49.72	1566.98	-1535.68	1192.91	1976.77	5775604.24	626320.28
3053	70.40	49.74	1567.32	-1536.02	1193.52	1977.49	5775604.85	626320.99
3054	70.40	49.76	1567.65	-1536.35	1194.13	1978.20	5775605.46	626321.71
3055	70.41	49.76	1567.99	-1536.69	1194.74	1978.92	5775606.07	626322.43
3056	70.42	49.76	1568.32	-1537.02	1195.35	1979.64	5775606.68	626323.15
3057	70.42	49.76	1568.66	-1537.36	1195.96	1980.36	5775607.29	626323.87
3058	70.43	49.76	1568.99	-1537.69	1196.57	1981.08	5775607.90	626324.59
3059	70.44	49.76	1569.32	-1538.02	1197.18	1981.80	5775608.51	626325.31
3060	70.44	49.76	1569.66	-1538.36	1197.79	1982.52	5775609.12	626326.03
3061	70.45	49.77	1569.99	-1538.69	1198.40	1983.24	5775609.72	626326.75
3062	70.46	49.77	1570.32	-1539.02	1199.00	1983.96	5775610.33	626327.47
3063	70.46	49.77	1570.66	-1539.36	1199.61	1984.68	5775610.94	626328.19
3064	70.47	49.77	1570.99	-1539.69	1200.22	1985.40	5775611.55	626328.91
3065	70.48	49.77	1571.33	-1540.03	1200.83	1986.12	5775612.16	626329.63
3066	70.48	49.77	1571.66	-1540.36	1201.44	1986.84	5775612.77	626330.35
3067	70.49	49.77	1571.99	-1540.69	1202.05	1987.56	5775613.38	626331.07
3068	70.50	49.77	1572.33	-1541.03	1202.66	1988.28	5775613.99	626331.79
3069	70.51	49.77	1572.66	-1541.36	1203.27	1989.00	5775614.59	626332.51
3070	70.51	49.77	1572.99	-1541.69	1203.87	1989.72	5775615.20	626333.23
3071	70.52	49.77	1573.33	-1542.03	1204.48	1990.44	5775615.81	626333.95
3072	70.53	49.77	1573.66	-1542.36	1205.09	1991.16	5775616.42	626334.67
3073	70.53	49.77	1574.00	-1542.70	1205.70	1991.88	5775617.03	626335.39
3074	70.54	49.77	1574.33	-1543.03	1206.31	1992.60	5775617.64	626336.10
3075	70.55	49.77	1574.66	-1543.36	1206.92	1993.32	5775618.25	626336.82
3076	70.55	49.78	1575.00	-1543.70	1207.53	1994.04	5775618.86	626337.54

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3077	70.56	49.78	1575.33	-1544.03	1208.14	1994.76	5775619.46	626338.26
3078	70.57	49.78	1575.67	-1544.37	1208.75	1995.48	5775620.07	626338.98
3079	70.57	49.78	1576.00	-1544.70	1209.35	1996.20	5775620.68	626339.70
3080	70.58	49.78	1576.33	-1545.03	1209.96	1996.92	5775621.29	626340.42
3081	70.59	49.78	1576.67	-1545.37	1210.57	1997.64	5775621.90	626341.14
3082	70.60	49.78	1577.00	-1545.70	1211.18	1998.35	5775622.51	626341.86
3083	70.59	49.78	1577.34	-1546.04	1211.79	1999.07	5775623.12	626342.58
3084	70.56	49.76	1577.68	-1546.38	1212.40	1999.79	5775623.73	626343.30
3085	70.53	49.75	1578.02	-1546.72	1213.01	2000.50	5775624.34	626344.01
3086	70.50	49.73	1578.36	-1547.06	1213.62	2001.22	5775624.95	626344.73
3087	70.47	49.72	1578.70	-1547.40	1214.23	2001.94	5775625.56	626345.44
3088	70.43	49.71	1579.04	-1547.74	1214.84	2002.65	5775626.17	626346.16
3089	70.40	49.69	1579.38	-1548.08	1215.45	2003.37	5775626.78	626346.88
3090	70.37	49.68	1579.72	-1548.42	1216.06	2004.08	5775627.39	626347.59
3091	70.34	49.67	1580.06	-1548.76	1216.67	2004.80	5775628.00	626348.31
3092	70.31	49.65	1580.40	-1549.10	1217.28	2005.51	5775628.61	626349.02
3093	70.28	49.64	1580.74	-1549.44	1217.89	2006.23	5775629.22	626349.74
3094	70.25	49.62	1581.08	-1549.78	1218.50	2006.95	5775629.83	626350.45
3095	70.22	49.61	1581.42	-1550.12	1219.11	2007.66	5775630.44	626351.17
3096	70.19	49.60	1581.76	-1550.46	1219.72	2008.38	5775631.05	626351.89
3097	70.16	49.58	1582.10	-1550.80	1220.33	2009.09	5775631.66	626352.60
3098	70.13	49.57	1582.44	-1551.14	1220.94	2009.81	5775632.27	626353.32
3099	70.09	49.56	1582.78	-1551.48	1221.55	2010.53	5775632.88	626354.03
3100	70.06	49.54	1583.12	-1551.82	1222.16	2011.24	5775633.49	626354.75
3101	70.03	49.53	1583.46	-1552.16	1222.77	2011.96	5775634.10	626355.46
3102	70.00	49.51	1583.80	-1552.50	1223.38	2012.67	5775634.71	626356.18
3103	69.97	49.50	1584.14	-1552.84	1223.99	2013.39	5775635.32	626356.90
3104	69.94	49.49	1584.48	-1553.18	1224.60	2014.10	5775635.93	626357.61
3105	69.91	49.47	1584.82	-1553.52	1225.21	2014.82	5775636.54	626358.33
3106	69.88	49.46	1585.16	-1553.86	1225.82	2015.54	5775637.15	626359.04
3107	69.85	49.45	1585.50	-1554.20	1226.43	2016.25	5775637.76	626359.76
3108	69.82	49.43	1585.84	-1554.54	1227.04	2016.97	5775638.37	626360.47
3109	69.79	49.42	1586.18	-1554.88	1227.65	2017.68	5775638.98	626361.19
3110	69.76	49.41	1586.52	-1555.22	1228.26	2018.40	5775639.59	626361.91
3111	69.72	49.39	1586.86	-1555.56	1228.87	2019.11	5775640.20	626362.62
3112	69.69	49.38	1587.20	-1555.90	1229.48	2019.83	5775640.81	626363.34
3113	69.66	49.36	1587.54	-1556.24	1230.09	2020.55	5775641.42	626364.05
3114	69.63	49.35	1587.88	-1556.58	1230.70	2021.26	5775642.03	626364.77
3115	69.63	49.37	1588.23	-1556.93	1231.30	2021.98	5775642.63	626365.48
3116	69.62	49.38	1588.58	-1557.28	1231.91	2022.69	5775643.24	626366.20
3117	69.62	49.40	1588.93	-1557.63	1232.52	2023.40	5775643.85	626366.91
3118	69.61	49.42	1589.28	-1557.98	1233.13	2024.12	5775644.45	626367.62
3119	69.61	49.43	1589.63	-1558.33	1233.73	2024.83	5775645.06	626368.34
3120	69.60	49.45	1589.98	-1558.68	1234.34	2025.54	5775645.67	626369.05
3121	69.60	49.47	1590.33	-1559.03	1234.95	2026.26	5775646.28	626369.76
3122	69.59	49.48	1590.67	-1559.37	1235.56	2026.97	5775646.88	626370.48
3123	69.59	49.50	1591.02	-1559.72	1236.16	2027.68	5775647.49	626371.19
3124	69.58	49.52	1591.37	-1560.07	1236.77	2028.40	5775648.10	626371.90
3125	69.58	49.53	1591.72	-1560.42	1237.38	2029.11	5775648.71	626372.62
3126	69.57	49.55	1592.07	-1560.77	1237.99	2029.82	5775649.31	626373.33
3127	69.57	49.57	1592.42	-1561.12	1238.59	2030.54	5775649.92	626374.04
3128	69.56	49.58	1592.77	-1561.47	1239.20	2031.25	5775650.53	626374.76
3129	69.56	49.60	1593.12	-1561.82	1239.81	2031.96	5775651.14	626375.47
3130	69.55	49.62	1593.47	-1562.17	1240.42	2032.68	5775651.74	626376.18
3131	69.55	49.63	1593.82	-1562.52	1241.02	2033.39	5775652.35	626376.90
3132	69.54	49.65	1594.17	-1562.87	1241.63	2034.10	5775652.96	626377.61
3133	69.54	49.67	1594.52	-1563.22	1242.24	2034.82	5775653.57	626378.33
3134	69.53	49.69	1594.86	-1563.56	1242.84	2035.53	5775654.17	626379.04
3135	69.53	49.70	1595.21	-1563.91	1243.45	2036.24	5775654.78	626379.75
3136	69.52	49.72	1595.56	-1564.26	1244.06	2036.96	5775655.39	626380.47
3137	69.52	49.74	1595.91	-1564.61	1244.67	2037.67	5775656.00	626381.18
3138	69.51	49.75	1596.26	-1564.96	1245.27	2038.39	5775656.60	626381.89
3139	69.51	49.77	1596.61	-1565.31	1245.88	2039.10	5775657.21	626382.61
3140	69.50	49.79	1596.96	-1565.66	1246.49	2039.81	5775657.82	626383.32
3141	69.50	49.80	1597.31	-1566.01	1247.10	2040.53	5775658.43	626384.03
3142	69.49	49.82	1597.66	-1566.36	1247.70	2041.24	5775659.03	626384.75

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3143	69.49	49.83	1598.01	-1566.71	1248.31	2041.95	5775659.64	626385.46
3144	69.49	49.83	1598.36	-1567.06	1248.92	2042.67	5775660.24	626386.18
3145	69.50	49.82	1598.71	-1567.41	1249.52	2043.38	5775660.85	626386.89
3146	69.50	49.82	1599.06	-1567.76	1250.13	2044.10	5775661.45	626387.61
3147	69.50	49.82	1599.41	-1568.11	1250.73	2044.81	5775662.06	626388.32
3148	69.50	49.81	1599.76	-1568.46	1251.34	2045.53	5775662.66	626389.04
3149	69.51	49.81	1600.11	-1568.81	1251.94	2046.25	5775663.27	626389.75
3150	69.51	49.81	1600.46	-1569.16	1252.54	2046.96	5775663.87	626390.47
3151	69.51	49.80	1600.81	-1569.51	1253.15	2047.68	5775664.48	626391.18
3152	69.51	49.80	1601.16	-1569.86	1253.75	2048.39	5775665.08	626391.90
3153	69.52	49.80	1601.51	-1570.21	1254.36	2049.11	5775665.69	626392.61
3154	69.52	49.79	1601.86	-1570.56	1254.96	2049.82	5775666.29	626393.33
3155	69.52	49.79	1602.21	-1570.91	1255.57	2050.54	5775666.90	626394.05
3156	69.52	49.79	1602.56	-1571.26	1256.17	2051.25	5775667.50	626394.76
3157	69.52	49.79	1602.91	-1571.61	1256.78	2051.97	5775668.11	626395.48
3158	69.53	49.78	1603.26	-1571.96	1257.38	2052.68	5775668.71	626396.19
3159	69.53	49.78	1603.60	-1572.30	1257.99	2053.40	5775669.32	626396.91
3160	69.53	49.78	1603.95	-1572.65	1258.59	2054.11	5775669.92	626397.62
3161	69.53	49.77	1604.30	-1573.00	1259.20	2054.83	5775670.53	626398.34
3162	69.54	49.77	1604.65	-1573.35	1259.80	2055.55	5775671.13	626399.05
3163	69.54	49.77	1605.00	-1573.70	1260.41	2056.26	5775671.74	626399.77
3164	69.54	49.76	1605.35	-1574.05	1261.01	2056.98	5775672.34	626400.48
3165	69.54	49.76	1605.70	-1574.40	1261.62	2057.69	5775672.95	626401.20
3166	69.55	49.76	1606.05	-1574.75	1262.22	2058.41	5775673.55	626401.91
3167	69.55	49.75	1606.40	-1575.10	1262.83	2059.12	5775674.16	626402.63
3168	69.55	49.75	1606.75	-1575.45	1263.43	2059.84	5775674.76	626403.35
3169	69.55	49.75	1607.10	-1575.80	1264.04	2060.55	5775675.37	626404.06
3170	69.56	49.74	1607.45	-1576.15	1264.64	2061.27	5775675.97	626404.78
3171	69.56	49.74	1607.80	-1576.50	1265.25	2061.98	5775676.58	626405.49
3172	69.56	49.74	1608.15	-1576.85	1265.85	2062.70	5775677.18	626406.21
3173	69.56	49.74	1608.50	-1577.20	1266.46	2063.41	5775677.79	626406.92
3174	69.56	49.74	1608.85	-1577.55	1267.06	2064.13	5775678.39	626407.64
3175	69.56	49.74	1609.20	-1577.90	1267.67	2064.85	5775679.00	626408.35
3176	69.56	49.75	1609.55	-1578.25	1268.27	2065.56	5775679.60	626409.07
3177	69.57	49.75	1609.90	-1578.60	1268.88	2066.28	5775680.21	626409.78
3178	69.57	49.75	1610.25	-1578.95	1269.48	2066.99	5775680.81	626410.50
3179	69.57	49.75	1610.59	-1579.29	1270.09	2067.71	5775681.42	626411.21
3180	69.57	49.75	1610.94	-1579.64	1270.70	2068.42	5775682.02	626411.93
3181	69.57	49.75	1611.29	-1579.99	1271.30	2069.14	5775682.63	626412.65
3182	69.57	49.75	1611.64	-1580.34	1271.91	2069.85	5775683.23	626413.36
3183	69.57	49.76	1611.99	-1580.69	1272.51	2070.57	5775683.84	626414.08
3184	69.57	49.76	1612.34	-1581.04	1273.12	2071.28	5775684.45	626414.79
3185	69.57	49.76	1612.69	-1581.39	1273.72	2072.00	5775685.05	626415.51
3186	69.58	49.76	1613.04	-1581.74	1274.33	2072.71	5775685.66	626416.22
3187	69.58	49.76	1613.39	-1582.09	1274.93	2073.43	5775686.26	626416.94
3188	69.58	49.76	1613.74	-1582.44	1275.54	2074.15	5775686.87	626417.65
3189	69.58	49.76	1614.08	-1582.78	1276.14	2074.86	5775687.47	626418.37
3190	69.58	49.77	1614.43	-1583.13	1276.75	2075.58	5775688.08	626419.08
3191	69.58	49.77	1614.78	-1583.48	1277.35	2076.29	5775688.68	626419.80
3192	69.58	49.77	1615.13	-1583.83	1277.96	2077.01	5775689.29	626420.51
3193	69.58	49.77	1615.48	-1584.18	1278.57	2077.72	5775689.89	626421.23
3194	69.58	49.77	1615.83	-1584.53	1279.17	2078.44	5775690.50	626421.94
3195	69.58	49.77	1616.18	-1584.88	1279.78	2079.15	5775691.10	626422.66
3196	69.59	49.77	1616.53	-1585.23	1280.38	2079.87	5775691.71	626423.38
3197	69.59	49.78	1616.88	-1585.58	1280.99	2080.58	5775692.32	626424.09
3198	69.59	49.78	1617.23	-1585.93	1281.59	2081.30	5775692.92	626424.81
3199	69.59	49.78	1617.57	-1586.27	1282.20	2082.01	5775693.53	626425.52
3200	69.59	49.78	1617.92	-1586.62	1282.80	2082.73	5775694.13	626426.24
3201	69.58	49.78	1618.27	-1586.97	1283.41	2083.44	5775694.74	626426.95
3202	69.57	49.78	1618.63	-1587.33	1284.01	2084.16	5775695.34	626427.67
3203	69.56	49.78	1618.98	-1587.68	1284.62	2084.87	5775695.95	626428.38
3204	69.55	49.78	1619.33	-1588.03	1285.22	2085.59	5775696.55	626429.10
3205	69.54	49.78	1619.68	-1588.38	1285.83	2086.30	5775697.15	626429.81
3206	69.53	49.78	1620.03	-1588.73	1286.43	2087.02	5775697.76	626430.53
3207	69.52	49.78	1620.38	-1589.08	1287.03	2087.73	5775698.36	626431.24
3208	69.51	49.78	1620.73	-1589.43	1287.64	2088.45	5775698.97	626431.96

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3209	69.50	49.78	1621.08	-1589.78	1288.24	2089.16	5775699.57	626432.67
3210	69.49	49.78	1621.43	-1590.13	1288.85	2089.88	5775700.18	626433.39
3211	69.48	49.78	1621.78	-1590.48	1289.45	2090.60	5775700.78	626434.10
3212	69.47	49.78	1622.14	-1590.84	1290.06	2091.31	5775701.39	626434.82
3213	69.46	49.78	1622.49	-1591.19	1290.66	2092.03	5775701.99	626435.53
3214	69.45	49.78	1622.84	-1591.54	1291.27	2092.74	5775702.60	626436.25
3215	69.44	49.79	1623.19	-1591.89	1291.87	2093.46	5775703.20	626436.96
3216	69.43	49.79	1623.54	-1592.24	1292.48	2094.17	5775703.80	626437.68
3217	69.42	49.79	1623.89	-1592.59	1293.08	2094.89	5775704.41	626438.39
3218	69.41	49.79	1624.24	-1592.94	1293.69	2095.60	5775705.01	626439.11
3219	69.40	49.79	1624.59	-1593.29	1294.29	2096.32	5775705.62	626439.82
3220	69.39	49.79	1624.94	-1593.64	1294.89	2097.03	5775706.22	626440.54
3221	69.38	49.79	1625.29	-1593.99	1295.50	2097.75	5775706.83	626441.25
3222	69.37	49.79	1625.65	-1594.35	1296.10	2098.46	5775707.43	626441.97
3223	69.36	49.79	1626.00	-1594.70	1296.71	2099.18	5775708.04	626442.68
3224	69.35	49.79	1626.35	-1595.05	1297.31	2099.89	5775708.64	626443.40
3225	69.34	49.79	1626.70	-1595.40	1297.92	2100.61	5775709.25	626444.11
3226	69.33	49.79	1627.05	-1595.75	1298.52	2101.32	5775709.85	626444.83
3227	69.32	49.79	1627.40	-1596.10	1299.13	2102.04	5775710.46	626445.54
3228	69.31	49.79	1627.75	-1596.45	1299.73	2102.75	5775711.06	626446.26
3229	69.30	49.79	1628.11	-1596.81	1300.33	2103.46	5775711.66	626446.97
3230	69.29	49.79	1628.46	-1597.16	1300.94	2104.18	5775712.27	626447.69
3231	69.27	49.79	1628.82	-1597.52	1301.54	2104.89	5775712.87	626448.40
3232	69.26	49.80	1629.18	-1597.88	1302.14	2105.61	5775713.47	626449.11
3233	69.24	49.80	1629.53	-1598.23	1302.75	2106.32	5775714.07	626449.83
3234	69.23	49.80	1629.89	-1598.59	1303.35	2107.03	5775714.68	626450.54
3235	69.21	49.80	1630.25	-1598.95	1303.95	2107.75	5775715.28	626451.25
3236	69.20	49.80	1630.60	-1599.30	1304.55	2108.46	5775715.88	626451.97
3237	69.19	49.80	1630.96	-1599.66	1305.16	2109.17	5775716.49	626452.68
3238	69.17	49.80	1631.32	-1600.02	1305.76	2109.89	5775717.09	626453.40
3239	69.16	49.80	1631.67	-1600.37	1306.36	2110.60	5775717.69	626454.11
3240	69.14	49.81	1632.03	-1600.73	1306.97	2111.31	5775718.29	626454.82
3241	69.13	49.81	1632.39	-1601.09	1307.57	2112.03	5775718.90	626455.54
3242	69.12	49.81	1632.74	-1601.44	1308.17	2112.74	5775719.50	626456.25
3243	69.10	49.81	1633.10	-1601.80	1308.77	2113.46	5775720.10	626456.96
3244	69.09	49.81	1633.46	-1602.16	1309.38	2114.17	5775720.71	626457.68
3245	69.07	49.81	1633.81	-1602.51	1309.98	2114.88	5775721.31	626458.39
3246	69.06	49.81	1634.17	-1602.87	1310.58	2115.60	5775721.91	626459.10
3247	69.04	49.82	1634.53	-1603.23	1311.19	2116.31	5775722.51	626459.82
3248	69.03	49.82	1634.88	-1603.58	1311.79	2117.02	5775723.12	626460.53
3249	69.02	49.82	1635.24	-1603.94	1312.39	2117.74	5775723.72	626461.25
3250	69.00	49.82	1635.60	-1604.30	1312.99	2118.45	5775724.32	626461.96
3251	68.99	49.82	1635.95	-1604.65	1313.60	2119.17	5775724.93	626462.67
3252	68.97	49.82	1636.31	-1605.01	1314.20	2119.88	5775725.53	626463.39
3253	68.96	49.82	1636.67	-1605.37	1314.80	2120.59	5775726.13	626464.10
3254	68.95	49.83	1637.02	-1605.72	1315.41	2121.31	5775726.74	626464.81
3255	68.93	49.83	1637.38	-1606.08	1316.01	2122.02	5775727.34	626465.53
3256	68.92	49.83	1637.74	-1606.44	1316.61	2122.73	5775727.94	626466.24
3257	68.90	49.83	1638.09	-1606.79	1317.22	2123.45	5775728.54	626466.95
3258	68.89	49.82	1638.46	-1607.16	1317.82	2124.16	5775729.15	626467.67
3259	68.87	49.82	1638.82	-1607.52	1318.42	2124.87	5775729.75	626468.38
3260	68.85	49.81	1639.18	-1607.88	1319.02	2125.58	5775730.35	626469.09
3261	68.83	49.80	1639.55	-1608.25	1319.62	2126.29	5775730.95	626469.80
3262	68.81	49.80	1639.91	-1608.61	1320.22	2127.00	5775731.55	626470.51
3263	68.79	49.79	1640.28	-1608.98	1320.83	2127.71	5775732.16	626471.22
3264	68.77	49.78	1640.64	-1609.34	1321.43	2128.42	5775732.76	626471.93
3265	68.76	49.78	1641.01	-1609.71	1322.03	2129.13	5775733.36	626472.64
3266	68.74	49.77	1641.37	-1610.07	1322.63	2129.84	5775733.96	626473.35
3267	68.72	49.76	1641.73	-1610.43	1323.23	2130.55	5775734.56	626474.06
3268	68.70	49.76	1642.10	-1610.80	1323.84	2131.26	5775735.17	626474.77
3269	68.68	49.75	1642.46	-1611.16	1324.44	2131.98	5775735.77	626475.48
3270	68.66	49.74	1642.83	-1611.53	1325.04	2132.69	5775736.37	626476.19
3271	68.64	49.74	1643.19	-1611.89	1325.64	2133.40	5775736.97	626476.90
3272	68.63	49.73	1643.56	-1612.26	1326.24	2134.11	5775737.57	626477.61
3273	68.61	49.72	1643.92	-1612.62	1326.85	2134.82	5775738.17	626478.33
3274	68.59	49.72	1644.28	-1612.98	1327.45	2135.53	5775738.78	626479.04

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3275	68.57	49.71	1644.65	-1613.35	1328.05	2136.24	5775739.38	626479.75
3276	68.55	49.70	1645.01	-1613.71	1328.65	2136.95	5775739.98	626480.46
3277	68.53	49.70	1645.38	-1614.08	1329.25	2137.66	5775740.58	626481.17
3278	68.51	49.69	1645.74	-1614.44	1329.86	2138.37	5775741.18	626481.88
3279	68.49	49.68	1646.11	-1614.81	1330.46	2139.08	5775741.79	626482.59
3280	68.48	49.68	1646.47	-1615.17	1331.06	2139.79	5775742.39	626483.30
3281	68.46	49.67	1646.83	-1615.53	1331.66	2140.50	5775742.99	626484.01
3282	68.44	49.66	1647.20	-1615.90	1332.26	2141.21	5775743.59	626484.72
3283	68.42	49.66	1647.56	-1616.26	1332.86	2141.92	5775744.19	626485.43
3284	68.40	49.65	1647.93	-1616.63	1333.47	2142.63	5775744.80	626486.14
3285	68.38	49.64	1648.29	-1616.99	1334.07	2143.34	5775745.40	626486.85
3286	68.37	49.64	1648.66	-1617.36	1334.67	2144.05	5775746.00	626487.56
3287	68.35	49.62	1649.03	-1617.73	1335.28	2144.76	5775746.60	626488.27
3288	68.34	49.60	1649.40	-1618.10	1335.88	2145.46	5775747.21	626488.97
3289	68.33	49.59	1649.77	-1618.47	1336.48	2146.17	5775747.81	626489.68
3290	68.31	49.57	1650.15	-1618.85	1337.09	2146.87	5775748.42	626490.38
3291	68.30	49.55	1650.52	-1619.22	1337.69	2147.58	5775749.02	626491.09
3292	68.29	49.54	1650.89	-1619.59	1338.30	2148.28	5775749.62	626491.79
3293	68.27	49.52	1651.26	-1619.96	1338.90	2148.99	5775750.23	626492.50
3294	68.26	49.50	1651.63	-1620.33	1339.50	2149.69	5775750.83	626493.20
3295	68.25	49.49	1652.00	-1620.70	1340.11	2150.40	5775751.44	626493.90
3296	68.23	49.47	1652.38	-1621.08	1340.71	2151.10	5775752.04	626494.61
3297	68.22	49.45	1652.75	-1621.45	1341.32	2151.81	5775752.65	626495.31
3298	68.21	49.44	1653.12	-1621.82	1341.92	2152.51	5775753.25	626496.02
3299	68.20	49.42	1653.49	-1622.19	1342.53	2153.22	5775753.85	626496.72
3300	68.18	49.40	1653.86	-1622.56	1343.13	2153.92	5775754.46	626497.43
3301	68.17	49.39	1654.23	-1622.93	1343.73	2154.63	5775755.06	626498.13
3302	68.16	49.37	1654.61	-1623.31	1344.34	2155.33	5775755.67	626498.84
3303	68.14	49.35	1654.98	-1623.68	1344.94	2156.04	5775756.27	626499.54
3304	68.13	49.34	1655.35	-1624.05	1345.55	2156.74	5775756.87	626500.25
3305	68.12	49.32	1655.72	-1624.42	1346.15	2157.45	5775757.48	626500.95
3306	68.10	49.30	1656.09	-1624.79	1346.75	2158.15	5775758.08	626501.66
3307	68.09	49.29	1656.46	-1625.16	1347.36	2158.86	5775758.69	626502.36
3308	68.08	49.27	1656.84	-1625.54	1347.96	2159.56	5775759.29	626503.07
3309	68.06	49.25	1657.21	-1625.91	1348.57	2160.27	5775759.90	626503.77
3310	68.05	49.24	1657.58	-1626.28	1349.17	2160.97	5775760.50	626504.48
3311	68.04	49.22	1657.95	-1626.65	1349.78	2161.68	5775761.10	626505.18
3312	68.03	49.20	1658.32	-1627.02	1350.38	2162.38	5775761.71	626505.89
3313	68.01	49.19	1658.69	-1627.39	1350.98	2163.09	5775762.31	626506.59
3314	68.00	49.17	1659.07	-1627.77	1351.59	2163.79	5775762.92	626507.30
3315	67.99	49.16	1659.44	-1628.14	1352.19	2164.49	5775763.52	626508.00
3316	67.99	49.17	1659.81	-1628.51	1352.80	2165.20	5775764.13	626508.70
3317	67.99	49.17	1660.19	-1628.89	1353.40	2165.90	5775764.73	626509.41
3318	67.99	49.17	1660.56	-1629.26	1354.01	2166.60	5775765.34	626510.11
3319	67.99	49.18	1660.94	-1629.64	1354.61	2167.30	5775765.94	626510.81
3320	67.98	49.18	1661.31	-1630.01	1355.22	2168.00	5775766.55	626511.51
3321	67.98	49.19	1661.69	-1630.39	1355.83	2168.71	5775767.15	626512.21
3322	67.98	49.19	1662.06	-1630.76	1356.43	2169.41	5775767.76	626512.92
3323	67.98	49.20	1662.44	-1631.14	1357.04	2170.11	5775768.36	626513.62
3324	67.98	49.20	1662.81	-1631.51	1357.64	2170.81	5775768.97	626514.32
3325	67.98	49.20	1663.19	-1631.89	1358.25	2171.51	5775769.58	626515.02
3326	67.98	49.21	1663.56	-1632.26	1358.85	2172.22	5775770.18	626515.72
3327	67.98	49.21	1663.94	-1632.64	1359.46	2172.92	5775770.79	626516.43
3328	67.98	49.22	1664.31	-1633.01	1360.06	2173.62	5775771.39	626517.13
3329	67.97	49.22	1664.69	-1633.39	1360.67	2174.32	5775772.00	626517.83
3330	67.97	49.22	1665.06	-1633.76	1361.27	2175.02	5775772.60	626518.53
3331	67.97	49.23	1665.44	-1634.14	1361.88	2175.73	5775773.21	626519.23
3332	67.97	49.23	1665.81	-1634.51	1362.49	2176.43	5775773.81	626519.94
3333	67.97	49.24	1666.19	-1634.89	1363.09	2177.13	5775774.42	626520.64
3334	67.97	49.24	1666.56	-1635.26	1363.70	2177.83	5775775.02	626521.34
3335	67.97	49.25	1666.94	-1635.64	1364.30	2178.53	5775775.63	626522.04
3336	67.97	49.25	1667.31	-1636.01	1364.91	2179.24	5775776.24	626522.74
3337	67.97	49.25	1667.69	-1636.39	1365.51	2179.94	5775776.84	626523.45
3338	67.97	49.26	1668.06	-1636.76	1366.12	2180.64	5775777.45	626524.15
3339	67.96	49.26	1668.44	-1637.14	1366.72	2181.34	5775778.05	626524.85
3340	67.96	49.27	1668.81	-1637.51	1367.33	2182.04	5775778.66	626525.55

MD	Angle	Direction	TVDRT	TVDSS	Dnorth	Deast	Northing	Easting
3341	67.96	49.27	1669.19	-1637.89	1367.93	2182.75	5775779.26	626526.25
3342	67.96	49.28	1669.56	-1638.26	1368.54	2183.45	5775779.87	626526.96
3343	67.96	49.28	1669.94	-1638.64	1369.15	2184.15	5775780.47	626527.66
3344	67.95	49.29	1670.32	-1639.02	1369.75	2184.85	5775781.08	626528.36
3345	67.93	49.30	1670.70	-1639.40	1370.35	2185.56	5775781.68	626529.06
3346	67.92	49.30	1671.07	-1639.77	1370.95	2186.26	5775782.28	626529.77
3347	67.91	49.31	1671.45	-1640.15	1371.56	2186.96	5775782.88	626530.47
3348	67.89	49.32	1671.83	-1640.53	1372.16	2187.66	5775783.49	626531.17
3349	67.88	49.33	1672.21	-1640.91	1372.76	2188.37	5775784.09	626531.87
3350	67.87	49.33	1672.59	-1641.29	1373.36	2189.07	5775784.69	626532.58
3351	67.85	49.34	1672.97	-1641.67	1373.97	2189.77	5775785.29	626533.28
3352	67.84	49.35	1673.34	-1642.04	1374.57	2190.47	5775785.90	626533.98
3353	67.83	49.36	1673.72	-1642.42	1375.17	2191.18	5775786.50	626534.68
3354	67.81	49.36	1674.10	-1642.80	1375.77	2191.88	5775787.10	626535.39
3355	67.80	49.37	1674.48	-1643.18	1376.38	2192.58	5775787.70	626536.09
3356	67.79	49.38	1674.86	-1643.56	1376.98	2193.29	5775788.31	626536.79
3357	67.77	49.39	1675.24	-1643.94	1377.58	2193.99	5775788.91	626537.50
3358	67.76	49.40	1675.61	-1644.31	1378.18	2194.69	5775789.51	626538.20
3359	67.75	49.40	1675.99	-1644.69	1378.79	2195.39	5775790.11	626538.90
3360	67.73	49.41	1676.37	-1645.07	1379.39	2196.10	5775790.72	626539.60
3361	67.72	49.42	1676.75	-1645.45	1379.99	2196.80	5775791.32	626540.31
3362	67.71	49.43	1677.13	-1645.83	1380.59	2197.50	5775791.92	626541.01
3363	67.69	49.43	1677.51	-1646.21	1381.20	2198.20	5775792.53	626541.71
3364	67.68	49.44	1677.88	-1646.58	1381.80	2198.91	5775793.13	626542.41
3365	67.67	49.45	1678.26	-1646.96	1382.40	2199.61	5775793.73	626543.12
3366	67.65	49.46	1678.64	-1647.34	1383.00	2200.31	5775794.33	626543.82
3367	67.64	49.47	1679.02	-1647.72	1383.61	2201.02	5775794.94	626544.52
3368	67.63	49.47	1679.40	-1648.10	1384.21	2201.72	5775795.54	626545.23
3369	67.61	49.48	1679.78	-1648.48	1384.81	2202.42	5775796.14	626545.93
3370	67.60	49.49	1680.15	-1648.85	1385.41	2203.12	5775796.74	626546.63
3371	67.59	49.50	1680.53	-1649.23	1386.02	2203.83	5775797.35	626547.33
3372	67.58	49.49	1680.91	-1649.61	1386.62	2204.53	5775797.95	626548.04
3373	67.58	49.48	1681.29	-1649.99	1387.22	2205.23	5775798.55	626548.74
3374	67.59	49.47	1681.67	-1650.37	1387.82	2205.93	5775799.15	626549.44
3375	67.59	49.46	1682.06	-1650.76	1388.42	2206.64	5775799.75	626550.14
3376	67.59	49.45	1682.44	-1651.14	1389.02	2207.34	5775800.35	626550.84
3377	67.59	49.44	1682.82	-1651.52	1389.63	2208.04	5775800.95	626551.55
3378	67.59	49.43	1683.20	-1651.90	1390.23	2208.74	5775801.56	626552.25
3379	67.60	49.42	1683.58	-1652.28	1390.83	2209.44	5775802.16	626552.95
3380	67.60	49.41	1683.96	-1652.66	1391.43	2210.15	5775802.76	626553.65
3381	67.60	49.40	1684.34	-1653.04	1392.03	2210.85	5775803.36	626554.36
3382	67.60	49.38	1684.72	-1653.42	1392.63	2211.55	5775803.96	626555.06
3383	67.61	49.37	1685.10	-1653.80	1393.23	2212.25	5775804.56	626555.76
3384	67.61	49.36	1685.49	-1654.19	1393.83	2212.95	5775805.16	626556.46
3385	67.61	49.35	1685.87	-1654.57	1394.44	2213.66	5775805.76	626557.16
3386	67.61	49.35	1686.25	-1654.95	1395.04	2214.36	5775806.37	626557.87
3387	67.61	49.35	1686.63	-1655.33	1395.64	2215.06	5775806.97	626558.57
3388	67.61	49.35	1687.01	-1655.71	1396.24	2215.76	5775807.57	626559.27
3389	67.61	49.35	1687.39	-1656.09	1396.84	2216.46	5775808.17	626559.97
3390	67.61	49.35	1687.77	-1656.47	1397.45	2217.16	5775808.78	626560.67
3391	67.61	49.35	1688.15	-1656.85	1398.05	2217.87	5775809.38	626561.37
3392	67.61	49.35	1688.53	-1657.23	1398.65	2218.57	5775809.98	626562.08
3393	67.61	49.35	1688.91	-1657.61	1399.25	2219.27	5775810.58	626562.78
3394	67.61	49.35	1689.30	-1658.00	1399.86	2219.97	5775811.18	626563.48
3395	67.61	49.35	1689.68	-1658.38	1400.46	2220.67	5775811.79	626564.18
3396	67.61	49.35	1690.06	-1658.76	1401.06	2221.37	5775812.39	626564.88
3397	67.61	49.35	1690.44	-1659.14	1401.66	2222.08	5775812.99	626565.58
3398	67.61	49.35	1690.82	-1659.52	1402.27	2222.78	5775813.59	626566.28
3399	67.61	49.35	1691.20	-1659.90	1402.87	2223.48	5775814.20	626566.99
3400	67.61	49.35	1691.58	-1660.28	1403.47	2224.18	5775814.80	626567.69
3401	67.61	49.35	1691.96	-1660.66	1404.07	2224.88	5775815.40	626568.39
3402	67.61	49.35	1692.34	-1661.04	1404.67	2225.58	5775816.00	626569.09
3403	67.61	49.35	1692.72	-1661.42	1405.28	2226.28	5775816.61	626569.79
3404	67.61	49.35	1693.10	-1661.80	1405.88	2226.99	5775817.21	626570.49
3405	67.61	49.35	1693.49	-1662.19	1406.48	2227.69	5775817.81	626571.19
3406	67.61	49.35	1693.87	-1662.57	1407.08	2228.39	5775818.41	626571.90

## **APPENDIX 2a**

### **TUNA A31A**

#### **Petrophysics Evaluation Summary**

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

**Tuna A31A**  
**Petrophysics Report**

**Petrophysicist: K.Kuttan**

## Tuna A31A Log Interpretation

Tuna A31A is a directional well drilled from the plugged and abandoned Tuna A31 well. It was designed to reach the M-1 Sands (primary target) and L-050 Sands (secondary target). The well was spudded on the 31st of December 2004 below the Tuna A31 9.625inch casing. A 8.5" hole was drilled to 3048mMD and the well was logged with the Reeves Shuttle Logging system from 3031m to 829mMD. After reviewing the logs a decision was made to drill ahead to a total depth of the 3406mMD. The well was then logged with the Reeves Shuttle Logging system from 3388m to 2930m MD. 7" production casing was then run after logging was completed. The well was completed with a 3½" tandem completion and handed over to Production on the 25th of January 2005

The Reeves wireline equivalent logs have been analysed for porosity, water saturation and net pay over the interval 33 – 3247 mMDRT.

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

### DATA

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

Survey/Log	Suite	Company	Top (m MDRT)	Bottom (m MDRT)
Compact Gamma Ray - Compact Dual Neutron - Compact Photodensity - Compact Sonic - Compact Dual Laterolog	1	Reeves	829	3031
Compact Gamma Ray - Compact Dual Neutron - Compact Photodensity - Compact Sonic - Compact Dual Laterolog	2	Reeves	2930	3388

### Deviation

The well angle over the M and L reservoirs was 67 degrees.

### Mud Data

Mud Type : KCl/Glycol/PHPA  
Mud Weight: 10.1 ppg  
Rm: 0.137 @ 25 °C  
Rmf: 0.099 @ 25 °C  
Rmc: 0.17 @ 25 °C  
BHT: 80.3 °C

### Hole Size

829 – 3406 mMDRT 8½ inches

### Data Acquisition & Log Quality

No problems were encountered in the acquisition of the logs and the data quality of all the logs is acceptable.

### Data Processing

The resistivity, density, neutron , gr and sonic logs from the two suites were merged. The DDLL (deep laterolog), DSLL (shallow laterolog), DEN (bulk density), NPRL (neutron porosity) and DT35 (compressional sonic) curves were depth aligned to the GGCE (borehole corrected gamma ray) curve. All coal zones were manually picked and a coal flag (flag\_coal) was created.

In addition, temperature (temp) and hydrocarbon flag (flag\_rhoH) curves were also generated. All the new curves were used as inputs for the final petrophysical interpretation.

## INTERPRETATION

### Logs Used

The primary logs used in the interpretation were DDLL (deep resistivity), GGCE (borehole corrected gamma ray), DEN (bulk density) and NPRL (thermal neutron porosity in LPU).

### Formation Water Salinity

$R_{wa}$  analysis using  $a = 1$ ,  $m = 2$  and  $n = 2$  indicates clean water sands have an apparent formation water salinity of 25,000 ppm NaCl equivalent.

### Hydrocarbon Type Identification

In the M-1 reservoir, the density-neutron logs suggest that it is gas bearing down to 2611m MD and the PHIX-DT plot (Fig.1) suggest that GOC is probably at 2611.8mMD (1380.5m TVDSS).

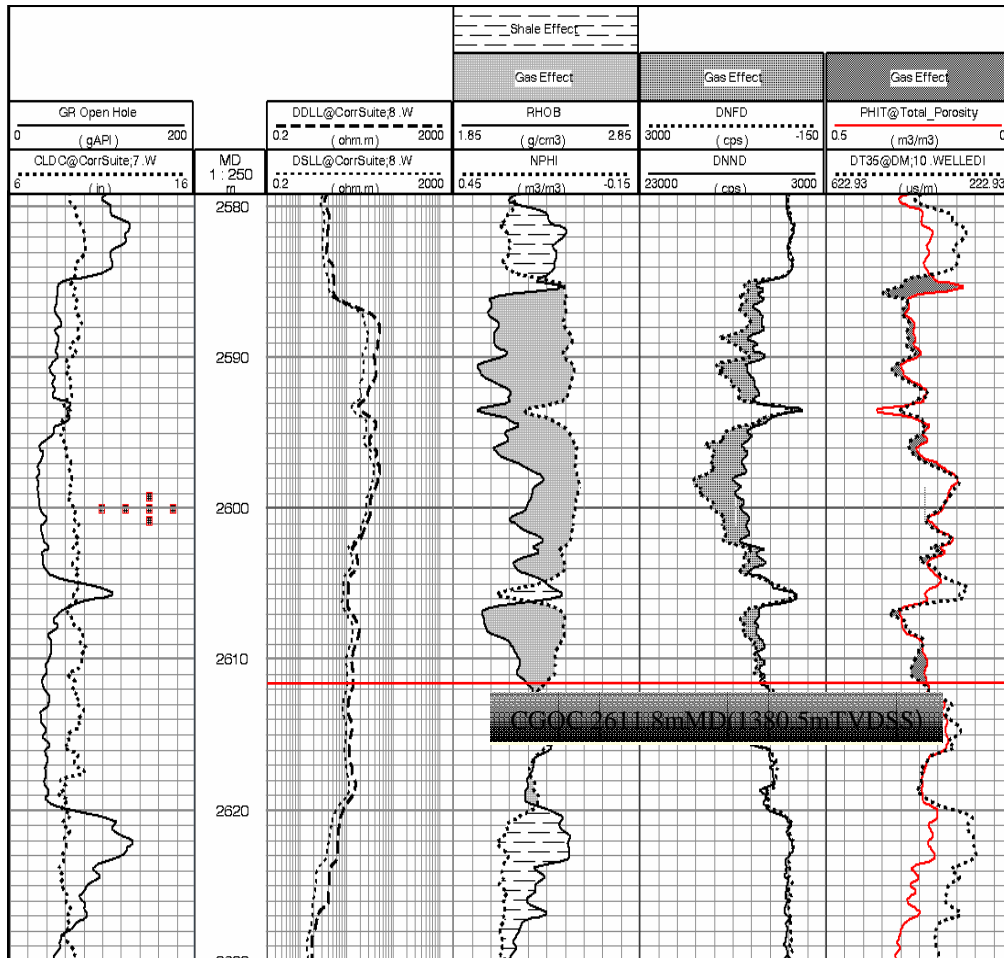
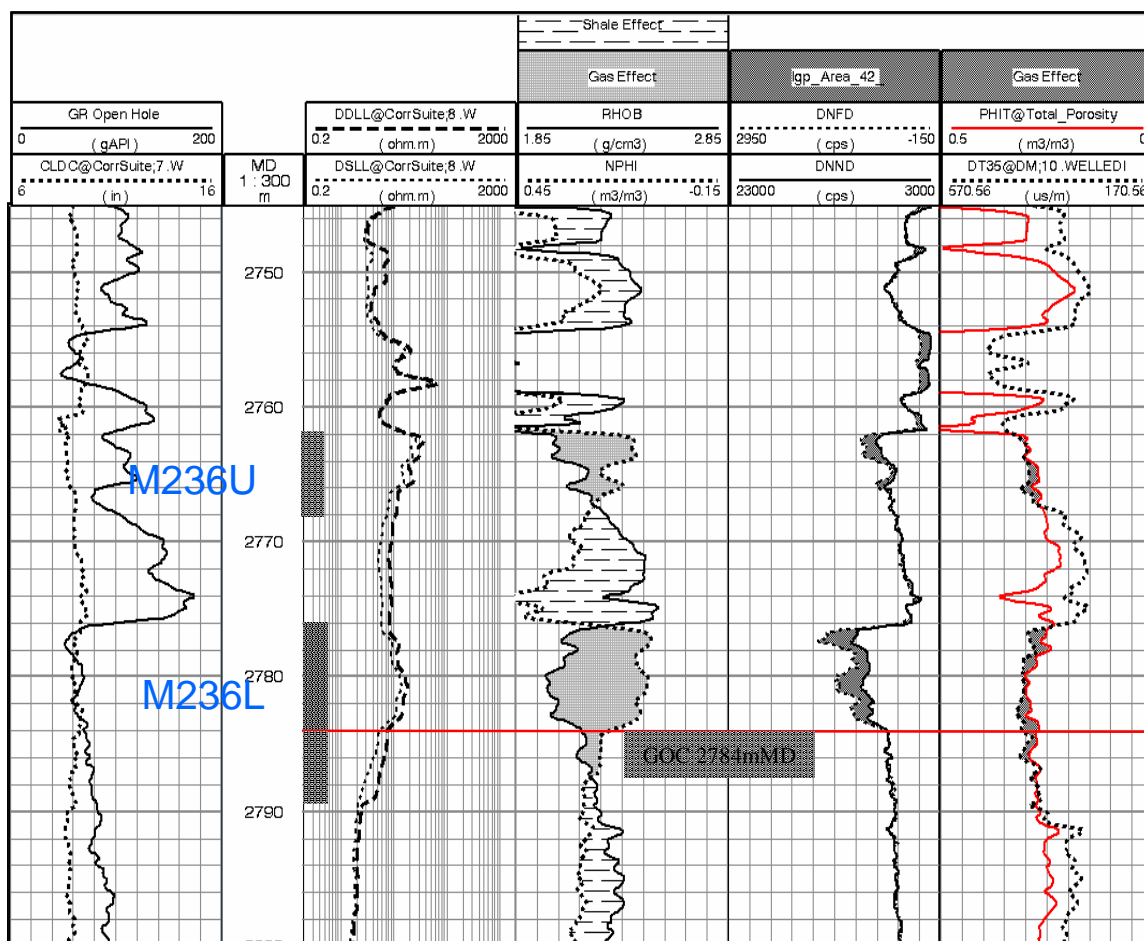


Figure 1: M-1 Hydrocarbon Type

The M236U is clearly gas bearing as indicated by the density-neutron cross-over and separation between the near and far neutron count rates (Figure 2). The M236L has a GOC at 2784m MD as indicated by the density-neutron cross-over and the near-far neutron counts separation.



**Figure 2: M236U and M236L Hydrocarbon Type**

The M230CU , M230CL, L040 and L042 reservoirs are interpreted to be gas bearing on the strength of the apparent gas effect shown by the PHIX-DT overlay (Figure 3).

The L045, L046 and L047 sands (Figure 4) are interpreted to be gas bearing as indicated by the clear density-neutron cross-over and the apparent gas effect indicated by the PHIX-DT overlay.

The upper part of the L050 sand is shaly and this probably has suppressed the gas effect on the density-neutron overlay. However, the PHIX-DT overlay suggest that the upper part of this sand is probably gas bearing and therefore a GOC is interpreted at 2924mMD. Similarly, the very top of the L051 sand is probably gas bearing per the PHIX-DT overlay and GOC for this sand is interpreted at 2931mMD.

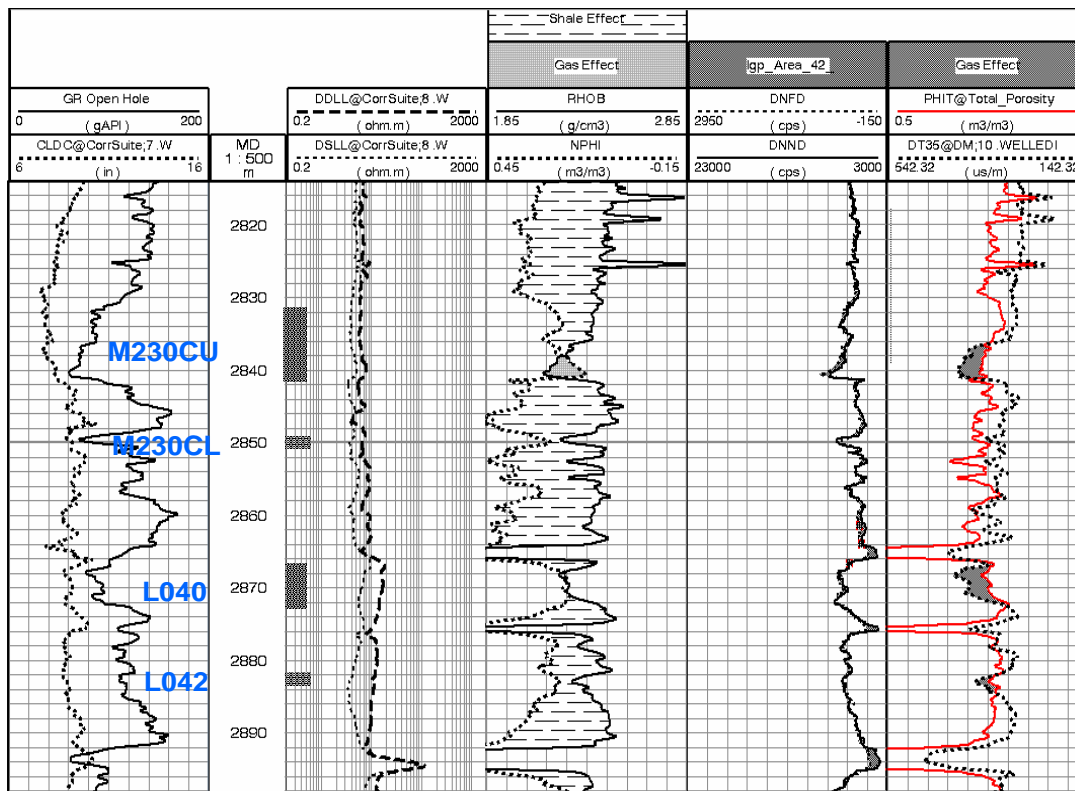


Figure 3: Hydrocarbon Type in M230, L0040 and L042

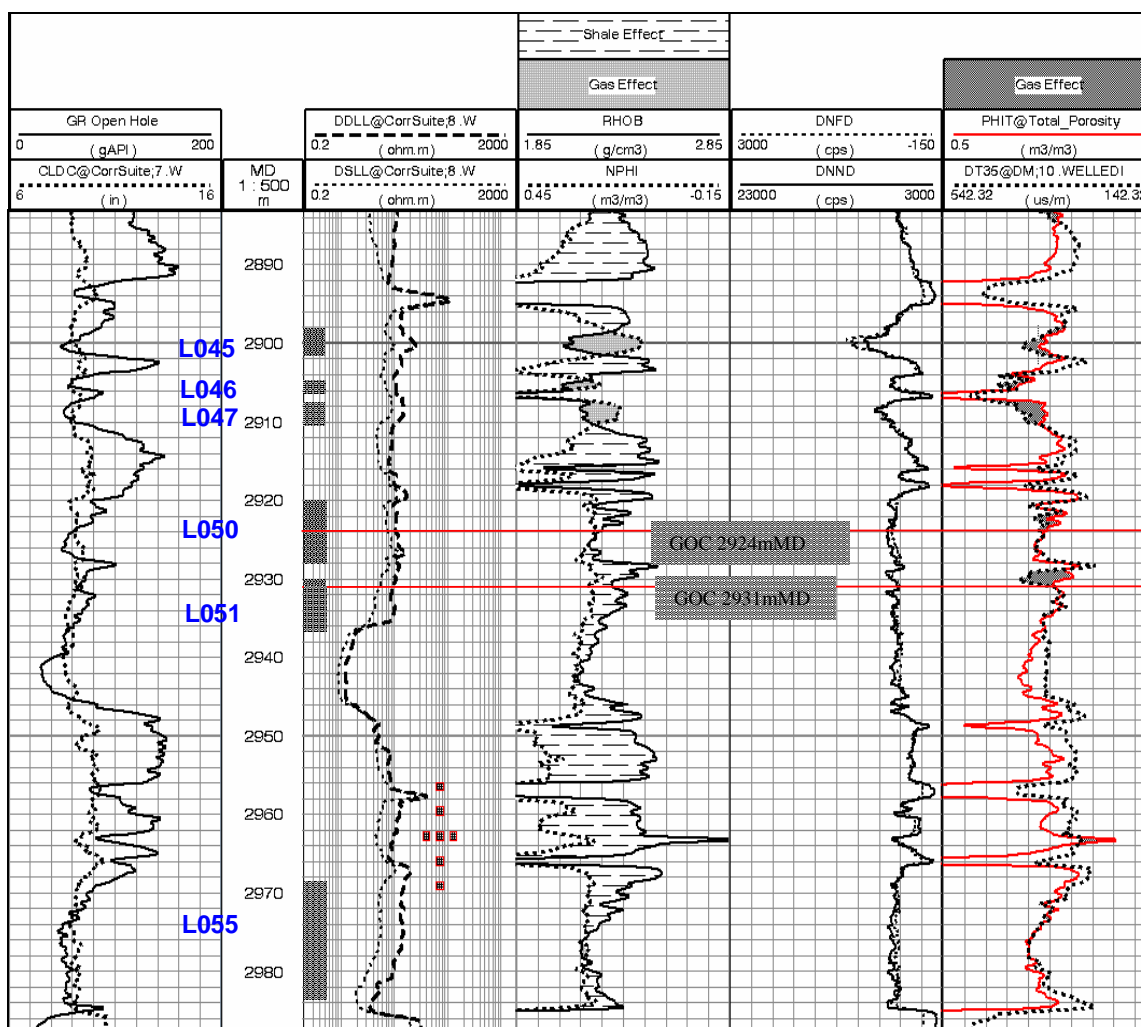


Figure 4: Hydrocarbon Type in L045, L046, L050, L051, L055

Shale Volume, Porosity and Water Saturation

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

ELAN+ MODEL

ELAN Processes

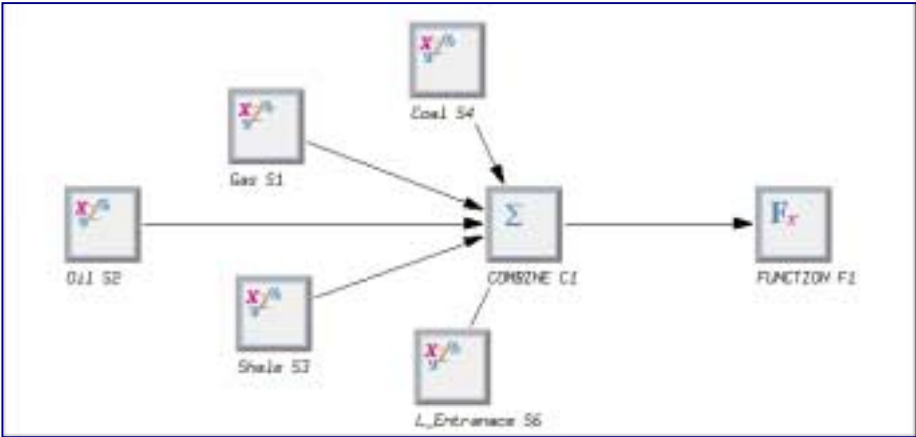


Figure 5: Elan + Model and Module Configuration

ELAN Input Channels

Log Curve Selector		Selector Options	
		Compound Name Spec	TUNA A31A
TEMP_CH	TEMP;*	TEMP@WELLEDIT;2 .WELLEDIT .WELLEDIT [A159	
RHOB_IFAC_CH	IFRH;*		
NPRI_IFAC_CH	INPR;*		
RHOB_CH	DEN-BPB;*	DEN@CorrSuite;8 .WELLEDIT [A1598926]	
NPRI_CH	NPRL-BPB;*	NPRL@CorrSuite;8 .WELLEDIT [A1598934]	
CUDC_CH/RT_CH	DDLL-BPB;*	DDLL@CorrSuite;8 .WELLEDIT [A1598924]	
GR_CH	GGCE-BPB;*	GGCE@CorrSuite;9 .WELLEDIT [A1598932]	
PRB1_CH	FLAG_RHON;*	FLAG_RHON@Hydrocarb_Density;5 [A1847434]	
PRB2_CH	PRB2;*		
PRB3_CH	PRB3;*		
PRB4_CH	FLAG_COAL;*	FLAG_COAL@CorrSuite;3 .WELLEDIT [A1598941]	

## ELAN Global Parameters

---

Reference Index	MD
Processing Interval	2460.0120(m) To 3380.0002(m)
Sampling Rate	0.1(m)
Uncertainty Channel	FALSE
Clay Input	DRY
Special Fluids	IMMOVABLE_HYDROCARBON

---

## ELAN Zone Definition

---

Name	Bottom To Top
Coarse Clastics	3380.0002(m) To 2482.0000(m)
Gurnard	2482.0000(m) To 2460.0120(m)

---

## ELAN Process Definiton

### Process SOLVE1 "Gas"

Equations	RHOB	NPHI	CUDC_DWA	GR	CT1	CT3	CT4	
Volumes	QUAR	ORTH	PYRI	ILLI	XWAT	UWAT	XGAS	UGAS
Constraint Zones	Bottom			Top				
UNDEFINED	3380.0002(m )			2468.0000(m )				
U Gurnard	2468.0000(m )			2460.0120(m )				

### Constraints Applied

UNDEFINED	- IrreducibleXWater
UNDEFINED	- IrreducibleUWater
UNDEFINED	- WaterBaseMud_SXO_gt_SW

---

### Process SOLVE2 "Oil"

Equations	RHOB	NPHI	CUDC_DWA	GR	CT2	CT3	
Volumes	QUAR	ORTH	ILLI	XWAT	UWAT	XOIL	UOIL
Constraint Zones	Bottom			Top			
UNDEFINED	3380.0002(m )			2460.0120(m )			

### Constraints Applied

UNDEFINED	- IrreducibleXWater
UNDEFINED	- IrreducibleUWater
UNDEFINED	- WaterBaseMud_SXO_gt_SW

---

### Process SOLVE3 "Shale"

Equations	RHOB	CUDC_DWA	GR	
Volumes	QUAR	ILLI	XWAT	UWAT
Constraint Zones	Bottom		Top	
UNDEFINED	3380.0002(m )		2460.0120(m )	

### Process SOLVE4 "Coal"

Equations	RHOB
-----------	------

Volumes	COAL	
Constraint Zones	Bottom	Top
UNDEFINED	3380.0002(m )	2460.0120(m )

---

<b>Process</b>	<b>SOLVE6 "L_Entranace"</b>	Tuna A5A
Equations	RHOB	Logs used in
Volumes	CALC	Elan + analysis

Constraint Zones	Bottom	Top
UNDEFINED	3380.0002(m )	2460.0120(m )

---

<b>Process</b>	<b>COMBINE 1 "COMBINE"</b>
Order	SOL.2 SOL.1 SOL.3 SOL.4 SOL.6

#### Combine Method

"Tuna " 11089.2393 (m ) **Internal Average**  
 "L Entrance " 8077.4277 (m ) **Sol.6**

#### Probability Functions

```
probability(SOL.6, 0)

probability(SOL.4, PRB4_CH)

prob3 = linear(ILLI_VOL.SOL.3, 0.4, 0, 0.6, 1)
probability(SOL.3, prob3)

prob1 = if (PRB1_CH <=0.25, 1, 0)
probability(SOL.1, prob1)
```

---

<b>Process</b>	<b>FUNCTION 1 "FUNCTION"</b>					
Outputs	VCL	SXWI	SWT	SUWI	PIGN	PHIT

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

---

#### ELAN Probability Expressions

---

```
probability(SOL.6, 0)

probability(SOL.4, PRB4_CH)

prob3 = linear(ILLI_VOL.SOL.3, 0.4, 0, 0.6, 1)
probability(SOL.3, prob3)

prob1 = if (PRB1_CH <=0.25, 1, 0)
probability(SOL.1, prob1)
```

---

## ELAN Model Constraints

---

Model 1:      Constraint Zones

Name	Boundary	Temperature
UNDEFINED	11089.2393	-999.25
U Gurnard	8097.1128	0.00

constraints

UNDEFINED	- IrreducibleXWater
UNDEFINED	- IrreducibleUWater
UNDEFINED	- WaterBaseMud_SXO_gt_SW

Model 2:      Constraint Zones

Name	Boundary	Temperature
UNDEFINED	11089.2393	-999.25

constraints

UNDEFINED	- IrreducibleXWater
UNDEFINED	- IrreducibleUWater
UNDEFINED	- WaterBaseMud_SXO_gt_SW

Model 3:      Constraint Zones

Name	Boundary	Temperature
UNDEFINED	11089.2393	-999.25

constraints

Model 4:      Constraint Zones

Name	Boundary	Temperature
UNDEFINED	11089.2393	-999.25

constraints

Model 6:      Constraint Zones

Name	Boundary	Temperature
UNDEFINED	11089.2393	-999.25

---

Model 1:      Constraint Zones

---

## ELAN Different Parameters

---

Parameters	Coarse C1	Gurnard
CXDC_XWAT (mS/m )	20.038	15.642
CXDC_XBWA (mS/m )	11.445	8.864
CUDC_UWAT (mS/m )	9.334	7.546
CUDC_UBWA (mS/m )	4.000	7.546
GR_QUAR (gAPI )	40.000	100.000
CT4_QUAR ( )	0.010	0.040
CUDC_UNC_ZP (mS/m )	0.046	0.041
GR_UNC_WM ( )	0.300	0.100
RHOB_IFAC_ZP( )	0.700	0.100
NPHI_IFAC_ZP( )	0.700	0.100

---

# ELAN Same Parameters

Parameter	Value	Parameter	Value
RHOB_QUAR	2.650(g/cm3 )	RHOB_CALC	2.710(g/cm3 )
RHOB_DOLO	2.847(g/cm3 )	RHOB_ORTH	2.570(g/cm3 )
RHOB_PYRI	4.990(g/cm3 )	RHOB_GLAU	2.650(g/cm3 )
RHOB_ILLI	2.780(g/cm3 )	RHOB_KAOL	2.620(g/cm3 )
RHOB_COAL	1.200(g/cm3 )	RHOB_IGNE	3.000(g/cm3 )
RHOB_XWAT	1.014(g/cm3 )	RHOB_UWAT	0.994(g/cm3 )
RHOB_XOIL	0.700(g/cm3 )	RHOB_UOIL	0.700(g/cm3 )
RHOB_XGAS	-0.051(g/cm3 )	RHOB_UGAS	-0.051(g/cm3 )
RHOB_XBWA	1.000(g/cm3 )	NPHI_QUAR	-0.059(m3/m3 )
NPHI_CALC	0.000(m3/m3 )	NPHI_DOLO	0.032(m3/m3 )
NPHI_ORTH	-0.010(m3/m3 )	NPHI_PYRI	0.008(m3/m3 )
NPHI_GLAU	0.410(m3/m3 )	NPHI_ILLI	0.247(m3/m3 )
NPHI_KAOL	0.450(m3/m3 )	NPHI_COAL	0.450(m3/m3 )
NPHI_XWAT	1.000(m3/m3 )	NPHI_UWAT	1.000(m3/m3 )
NPHI_XOIL	1.000(m3/m3 )	NPHI_UOIL	1.000(m3/m3 )
NPHI_XGAS	0.039(m3/m3 )	NPHI_UGAS	0.039(m3/m3 )
NPHI_XBWA	1.000(m3/m3 )	DT_QUAR	55.500(us/m )
DT_CALC	47.800(us/m )	DT_DOLO	43.500(us/m )
DT_ORTH	60.000(us/m )	DT_ILLI	60.000(us/m )
DT_KAOL	91.318(us/m )	DT_COAL	121.920(us/m )
DT_IGNE	16.916(us/m )	DT_XWAT	0.000(us/m )
DT_UWAT	220.000(us/m )	DT_XOIL	0.000(us/m )
DT_UOIL	240.000(us/m )	DT_XGAS	0.000(us/m )
DT_UGAS	289.865(us/m )	DT_XBWA	189.000(us/m )
U_QUAR	5.000( )	U_CALC	14.100( )
U_DOLO	9.100( )	U_ILLI	9.900( )
U_KAOL	5.100( )	U_COAL	1.000( )
U_XWAT	0.692( )	U_UWAT	0.000( )
U_XOIL	0.136( )	U_UOIL	0.000( )
U_XGAS	0.012( )	U_UGAS	0.000( )
U_XBWA	0.398( )	CXDC_ILLI	-999.250(mS/m )
CXDC_KAOL	-999.250(mS/m )	CUDC_GLAU	-999.250(mS/m )
CUDC_ILLI	-999.250(mS/m )	CUDC_KAOL	-999.250(mS/m )
GR_CALC	11.000(gAPI )	GR_DOLO	3.000(gAPI )
GR_ORTH	200.000(gAPI )	GR_PYRI	0.000(gAPI )
GR_GLAU	150.000(gAPI )	GR_ILLI	235.000(gAPI )
GR_KAOL	98.000(gAPI )	GR_COAL	40.000(gAPI )
GR_IGNE	40.000(gAPI )	GR_XWAT	0.000(gAPI )
GR_UWAT	0.000(gAPI )	GR_XOIL	0.000(gAPI )
GR_UOIL	0.000(gAPI )	GR_XGAS	0.000(gAPI )
GR_UGAS	0.000(gAPI )	GR_XBWA	0.000(gAPI )
EX1_QUAR	0.000( )	EX1_CALC	0.000( )
EX1_ORTH	0.000( )	EX1_PYRI	0.000( )
EX1_ILLI	0.000( )	EX1_COAL	0.000( )
EX1_XWAT	0.000( )	EX1_UWAT	0.000( )
EX1_XOIL	0.000( )	EX1_UOIL	0.000( )
EX1_XGAS	0.000( )	EX1_UGAS	0.000( )
EX1_XBWA	0.000( )	CT1_QUAR	0.000( )
CT1_CALC	0.000( )	CT1_DOLO	0.000( )
CT1_ORTH	0.000( )	CT1_PYRI	0.000( )
CT1_GLAU	0.000( )	CT1_ILLI	0.000( )
CT1_KAOL	0.000( )	CT1_COAL	0.000( )
CT1_IGNE	0.000( )	CT1_XWAT	0.000( )
CT1_UWAT	0.000( )	CT1_XOIL	0.000( )
CT1_UOIL	0.000( )	CT1_XGAS	1.000( )
CT1_UGAS	-0.300( )	CT1_XBWA	0.000( )
CT2_QUAR	0.000( )	CT2_CALC	0.000( )

CT2_DOLO	0.000( )	CT2_ORTH	0.000( )
CT2_PYRI	0.000( )	CT2_GLAU	0.000( )
CT2_ILLI	0.000( )	CT2_KAOL	0.000( )
CT2_COAL	0.000( )	CT2_IGNE	0.000( )
CT2_XWAT	0.000( )	CT2_UWAT	0.000( )
CT2_XOIL	1.000( )	CT2_UOIL	-0.300( )
CT2_XGAS	0.000( )	CT2_UGAS	0.000( )
CT2_XBWA	0.000( )	CT3_QUAR	-0.050( )
CT3_CALC	0.000( )	CT3_ORTH	1.000( )
CT3_PYRI	0.000( )	CT3_GLAU	0.000( )
CT3_ILLI	0.000( )	CT3_KAOL	0.000( )
CT3_COAL	0.000( )	CT3_XWAT	0.000( )
CT3_UWAT	0.000( )	CT3_XOIL	0.000( )
CT3_UOIL	0.000( )	CT3_XGAS	0.000( )
CT3_UGAS	0.000( )	CT3_XBWA	0.000( )
CT4_CALC	0.000( )	CT4_ORTH	0.000( )
CT4_PYRI	-1.000( )	CT4_GLAU	0.000( )
CT4_ILLI	0.000( )	CT4_COAL	0.000( )
CT4_XWAT	0.000( )	CT4_UWAT	0.000( )
CT4_XOIL	0.000( )	CT4_UOIL	0.000( )
CT4_XGAS	0.000( )	CT4_UGAS	0.000( )
CT4_XBWA	0.000( )	ARHOB_GLAU	2.960(g/cm3 )
ARHOB_ILLI	2.780(g/cm3 )	ARHOB_KAOL	2.620(g/cm3 )
WCLP_GLAU	0.156(m3/m3 )	WCLP_ILLI	0.154(m3/m3 )
WCLP_KAOL	0.058(m3/m3 )	CBWA_GLAU	-999.250(mS/m )
CBWA_ILLI	-999.250(mS/m )	CBWA_KAOL	-999.250(mS/m )
CECA_GLAU	0.233(meq/g )	CECA_ILLI	0.200(meq/g )
CECA_KAOL	0.090(meq/g )	RMF	0.160(ohm.m )
MST	61.880(degC )	RW	0.460(ohm.m )
RWT	-999.250(degC )	SALIN_ISOL	-999.250(ppk )
SALIN_PARA	-999.250(ppk )	SALIN_XWAT	12.924(ppk )
SALIN_UWAT	30.000(ppk )	SALIN_XIWA	-999.250(ppk )
SALIN_UIWA	-999.250(ppk )	SALIN_XOIL	0.000(ppk )
SALIN_UOIL	0.000(ppk )	SALIN_XGAS	0.000(ppk )
SALIN_UGAS	0.000(ppk )	SALIN_XSFL	-999.250(ppk )
SALIN_USFL	-999.250(ppk )	CT1_ZP	0.000( )
CT2_ZP	0.000( )	CT3_ZP	0.000( )
CT4_ZP	0.000( )	RHOB_UNC_ZP	0.027(g/cm3 )
NPHI_UNC_ZP	0.015(m3/m3 )	DT_UNC_ZP	2.250(us/m )
U_UNC_ZP	0.225( )	CXDC_UNC_ZP	0.072(mS/m )
GR_UNC_ZP	2.250(gAPI )	EX1_UNC_ZP	0.015( )
CT1_UNC_ZP	0.015( )	CT2_UNC_ZP	0.015( )
CT3_UNC_ZP	0.015( )	CT4_UNC_ZP	0.015( )
VOLS_UNC_ZP	0.015(m3/m3 )	RHOB_UNC_WM	1.000( )
NPHI_UNC_WM	1.000( )	DT_UNC_WM	0.300( )
U_UNC_WM	0.400( )	CXDC_UNC_WM	0.500( )
CUDC_UNC_WM	0.700( )	EX1_UNC_WM	1.000( )
CT1_UNC_WM	0.200( )	CT2_UNC_WM	0.200( )
CT3_UNC_WM	0.900( )	CT4_UNC_WM	1.000( )
VOLS_UNC_WM	1.000( )	A_ZP	1.000( )
N_ZP	2.000( )	C_DWA	0.000( )
M_DWA	2.000( )	BVIRR	0.010(m3/m3 )

## RESULTS AND DISCUSSION

The calculated effective water saturation (SWE or SUWI) in the gas bearing sands in the interval 2468 – 2581mMD (Figure 6) appears to be high ( average of 69%). Shaliness alone is not sufficient to account for the observed low formation resistivity. An attempt was made to include conductive minerals such as pyrite in the Elan+ model but the calculated effective water saturations still appear to be high. It is likely the gas saturation is probably higher than what is listed in summary table. In order to establish the true water saturation core data will be needed.

The calculated residual oil saturation in the M-1 is 15%.

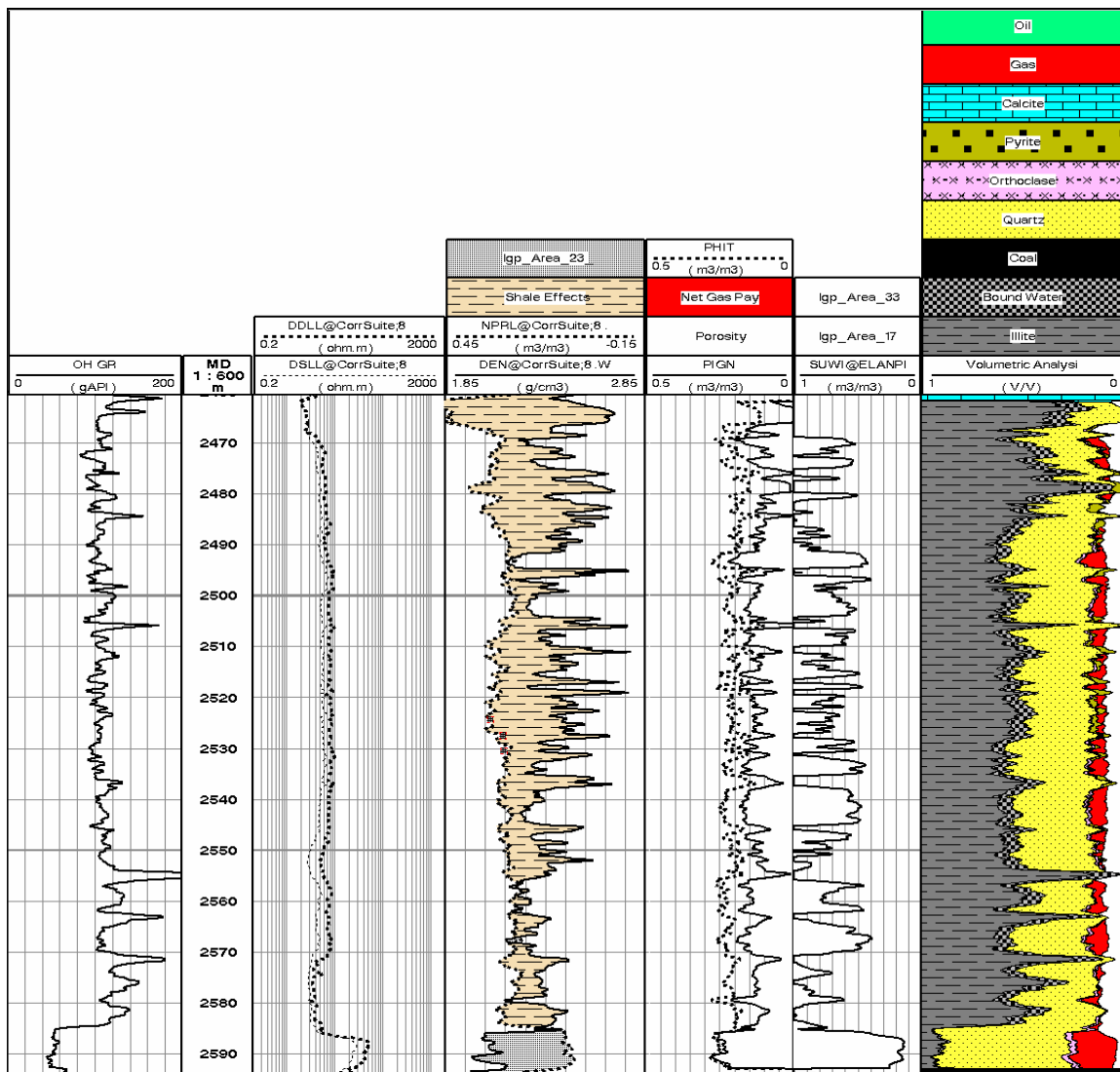


Figure 6: High SWE in the Interval 2468 – 2581m MD

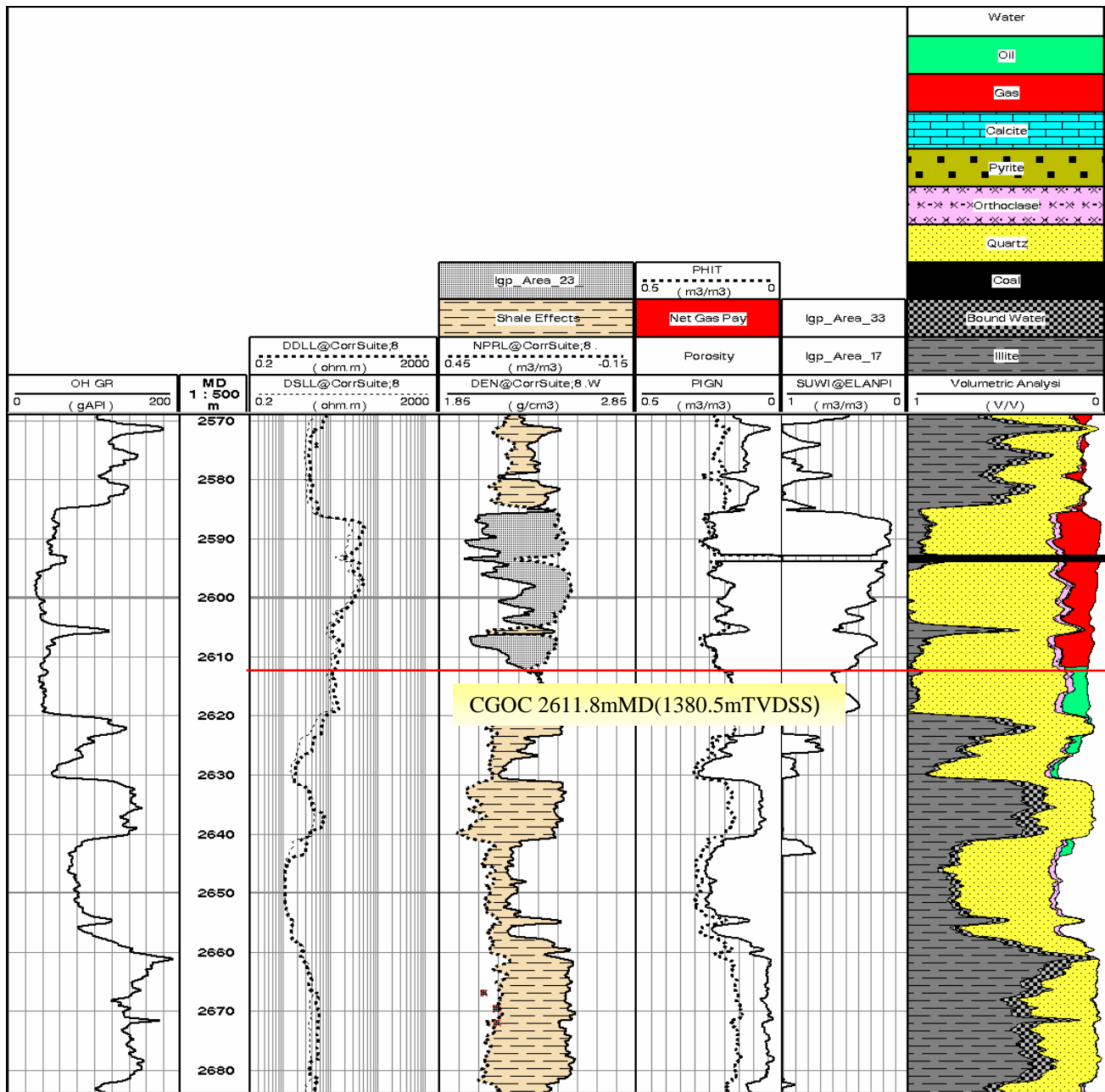


Figure 7: M-1 Reservoir

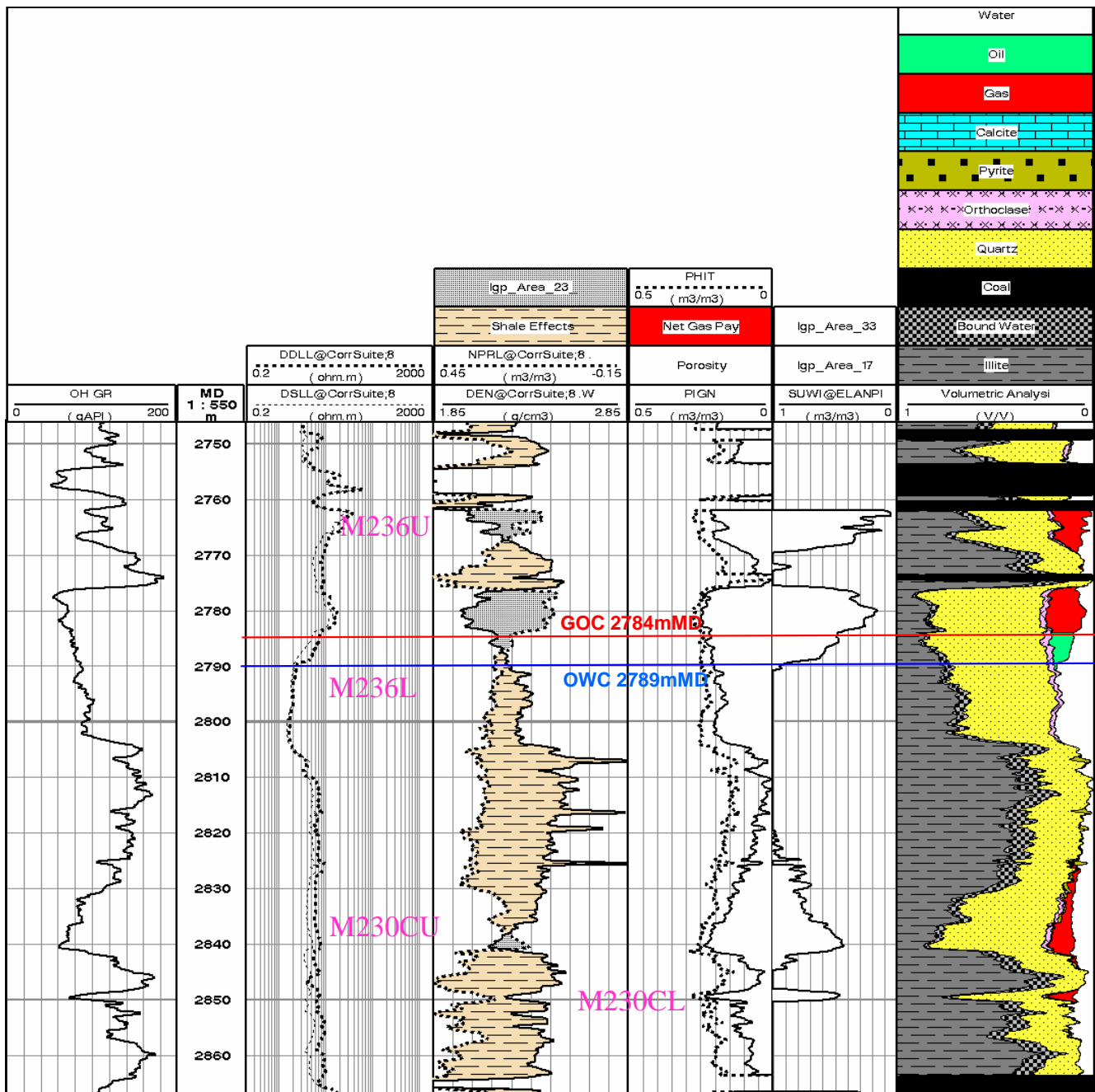


Figure 8: M230 and M236 Reservoirs

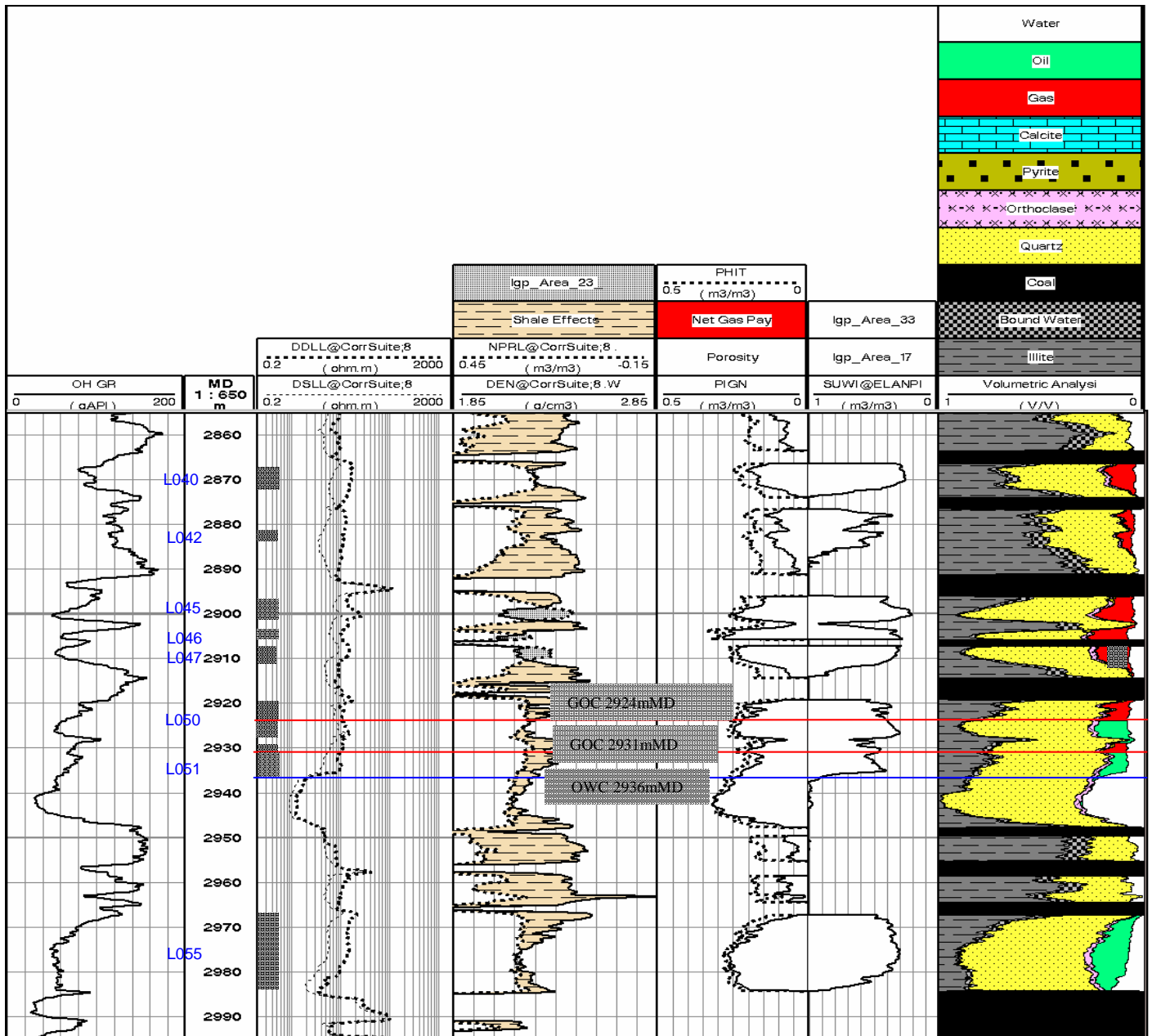


Figure 9: L040 to L055 Reservoirs

## Tuna A31A

Petrophysical Summary 2468 - 3287m MD

Depth Reference:

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

Primary: MDKB

0.08 for Gas, 0.12 for oil and water

Zone	Top Depth mMD	Top Depth mTVDSS	Bottom Depth mMD	Bottom Depth mTVDSS	Gross Thickness mMD	Gross Thickness mTVD	Net/Gross	Mean VCL	Mean PHIE	Mean SWE	Comments	Net Pay Thickness mMD	Net Pay Thickness mTVD
Gurn SstGas	2468.7	1326.0	2581.0	1369.0	112.3	43.0	0.87	0.51	0.136	0.69	Gas bearing,	98.2	37.6
M-1Gas	2585.2	1370.6	2611.8	1380.5	26.6	9.9	0.96	0.08	0.217	0.30	Gas bearing, GOC,2611.8mMD, 1380.5mtvdss	25.5	9.5
M-1Oil	2611.8	1380.5	2620.2	1383.6	8.4	3.1	1.00	0.05	0.194	0.50	Oil bearing	8.4	3.1
M-1 LowerOil	2623.1	1384.7	2630.8	1387.5	7.7	2.8	0.97	0.26	0.222	0.85	Residual oil		
M-2Gas	2697.4	1412.1	2700.5	1413.3	3.1	1.1	0.97	0.37	0.199	0.59	Poss. gas bearing	3.0	1.1
M-2Gas	2718.7	1419.9	2720.6	1420.6	1.9	0.7	0.95	0.46	0.225	0.46	Poss. gas bearing	1.8	0.7
M-236UGas	2762.0	1435.7	2769.4	1438.4	7.4	2.7	0.99	0.43	0.178	0.29	Gas bearing,	7.4	2.7
M-236LGas	2775.6	1440.6	2784.0	1443.6	8.4	3.0	0.99	0.19	0.227	0.30	Gas bearing, GOC at 2784mMD, 1443.6mtvdss	8.3	3.0
M-236LOil	2784.0	1443.6	2789.1	1445.4	5.1	1.8	1.00	0.19	0.214	0.54	Oil bearing, OWC at 2789.1mMD, 1445.4mtvdss	5.1	1.8
M-236LWater	2789.1	1445.4	2804.3	1450.8	15.2	5.4	1.00	0.34	0.185	0.99	Water bearing		
M-230CUGas	2830.9	1460.2	2842.0	1464.0	11.1	3.9	1.00	0.30	0.182	0.60	Gas bearing	11.1	3.9
M-230CLGas	2848.2	1466.2	2850.6	1467.0	2.3	0.8	1.00	0.46	0.167	0.56	Gas bearing	2.3	0.8
L-040Gas	2866.6	1472.6	2872.7	1474.7	6.1	2.1	0.97	0.37	0.163	0.30	Gas bearing	5.9	2.1
L-042Gas	2876.7	1476.1	2885.5	1479.2	8.9	3.1	0.89	0.53	0.111	0.53	Gas bearing	7.9	2.7
L-045Gas	2896.2	1482.9	2902.0	1484.9	5.8	2.0	0.99	0.28	0.183	0.31	Gas bearing	5.7	2.0
L-046Gas	2903.7	1485.5	2905.9	1486.3	2.2	0.8	0.96	0.28	0.262	0.33	Gas bearing	2.1	0.7
L-047Gas	2907.4	1486.8	2912.2	1488.5	4.8	1.7	1.01	0.26	0.202	0.37	Gas bearing	4.9	1.7
L-050Gas	2919.3	1490.9	2924.0	1492.6	4.7	1.6	0.97	0.32	0.175	0.43	Gas bearing, GOC at 2924mMD, 1492.6mtvdss	4.6	1.6
L-050Oil	2924.0	1492.6	2928.0	1494.0	4.0	1.4	1.00	0.17	0.226	0.35	Oil bearing	4.0	1.4
L-051Gas	2928.7	1494.2	2931.0	1495.0	2.3	0.8	1.00	0.28	0.167	0.51	Gas bearing, GOC at 2931mMD, 1495.0tvdss	2.3	0.8
L-051Oil	2931.0	1495.0	2936.0	1496.7	5.0	1.7	1.00	0.24	0.183	0.50	Oil bearing, OWC at 2936 mMD, 1496.7mtvdss	5.0	1.7
L-051Water	2936.0	1496.7	2947.8	1500.8	11.8	4.1	0.94	0.13	0.262	0.98	Water bearing		
L-055Oil	2967.3	1507.5	2984.2	1513.3	16.9	5.8	0.92	0.18	0.220	0.41	Oil bearing	15.6	5.3
L-X1	3226.5	1596.4	3245.1	1603.0	18.6	6.6	1.00	0.07	0.259	0.76	Prob. residual oil		
L-X2	3247.4	1603.8	3254.7	1606.5	7.3	2.6	0.94	0.23	0.204	0.75	Prob. residual oil		
L-X3	3259.3	1608.1	3282.1	1616.4	22.8	8.3	1.00	0.15	0.222	0.88	Prob. residual oil		
L-X4	3286.9	1618.2	3302.0	1623.8	15.1	5.6	0.99	0.09	0.235	0.84	Prob. residual oil		

## **APPENDIX 3a**

### **TUNA A31A**

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

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b>			
<b>From</b>	<b>To</b>	<b>%</b>	<b>Lithology / Show Description</b>
			<p>Previous Well History:</p> <p>Tuna A31 Plugged and Abandoned December 2004.</p> <p>9.625" Casing at 829.0 mMDRT.</p> <p>7.00" Production Liner at 3214.0 mMDRT.</p> <p>Last casing (9.625") at 829.0 mMDRT.</p> <p>TNA A31A Kick-off point at 830.0 mMDRT at 2200 hrs on 31 December 2004.</p> <p>PIT at 829.0 mMDRT (657.0 mTVDRT), 456 psi with 8.85 ppg mud (12.9 ppg EMW).</p> <p>Drill with KCl/PHPA/Glycol mud system.</p> <p>Drilled from 829.0 to xxxx.0 mMDRT with a Smith PDC bit on steerable motor assembly.</p> <p>Bit Details:</p> <p>Bit # 1, Size: 8.5", Manufacturer / Type: Smith S73PX. Serial #: JT0016</p> <p>Jets: 20 x 6, TFA: 1.841 sq.in, HOB: 90.20, Grading: <b>1-1-WT-A-X-IN-CT-TD</b>.</p> <p>Krevs: 1405.0, RPM: 107-121 ( + 176 RPM DHM).</p> <p>Average ROP: 1419.0 / 90.20 = 15.7 m/hr.</p> <p>Rotating: 1139.0 metres / Rotating HOB = 65.52, Average Rotating ROP = 17.4 m/hr</p> <p>Steering: 280.0 metres / Steering HOB = 11.34 , Average Steering ROP = 11.3 m/hr.</p> <p>Spot 5 metre samples from 840.0-870.0 mMDRT.</p> <p>Spot 30 metre samples from 870.0-2310.0 mMDRT (approximately 150.0 metres above prognosed TOL at 2476 .0 mMDRT = 1358.3 mTVDRT).</p> <p>Actual TOL at 2459 .0 mMDRT = 1353.0 mTVDRT</p> <p>Bagged 10 metre samples from 2310.0-2570.0 mMDRT.</p> <p>TCC (Top of M1) prognosed at 2601.2 mMDRT = 1404.1 mTVDRT.</p> <p>Actual TCC (Top of M1) at 2585.0 mMDRT = 1401.4 mTVDRT</p> <p>Bagged 5 metre samples from 2570.0 mMDRT to TD of 3048.0 mMDRT (1565.6 mTVDRT).</p>
1380	1710	100	<p><b>Geologist on board from 1380.0 mMDRT (884.5 mTVDRT), at 1030 hrs 03 January 2005.</b></p> <p>Summary:</p> <p>CALCILUTITE: light olive grey to light olive green grey, argillaceous, silty in part grading to CALCAREOUS CLAYSTONE, common fossil fragments, forams, ooids, trace disseminated pyrite, rare carbonaceous specks, rare specks, commonly soft, occasionally moderately hard, amorphous to sub blocky.</p> <p><b>Midnight depth 03 January 2005 = 1607.0 mMDRT (1001.2 mTVRDT)</b></p>
1710	1740	100 Trace	<p>CALCILUTITE: as above.</p> <p>CALCAREOUS CLAYSTONE: medium grey, to medium dark grey, very calcareous grading to CALCILUTITE, silty in part, trace Foraminifera, trace micromica, trace disseminated pyrite, moderately hard to hard, sub blocky to blocky.</p> <p><b>Top of Lakes Entrance picked at 1752.0 mMDRT (1078.1 mTVDRT) on change of cuttings from CALCILUTITE to CALCAREOUS CLAYSTONE, and ROP change.</b></p>
1740	1770	80 20	<p>CALCILUTITE: as above.</p> <p>CALCAREOUS CLAYSTONE: as above.</p>

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b>		<b>%</b>	<b>Lithology / Show Description</b>
<b>From</b>	<b>To</b>		
1770	1800	20	CALCILUTITE: : light olive grey to light olive green grey, argillaceous, silty in part grading to CALCAREOUS CLAYSTONE, trace forams, trace disseminated pyrite, rare specks, commonly soft, occasionally moderately hard, amorphous to sub blocky.
		80	CALCAREOUS CLAYSTONE: medium grey, to dark greenish grey, silty in part, trace Foraminifera, trace micromica, trace specks, moderately hard, sub blocky.
1800	1830	5	CALCILUTITE: as above.
		95	CALCAREOUS CLAYSTONE: as above.
1830	1860	5	CALCILUTITE: as above.
		95	CALCAREOUS CLAYSTONE: medium-light grey to medium grey, silty in part, trace Foraminifera, trace ooids, trace micromica, trace disseminated pyrite, moderately hard, sub blocky to blocky.
1860	1890	5	CALCILUTITE: as above.
		95	CALCAREOUS CLAYSTONE: as above.
1890	1920	5	CALCILUTITE: as above.
		95	CALCAREOUS CLAYSTONE: light olive grey to light grey, occasionally light medium grey, trace forams, trace ooids, rare gastropods, trace micromicaceous, trace disseminated pyrite, trace nodular pyrite, moderately hard to hard, sub blocky to blocky. Drilled to 1929.8 mMDRT = 1157.3 mTVDRDT at 1710 hrs 04 January 2005. CBU. Wiper trip to shoe to change out the saver sub to 5". Work on power in the SCR Room. Back on bottom drilling at 1205 hrs 05 January 2005. Trip Gas (at 1880.0 mMDRT) = 31 units. Midnight depth 04 January 2005 = 1930.0 mMDRT (1157.3 mTVRDT)
1920	1950	100	CALCAREOUS CLAYSTONE: as above.
1950	1980	100	CALCAREOUS CLAYSTONE: CALCAREOUS CLAYSTONE: light grey, medium grey to medium dark grey, trace forams, trace ooids, rare gastropods, trace micromicaceous, trace disseminated pyrite, trace nodular pyrite, moderately hard to hard, sub blocky to blocky.
1980	2010	100	CALCAREOUS CLAYSTONE: as above.
2010	2040	100	CALCAREOUS CLAYSTONE: light medium grey to medium grey, trace forams, trace ooids, trace micromicaceous, trace disseminated pyrite, soft to moderately hard, sub blocky.
2040	2070	100	CALCAREOUS CLAYSTONE: as above.
2070	2100	100	CALCAREOUS CLAYSTONE: as above.
2100	2130	100	CALCAREOUS CLAYSTONE: as above. Midnight depth 05 January 2005 = 2159.0 mMDRT (1241.6 mTVRDT)
2130	2160	100	CALCAREOUS CLAYSTONE: medium light grey, occasionally medium grey, trace forams, rare disseminated pyrite, firm to commonly soft, sub fissile to commonly sub blocky.
2160	2190	100	CALCAREOUS CLAYSTONE: as above.
2190	2220	100	CALCAREOUS CLAYSTONE: light grey to medium grey, trace ooids, rare forams, trace disseminated pyrite, rare dark brown carbonaceous microlaminations, soft to firm, sub fissile to sub blocky.
2220	2250	100	CALCAREOUS CLAYSTONE: as above.
2250	2280		CALCAREOUS CLAYSTONE: medium to light grey occasionally olive grey, trace pyrite laminations and disseminated pyrite, trace carbonaceous specks, trace , commonly soft to occasionally firm, sub fissile to sub blocky.

## **Tuna A31A Lithology / Show Descriptions**

Interval (m)		% From To	Lithology / Show Description
From	To		
<div>At 0715 hrs 06 January 2005, Baracarb added to the mud system at 2259.0 mMDRT (Drilled depth) and maintained at 5 ppb to TD. Baracarb seen in Bagged Samples from 2310.0 mMDRT.</div>			
<div>870.0 to 2310.0: Spot 30.0 metre samples. 2310.0 to 2470.0: Bagged 10.0 metre samples.</div>			
2280	2310	100	CALCAREOUS CLAYSTONE: as above.
2310	2320	100	CALCAREOUS CLAYSTONE: as above.
2320	2330	100	CALCAREOUS CLAYSTONE: as above.
	2334	100	Spot sample at 2334.0 mMDRT due to slow drilling (while sliding): CALCAREOUS CLAYSTONE: as above, no dolomite in sample.
2330	2340	100	CALCAREOUS CLAYSTONE: medium grey to medium dark grey, occasionally olive grey and greenish grey, trace pale brown to moderate brown moderately hard dolomite, trace micromicaceous, and trace disseminated pyrite, trace carbonaceous specks, trace , commonly soft to occasionally firm, sub fissile to sub blocky.
2340	2350	100	CALCAREOUS CLAYSTONE: as above.
2350	2360	100	CALCAREOUS CLAYSTONE: light grey to medium grey, occasionally greenish grey, trace micromicaceous, trace disseminated pyrite, trace , rare gastropods, dispersive, soft to moderately hard, amorphous to sub blocky.
2360	2370	100	CALCAREOUS CLAYSTONE: as above.
2370	2380	100	CALCAREOUS CLAYSTONE: as above, trace nodular pyrite.
2380	2390	100	CALCAREOUS CLAYSTONE: medium light grey to medium grey, occasionally greenish grey, trace micromicaceous, trace disseminated pyrite, trace , trace forams, occasionally soft, moderately hard to hard, sub blocky to blocky.
2390	2400	100	CALCAREOUS CLAYSTONE: as above.
2400	2410	100	CALCAREOUS CLAYSTONE: as above, trace nodular pyrite.
2410	2420	100	CALCAREOUS CLAYSTONE: as above, no nodular pyrite.
2420	2430	100	CALCAREOUS CLAYSTONE: as above.
2430	2440	100	CALCAREOUS CLAYSTONE: light grey to olive grey, occasionally medium to medium dark grey, greenish grey, trace micromicaceous, trace disseminated pyrite, trace nodular pyrite, trace , soft to moderately hard, dispersive, amorphous to sub blocky.
2440	2450	100	CALCAREOUS CLAYSTONE: light grey to olive grey, occasionally, greenish grey, trace micromicaceous, trace disseminated pyrite, trace , soft to moderately hard, dispersive, amorphous to sub blocky.
2450	2460	95	CALCAREOUS CLAYSTONE: as above.
		5	CLAYSTONE: dusky yellow to light olive brown, trace glauconitic clay, soft, amorphous.
2460	2470	40	CALCAREOUS CLAYSTONE: as above.
		40	CLAYSTONE: dusky yellow to light olive brown, dark yellowish orange, trace glauconitic clay, soft, amorphous.
		20	SILTSTONE: dark yellowish brown, greyish brown, common micromicaceous, trace , argillaceous in part, 10% calcareous, soft to firm, sub blocky.
		Trace	SANDSTONE: clear to translucent, coarse to very coarse, well sorted, sub rounded to rounded, nil matrix, loose grains, hard, very good inferred porosity. FLUORESCENCE: Nil.
<div>Circulate hole clean at stand down 2474.5 mMDRT.  Top of the Latrobe prognosed at 2476.0 mMDRT = 1358.3 mTVDRT. Top of Latrobe (picked) at 247x.x mMDRT = 135x.x mTVDRT.  (Bagged 10 metre samples from 2310.0 to 2470.0 mMDRT.) Bagged 5 metre samples from 2470.0 to TD.</div>			

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
			<p style="color: red;">Bottoms-up sample at 2474.5 bagged as 2475.0 sample.</p> <p style="color: red;">Gas readings started rising from 2468.0 mMDRT to the Gas peak of 567 units at 2474.5 mMDRT.</p>
2470	2475	30	CALCAREOUS CLAYSTONE: as above.
		40	CLAYSTONE: dusky yellow to light olive brown, dark yellowish orange, trace glauconitic clay, soft, amorphous.
		25	SILTSTONE: dark yellowish brown, greyish brown, common micromicaceous, trace , argillaceous in part, 10% calcareous, soft to firm, sub blocky.
		5	SANDSTONE: translucent, very fine to medium, predominantly fine, moderately well sorted, sub angular to sub rounded, common grey white argillaceous matrix, trace silica cement, rare , trace pyrite cement, rare nodular pyrite, friable, tight visual porosity. FLUORESCENCE: Nil.
2475	2480	10	CLAYSTONE: dusky yellow to light olive brown, dark yellowish orange, trace glauconitic clay, soft, amorphous.
		20	SILTSTONE: dark yellowish orange brown, common micromicaceous, very argillaceous grading to SILTY CLAYSTONE, trace arenaceous in part, rare calcareous, trace glauconitic clay, trace nodular pyrite, soft to occasionally firm, blocky to sub blocky.
		70	SANDSTONE: translucent occasionally yellowish brown, very fine to medium, predominantly fine occasionally coarse angular grains, moderately well sorted, sub angular to sub rounded, common yellow brown argillaceous matrix, occasionally green glauconitic clay, trace nodular pyrite, friable to moderately hard aggregates, tight visual porosity. FLUORESCENCE: Nil.
2480	2485	30	CLAYSTONE: as above.
		60	SILTSTONE: as above.
			FLUORESCENCE: Nil.
		10	SANDSTONE: as above.
2485	2490		FLUORESCENCE: Nil.
		20	CLAYSTONE: as above.
		75	SILTSTONE: as above.
2490	2495	5	SANDSTONE: as above.
			FLUORESCENCE: Nil.
		10	CLAYSTONE: light grey to light brown grey weakly calcareous, minor green glauconitic clay in part, soft to amorphous.
2495	2500	85	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.
		5	SANDSTONE: as above, very silty grading to ARENACEOUS SILTSTONE.
			FLUORESCENCE: Nil.
2500	2505	90	SILTSTONE: dark yellowish orange, yellowish brown, very argillaceous, moderately arenaceous in part, trace grains, minor micromicaceous, soft, amorphous to sub blocky.
		10	SANDSTONE: translucent occasionally yellowish grey, pale brown, very fine to occasionally coarse angular grains, predominantly very fine, moderately well sorted, sub angular to sub rounded, common yellow brown silty matrix grading to ARENACEOUS SILTSTONE, trace , fine hard aggregates, tight visual porosity.
			FLUORESCENCE: Nil.
2505	2510	85	SILTSTONE: medium brown to light brown, argillaceous in part to fairly arenaceous grading to very fine SANDSTONE, trace mica flakes, rare ,soft, sub blocky, amorphous.
		15	SANDSTONE: as above, very silty grading to ARENACEOUS SILTSTONE.
2510	2515		FLUORESCENCE: Nil.
		90	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.
		10	SANDSTONE: as above, very silty grading to ARENACEOUS SILTSTONE.
2515			FLUORESCENCE: Nil.
		95	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.

SAND

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
		5	SANDSTONE: yellowish brown to light brown, occasionally translucent, occasionally dusky red aggregates, very fine to fine, moderately well sorted, rare , common light brown silty matrix grading to ARENACEOUS SILTSTONE, loose, tight visual and inferred porosity. FLUORESCENCE: Nil.
2515	2520	90	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.S
		10	SANDSTONE: as above, very silty grading to ARENACEOUS SILTSTONE. FLUORESCENCE: Nil.
2520	2525	80	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.
		20	SANDSTONE: light brown to translucent light brown, occasionally very dark red aggregates, fine to occasionally medium grained, rare coarse grains, sub angular to sub rounded, rare , common light brown silty matrix grading to ARENACEOUS SILTSTONE, loose, tight visual and inferred porosity. FLUORESCENCE: Nil.
2525	2530	80	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.
		20	SANDSTONE: as above.
2530	2535	70	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.
		30	SANDSTONE: as above.
2535	2540	80	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.
		20	SANDSTONE: as above.
2540	2545	70	SILTSTONE: light brown to medium brown, argillaceous, common fine arenaceous, trace , trace dark brown carbonaceous microlaminations in part, soft to firm, sub blocky.
		30	SANDSTONE: as above.
2545	2550	80	SILTSTONE: generally as above, very arenaceous grading to very fine SANDSTONE.
		20	SANDSTONE: as above.
2550	2555	70	SILTSTONE: as above.
		30	SANDSTONE: translucent to yellowish brown to light brown, very fine to fine, minor medium to coarse, sub-angular to sub-rounded, moderately well sorted, rare , common light brown silty matrix grading to ARENACEOUS SILTSTONE, loose, tight visual and inferred porosity. FLUORESCENCE: Nil.
2555	2560	70	SILTSTONE: as above.
		30	SANDSTONE: as above.
2560	2565	60	SILTSTONE: as above.
		40	SANDSTONE: Dusky red to light brown, fine to medium, predominantly fine, sub-angular to sub-rounded, moderately well sorted, minor locally common light brown argillaceous matrix, trace calcareous cement, rare nodular pyrite, trace glauconite grains, firm to moderately hard, tight visual porosity. FLUORESCENCE: Nil
2565	2570	70	SILTSTONE: as above.
		30	SANDSTONE: as above. FLUORESCENCE: Nil.
2570	2575	80	SILTSTONE: as above.
		20	SANDSTONE: as above, light brown to occasionally translucent, light brown argillaceous matrix, rare nodular pyrite, trace glauconite, soft to friable, tight visual porosity. FLUORESCENCE: Nil.
2575	2580	90	SILTSTONE: light brown to pale brown, trace nodular pyrite, trace micromicaceous, arenaceous in parts, soft to moderately hard, amorphous to sub-blocky.
		10	SANDSTONE: as above. FLUORESCENCE: Nil.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
			<p>TCC (Top M1 sand) = 2585.0 mMDRT=1401.4 mTVDRT</p> <p>GOC at 2604.0 mMDRT = 1408.4 mTVDRT.</p> <p>OWC at 2617.0 mMDRT = 1413.2 mMDRT.</p>
2580	2585	70	SILTSTONE: as above.
		30	SANDSTONE: translucent to pale brown, very fine to fine, common light brown silty matrix, grading to arenaceous siltstone, trace white argillaceous matrix, trace nodular pyrite, hard aggregates, tight visual porosity. FLUORESCENCE: Nil.
2585	2590	20	SILTSTONE: as above.
		80	SANDSTONE: clear to translucent, very fine to occasionally coarse, dominantly medium, moderately well sorted, sub-angular to sub-rounded, trace white argillaceous matrix, trace nodular pyrite, trace glauconite, trace light brown silty matrix, predominantly loose grains, hard, fair to good inferred porosity. FLUORESCENCE: Nil.
2590	2595	10	SILTSTONE: as above.
		90	SANDSTONE: clear to translucent, occasionally off white, fine to coarse, dominantly coarse, moderately well sorted, trace white argillaceous matrix, trace nodular pyrite, trace glauconite, predominantly loose grains, hard, fair to good inferred porosity. FLUORESCENCE: Nil.
2595	2600	10	SILTSTONE: as above.
		90	SANDSTONE: as above, medium to very coarse, dominantly coarse, fine to good inferred porosity. FLUORESCENCE: Nil.
2600	2605	5	SILTSTONE: as above.
		95	SANDSTONE: as above, rare white argillaceous matrix. FLUORESCENCE: Nil.
2605	2610	10	SILTSTONE: as above.
		90	SANDSTONE: clear to translucent, occasionally off white, fine to very coarse, dominantly coarse, sub-angular to sub-rounded, trace white argillaceous matrix, trace nodular pyrite, trace glauconite, predominantly loose grains, hard, fair to good inferred porosity. FLUORESCENCE: Nil.
2610	2615	15	SILTSTONE: as above
		85	SANDSTONE: as above. FLUORESCENCE: Nil.
2615	2620	Tr	At 2617.6 mMDRT (1413.4 mTVDRT) circulate hole clean due to excessive drag. COAL: brownish black, earthy, brittle, sub-fissile.
		20	CLAYSTONE: light grey to medium grey, occasionally medium to dark grey, trace glauconite, trace micromicaceous, moderately hard to hard, sub-blocky to blocky.
		40	SILTSTONE: as above.
		40	SANDSTONE: clear to translucent, off white, fine to very coarse, dominantly coarse, moderately well sorted, sub-angular to sub-rounded, trace white argillaceous matrix, trace glauconite, trace nodular pyrite, loose, hard, fair inferred porosity. FLUORESCENCE: Nil.
2620	2625	20	CLAYSTONE: as above.
		30	SILTSTONE: as above.
		50	SANDSTONE: as above, fair to good inferred porosity. FLUORESCENCE: Nil.
2625	2630	15	CLAYSTONE: as above.
		55	SILTSTONE: as above.
		30	SANDSTONE: as above.

## **Tuna A31A Lithology / Show Descriptions**

Interval (m)		%	Lithology / Show Description
From	To		
2630	2635	10	CLAYSTONE: greenish grey to medium bluish grey, trace glauconite, moderately hard to hard, sub-blocky to blocky.
		80	SILTSTONE: light brown to pale brown, arenaceous in parts grading to very fine sandstone, trace micromicaceous, trace nodular pyrite, soft, amorphous. (rock flour ground down by PDC bit?)
		10	SANDSTONE: as above. FLUORESCENCE: Nil.
2635	2640	5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		5	SANDSTONE: as above. FLUORESCENCE: Nil.
2640	2645	5	CLAYSTONE: as above.
		80	SILTSTONE: as above.
		15	SANDSTONE: clear to translucent, occasionally off white, coarse to very coarse, dominantly very coarse, trace nodular pyrite, trace pyrite cement, loose, hard, good inferred porosity. FLUORESCENCE: Nil.
2645	2650	5	CLAYSTONE: as above.
		75	SILTSTONE: as above.
		20	SANDSTONE: as above. FLUORESCENCE: Nil.
Start adding Baracarb at 2654.0 mMDRT (1426.9 mTVDRT)			
2650	2655	5	CLAYSTONE: as above.
		75	SILTSTONE: as above.
		20	SANDSTONE: as above. FLUORESCENCE: Nil.
2655	2660	5	CLAYSTONE: as above.
		80	SILTSTONE: as above.
		15	SANDSTONE: as above. FLUORESCENCE: Nil.
2660	2665	5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		5	SANDSTONE: as above. FLUORESCENCE: Nil.
2665	2670	5	CLAYSTONE: greenish grey to medium bluish grey, trace glauconite, moderately hard to hard, sub-blocky to blocky.
		90	SILTSTONE: light brown to pale brown, arenaceous grading to very fine sandstone, common micromicaceous, trace nodular pyrite, soft, amorphous.
		5	SANDSTONE: clear to translucent, occasionally off white, occasionally greyish orange pink, moderately well sorted, sub-angular to sub-rounded, trace white argillaceous matrix, trace pyrite cement, loose, hard, fair inferred porosity. FLUORESCENCE: Nil.
2670	2675	5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		5	SANDSTONE: as above. FLUORESCENCE: Nil.
Barabloc fine grains seen in samples from 2680 mMDRT.			
2675	2680	10	CLAYSTONE: as above.
		85	SILTSTONE: as above.
		5	SANDSTONE: as above. FLUORESCENCE: Nil.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b>		<b>%</b>	<b>Lithology / Show Description</b>
<b>From</b>	<b>To</b>		
2680	2685	5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		5	SANDSTONE: as above.
			FLUORESCENCE: Nil.
2685	2690	5	CLAYSTONE: as above.
		95	SILTSTONE: as above.
		Trace	SANDSTONE: as above.
			FLUORESCENCE: Nil.
2690	2695	5	CLAYSTONE: as above.
		95	SILTSTONE: as above.
		Trace	SANDSTONE: as above.
			FLUORESCENCE: Nil.
2695	2700	5	CLAYSTONE: as above.
		85	SILTSTONE: as above.
			<b>Base of Tuna Flounder Channel at 2699.6 mMDRT = 1443.7 mTVDRT.</b>
		10	SANDSTONE: clear to translucent, occasionally smoky grey, medium to very coarse, dominantly coarse, moderately well sorted, sub-rounded to rounded, trace pyrite cement, trace nodular pyrite, trace white argillaceous matrix, loose, hard, fair to good inferred porosity.
2700	2705		FLUORESCENCE: Nil.
		15	COAL: dusky brown to brownish black, sub-vitreous, brittle, sub-fissile, angular, silty grading to Carbonaceous Siltstone.
		5	CLAYSTONE: as above.
		75	SILTSTONE: as above.
		5	SANDSTONE: as above.
			FLUORESCENCE: Nil.
2705	2710		Gas peak 2704.5 mMDRT = 235 units.
		20	COAL: as above.
		5	CLAYSTONE: as above.
		60	SILTSTONE: 50% as above, light brown to pale brown, arenaceous grading to very fine sandstone.
			SILTSTONE: 10% brownish black to black, carbonaceous grading to silty coal, common nodular pyrite, firm, moderately hard, sub-blocky.
		15	SANDSTONE: as above.
2710	2715		FLUORESCENCE: Nil.
			<b>Gas peak at 2709.5 mMDRT (2706-2712 mMDRT) = 544 units.</b>
		20	COAL: as above, common pyritic coal.
		5	CLAYSTONE: as above.
		70	SILTSTONE: as above. 60% arenaceous, 10% carbonaceous.
		5	SANDSTONE: as above.
2715	2720		FLUORESCENCE: Nil.
		5	COAL: as above.
		Trace	CLAYSTONE: as above.
		90	SILTSTONE: as above, 80% arenaceous, 10% carbonaceous.
		5	SANDSTONE: as above.
			FLUORESCENCE: Nil.
2720	2725	Trace	COAL: as above.
		Trace	CLAYSTONE: as above.
		85	SILTSTONE: as above, 75% arenaceous, 10% carbonaceous.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
		15	SANDSTONE: clear to translucent, occasionally greyish pink, medium to very coarse, dominantly coarse, sub-rounded to rounded, moderately well sorted, trace glauconite, trace pyrite cement, trace nodular pyrite, loose, hard, fair to good inferred porosity. FLUORESCENCE: Nil.
2725	2730	Trace	COAL: as above.
		Trace	CLAYSTONE: as above.
		85	SILTSTONE: as above, 80% arenaceous, 5% carbonaceous.
		15	SANDSTONE: as above. FLUORESCENCE: Nil.
			<b>Gas peak 2929.5 mMDRT (2725-2733 mMDRT) = 472 units.</b>
2730	2735	30	SILTSTONE: light brown to pale brown, arenaceous grading to very fine sandstone, trace micromicaceous, trace nodular pyrite, soft, amorphous.
		70	SANDSTONE: clear to translucent, occasionally off white, fine to occasionally coarse, dominantly medium, moderately well sorted, sub-angular to sub-rounded, trace glauconite, trace pyritic cement, trace nodular pyrite, loose, hard, fair inferred porosity. FLUORESCENCE: Nil.
2735	2740	25	SILTSTONE: as above.
		75	SANDSTONE: as above. FLUORESCENCE: Nil.
2740	2745	30	SILTSTONE: 25% as above, light brown to pale brown, arenaceous grading to very fine sandstone. SILTSTONE: 5% brownish black to black, carbonaceous grading to silty coal, common nodular pyrite, firm, moderately hard, sub-blocky.
		70	SANDSTONE: as above. FLUORESCENCE: Nil.
			<b>Fault at 2746.0 mMDRT = 1460.8 mTVDRT.</b>
2745	2750	15	SILTSTONE: 5% as above, light brown to pale brown, arenaceous grading to very fine sandstone. SILTSTONE: 10% brownish black to black, carbonaceous grading to silty coal, common nodular pyrite, firm, moderately hard, sub-blocky.
		85	SANDSTONE: as above. FLUORESCENCE: Nil.
2750	2755	10	COAL: dusky brown to brownish black, sub-vitreous, brittle, sub-fissile, angular, silty grading to Carbonaceous Siltstone.
		50	SILTSTONE: 30% as above, light brown to pale brown, arenaceous grading to very fine sandstone. SILTSTONE: 20% brownish black to black, carbonaceous grading to silty coal, common nodular pyrite, firm, moderately hard, sub-blocky.
		40	SANDSTONE: as above. FLUORESCENCE: Nil.
2755	2760	5	COAL: as above.
		65	SILTSTONE: as above. 55% arenaceous, 10% carbonaceous.
		30	SANDSTONE: as above. FLUORESCENCE: Nil.
2760	2765	90	SILTSTONE: light brown to pale brown, occasionally very light grey, arenaceous grading to very fine sandstone, trace micromicaceous, trace glauconite, trace nodular pyrite, soft to moderately hard, amorphous to sub-blocky.
		10	SANDSTONE: as above. FLUORESCENCE: Nil.
2765	2770	Tr	COAL: dark brownish black, sub-vitreous, brittle, angular, silty grading to Carbonaceous Siltstone.

## Tuna A31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
		5	CLAYSTONE: greenish grey, trace glauconite, moderately hard to hard, sub-blocky to blocky.
		55	SILTSTONE: as above.
		40	SANDSTONE: clear to translucent, off white to occasionally greyish pink, medium to very coarse, dominantly coarse, moderately well sorted, sub-rounded to rounded, trace nodular pyrite, trace pyritic cement, loose, hard, fair to good inferred porosity.
			FLUORESCENCE: Nil.
			Gas peak at 2770 mMDRT (2764-2777 mMDRT) = 930 units.
2770	2775	95	SILTSTONE: as above.
		5	SANDSTONE: as above.
2775	2780		FLUORESCENCE: Nil.
		5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		5	SANDSTONE: as above.
2780	2785		FLUORESCENCE: Nil.
		70	SILTSTONE: as above.
		30	SANDSTONE: clear to translucent, occasionally off white, common rock flour, medium to coarse, dominantly coarse, sub-angular to sub-rounded, moderately well sorted, trace pyrite cement, trace nodular pyrite, loose, hard, fair to good inferred and visual porosity.
2785	2790		<b>FLUORESCENCE: Trace, dull, yellowish green, pinpoint fluorescence, very slow, bleeding cut, thin film residue.</b>
			<b>Mud log bar = 0</b>
		20	SILTSTONE: as above.
		80	SANDSTONE: as above.
2790	2795		<b>FLUORESCENCE: 20%-30% moderately bright, even yellowish green fluorescence, moderately rapid blooming cut, thick ring residue.</b>
			<b>Mudlog bar = 1</b>
		10	CLAYSTONE: greenish grey, trace glauconite, moderately hard to hard, sub-blocky to blocky.
		15	SILTSTONE: as above.
2795	2800	75	SANDSTONE: as above.
			<b>FLUORESCENCE: 10%-15%, moderately bright, spotted greenish yellow fluorescence, very slow blooming cut, thin ring residue.</b>
			<b>Mud log bar = 1/2</b>
		15	CLAYSTONE: as above.
2800	2805	15	SILTSTONE: as above.
		70	SANDSTONE: as above.
			<b>FLUORESCENCE: 5%-10%, dull, pinpoint, greenish yellow fluorescence, very slow bleeding cut, thick film residue.</b>
			<b>Mud log bar = 1/2</b>
2805	2810	10	CLAYSTONE: as above.
		15	SILTSTONE: as above.
		75	SANDSTONE: as above.
2810	2815		<b>FLUORESCENCE: Trace, dim, pinpoint, yellowish green fluorescence, very slow bleeding cut, thin ring residue.</b>
			<b>Mud log bar = 0</b>
2815	2820	10	CLAYSTONE: as above.
		70	SILTSTONE: as above.

## Tuna A31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2810	2815	20	SANDSTONE: as above. <b>FLUORESCENCE: Trace, dim, pinpoint, yellowish green fluorescence, very slow bleeding cut, thin film residue.</b> <b>Mud log bar = 0</b>
		10	CLAYSTONE: as above.
		80	SILTSTONE: as above.
2815	2820	10	SANDSTONE: as above. FLUORESCENCE: Nil.
		10	CLAYSTONE: as above.
		85	SILTSTONE: as above.
2820	2825	5	SANDSTONE: as above. FLUORESCENCE: Nil.
		15	CLAYSTONE: as above.
		80	SILTSTONE: as above.
2825	2830	5	SANDSTONE: as above. FLUORESCENCE: Nil.
		95	CLAYSTONE: as above.
		Trace	SILTSTONE: as above.
2830	2835	Trace	SANDSTONE: as above. FLUORESCENCE: Nil.
		5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
2835	2840	5	SANDSTONE: as above. FLUORESCENCE: Nil.
		95	CLAYSTONE: as above.
		Trace	SILTSTONE: as above.
2840	2845	Trace	SANDSTONE: as above. FLUORESCENCE: Nil.
		50	SILTSTONE: as above.
		50	SANDSTONE: clear-translucent, occasionally off white, common crushed to rock flour, fine to medium, occasionally coarse, dominantly fine, sub-angular to sub-rounded, minor pyritic cement, trace off white argillaceous matrix, trace nodular pyrite, loose, common hard, poor to fair visual and inferred porosity. FLUORESCENCE: Nil.
2845	2850	60	SILTSTONE: as above.
		40	SANDSTONE: as above. FLUORESCENCE: Nil.
2850	2855	90	SILTSTONE: light brown to medium brown, dark brown occasionally grading to Carbonaceous Siltstone, minor carbonaceous flakes and micro laminations, trace nodular pyrite, soft, occasionally moderately hard, sub-blocky to blocky.
		10	SANDSTONE: clear to translucent, fine to occasionally medium, minor coarse, predominantly fine, sub-angular to sub-rounded, moderately sorted, trace pyrite cement, trace off white argillaceous matrix, common rock flour, predominantly loose, poor to fair inferred porosity. FLUORESCENCE: Nil.
2855	2860	95	SILTSTONE: as above.
		5	SANDSTONE: as above. <b>FLUORESCENCE: Trace, dull, yellow green, pinpoint fluorescence, no cut, no discernible crush cut.</b> <b>Mud log bar = 0</b>
2860	2865	80	SILTSTONE: as above.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b>		<b>%</b>	<b>Lithology / Show Description</b>
<b>From</b>	<b>To</b>		
2865	2870	20	SANDSTONE: as above. <b>FLUORESCENCE: Trace, dull, yellow green, pinpoint fluorescence, no cut, no discernible crush cut.</b> <b>Mud log bar = 0</b>
		60	SILTSTONE: as above.
		40	SANDSTONE: as above. <b>FLUORESCENCE: Trace, dull, yellow green, pinpoint fluorescence, no cut, no discernible crush cut.</b> <b>Mud log bar = 0</b>
2870	2875	70	SILTSTONE: as above.
		30	SANDSTONE: as above FLUORESCENCE: Nil.
2875	2880	90	SILTSTONE: light brown, common medium to dark brown, argillaceous, fine arenaceous in parts, minor carbonaceous micro laminations, soft, occasionally firm, sub-blocky.
		10	SANDSTONE: as above. FLUORESCENCE: Nil.
2880	2885	95	SILTSTONE: as above.
		5	SANDSTONE: as above. FLUORESCENCE: Nil.
2885	2890	95	SILTSTONE: as above.
		5	SANDSTONE: as above. FLUORESCENCE: Nil.
2890	2895	20	COAL: dark greyish brown, dull, brittle, sub-fissile, uneven, silty in parts.
		80	SILTSTONE: as above.
2895	2900	80	SILTSTONE: as above.
		20	SANDSTONE: clear to translucent, occasionally off white, very fine to fine, rare coarse, angular grains, sub-angular, moderately well sorted, minor to locally common off white argillaceous matrix, trace pyrite cement, trace nodular pyrite, occasional carbonaceous specks, friable to loose, poor to fair visual and inferred porosity. FLUORESCENCE: Nil.
2900	2905	70	SILTSTONE: as above.
		30	SANDSTONE: clear to translucent, occasionally off white, fine to occasionally very coarse, dominantly medium, moderately well sorted, sub-angular to sub-rounded, trace glauconite, hard, loose, fair inferred porosity. FLUORESCENCE: Nil.
2905	2910	20	SILTSTONE: as above.
		80	SANDSTONE: as above with trace nodular pyrite. FLUORESCENCE: Nil.
2910	2915	10	COAL: black, sub-vitreous, brittle, sub-fissile, angular.
		80	SILTSTONE: as above.
		10	SANDSTONE: as above. FLUORESCENCE: Nil.
2915	2920	90	SILTSTONE: as above.
		10	SANDSTONE: as above. FLUORESCENCE: Nil.
2920	2925	Trace	COAL: as above.
		Trace	CLAYSTONE: bluish green, trace glauconite, trace micromicaceous, moderately hard to hard, sub-blocky to blocky.
		80	SILTSTONE: as above.
		20	SANDSTONE: as above. FLUORESCENCE: Nil.

## Tuna A31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
2925	2930		<b>Top of L 050 Sand at 2929.0 mMDRT = 1525.1 mTVDRT.</b> <b>Base of L 050 Sand at 2947.0 mMDRT = 1531.4 mTVDRT.</b>
		10	COAL: as above.
		40	SILTSTONE: as above.
2930	2935	50	SANDSTONE: clear-translucent, occasionally milky white, very fine to occasionally coarse, dominantly fine to medium, moderately well sorted, sub-angular to sub-rounded, trace glauconite, trace nodular pyrite, trace white argillaceous matrix, loose, hard, fair to good inferred and visual porosity. <b>FLUORESCENCE: 15-20%, moderately bright, yellowish green, spotted fluorescence, moderately rapid bleeding, direct cut, thick ring residue.</b> <b>Mud log bar = 1/2</b> <b>Gas peak 2923-2932 mMDRT = 700 units.</b>
		30	CLAYSTONE: as above.
		50	SILTSTONE: as above.
2935	2940	20	SANDSTONE: as above, very fine to occasionally coarse, dominantly medium. <b>FLUORESCENCE: Trace to 5%, moderately bright, yellowish green pinpoint fluorescence, very slow bleeding cut, thin ring residue.</b> <b>Mud log bar = 0</b> <b>Gas peak 2937-2943 mMDRT = 546 units.</b>
		5	CLAYSTONE: as above.
		35	SILTSTONE: as above.
2940	2945	60	SANDSTONE: very fine to occasionally coarse, dominantly fine, and generally as above. <b>FLUORESCENCE: 25-30%, moderately bright to bright, even greenish yellow fluorescence, slow bleeding direct cut, thick film residue.</b> <b>Mud log bar = 1</b>
		Trace	CLAYSTONE: as above.
		10	SILTSTONE: as above.
2945	2950	90	SANDSTONE: clear to translucent, very fine to medium, dominantly fine, moderately well sorted, sub-angular to sub-rounded, common white argillaceous matrix, trace glauconite, trace pyrite nodular, loose, hard, poor to fair inferred and visual porosity. <b>FLUORESCENCE: 20-25%, moderately bright to bright, patchy greenish yellow fluorescence, slow bleeding direct cut, thick film residue.</b> <b>Mud log bar = 1</b>
		10	COAL: brownish black to black, earthy, brittle, sub-blocky, angular grading to Carbonaceous Siltstone.
		5	CLAYSTONE: as above.
2950	2955	35	SILTSTONE: 10% arenaceous as above. SILTSTONE: 25% dark brown to brownish black, trace mica, moderately hard, sub-blocky grading to silty Coal.
		50	SANDSTONE: as above, fine to occasionally coarse, dominantly medium, poor to fair inferred and visual porosity. <b>FLUORESCENCE: Trace to 5%,dull pinpoint, yellowish green fluorescence, very slow bleeding cut, thin ring residue.</b> <b>Mud log bar = 0</b>
		5	COAL: as above.
2950	2955	5	CLAYSTONE: as above.
		85	SILTSTONE: 80% arenaceous as above. SILTSTONE: 5% carbonaceous as above.
		5	SANDSTONE: as above, very fine to occasionally coarse, trace nodular pyrite, poor to fair inferred porosity. <b>FLUORESCENCE: Nil.</b>

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b>		<b>%</b>	<b>Lithology / Show Description</b>
<b>From</b>	<b>To</b>		
2955	2960	5	COAL: as above.
		10	CLAYSTONE: as above.
		75	SILTSTONE: 70% arenaceous as above. SILTSTONE: 5% carbonaceous as above.
		10	SANDSTONE: clear to translucent, fine to occasionally coarse, dominantly medium, moderately well sorted, sub-angular to sub-rounded, common white argillaceous matrix, trace glauconite, trace pyrite nodular, loose, hard, poor inferred and visual porosity. FLUORESCENCE: Nil.
2960	2965	Trace	COAL: as above.
		10	CLAYSTONE: as above.
		85	SILTSTONE: light brown, common medium to dark brown, argillaceous, fine arenaceous in parts, minor carbonaceous micro laminations, soft, occasionally firm, sub-blocky.
		5	SANDSTONE: as above and fine to occasionally coarse, dominantly fine, poor to fair inferred porosity. FLUORESCENCE: Nil.
2965	2970	5	COAL: as above.
		20	CLAYSTONE: as above.
		65	SILTSTONE: 60% arenaceous as above. SILTSTONE: 5% carbonaceous as above.
		10	SANDSTONE: as above. FLUORESCENCE: Nil.
2970	2975	10	CLAYSTONE: as above.
		25	SILTSTONE: arenaceous as above.
		65	SANDSTONE: clear to translucent, very fine to medium, rare coarse, dominantly fine, moderately well sorted, sub-angular to sub-rounded, common white argillaceous matrix, trace pyrite nodular, loose, hard, poor to fair inferred and visual porosity. <b>FLUORESCENCE: Trace to 5%, dull, pinpoint, greenish yellow fluorescence, very slow bleeding cut, thin film residue.</b> <b>Mud log bar = ½</b> <b>Gas peak 2980.5 mMDRT (2972-2990 mMDRT) = 862 units.</b>
2975	2980	10	CLAYSTONE: as above.
		15	SILTSTONE: as above.
		75	SANDSTONE: clear to translucent, very fine to medium, dominantly fine, moderately well sorted, sub-angular to sub-rounded, trace white argillaceous matrix, trace nodular pyrite, fair inferred porosity, fair visual porosity. <b>FLUORESCENCE: 5-10%, moderately bright, spotted, greenish yellow fluorescence, moderately rapid bleeding cut, thin ring residue.</b> <b>Mud log bar = ½</b>
2980	2985	10	COAL: as above.
		10	CLAYSTONE: as above.
		60	SILTSTONE: as above.
		20	SANDSTONE: as above. <b>FLUORESCENCE: Trace to 5%, dull, pinpoint, greenish yellow fluorescence, very slow bleeding cut, thin ring residue.</b> <b>Mud log bar = ½</b>
2985	2990	10	COAL: as above.
		5	CLAYSTONE: as above.
		65	SILTSTONE: as above.
		25	SANDSTONE: as above. <b>FLUORESCENCE: Trace due to cavings.</b>

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b>		<b>%</b>	<b>Lithology / Show Description</b>
<b>From</b>	<b>To</b>		
2990	2995	20	COAL: brownish black to black, earthy, brittle, sub-blocky, angular, grading to Carbonaceous Siltstone, abundant disseminating and nodular pyrite.
		5	CLAYSTONE: as above.
		60	SILTSTONE: 50% light brown, common medium to dark brown, argillaceous, fine arenaceous in parts, common to abundant disseminating and nodular pyrite, minor carbonaceous micro laminations, soft, occasionally firm, sub-blocky.
			SILTSTONE: 10% Carbonaceous, abundant nodular pyrite and as above.
		15	SANDSTONE: as above. FLUORESCENCE: Nil.
2995	3000	5	COAL: as above and common nodular and disseminating pyrite.
		10	CLAYSTONE: as above.
		75	SILTSTONE: 70% arenaceous as above.
			SILTSTONE: 5% carbonaceous as above.
		10	SANDSTONE: as above. FLUORESCENCE: Nil.
3000	3005	5	CLAYSTONE: as above.
		90	SILTSTONE: arenaceous as above.
		5	SANDSTONE: as above.
			FLUORESCENCE: Nil.
3005	3010	5	CLAYSTONE: as above.
		85	SILTSTONE: arenaceous as above.
		10	SANDSTONE: as above.
			FLUORESCENCE: Nil.
3010	3015	10	CLAYSTONE: as above.
		90	SILTSTONE: as above and trace disseminating pyrite and occasional nodular pyrite.
		Trace	SANDSTONE: as above.
			FLUORESCENCE: Nil.
3015	3020	5	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		5	SANDSTONE: as above and clear to translucent, coarse to very coarse.
			FLUORESCENCE: Nil.
3020	3025	5	CLAYSTONE: as above.
		95	SILTSTONE: as above.
		Trace	SANDSTONE: as above.
			FLUORESCENCE: Nil.
3025	3030	Trace	CLAYSTONE: as above.
		95	SILTSTONE: as above and trace mica flakes.
		5	SANDSTONE: as above and fine to coarse, dominantly fine.
			FLUORESCENCE: Nil.
3030	3035	Trace	CLAYSTONE: as above.
		90	SILTSTONE: as above.
		10	SANDSTONE: clear to translucent, fine to medium, occasionally coarse, moderately sorted, sub-angular to sub-rounded, common white argillaceous matrix, trace carbonaceous specks, trace nodular pyrite, loose, hard, poor to fair visual and inferred porosity.
			<b>FLUORESCENCE: Trace to 2%, dull, pinpoint, greenish yellow fluorescence, very slow direct cut, very thin ring residue.</b> <b>Mud log bar = 0</b> <b>Gas peak 3031.5-3034 mMDRT = 245 units.</b>
3035	3040	50	SILTSTONE: as above.

## Tuna A31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
		50	SANDSTONE: clear to translucent, smoky grey, medium to coarse, trace very coarse, moderately well sorted, sub-angular to sub-rounded, occasionally locally common white argillaceous matrix, common nodular pyrite, common disseminating pyrite, loose, poor to fair inferred and visual porosity. <b>FLUORESCENCE: Trace due to cavings.</b>
3040	3045	Trace	COAL: as above and grading to Carbonaceous Siltstone.
		5	CLAYSTONE: as above.
		90	SILTSTONE: 85% arenaceous as above.
			SILTSTONE: 5% Carbonaceous as above and trace nodular pyrite.
		5	SANDSTONE: as above.
			FLUORESCENCE: Nil.
3045	3048	Trace	CLAYSTONE: as above.
		95	SILTSTONE: arenaceous as above.
		5	SANDSTONE: as above.
			FLUORESCENCE: Nil.

TNA A31A TD criterion:

Rathole logging of 60.0 metres MD below the last depth at which fluorescence seen in sample.

This depth was 2985.0 mMDRT.

TD = 2985.0 + 60.0 = 3045.0 mMDRT.

Decided to drill to the stand-down depth of 3048.0 mMDRT = 1565.6 mTVDRT (-1534.3 mTVDSS).

**TNA A31A reached a TD of 3048.0 mMDRT = 1565.6 mTVDRT = (-1534.3 mTVDSS) at 09:45 hrs 08 January 2005.**

CBU. POOH. BOP stack test.

Wiper Trip.

Trip gas 36 units at 02:40 hrs, 09 January 2005.

Last circulation at 04:35 hrs 09 January 2005.

Start POOH at 04:36 hrs 09 January 2005 for Reeves Wireline Logging.

**IN ALL OF THE ABOVE FLUORESCENCE DESCRIPTIONS, "TRACE TO 5%" IN QUANTITY WOULD MOST LIKELY BE CAVINGS AND SHOULD BE DISREGARDED. THE "TRACE TO 5%" IN QUANTITY HAS BEEN RECORDED AS SEEN IN THE SAMPLES.**

## Tuna A31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
<b>Logging Interval (Drilling Program: Section 10)</b>			
<b>Reeves Logging:</b>			
At Logging speed from TD to 80 mTVDRT above the TOL.			
At Tripping speed from 80 mTVDRT above the TOL to surface.			
<b>Top of Latrobe= 2459.0 mMDRT = 1353.0 mTVDRT</b> <b>- 80.0 mTVDRT</b> <b>= 1273.0 mTVDRT</b>  <b>= 2243.0 mMDRT.</b>			
At Logging speed from TD (3048.0 mMDRT) to 2242.5 mMDRT.			
At Tripping Speed from 2242.5 mMDRT to 9.625" Casing at 829.0 mMDRT.			
<b>After viewing the Reeves Wireline Logs, a decision was taken at 2100 hrs on 10 January 2005, to initially drill ahead and extend Tuna A31A deeper by 210.0 mMDRT.</b> <b>This extension depth was later changed 3429.0 mMDRT (=1693.45 mTVDRT).</b> RIH with a Hycalog PDC bit with no Downhole Mud Motor. On Bottom Drilling at 10:35 hrs 11 January 2005. Trip Gas at 10:57 hrs 11 January 2005 = 31 units.			
Drilled from 3048.0 to 3101.0 mMDRT with a Smith Tricone bit. No Downhole Mud Motor. Bit Details: Bit # 2, Size: 8.5", Manufacturer / Type: Smith S73PX. Serial #: MR 6363 Jets: 22 x 3, TFA: 1.114 sq.in, HOB: 6.00, Grading: <b>0-0-WT-A-E-E-EIN-NO-TD.</b> Krevs: 44.0, RPM: (100-176), Average RPM: 120, Average ROP: 53.0 / 6.00 = 8.83 m/hr.			
3048	3050	5	COAL: black, sub vitreous, sub blocky, angular, trace disseminated pyrite.
		80	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		15	SILTSTONE: light brownish grey to pale brown, arenaceous grading to silty Sandstone in part, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
		Trace	SANDSTONE: as above.
			FLUORESCENCE: Nil.
3050	3055	Trace	COAL: as above.
		60	CLAYSTONE: as above.
		30	SILTSTONE: arenaceous as above.
		10	SANDSTONE: clear to translucent, fine to occasionally coarse fractured quartz grains, dominantly medium, moderately well sorted, sub angular to predominantly sub rounded, trace white argillaceous matrix, trace pyrite cement, trace nodular pyrite, loose, hard, fair inferred porosity.
			FLUORESCENCE: Nil.
3055	3060	5	COAL: as above, commonly darkish red to black, abundant nodular pyrite, silty grading to Carbonaceous Siltstone.
		60	CLAYSTONE: as above.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3060	3065	30	SILTSTONE: 20%, light brownish grey to pale brown, arenaceous grading to silty Sandstone in part, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
			SILTSTONE: 10%, brownish black to black, very carbonaceous with abundant nodular pyrite, grading to Silty Coal.
		5	SANDSTONE: as above.
			FLUORESCENCE: Nil
			Gas peak 3059.5 to 3063.0 = 111 Units.
		Trace	COAL: as above.
		60	CLAYSTONE: as above.
		20	SILTSTONE: 15% arenaceous as above.
			SILTSTONE: 5% carbonaceous as above.
		Trace	SANDSTONE: as above.
3065	3070		FLUORESCENCE: Nil
		Trace	COAL: as above.
		70	CLAYSTONE: as above.
		25	SILTSTONE: All 25%, arenaceous as above.
		5	SANDSTONE: clear to translucent, fine to occasionally coarse fractured quartz grains, dominantly fine, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, trace nodular pyrite, loose, hard, poor to fair inferred porosity.
3070	3075		FLUORESCENCE: Nil.
		40	CLAYSTONE: as above.
		60	SILTSTONE: 60% arenaceous as above.
			SILTSTONE: Trace, carbonaceous as above.
		Trace	SANDSTONE: as above.
3075	3080		FLUORESCENCE: Nil
		25	CLAYSTONE: as above.
		70	SILTSTONE: All 70% arenaceous as above.
		Trace	SANDSTONE: clear to translucent, very fine to occasionally coarse fractured quartz grains, dominantly medium, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, abundant nodular pyrite, loose, hard, poor to fair inferred porosity.
			FLUORESCENCE: Nil.
3080	3085		(Very slow drilling from 3075 to 3083 mMDRT due to pyrite stringer).
		60	CLAYSTONE: as above.
		35	SILTSTONE: 60% arenaceous as above.
		5	SANDSTONE: as above, common nodular pyrite, rare gastropods.
			FLUORESCENCE: Nil
3085	3090	70	CLAYSTONE: as above.
		25	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
		5	SANDSTONE: clear to translucent, very fine to occasionally coarse fractured quartz grains, dominantly fine, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, trace nodular pyrite, loose, hard, poor to fair inferred porosity.
			FLUORESCENCE: Nil
3090	3095	55	CLAYSTONE: as above.
		40	SILTSTONE: 60% arenaceous as above.

## Tuna A31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3095	3100	5	SANDSTONE: clear to translucent, medium to very coarse, dominantly coarse, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, abundant nodular pyrite, loose, hard, fair to good inferred porosity. FLUORESCENCE: Nil
		70	CLAYSTONE: as above.
		30	SILTSTONE: 60% arenaceous as above.
		Trace	SANDSTONE: as above. FLUORESCENCE: Nil  At stand-down 3101.3 mMDRT (1583.4 mTVDRT), circulate the mud to bring down the Mud Weight from 10.4 ppg to 10.25 ppg. Circulate from 17:10 hrs to 20:30 hrs, on 11 January 2005. POOH to the shoe at 20:30 hrs, on 11 January 2005. POOH at 22:00 hrs on 12 January 2005 to perform the BOP test. RIH with Mud Motor and Hycalog PDC bit. Trip Gas at 19:25 hrs 13 January 2005 = 88 units. On Bottom Drilling at 20:05 hrs 13 January 2005.  Drilled from 3101.0 to 3406.0 mMDRT with a Hycalog PDC bit on steerable motor assembly. Bit Details: Bit # 1, Size: 8.5", Manufacturer / Type: Hycalog RSX 163, Serial #: 207785. Jets: 2 x 18, 4 x 21, TFA: 1.850 sq.in, HOB: xx.xx, Grading: <b>1-1-CT-C,S-X-I-ER-TD</b> . Krevs: 225.0, RPM: 109-115 ( + 176 RPM DHM). Average ROP: 305.0 / 13.00 = 23.5 m/hr. Rotating: 304.0 metres / Rotating HOB = 12.96, Average Rotating ROP = 23.5 m/hr Steering: 1.0 metres / Steering HOB = 0.04 , Average Steering ROP = 25.0 m/hr.
3100	3105	50	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		50	SILTSTONE: light brownish grey to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, trace nodular pyrite, soft to moderately hard, amorphous to sub blocky.
3105	3110	35	CLAYSTONE: as above.
		65	SILTSTONE: 60% arenaceous as above. SILTSTONE: 5% , brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky. <b>Gas peak at 3109.0 mMDRT = 28 units/18 units BG.</b>
3110	3115	20	CLAYSTONE: as above.
		80	SILTSTONE: 80% arenaceous as above. SILTSTONE: Trace , brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky.
3115	3120	15	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		75	SILTSTONE: All 75%, light brownish grey to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, trace nodular pyrite, soft to moderately hard, amorphous to sub blocky.
		10	SANDSTONE: clear to translucent, coarse to very coarse, dominantly coarse, moderately well sorted, sub angular to sub rounded, trace pyrite cement, common nodular pyrite, nil matrix, occasionally fractured quartz grains, loose, hard, fair to good inferred porosity. FLUORESCENCE: Nil
3120	3125	5	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty in part, grading to Carbonaceous Siltstone.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3125	3130	10	CLAYSTONE: as above.
		80	SILTSTONE: 80% arenaceous as above.
			SILTSTONE: 5%, brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky. <b>Gas peak at 3122.0 mMDRT = 128 units/18 units BG.</b>
		25	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		60	SILTSTONE: All 60% , light brownish grey to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, trace nodular pyrite, soft to moderately hard, amorphous to sub blocky.
3130	3135	15	SANDSTONE: clear to translucent, very fine to occasionally coarse fractured quartz grains, dominantly fine, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace nodular pyrite, common white argillaceous matrix, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil
		15	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty in part, grading to Carbonaceous Siltstone.
		5	CLAYSTONE: as above.
		75	SILTSTONE: 70% arenaceous as above. SILTSTONE: 5% , carbonaceous, as above, trace nodular pyrite. <b>Gas peak at 3134.0 mMDRT = 110 units/18 units BG.</b>
		5	SANDSTONE: as above, trace nodular pyrite. FLUORESCENCE: Nil
3135	3140	10	CLAYSTONE: as above.
		60	SILTSTONE: 60%, light brownish grey to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, trace nodular pyrite, soft to moderately hard, amorphous to sub blocky. SILTSTONE: Trace, carbonaceous, as above, trace nodular pyrite.
		30	SANDSTONE: clear to translucent, very fine to occasionally coarse fractured quartz grains, dominantly fine, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace nodular pyrite, common white argillaceous matrix, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil
		10	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		60	SILTSTONE: All 60%, light brownish grey to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, trace nodular pyrite, soft to moderately hard, amorphous to sub blocky..
3140	3145	30	SANDSTONE: as above. FLUORESCENCE: Nil
		10	CLAYSTONE: as above.
		70	SILTSTONE: All 70% arenaceous as above.
		20	SANDSTONE: clear to translucent, very fine to occasionally coarse fractured quartz grains, dominantly fine, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace nodular pyrite, common white argillaceous matrix, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil
		10	CLAYSTONE: as above.
3150	3155	70	SILTSTONE: All 70%, light brownish to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, occasional carbonaceous laminations, soft to moderately hard, amorphous to sub blocky.

## Tuna A31A Lithology / Show Descriptions

Interval (m) From To		%	Lithology / Show Description
3155	3160	20	SANDSTONE: as above.
		10	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		70	SILTSTONE: 70% arenaceous as above.
		20	SANDSTONE: as above.
3160	3165		FLUORESCENCE: Nil
		10	CLAYSTONE: as above.
		70	SILTSTONE: All 70%, light brownish to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, occasional carbonaceous laminations, soft to moderately hard, amorphous to sub blocky.
		20	SANDSTONE: clear to translucent, occasionally white, very fine to coarse, dominantly very fine to fine, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace nodular pyrite, abundant white argillaceous matrix, poor to fair inferred porosity.
3165	3170		FLUORESCENCE: Nil
		20	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty.
		5	CLAYSTONE: as above.
		70	SILTSTONE: 80% arenaceous as above.
			SILTSTONE: 5%, brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky.
3170	3175	5	SANDSTONE: as above.
			FLUORESCENCE: Nil.
			<b>Mid L sand at 3175.0 mMDRT = 1609.2 mTVDRT.</b>
		30	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty.
		5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		60	SILTSTONE: 55% light brownish to pale brown occasionally moderate brown, arenaceous grading to Silty Sandstone, trace micromicaceous, occasional carbonaceous laminations, soft to moderately hard, amorphous to sub blocky.
3175	3180		SILTSTONE: 5%, brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky.
			<b>Gas peak at 3172.5 mMDRT = 405 units/22 units BG.</b>
		5	SANDSTONE: as above.
			FLUORESCENCE: Nil.
		10	CLAYSTONE: as above.
3180	3185	60	SILTSTONE: All 60% arenaceous as above.
		30	SANDSTONE: as above.
			FLUORESCENCE: Nil
		5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
3185	3190	70	SILTSTONE: All 70% arenaceous as above.
		25	SANDSTONE: clear to translucent, occasionally white, very fine to fine, occasionally coarse fractured quartz grains, dominantly very fine to fine, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace carbonaceous fragments, common white argillaceous matrix, poor visual and inferred porosity.
			FLUORESCENCE: Nil
3185	3190	10	CLAYSTONE: as above.
		50	SILTSTONE: All 50% arenaceous as above.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3190	3195	40	SANDSTONE: clear to translucent, occasionally white, very fine to fine, occasionally coarse fractured quartz grains, dominantly very fine to fine, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace carbonaceous fragments, common white argillaceous matrix, poor visual and inferred porosity. FLUORESCENCE: Nil
		5	CLAYSTONE: as above.
		70	SILTSTONE: All 70% arenaceous as above.
		25	SANDSTONE: clear to translucent, occasionally white, very fine to fine, occasionally coarse fractured quartz grains, dominantly very fine to fine, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace carbonaceous fragments, common white argillaceous matrix, minor friable aggregates, poor visual and inferred porosity. FLUORESCENCE: Nil
3195	3200	Trace	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone.
		5	CLAYSTONE: as above.
		80	SILTSTONE: 80% arenaceous as above. SILTSTONE: Trace, brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky.
		15	SANDSTONE: as above. FLUORESCENCE: Nil.
		Trace	COAL: as above, silty grading to carbonaceous Siltstone.
3200	3205	5	CLAYSTONE: as above.
		80	SILTSTONE: 80% arenaceous as above, trace carbonaceous specks.
		15	SANDSTONE: as above. FLUORESCENCE: Nil.
		Trace	COAL: as above, silty grading to carbonaceous Siltstone.
3205	3210	10	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		80	SILTSTONE: 80% arenaceous as above, trace carbonaceous specks.
		10	SANDSTONE: clear to translucent, occasionally white, very fine to medium, dominantly very fine to fine, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace carbonaceous specks, common white argillaceous matrix, poor visual and inferred porosity. FLUORESCENCE: Nil
		Trace	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone.
3210	3215	10	CLAYSTONE: as above.
		70	SILTSTONE: 70% arenaceous as above, trace carbonaceous specks.
		20	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally coarse, dominantly fine to medium, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace nodular pyrite, trace white argillaceous matrix, loose, hard occasionally crushed to rock flour by the PDC bit, poor visual and inferred porosity. FLUORESCENCE: Nil
		Trace	COAL: as above, silty grading to carbonaceous Siltstone.
3215	3220	5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		90	SILTSTONE: All 90% arenaceous as above, trace carbonaceous specks.
		5	SANDSTONE: as above. FLUORESCENCE: Nil.
3220	3225	5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		85	SILTSTONE: All 85% arenaceous as above, trace carbonaceous specks.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3225	3230	10	SANDSTONE: as above, fine to occasionally coarse fractured grains. FLUORESCENCE: Nil. <b>Top of L-095 sand at 3225.0 mMDRT = 1626.6 mTVDRT.</b>
		Trace	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone.
		Trace	CLAYSTONE: as above.
		70	SILTSTONE: 65% arenaceous as above. SILTSTONE: 5%, brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky. <b>Gas peak at 3227.0 mMDRT = 59 units/20 units BG.</b>
		30	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally coarse, dominantly fine to medium, moderately well sorted, sub angular to sub rounded, trace pyrite cement, trace nodular pyrite, trace white argillaceous matrix, loose, hard occasionally crushed to rock flour by the PDC bit, poor visual and inferred porosity. FLUORESCENCE: Nil
3230	3235	Trace	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		25	SILTSTONE: All 25%, light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, trace carbonaceous laminations, soft to moderately hard, amorphous to sub blocky.
		75	SANDSTONE: clear to translucent, occasionally white, fine to very coarse, dominantly coarse, moderately well sorted, sub angular to sub rounded, dominantly sub rounded, trace glauconite, trace pyrite cement, trace nodular pyrite, trace white argillaceous matrix, loose, hard occasionally crushed to rock flour by the PDC bit, poor visual and inferred porosity. FLUORESCENCE: Nil
3235	3240	Trace	CLAYSTONE: as above.
		10	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
		90	SANDSTONE: as above, medium to coarse, dominantly coarse, good to very good inferred porosity. FLUORESCENCE: Nil. <b>Fault (Top of L-100) sand at 3250.0 mMDRT = 1635.6 mTVDRT.</b>
3240	3245	Trace	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		5	SILTSTONE: arenaceous as above.
		95	SANDSTONE: as above, coarse to very coarse, dominantly coarse, very good inferred porosity. FLUORESCENCE: Nil. <b>EBL Finegreen added to mud system at 3249.0 mMDRT, in anticipation of drilling to coals and the increase in pump pressure and torque. At 3262.0 mMDRT the Finegreen in the mud system reached 2% by volume and this concentration was maintained to TD.</b>
3245	3250	5	CLAYSTONE: as above.
		5	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
		90	SANDSTONE: clear to translucent, occasionally white, coarse to very coarse, dominantly very coarse, well sorted, sub rounded to occasionally rounded, dominantly sub rounded, trace glauconite, trace pyrite cement, trace nodular pyrite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3250	3255	Trace	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		Trace	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
		100	SANDSTONE: clear to translucent, occasionally white, coarse to very coarse, dominantly very coarse, well sorted, sub rounded to dominantly rounded, nil matrix, trace glauconite, trace pyrite cement, trace nodular pyrite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil. <b>Top of L-110 sand at 3260.0 mMDRT = 1639.2 mTVDR.</b>
3255	3260	5	CLAYSTONE: as above.
		5	SILTSTONE: arenaceous as above.
		90	SANDSTONE: clear to translucent, occasionally white, very fine to very coarse, dominantly fine, moderately well sorted, sub angular to sub rounded, trace pale brown dolomite cement, trace glauconite, trace pyrite cement, trace nodular pyrite, hard aggregates, poor to fair inferred porosity. FLUORESCENCE: Trace, dull pinpoint greenish yellow fluorescence, no direct cut, very slow crush cut, thin residue ring. Mudlog Bar: 0.
3260	3265	5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		10	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
		85	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally very coarse, dominantly medium, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace glauconite, trace pyrite cement, trace nodular pyrite, hard aggregates, poor to fair inferred porosity. FLUORESCENCE: Trace to 5%, dull, even greenish yellow, rare pinpoint moderately bright orange fluorescence, very slow bleeding direct cut, thin ring residue. Mudlog Bar: 0.
3265	3270	Trace	CLAYSTONE: as above.
		10	SILTSTONE: arenaceous as above.
		90	SANDSTONE: clear to translucent, occasionally white, very fine to very coarse, dominantly fine, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace glauconite, trace pyrite cement, trace nodular pyrite, hard aggregates, poor to fair inferred porosity. FLUORESCENCE: Trace, moderately bright pinpoint greenish yellow and moderately bright orange fluorescence, very slow bleeding direct cut, thin ring residue. Mudlog Bar: 0.
3270	3275	Trace	CLAYSTONE: as above.
		5	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
		95	SANDSTONE: clear to translucent, occasionally white, very fine to very coarse, dominantly fine, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace glauconite, trace pyrite cement, trace nodular pyrite, hard aggregates, poor to fair inferred porosity. FLUORESCENCE: Trace to 5%, bright spotted bright orange fluorescence, no direct cut, very slow bleeding crush cut, thin ring residue. Mudlog Bar: 0.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From      To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3275	3280	Trace	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
		10	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.
		90	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally coarse, dominantly medium, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace glauconite, trace pyrite cement, trace nodular pyrite, hard aggregates, poor to fair inferred porosity. FLUORESCENCE: Trace, dull pinpoint greenish yellow fluorescence, no direct cut, very slow bleeding crush cut, thin ring residue. Mudlog Bar: 0.
3280	3285	5	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone.
		Trace	CLAYSTONE: as above.
		15	SILTSTONE: 10%, light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky. SILTSTONE: 5%, brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky. <b>Gas peak at 3284.0 mMDRT = 30 units/18 units BG.</b>
3285	3290	80	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally coarse, dominantly medium, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace glauconite, trace pyrite cement, trace nodular pyrite, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Trace, dull pinpoint greenish yellow fluorescence, very slow bleeding direct cut, thin ring residue. Mudlog Bar: 0.
		Trace	COAL: as above.
		30	SILTSTONE: arenaceous as above.
3290	3295	70	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally coarse, dominantly fine, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace nodular pyrite, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Trace, dull pinpoint greenish yellow fluorescence, no direct cut, no crush cut. Mudlog Bar: 0.
		Trace	CLAYSTONE: as above.
		30	SILTSTONE: arenaceous as above.
3295	3300	70	SANDSTONE: clear to translucent, occasionally white, very fine to coarse, dominantly medium, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, trace nodular pyrite, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Trace, dull even greenish yellow fluorescence, very slow bleeding direct cut, thin ring residue. Mudlog Bar: 0.
		5	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From      To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3300	3305	95	SANDSTONE: clear to translucent, occasionally white, very fine to medium, moderately well sorted, sub angular to sub rounded, dominantly sub rounded, trace white argillaceous matrix, trace nodular pyrite, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil. <b>Barablock blinding the shakers from 3300.0-3303.0 mMDRT Lag depth.</b>
		5	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone.
		5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		10	SILTSTONE: 10%, light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky. SILTSTONE: 5%, brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky. <b>Gas peak at 3303.0 mMDRT = 13 units/8 units BG.</b> <b>Top of L-150 sand at 3305.0 mMDRT = 1655.8 mTVDR.</b>
		80	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally coarse, dominantly fine, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace glauconite, trace nodular pyrite, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil.
3305	3310	5	CLAYSTONE: as above.
		15	SILTSTONE: arenaceous as above.
		80	SANDSTONE: clear to translucent, occasionally white, coarse to very coarse, dominantly coarse, moderately well sorted, sub rounded to dominantly rounded, nil matrix, trace pyrite cement, trace nodular pyrite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil.
3310	3315	5	CLAYSTONE: as above.
		25	SILTSTONE: arenaceous as above.
		70	SANDSTONE: clear to translucent, occasionally white, medium to very coarse, dominantly coarse, moderately well sorted, sub rounded to rounded, dominantly sub rounded, nil matrix, trace pyrite cement, trace nodular pyrite, loose, hard, good inferred porosity. FLUORESCENCE: Trace, dull pinpoint greenish yellow fluorescence, very slow bleeding direct cut, thin residue ring. Mudlog Bar: 0.
3315	3320	5	CLAYSTONE: as above.
		15	SILTSTONE: arenaceous as above.
		80	SANDSTONE: as above. FLUORESCENCE: Trace, moderately bright pinpoint greenish yellow fluorescence, very slow bleeding direct cut, very thin residue ring. Mudlog Bar: 0.
3320	3325	5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
		15	SILTSTONE: light brown to pale brown occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, soft to moderately hard, amorphous to sub blocky.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3325	3330	80	SANDSTONE: clear to translucent, occasionally white, coarse to very coarse, dominantly coarse, moderately well sorted, sub rounded to rounded, dominantly sub rounded, nil matrix, trace pyrite cement, trace nodular pyrite, loose, hard, good inferred porosity. FLUORESCENCE: Trace to 5%, dull to moderately bright pinpoint greenish yellow fluorescence, very slow bleeding direct cut, thin residue ring. Mudlog Bar: 0.
		5	CLAYSTONE: as above.
		80	SILTSTONE: light brownish grey to medium light grey, pale brown to occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, argillaceous in part, soft to moderately hard, amorphous to sub blocky.
3330	3335	15	SANDSTONE: clear to translucent, occasionally white, fine to very coarse, dominantly coarse, poorly sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, trace nodular pyrite, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil.
		5	COAL: brownish black to black, subvitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone.
		5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
		80	SILTSTONE: 75%, light brownish grey to medium light grey, pale brown to occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, argillaceous in part, soft to moderately hard, amorphous to sub blocky. SILTSTONE: 5%, brownish black to black, carbonaceous grading to Silty Coal in part, trace micromicaceous, trace nodular pyrite, soft to moderately hard, sub blocky to blocky. <b>Gas peak at 3332.0 mMDRT = 25 units/12 units BG.</b>
		10	SANDSTONE: as above. FLUORESCENCE: Nil.
3335	3340	Trace	COAL: Trace, as above. <b>Gas peak at 3339.0 mMDRT due to coal at 3339.0 mMDRT.</b>
		10	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky..
		80	SILTSTONE: All 80% arenaceous as above.
		10	SANDSTONE: clear to translucent, occasionally white, fine to coarse, dominantly very coarse, moderately well sorted, sub rounded to rounded, dominantly sub rounded, nil matrix, trace pyrite cement, trace nodular pyrite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil. <b>Top of L-160 sand at 3243.0 mMDRT = 1670.0 mTVDRt..</b>
		Trace	COAL: Trace, as above. <b>Gas peak at 3347.0 mMDRT = 18 units/10 units BG</b>
3340	3345	Trace	CLAYSTONE: as above.
		80	SILTSTONE: All 80% arenaceous as above.
		20	SANDSTONE: clear to translucent, occasionally white, coarse to very coarse, dominantly very coarse, moderately well sorted, sub rounded to rounded, dominantly sub rounded, nil matrix, trace pyrite cement, trace nodular pyrite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil.
		Trace	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
3345	3350	Trace	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
		25	SILTSTONE: All 25% arenaceous as above.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3350	3355	75	SANDSTONE: clear to translucent, occasionally white, coarse to very coarse, dominantly very coarse, moderately well sorted, sub rounded to rounded, dominantly sub rounded, nil matrix, trace pyrite cement, trace nodular pyrite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil.
		5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
		45	SILTSTONE: All 45%, light brownish grey to medium light grey, pale brown to occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, argillaceous in part, soft to moderately hard, amorphous to sub blocky.
		50	SANDSTONE: clear to translucent, occasionally white, coarse to very coarse, dominantly very coarse, moderately well sorted, sub rounded to rounded, dominantly sub rounded, nil matrix, trace pyrite cement, trace nodular pyrite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil.
3355	3360	5	CLAYSTONE: as above.
		60	SILTSTONE: All 60% arenaceous as above.
		35	SANDSTONE: clear to translucent, occasionally white, coarse to very coarse, dominantly very coarse, moderately well sorted, sub rounded to rounded, dominantly sub rounded, nil matrix, trace pyrite cement, trace nodular pyrite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Possible cavings (one grain), trace moderately bright pinpoint greenish yellow fluorescence, very slow bleeding cut, thin film residue.
Spot	3363.7	5	CLAYSTONE: as above.
		75	SILTSTONE: All 75% arenaceous as above.
		20	SANDSTONE: as above. FLUORESCENCE: Nil in spot sample.
3360	3365	Trace	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
		85	SILTSTONE: All 85%, light brownish grey to medium light grey, pale brown to occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, argillaceous in part, soft to moderately hard, amorphous to sub blocky.
		15	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally coarse, dominantly fine, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, trace nodular pyrite, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil.
3365	3370	Trace	CLAYSTONE: as above.
		40	SILTSTONE: All 40% arenaceous as above.
		60	SANDSTONE: clear to translucent, occasionally white, very fine to medium, dominantly very fine, moderately well sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, trace nodular pyrite, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil. <b>Gas peak at 3369.0 mMDRT = 12 units/8 units BG, from possible coal seam, not seen in the sample.</b>
3370	3375	Trace	CLAYSTONE: as above.
		25	SILTSTONE: All 25% arenaceous as above.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b> <b>From To</b>		<b>%</b>	<b>Lithology / Show Description</b>
3375	3380	75	SANDSTONE: clear to translucent, occasionally white, medium to occasionally very coarse, dominantly medium, moderately well sorted, sub angular to sub rounded, predominantly sub rounded, nil matrix, trace glauconite, loose, hard, fair to good inferred porosity. FLUORESCENCE: Nil.
		20	COAL: brownish black to black, sub vitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone. <b>Gas peak at 3379.5 mMDRT = 82 units/8 units BG.</b>
		10	SILTSTONE: All 10%, light brownish grey to medium light grey, pale brown to occasionally moderate brown, arenaceous grading to very fine Sandstone, trace micromicaceous, argillaceous in part, soft to moderately hard, amorphous to sub blocky.
		70	SANDSTONE: clear to translucent, occasionally white, medium to very coarse, dominantly very coarse, moderately well sorted, sub angular to predominantly sub rounded, trace white argillaceous matrix, trace glauconite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil. <b>Top of L-200 sand at 3385.0 mMDRT = 1685.9 mTVDRT.</b>
3380	3385	Trace	COAL: brownish black to black, sub vitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone.
		5	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
		20	SILTSTONE: All 20% arenaceous as above.
		75	SANDSTONE: clear to translucent, occasionally white, medium to very coarse, dominantly very coarse, moderately well sorted, sub angular to predominantly sub rounded, trace white argillaceous matrix, trace glauconite, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil.
3385	3390	10	CLAYSTONE: pale blue to greenish grey, trace micromicaceous, trace glauconite, moderately hard to hard, sub blocky to blocky.
		60	SILTSTONE: All 60%, light brownish grey to medium light grey, occasionally pale brown, arenaceous grading to very fine Sandstone, trace micromicaceous, argillaceous in part, soft to moderately hard, amorphous to sub blocky.
		30	SANDSTONE: clear to translucent, occasionally white, medium to very coarse, dominantly coarse, moderately well sorted, sub angular to predominantly sub rounded, nil matrix, trace glauconite, trace nodular pyrite, trace pyrite cement, loose, hard, good to very good inferred porosity. FLUORESCENCE: Nil.
3390	3395	10	CLAYSTONE: as above.
		50	SILTSTONE: All 50% arenaceous as above.
		40	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally very coarse, poorly sorted, sub angular to sub rounded, trace white argillaceous matrix, trace glauconite, trace pyrite cement, trace pyrite nodules, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil.
3395	3400	20	COAL: brownish black to black, sub vitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone. <b>Gas peak at 3399.0 to 3402.0 mMDRT = 104 units/10 units BG, from coal seam.</b>
		5	CLAYSTONE: as above.
		35	SILTSTONE: All 35% arenaceous as above.

## **Tuna A31A Lithology / Show Descriptions**

<b>Interval (m)</b>		<b>%</b>	<b>Lithology / Show Description</b>
<b>From</b>	<b>To</b>		
3400	3405	40	SANDSTONE: clear to translucent, occasionally white, very fine to occasionally coarse, poorly sorted, sub angular to sub rounded, common white argillaceous matrix, trace pyrite cement, trace pyrite nodules, loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil.
		20	COAL: brownish black to black, sub vitreous, brittle, sub blocky, angular, silty grading to carbonaceous Siltstone. <b>Gas peak at 3399.0 to 3402.0 mMDRT = 104 units/10 units BG, from coal seam.</b>
		10	CLAYSTONE: as above.
		30	SILTSTONE: All 30% arenaceous as above.
		40	SANDSTONE: clear to translucent, occasionally white, fine to very coarse, poorly sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, trace pyrite nodules, occasionally loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil.
<b>3405</b>	<b>3406 TD</b>	5	COAL: as above.
		10	CLAYSTONE: as above.
		50	SILTSTONE: All 50%, light brownish grey to medium light grey, occasionally pale brown, arenaceous grading to very fine Sandstone, trace micromicaceous, argillaceous in part, soft to moderately hard, amorphous to sub blocky.
		35	SANDSTONE: clear to translucent, occasionally white, fine to very coarse, poorly sorted, sub angular to sub rounded, trace white argillaceous matrix, trace pyrite cement, trace pyrite nodules, occasionally loose, hard, poor to fair inferred porosity. FLUORESCENCE: Nil.

TNA A31A TD criterion:

Drilling to the Measured Depth equivalent to the TVDRT of 1693.45 m, (or 60.0 mMDRT for rathole deeper than the last depth at which there was fluorescence and associated high gas in the samples)

Based on the Inclination Angle and the well path this MD (for the equivalent TVDRT of 1693.45 m) was 3406.0 mMDRT.

The final Schlumberger Direction Driller's projected TVDRT was 1693.9 m for the drilled TD of 3406.0 mMDRT.

**TNA A31A reached a TD of 3406.0 mMDRT = 1693.9 mTVDRT (-1662.6 mTVDSS) at 20:00 hrs 14 January 2005.**

CBU. POOH to shoe.

Wiper Trip.

Trip gas 78 units at 15:30 hrs, 15 January 2005.

Last circulation at 18:35 hrs 15 January 2005.

Start POOH at 18:36 hrs 15 January 2005 for Reeves Wireline Logging Run #2..

## Tuna A31A Lithology / Show Descriptions

Interval (m)			
From	To	%	Lithology / Show Description

IN ALL OF THE ABOVE FLUORESCENCE DESCRIPTIONS, "TRACE TO 5%" IN QUANTITY WOULD MOST LIKELY BE CAVINGS AND SHOULD BE DISREGARDED. THE "TRACE TO 5%" IN QUANTITY HAS BEEN RECORDED AS SEEN IN THE SAMPLES.

Logging Interval.

Reeves Logging:

To provide Logging data with a 100.0 metres overlap over the last Logging Run. The deepest data point in the first Logging run was at 3031.0 mMDRT.

Planned:

At Logging speed from TD 3406.0 to 2931.0 mMDRT.

At Tripping speed from 2931.0 mMDRT to surface.

Actual:

At **Logging speed** from TD (**3397.0** mMDRT) to **2930.0** mMDRT.

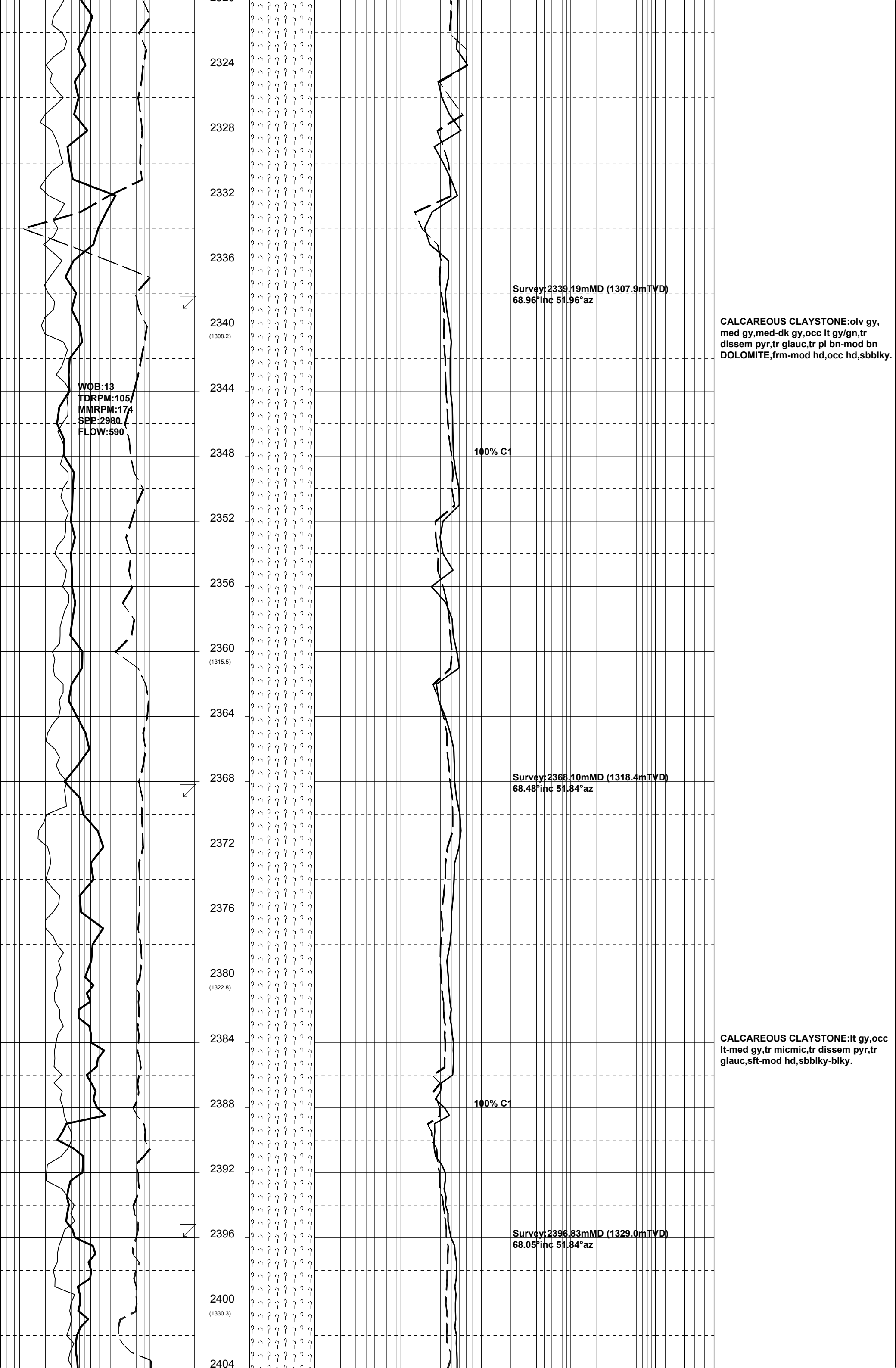
At Tripping Speed from **2930.0** mMDRT to **Surface**.

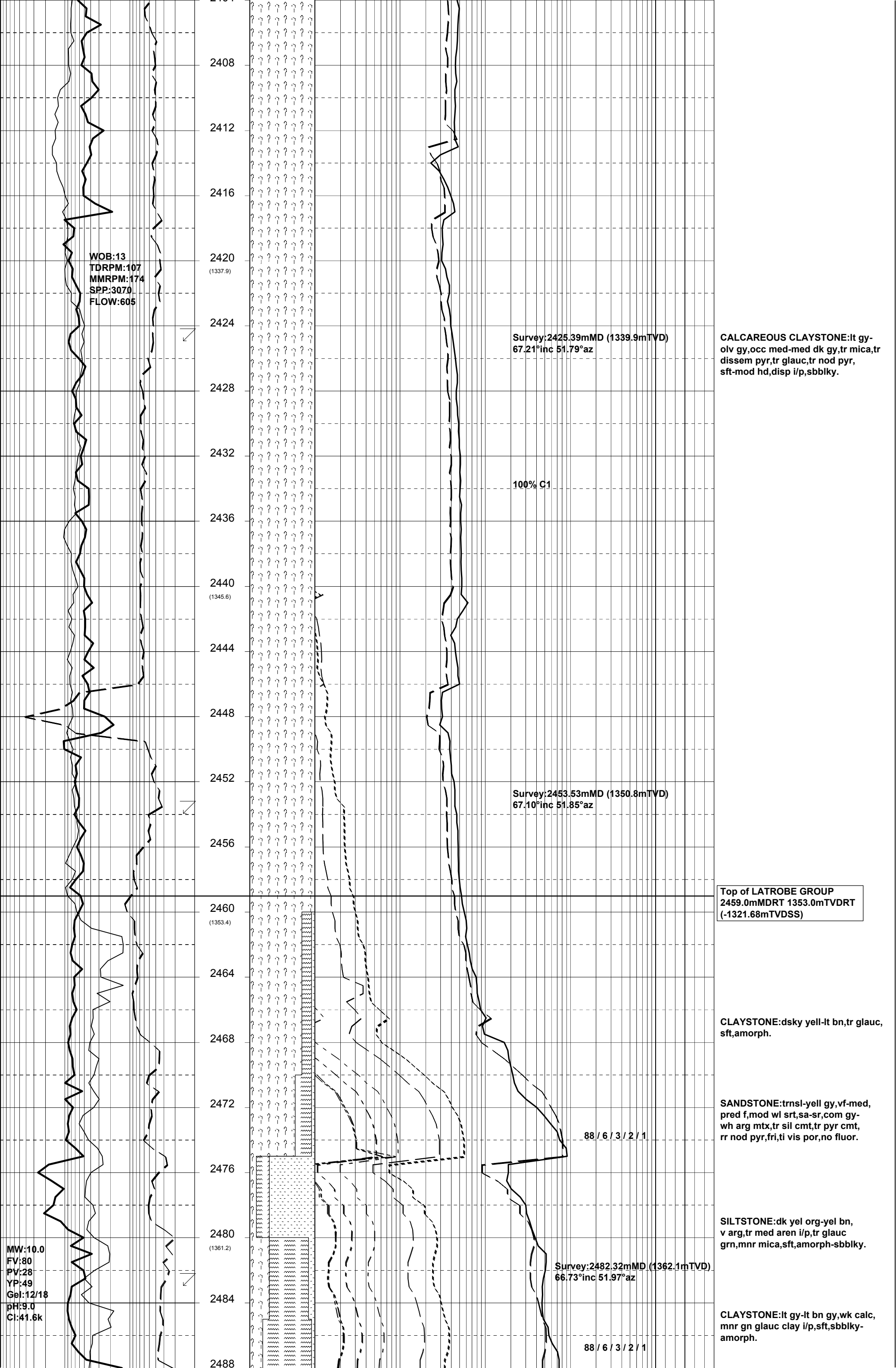
## **APPENDIX 4a**

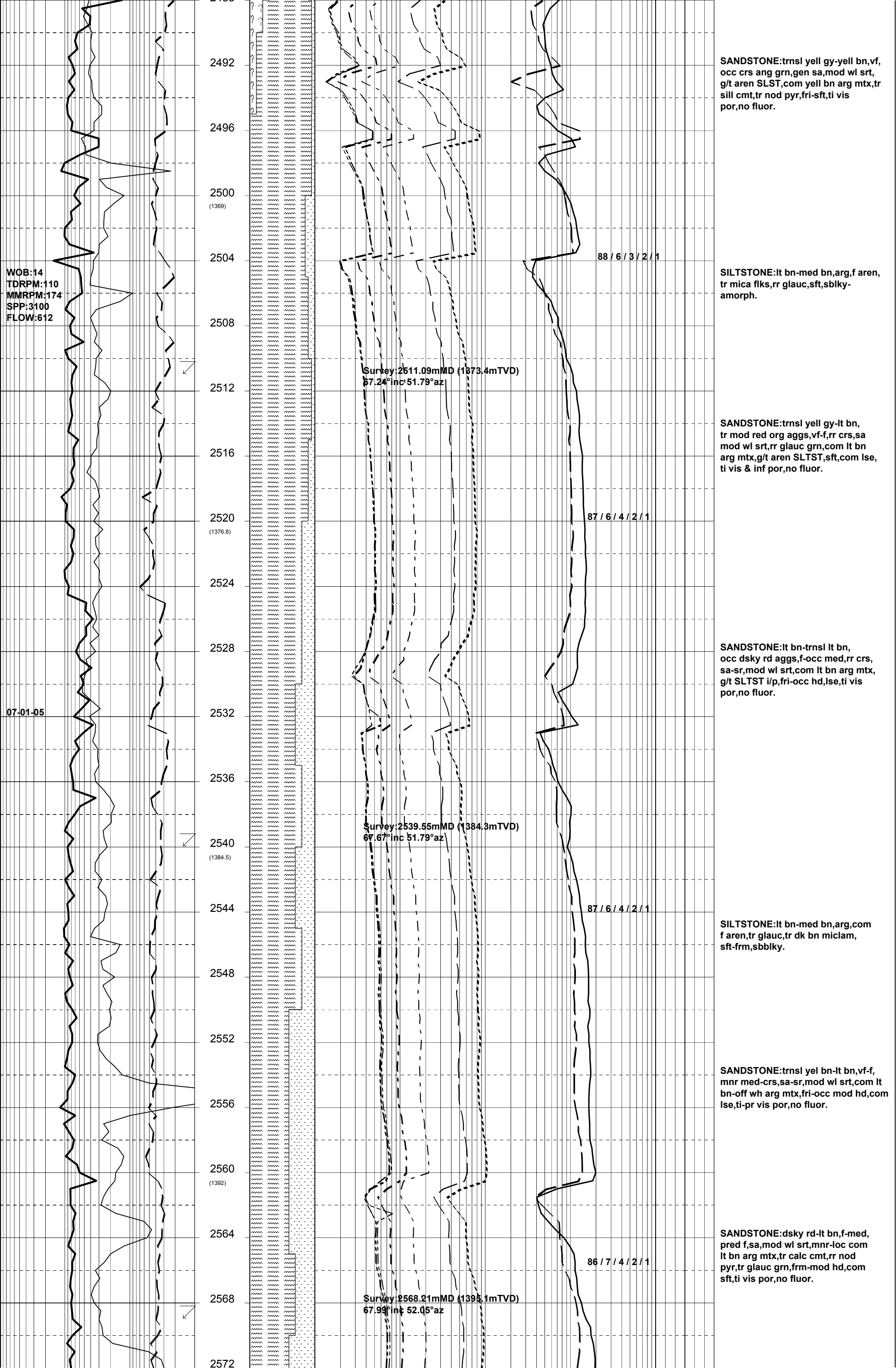
### **TUNA A31A**

#### **Mud Log**

[illegible]







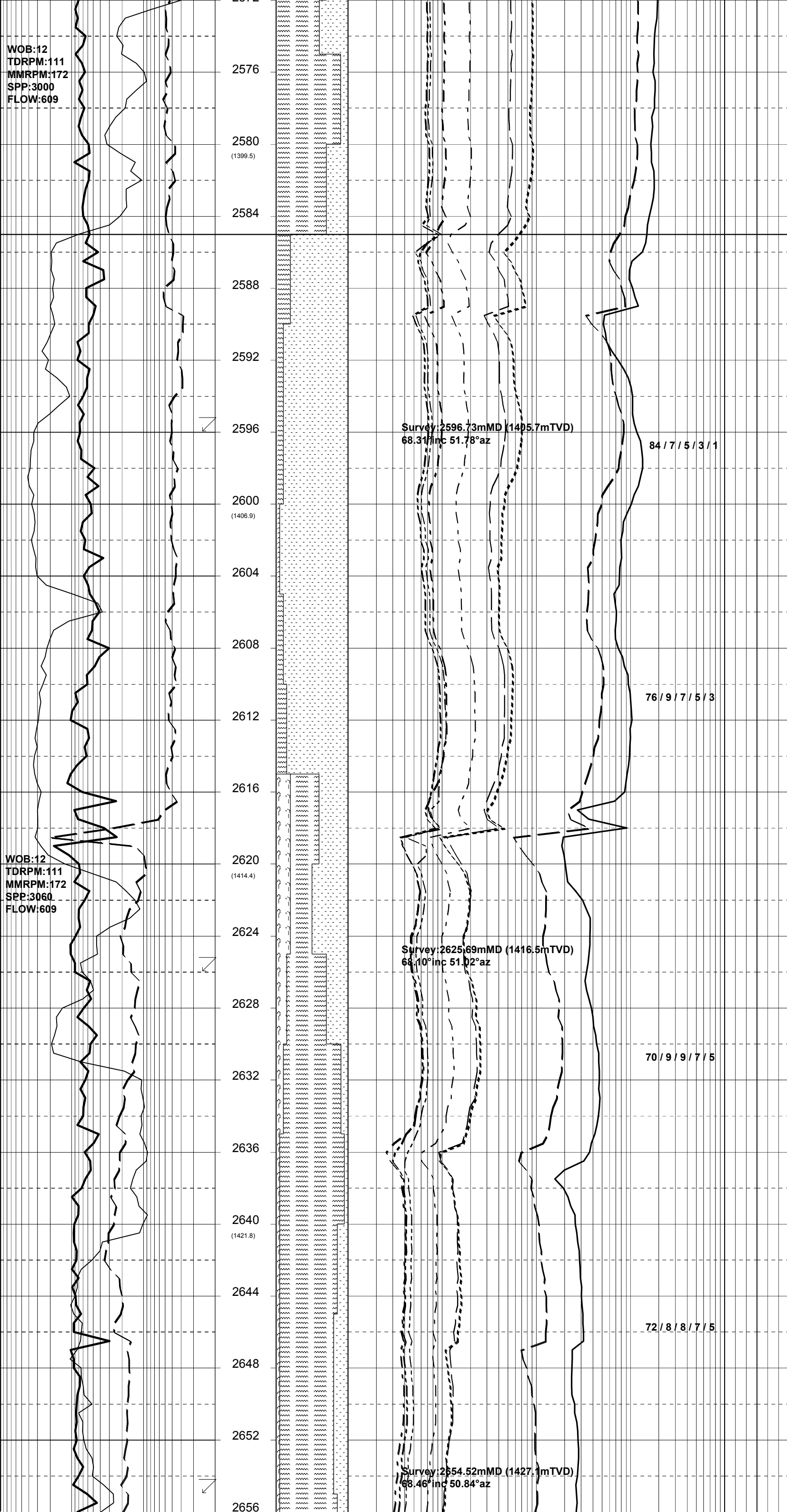
**SANDSTONE:**trnsI,pl bn,vf-f,com  
lt bn slty mtX,g/t aren SLTST,tr  
wh arg mtX,tr nod pyr,hd aggs,ti  
vis por,no fluor.

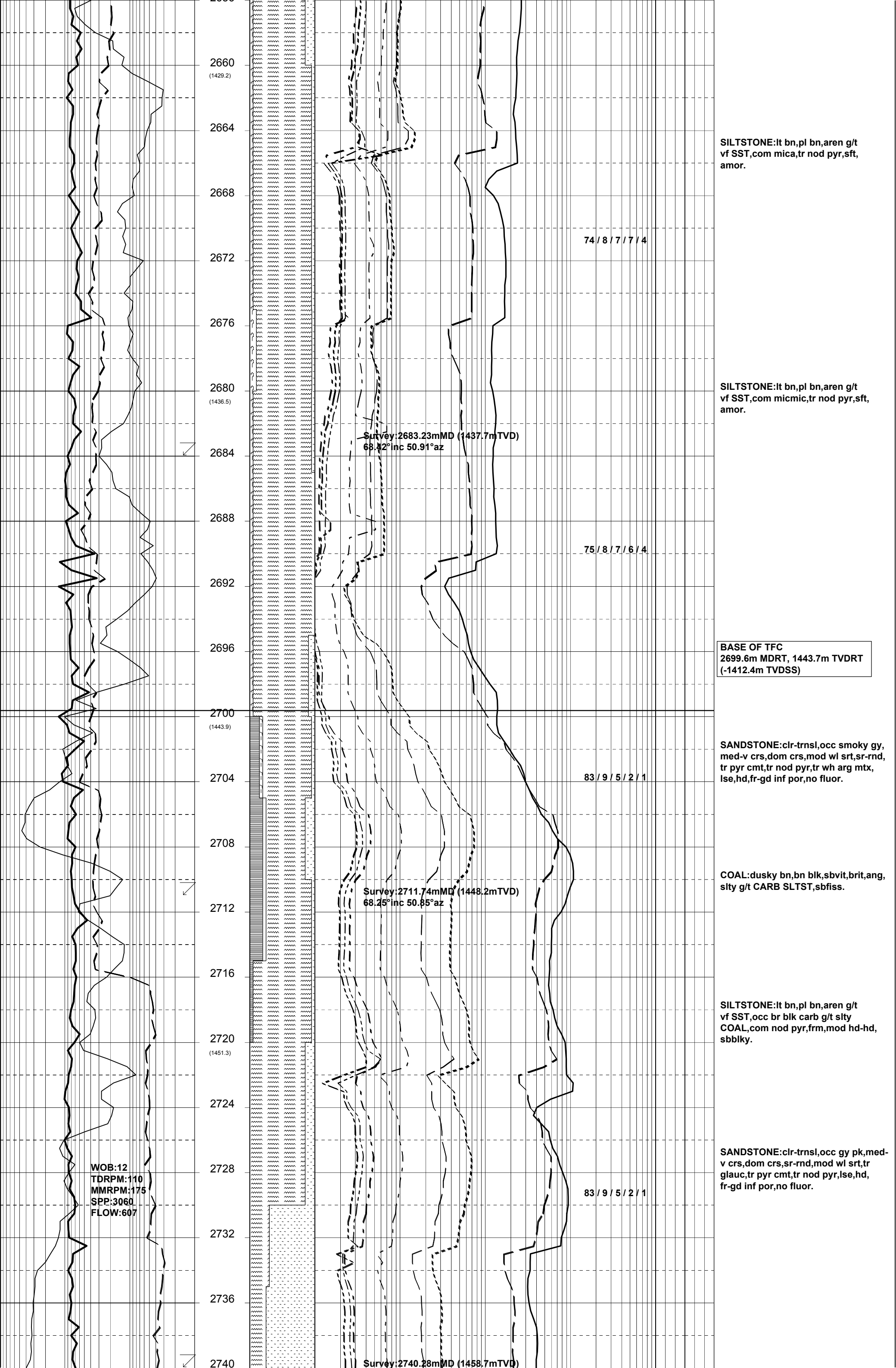
**SANDSTONE:**clr-trnsl,vf-occ crs,  
dom med,mod wl srt,tr wh arg mtx,  
tr nod pyr,tr glauc,lt bn slty mtx,  
pred lse grns,hd,fr-gd inf por,  
no fluor.

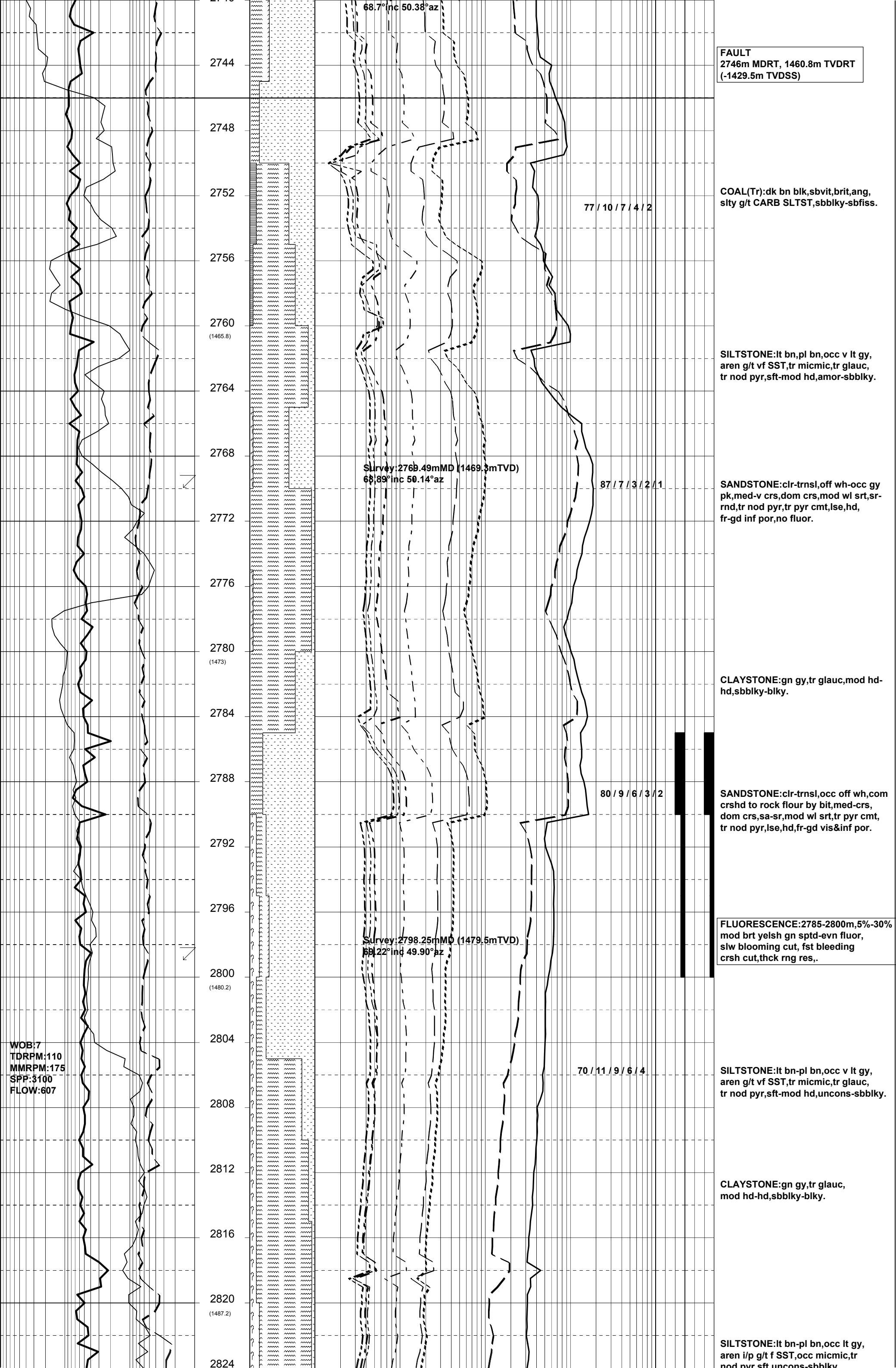
**SANDSTONE:**clr-trnsl,off wh,f-v crs,  
dom crs,mod srt,sa-sr,tr wh arg mtx,  
tr glauc, tr nod pyr,lse,hd,fr inf por,  
no fluor.

**CLAYSTONE:**lt gy-med gy,occ med dk gy,tr glauc, tr mica,mod hd-hd, sbblky-blky.

**SANDSTONE:**clr-trnsl,occ off wh,  
crs-v crs,dom crs,mod srt,sa-sr,tr pyr  
cmt,lse,hd,gd inf por,no fluor.







**FAULT**  
2746m MDRT, 1460.8m TVDRT  
(-1429.5m TVDSS)

**COAL(Tr):**dk bn blk,sbvit,brit,ang,  
slty g/t CARB SLTST,sbblky-sbfiss.

**SILTSTONE:**lt bn,pl bn,occ v lt gy,  
aren g/t vf SST,tr micmic,tr glauc,  
tr nod pyr,sft-mod hd,amor-sbblky.

**SANDSTONE:**clr-trnsl,off wh-occ gy  
pk,med-v crs,dom crs,mod wl srt,sr-  
rnd,tr nod pyr,tr pyr cmt,lse,hd,  
fr-gd inf por,no fluor.

**CLAYSTONE:**gn gy,tr glauc,mod hd-  
hd,sbblky-blky.

**SANDSTONE:**clr-trnsl,occ off wh,com  
crshd to rock flour by bit,med-crs,  
dom crs,sa-sr,mod wl srt,tr pyr cmt,  
tr nod pyr,lse,hd,fr-gd vis&inf por.

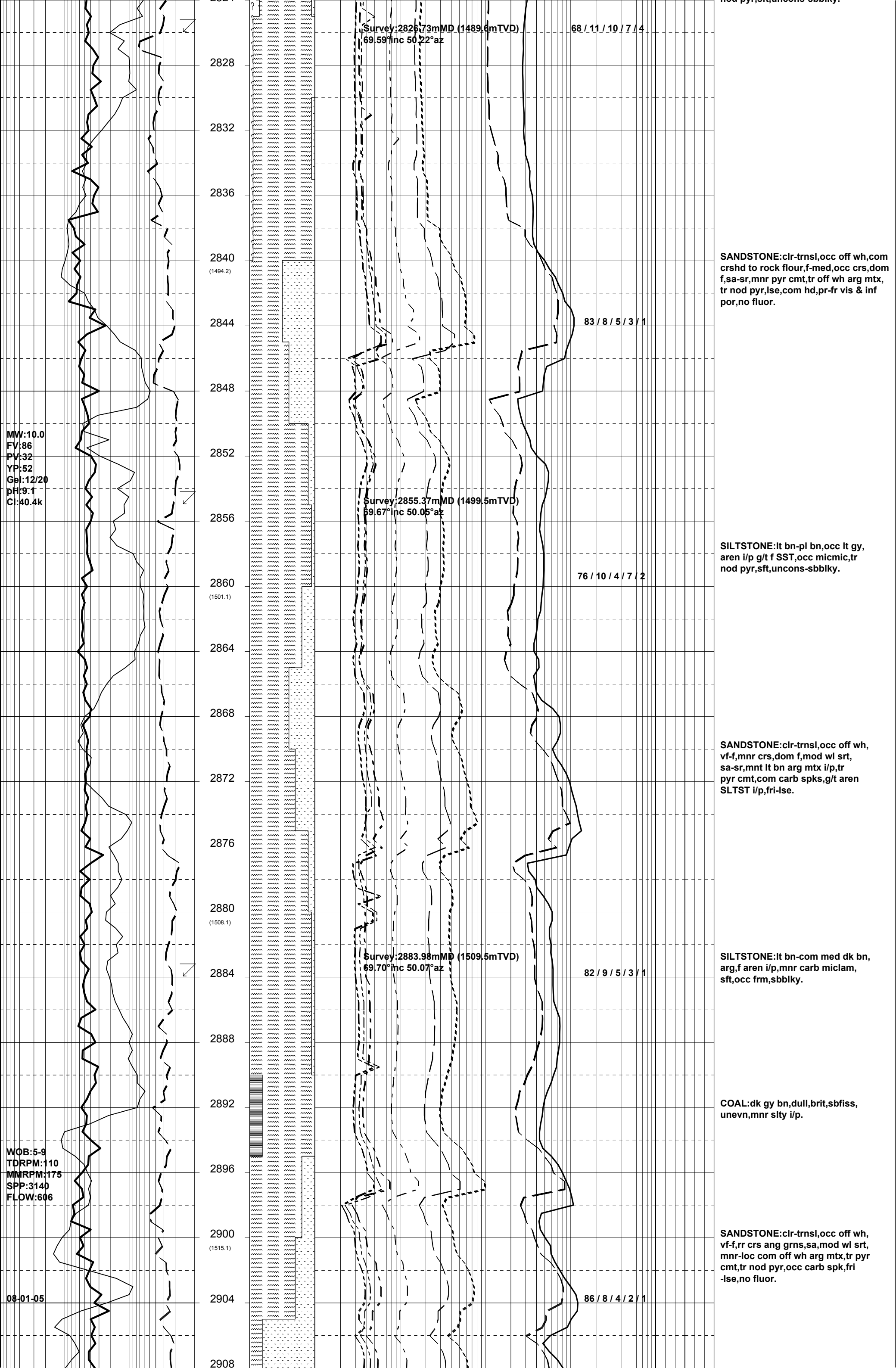
**FLUORESCENCE:**2785-2800m,5%-30%  
mod brt yelsh gn sptd-evn fluor,  
slw blooming cut, fst bleeding  
crsh cut,thck rng res.,.

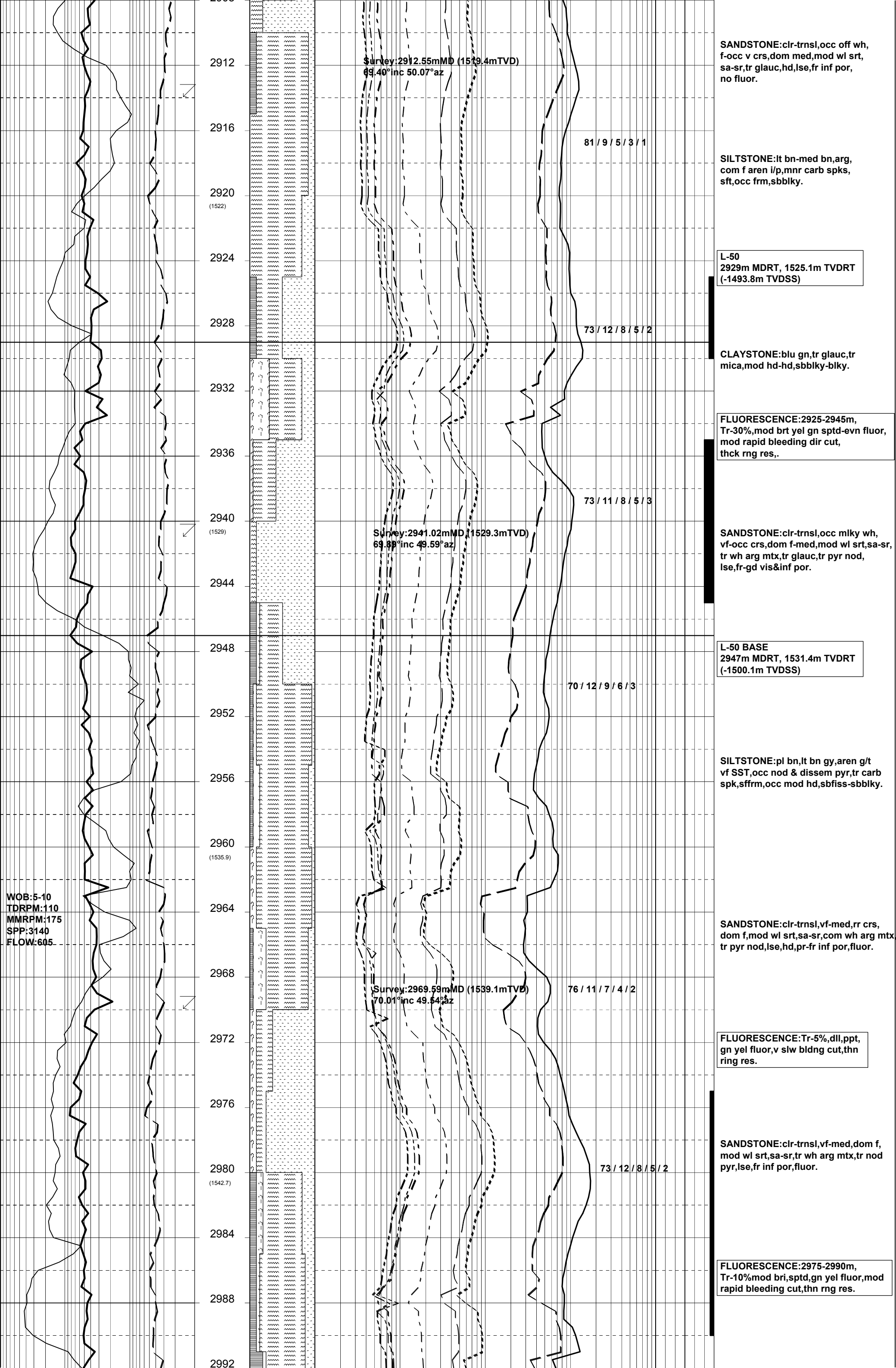
**SILTSTONE:**lt bn-pl bn,occ v lt gy,  
aren g/t vf SST,tr micmic,tr glauc,  
tr nod pyr,sft-mod hd,uncons-sbblky.

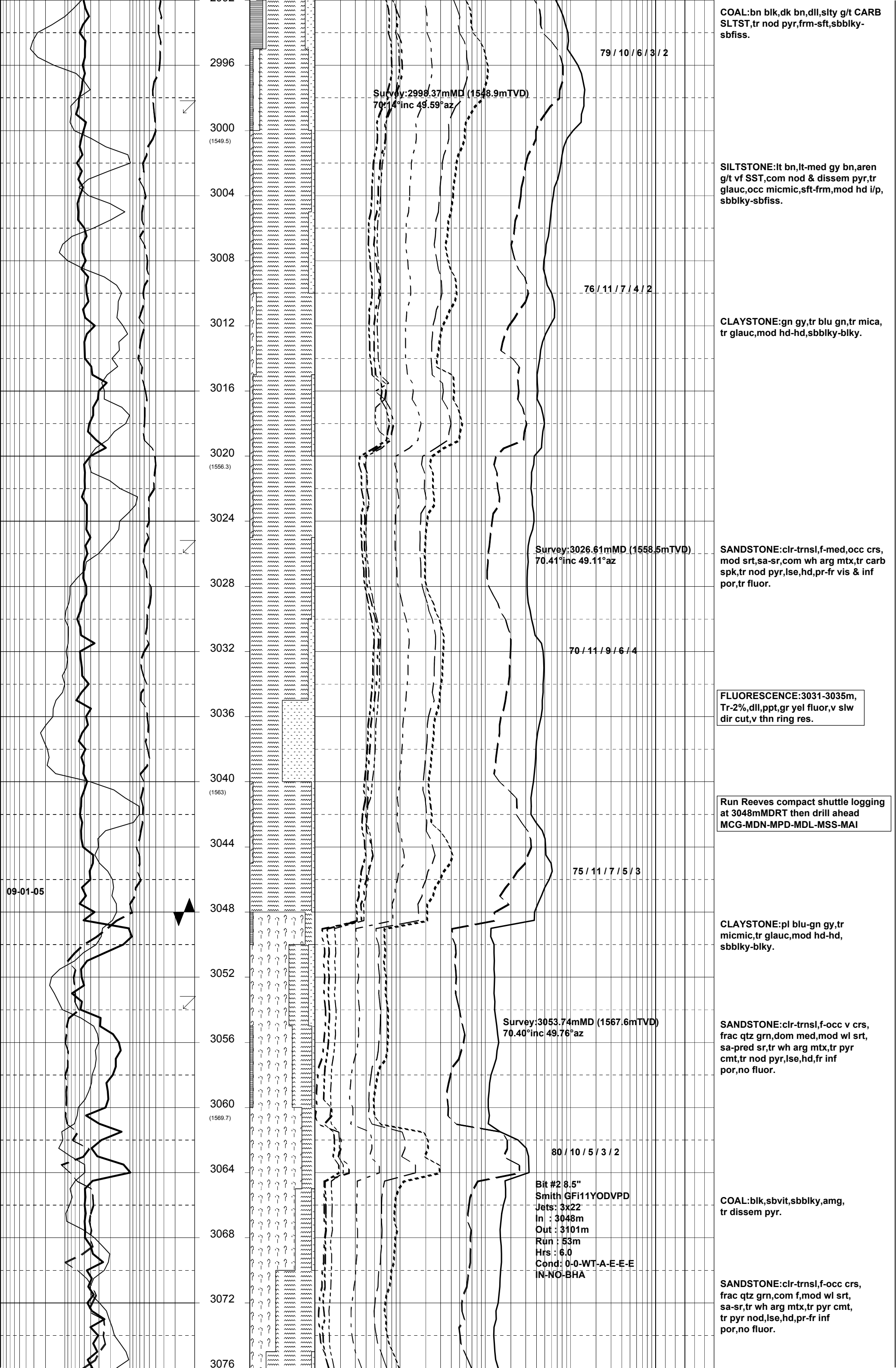
**CLAYSTONE:**gn gy,tr glauc,  
mod hd-hd,sbblky-blky.

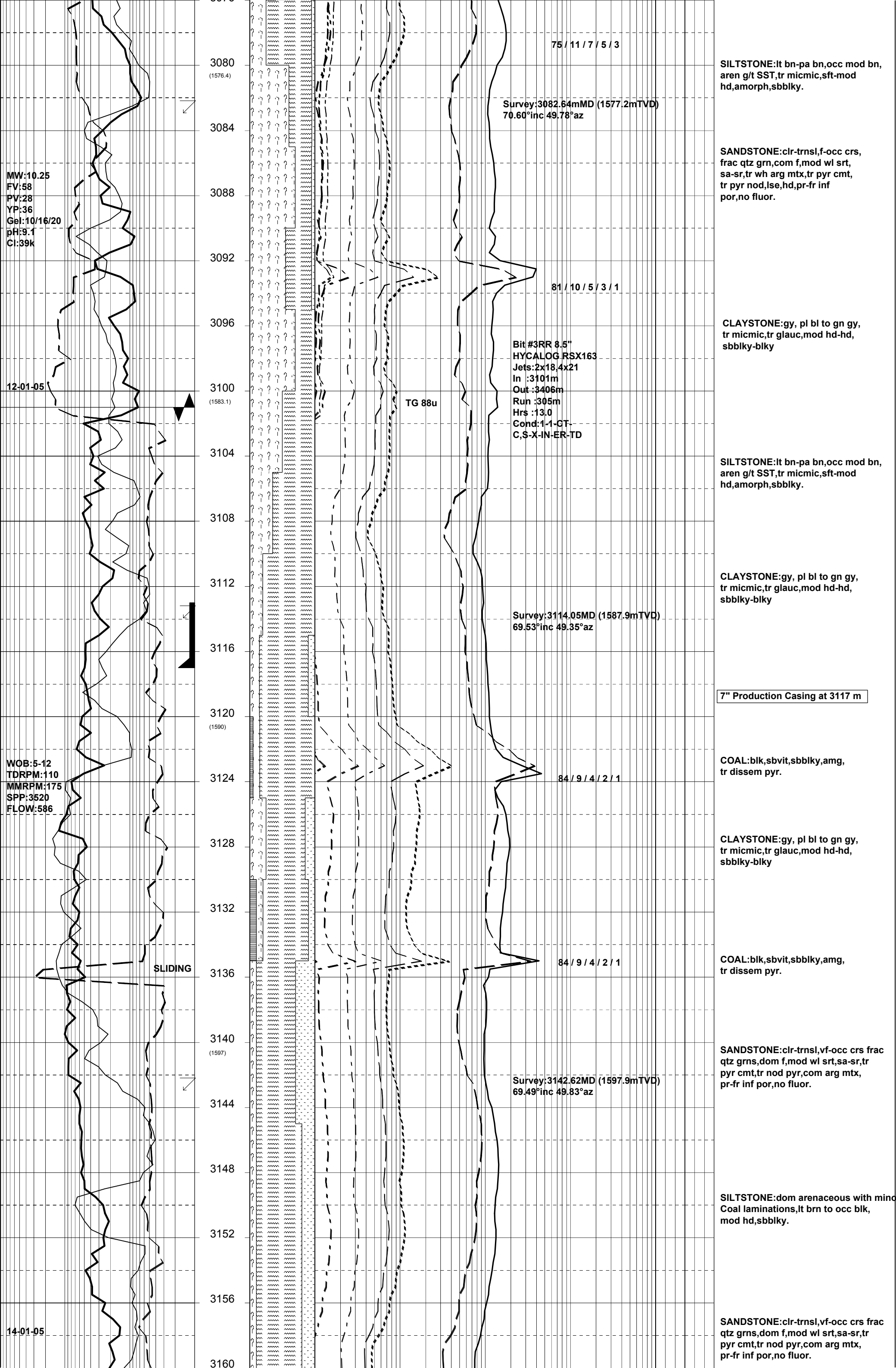
**SILTSTONE:**lt bn-pl bn,occ lt gy,  
aren i/p g/t f SST,occ micmic,tr  
nod pyr sft uncons-sbblky

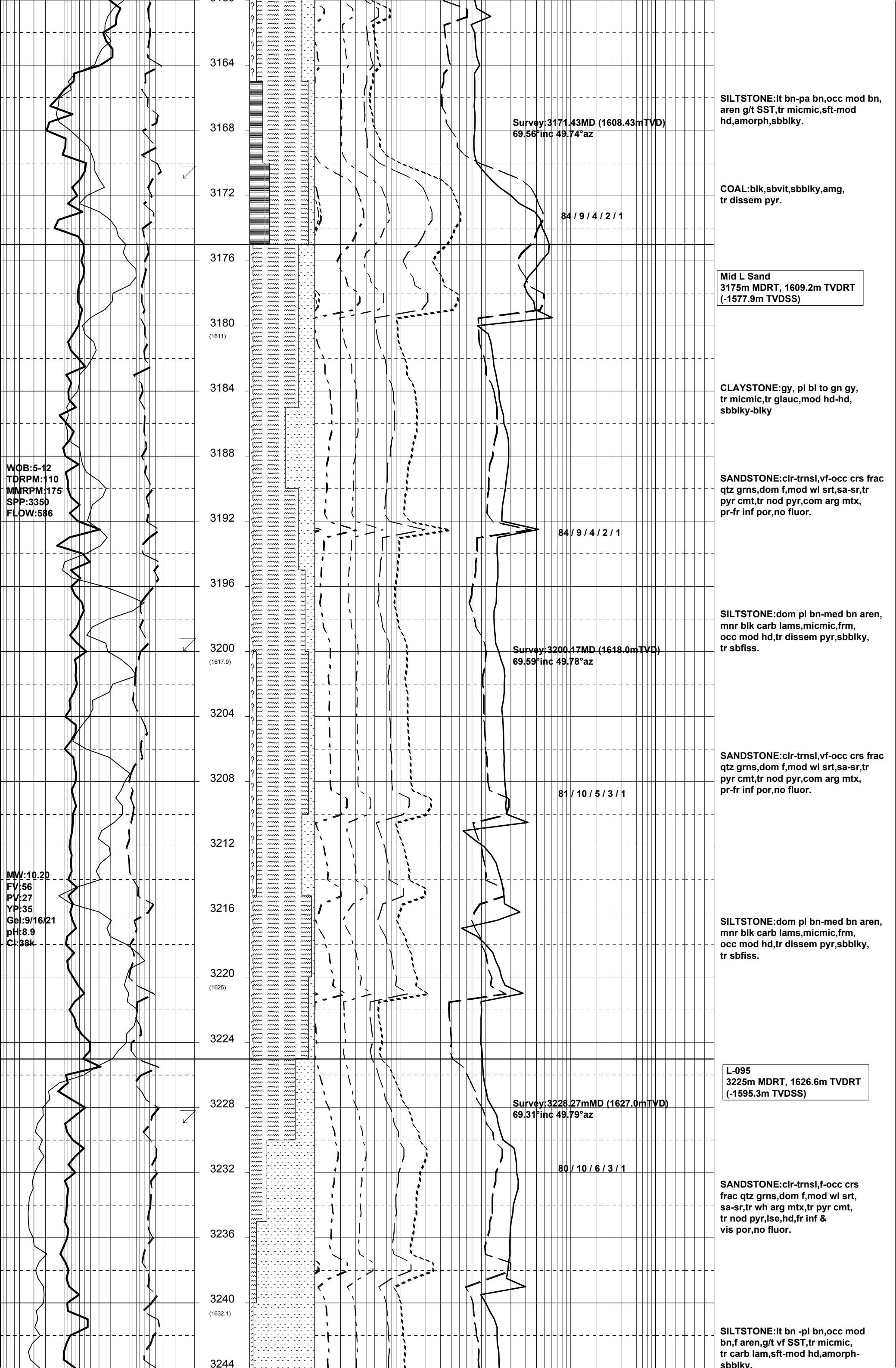
WOB:7  
TDRPM:110  
MMRPM:175  
SPP:3100  
FLOW:607

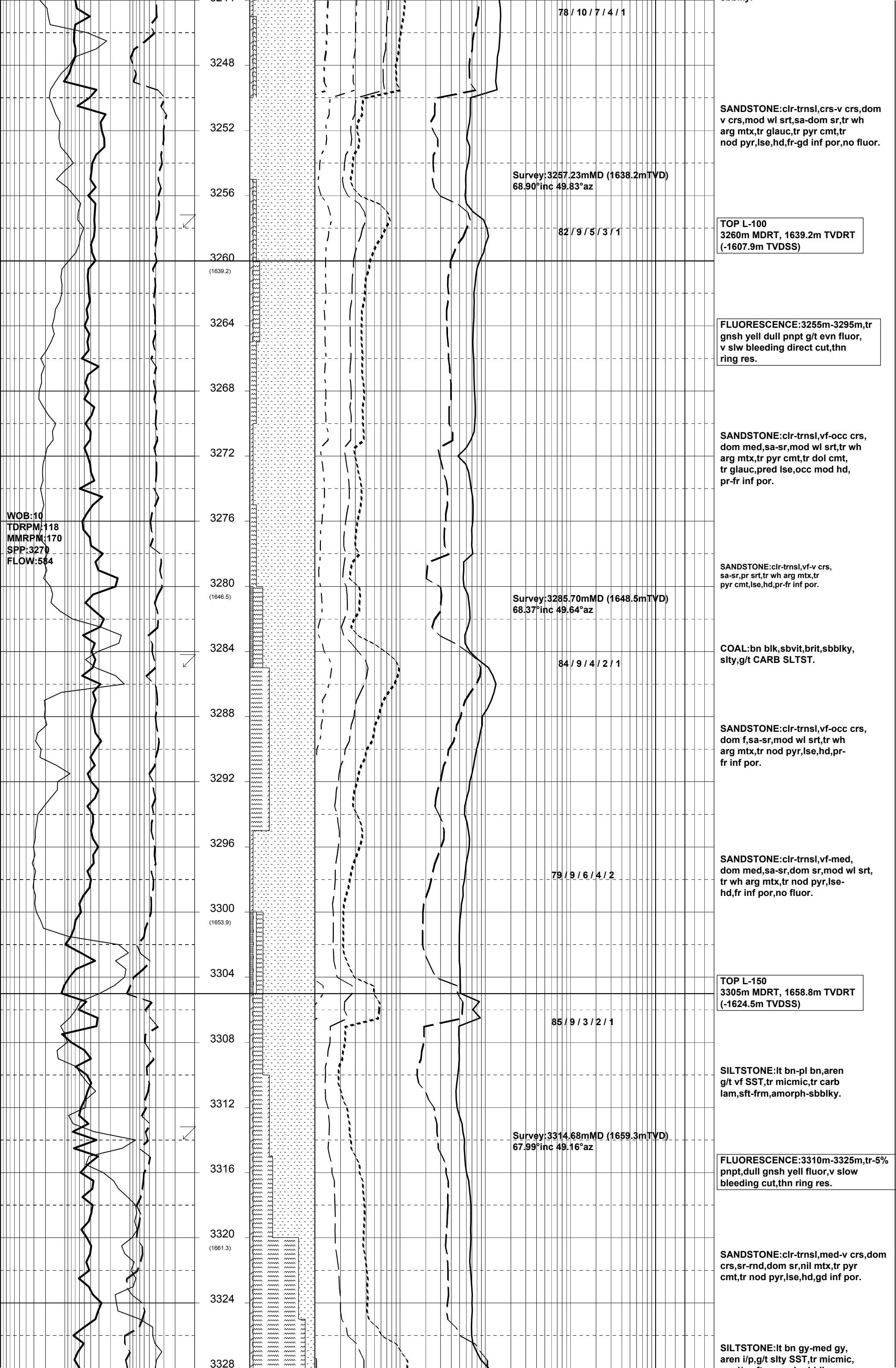












**arg i/p,sft,amorph-sbblky.**

87 / 9 / 3 / 1 / tr

TOP L-160  
3343m MDRT, 1670.0m TVDRT  
(-1638.7m TVDSS)

**COAL:bn blk-blk,ang,sbvit,blky,arg  
q/t CARB SLTST.**

**SANDSTONE:**clr-trnsl,crs-v crs,  
mod wl srt,tr wh arg mtx,tr pyr cmt,  
tr nod pyr,pred lse,hd,fr-gd inf  
por,no fluor.

Survey: 3343.03mMD (1670.0mTVD)  
67.96°inc 49.28°az

**SANDSTONE:**clr-trnsl,crs-v crs,dom  
v crs,sr-rnd,dom sr,mod wl srt,  
tr pyr cmt,tr pyr nod,lse,hd,  
gd-v gd inf por,no fluor.

**SANDSTONE:**clr-trnsl,vf-med,occ crs,  
mod wl srt,tr wh arg mtx,tr glauc,  
tr pyr nod,dom uncons,hd,pr-fr por,  
no fluor.

**SILTSTONE:**lt bn gy-med gy,  
aren i/p,g/t slty SST,tr micmic,  
arg i/p,sft,amorph-sbblky.

**SANDSTONE:clr-trnsl,med-occ v crs,  
dom crs,mod wl srt,sa-sr,tr wh arg  
mtx,tr glauc,lse,hd,gd inf por,  
no fluor.**

COAL:bn blk-blk,ang,sbvit,blky,arg  
g/t CARB SLTST.

**TOP L-200**  
**3385m MDRT, 1685.9m TVDRT**  
**(-1654.6m TVDSS)**

**CLAYSTONE:** gry org to pl yell org,  
non calc, v sft, disp, amorph.

**SILTSTONE:**lt bn gy-med gy,  
aren i/p,g/t slty SST,tr micmic,  
arg i/p,sft,amorph-sbblky.

COAL:bn blk-blk,ang,sbvit,blky,arg  
q/t CARB SLTST.

**Tuna A31A Total Depth at  
3406.0 mMDRT 1694.0 mTVDRT  
20:00 hours on 14/01/2005**

WOB:10-15  
TDRPM:117  
MMRPM:170  
SPP:3480  
FLOW:586

MW:10.15  
FV:60  
PV:25  
YP:39  
Gel:12/18/22  
pH:9.00  
Cl:32k

WOB:10-15  
TDRPM:117  
MMRPM:170  
SPP:3480  
FLOW:586

Run Reeves compact shuttle logging  
from 3403 m to 2900 m  
MCG-MDN-MPD-MDL-MSS-MAI

**APPENDIX 4b**

**TUNA A31A**

**Well Completion Log**



WELL COMPLETION LOG

Scale – 1:200

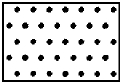
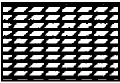
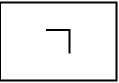

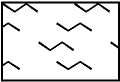


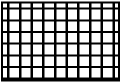

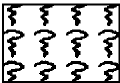
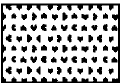

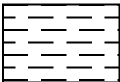

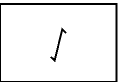


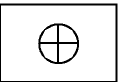
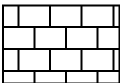
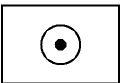

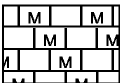
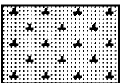

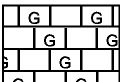
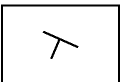

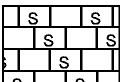
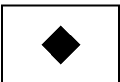
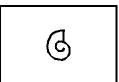

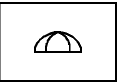

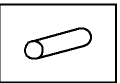

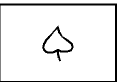
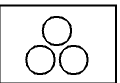

TUNA A-31A

Gippsland Basin, Victoria  
Concession: VIC/L9

POST-DRILL LOCATION: (Top of M-1)	Latitude:	38° 9' 40.246" S	COMPILED BY:	Sheryl Sazenis
	Longitude:	148° 26' 17.014" E	DRAFTED BY:	Andrew Hodgson
(Top L-050)	MGA X:	625984.10 mE	DRILLED BY:	Nabors Rig 453
	MGA Y:	5775324.55 mN	ELEVATION:	G.L.: -59.4 m R.T.: 31.32 m above MSL Water Depth: 59.4 m
	Depth:	2584.2m MDRT (-1369.8m TVDSS)	TOTAL DEPTH:	3406.0m MDRT
	Datum:	GDA94 (GRS80)	PLUGGED BACK T.D.:	3090.0m MDRT
	Projection:	MGA/ UTM Zone 55 (S)	CLASSIFICATION:	Development
	DATES:	Spudded: 31/12/2004 Rig Released: 25/01/2005 I.P. Established: 28/01/2005 (Initial production)	STATUS:	Cased and Completed
SERVICE COMPANIES:		DRILLING CONTRACTOR: Nabors Rig 453	PRODUCTION TESTING:	n/a
		MWD/DIRECT. DRLG: Schlumberger Anadrill	DIVERS:	n/a
		GYRO SURVEYING: SDI	MUD LOGGING:	Geoservices Overseas S.A.
		CORING: n/a	PRESSURE RECORDING:	n/a
		TC LOGGING: Reeves (Compact Shuttle Logging System)	WELL VELOCITY SURVEY:	n/a
		CEMENTING: Halliburton	MUD ENGINEERING:	Halliburton-Baroid
		CASING: Weatherford	LINER:	n/a
		LOGGING: Reeves (Shuttle)		

LEGEND

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

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

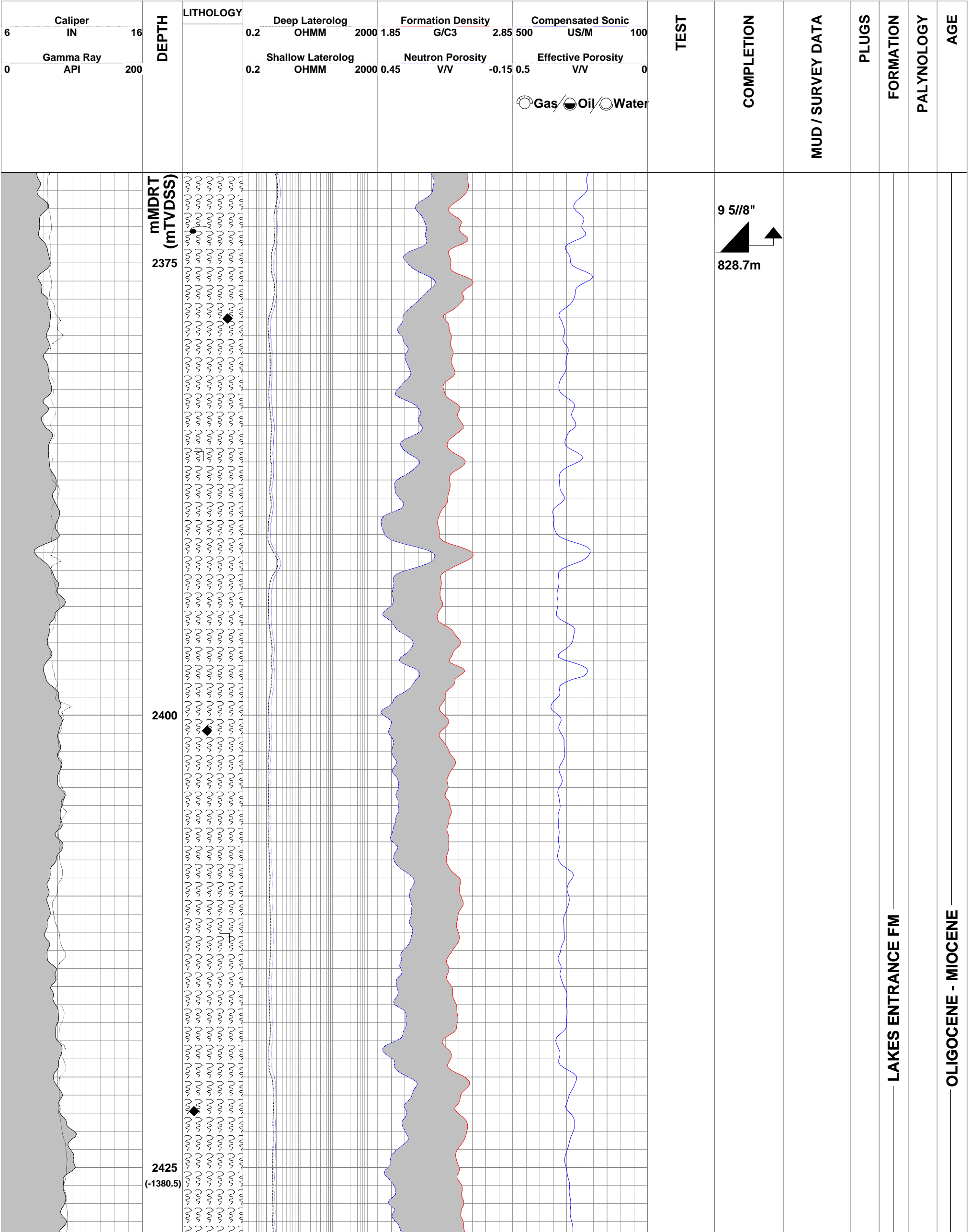
LOGGING AND SURVEYING				
Anadrill Schlumberger		Interval (mMDRT)	Reeves	Interval (mMDRT)
MWD (Directional & GR) – 3 Runs		829.0 - 3385.16	MCG-MDN-MPD-MSS-MDL	829.0 - 3388.8
Date	31/12/2004 - 08/01/2005	09/01/2005 -10/01/2005	10/01/2005 -12/01/2005	13/01/2005 -16/01/2005
Run	MWD #1	Wireline Run #1 on shuttle	MWD #2	MWD #3
Log	Powerpulse Directional & GR	MCG-MDN-MPD-MSS-MDL	Powerpulse Directional & GR	Powerpulse Directional & GR
Depth Driller	3048.0 mMDRT	3048.0 mMDRT	3101.0 mMDRT	3406.0 mMDRT
Depth Logger	3048.0 mMDRT	3045.0 mMDRT	3101.0 mMDRT	3406.0 mMDRT
Bottom Log Interval	3048.0 mMDRT	3031.21mMDRT	3101.0 mMDRT	3385.16 mMDRT
Top Log Interval	829.0 mMDRT	829.0 mMDRT	3048.0 mMDRT	3101.0 mMDRT
Casing Driller	829.0 mMDRT	829.0 mMDRT	829.0 mMDRT	829.0 mMDRT
Casing Logger	----	----	----	----
Casing Size	9 5/8"	9 5/8"	9 5/8"	9 5/8"
Casing Weight	47.0 ppf	47.0 ppf	47.0 ppf	47.0 ppf
Bit Size	8.5"	8.5"	8.5"	8.5"
Type of Fluid in Hole	KCI/PHPA/GLYCOL	KCI/PHPA/GLYCOL	KCI/PHPA/GLYCOL	KCI/PHPA/GLYCOL
Density	10.15 ppg	10.15 ppg	10.25 ppg	10.15 ppg
Rm @ Measured Temp.	N/A	0.139 ohmm @ 25°C	N/A	N/A
Rmf @ Measured Temp.	N/A	0.102 ohmm @ 25°C	N/A	N/A
Rmc @ Measured Temp.	N/A	0.266 ohmm @ 25°C	N/A	N/A
Max. Recorded Temp.	72.16°C	67.9°C	74.51°C	80.00°C
Equipment / Location	Sale	Sale	Sale	Sale
Recorded By	D.Hastie/A.DeCastro	G. McManus/M. Barnes	D.Hastie/A.DeCastro	D.Hastie/A.DeCastro
Witnessed By	Trevor Lobo	Trevor Lobo	Trevor Lobo	Trevor Lobo

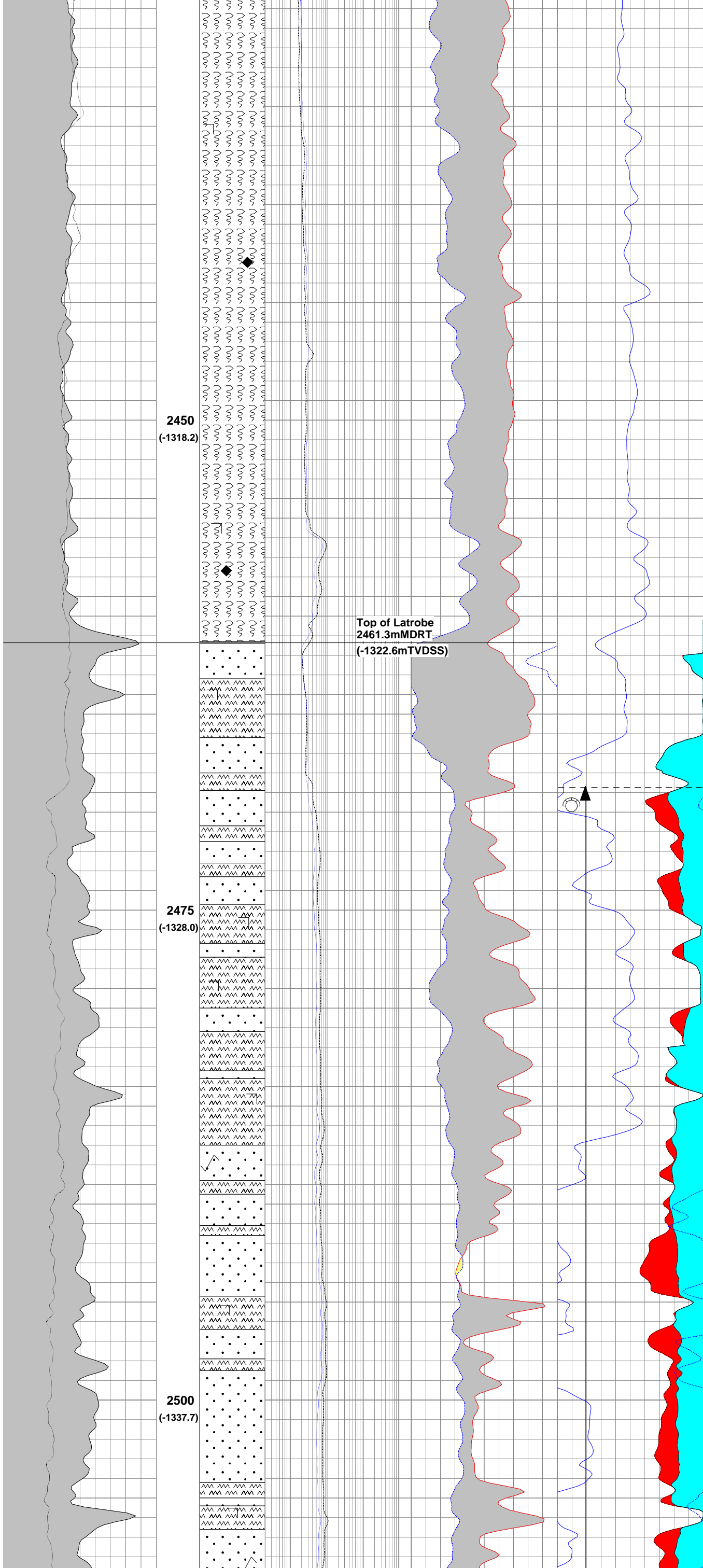
WELL DATA (Cont.)				
Date	16/01/2005 - 17/01/2005			
Run	Wireline Run #2 on shuttle			
Log	MCG-MDN-MPD-MSS-MDL			
Depth Driller	3406.0 mMDRT			
Depth Logger	3403.0 mMDRT			
Bottom Log Interval	3388.8 mMDRT			
Top Log Interval	2930.0 mMDRT			
Casing Driller	829.0 mMDRT			
Casing Logger	----			
Casing Size	9 5/8"			
Casing Weight	47.0 ppf			
Bit Size	8.5"			
Type of Fluid in Hole	KCI/PHPA/GLYCOL			
Density	10.10 ppg			
Rm @ Measured Temp.	0.137 ohmm @ 25°C			
Rmf @ Measured Temp.	0.099 ohmm @ 25°C			
Rmc @ Measured Temp.	0.170 ohmm @ 25°C			
Max. Recorded Temp.	80.3°C			
Equipment / Location	Sale			
Recorded By	G. McManus/M. Barnes			
Witnessed By	Trevor Lobo			

CORES			PERFORATIONS		
From (mMDRT)	To (mMDRT)	Rec %	From (mMDRT)	To (mMDRT)	Shots/ft

----	----	---	2618	2621	MaxR

CASING				PLUGS		
Size	Set @ (mMDRT)	Sx Cmt	Formation	From (mMDRT)	To (mMDRT)	Sx Cmt
9.625"	828.7	---	Gippsland Limestone			
7"	3117.0	834				
3.5"(tubing)	2677.9	---	Latrobe Group	3090.0	3117.0	





2450  
(-1318.2)

2475  
(-1328.0)

2500  
(-1337.7)

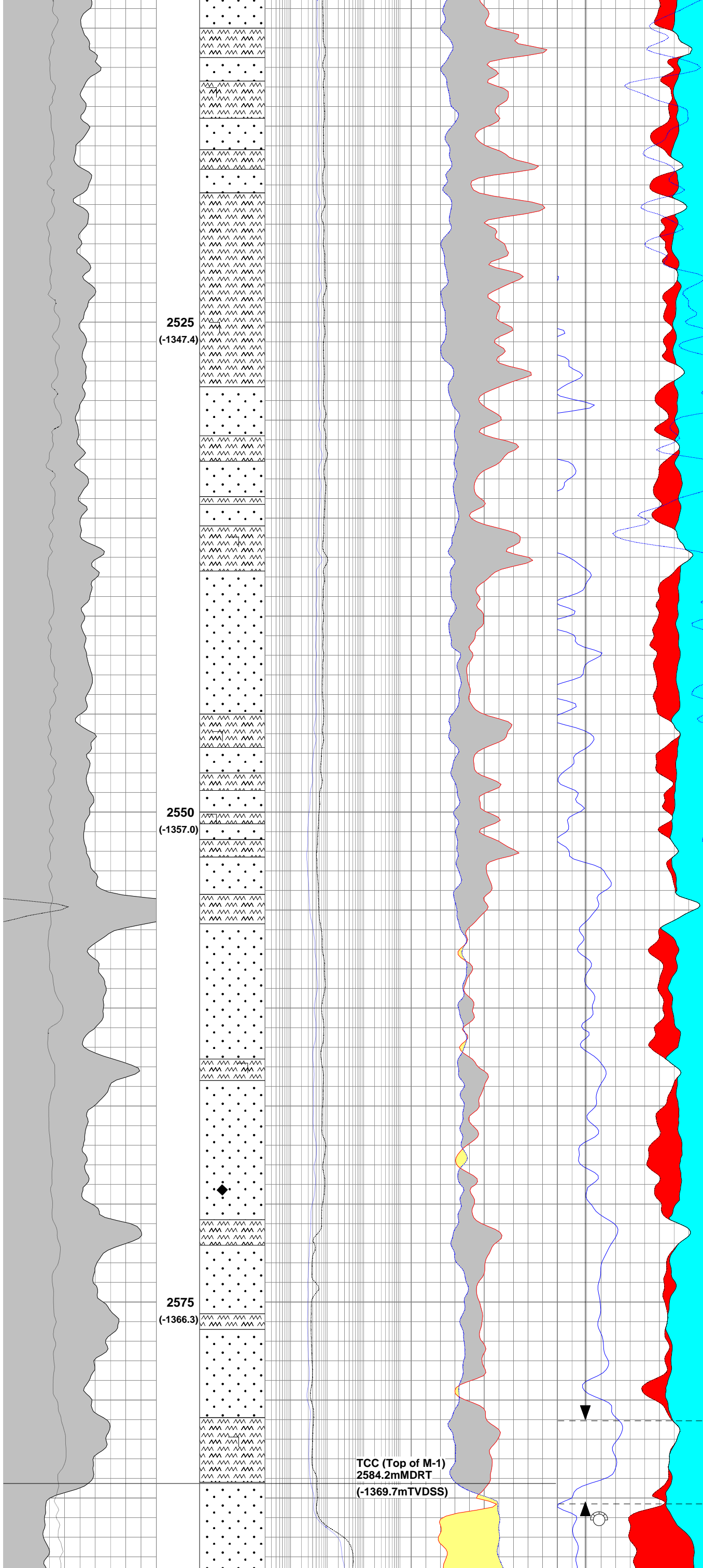
Top of Latrobe  
2461.3mMDRT  
(-1322.6mTVDSS)

Gas  
98.2 MT Net  
37.6 TVT Net  
Ø = 14 %  
Sw= 69 %

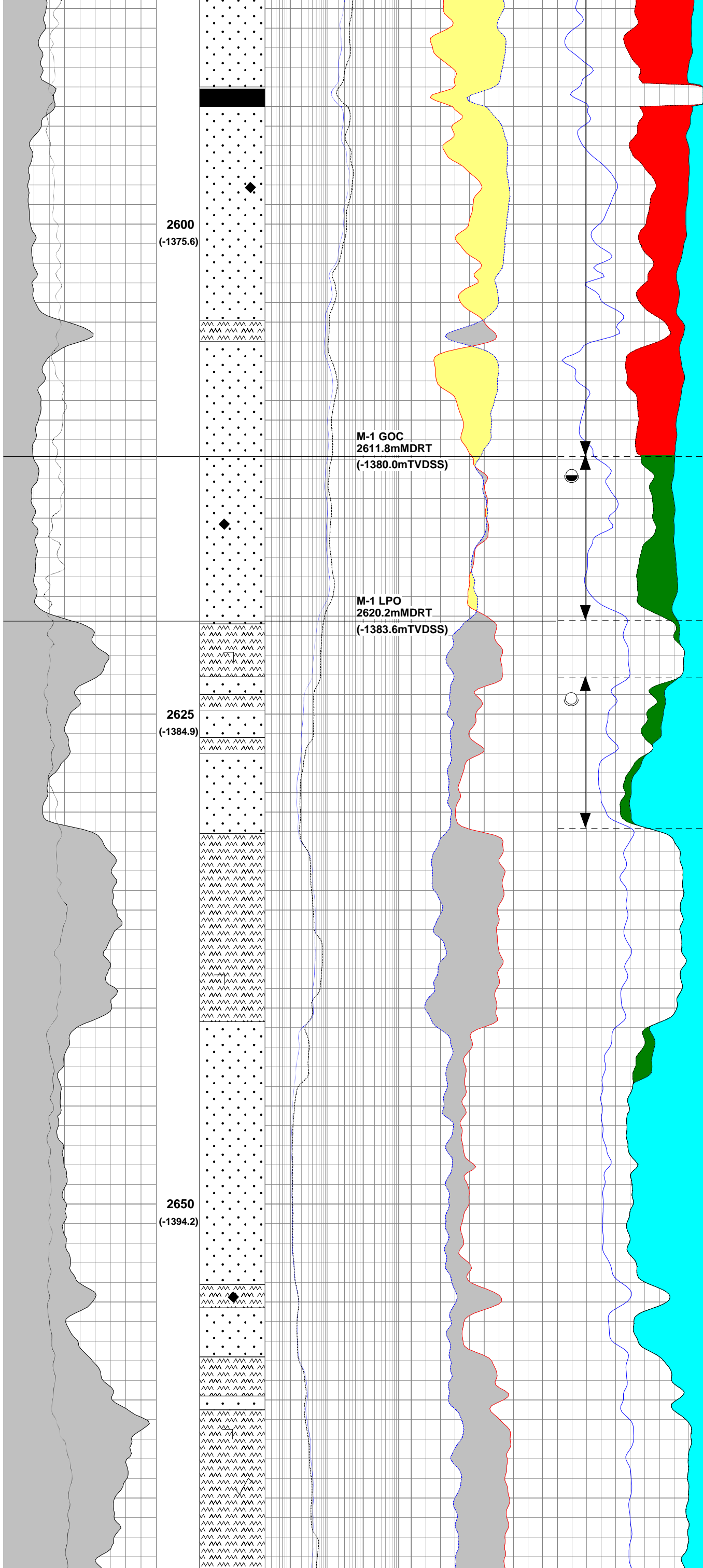
2482.3  
ANG 67  
DIR 52  
(-1330.8)

2480  
MW 10.0ppg  
FV 80sec/qt  
PV 28cP  
YP 49  
pH 9  
KCl 28

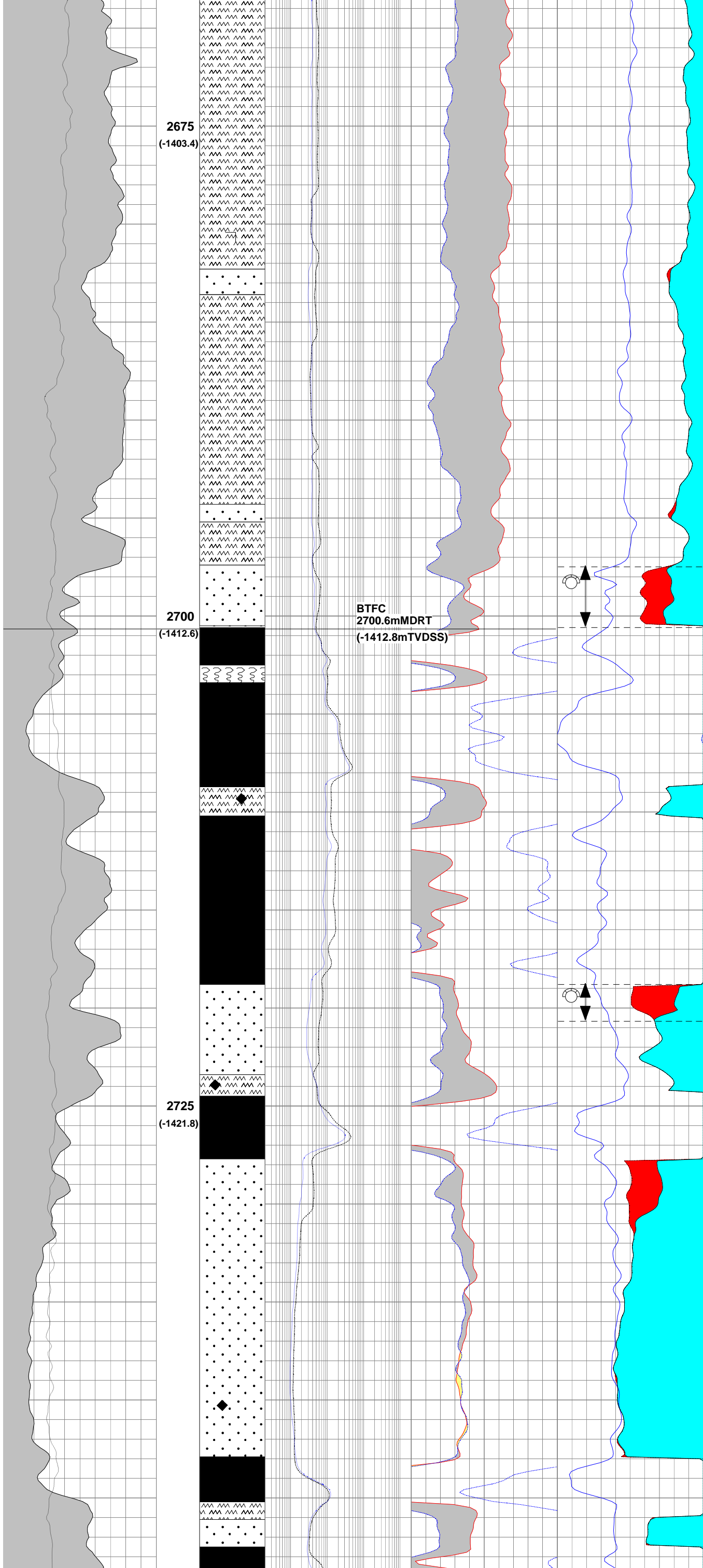




Gas  
25.5 MT Net  
9.5 TVT Net  
Ø = 22 %  
Sw= 30 %



2596.7  
ANG 68  
DIR 52  
(-1374.4)

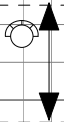


2675  
(-1403.4)

2700  
(-1412.6)

2725  
(-1421.8)

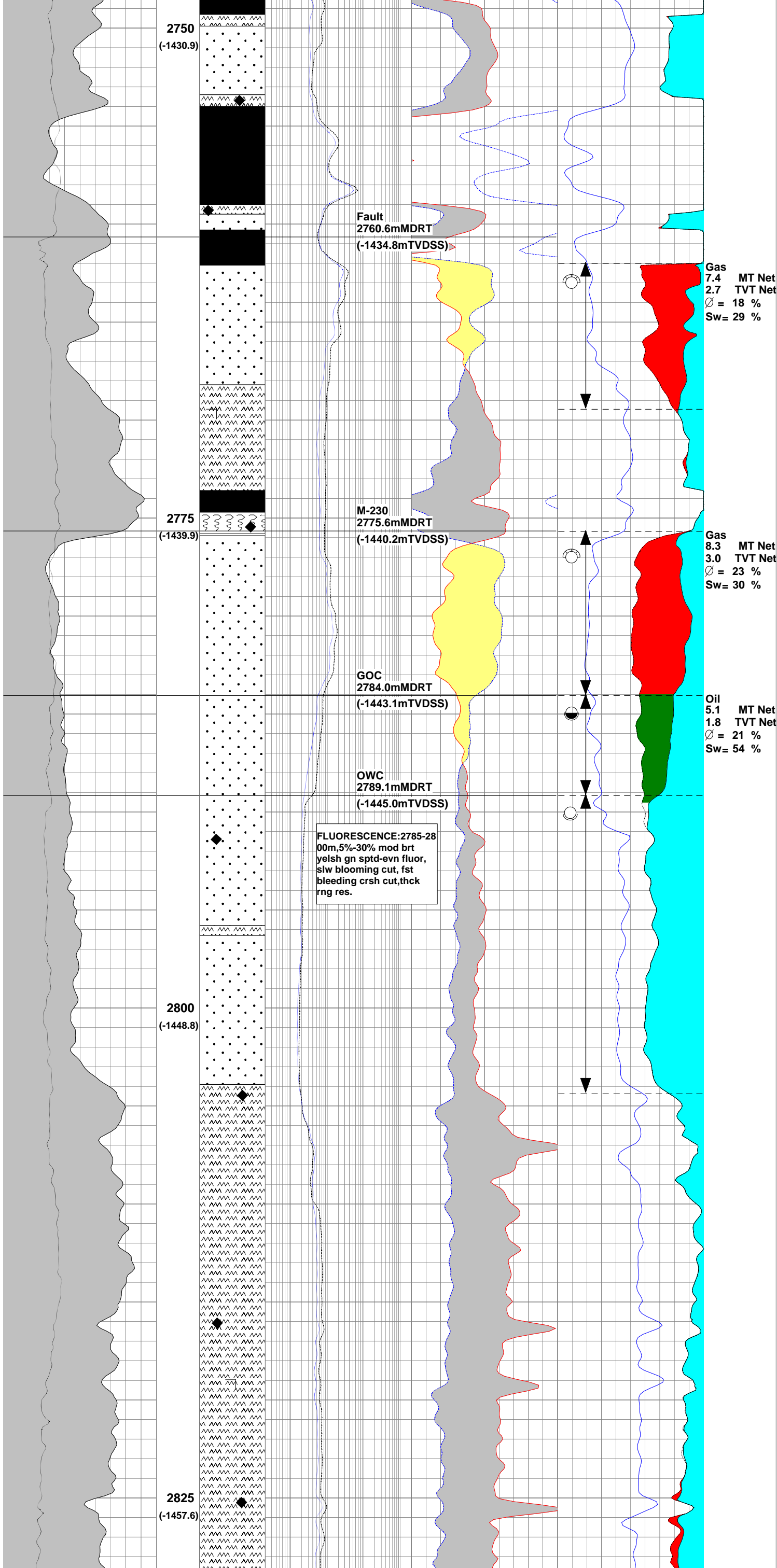
BTFC  
2700.6mMDRT  
(-1412.8mTVDSS)

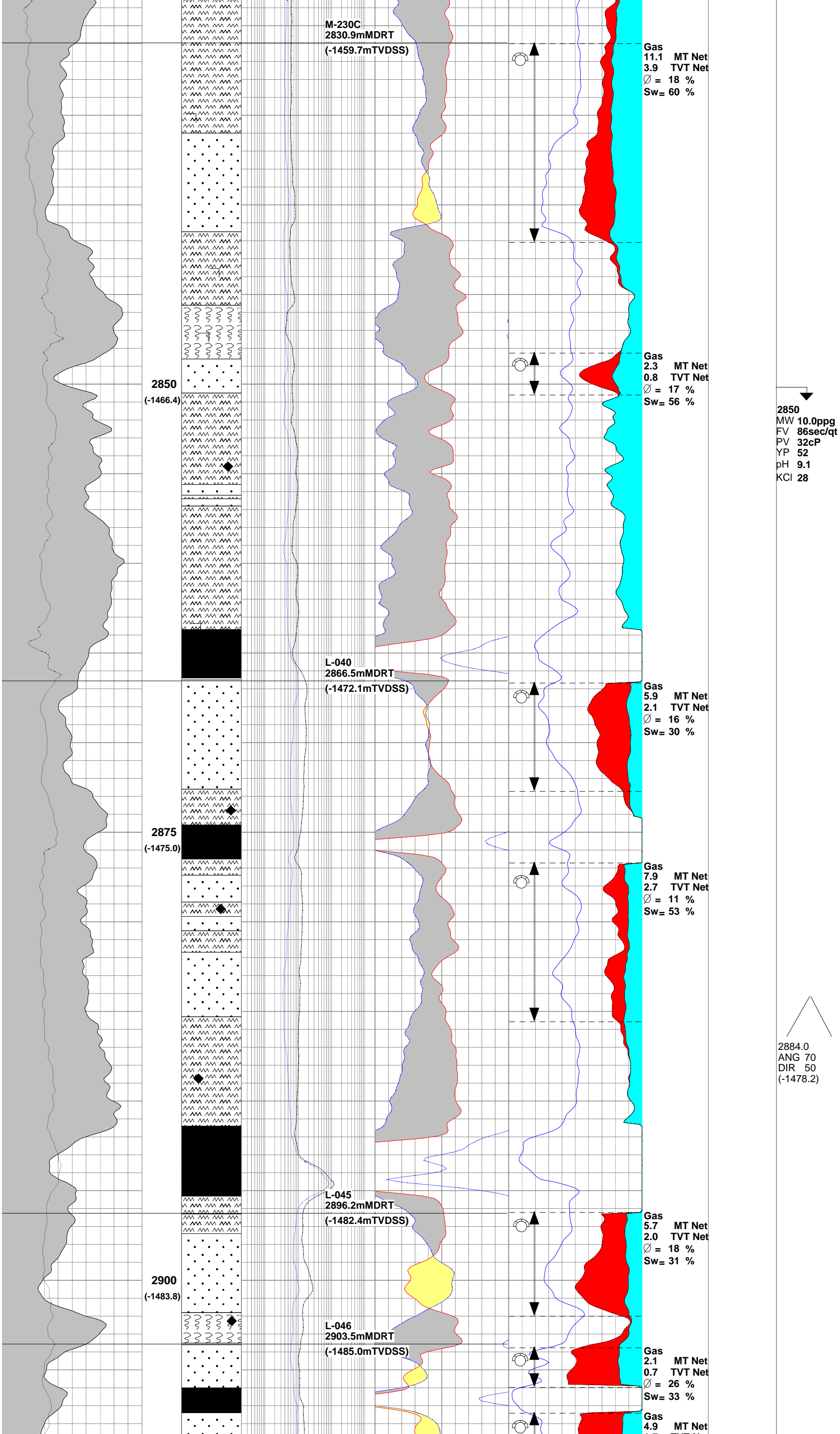


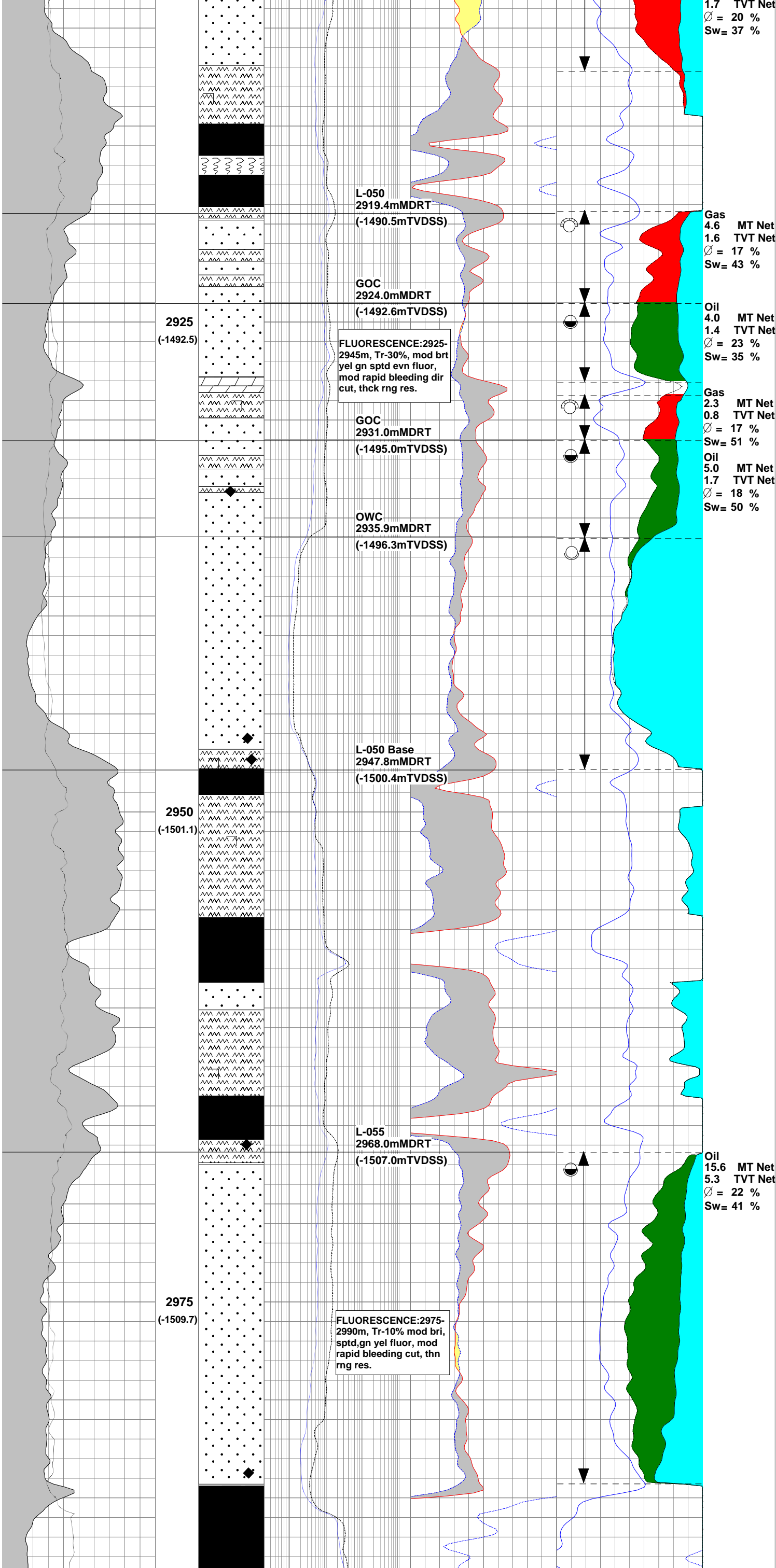
Poss. Gas  
3.0 MT Net  
1.1 TVT Net  
Ø = 20 %  
Sw= 59 %

Poss. Gas  
1.8 MT Net  
0.7 TVT Net  
Ø = 22 %  
Sw= 46 %

2683.2  
ANG 68  
DIR 51  
(-1406.4)



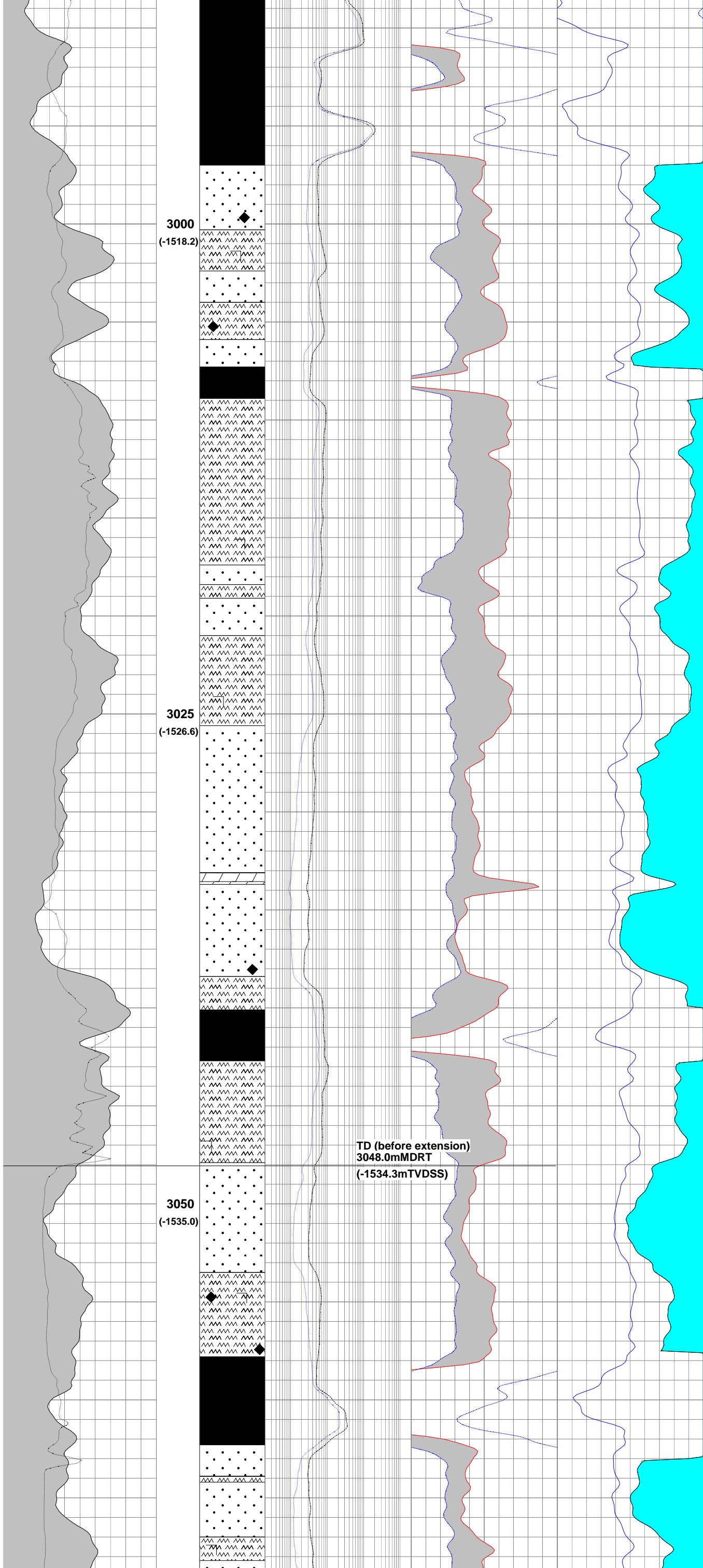


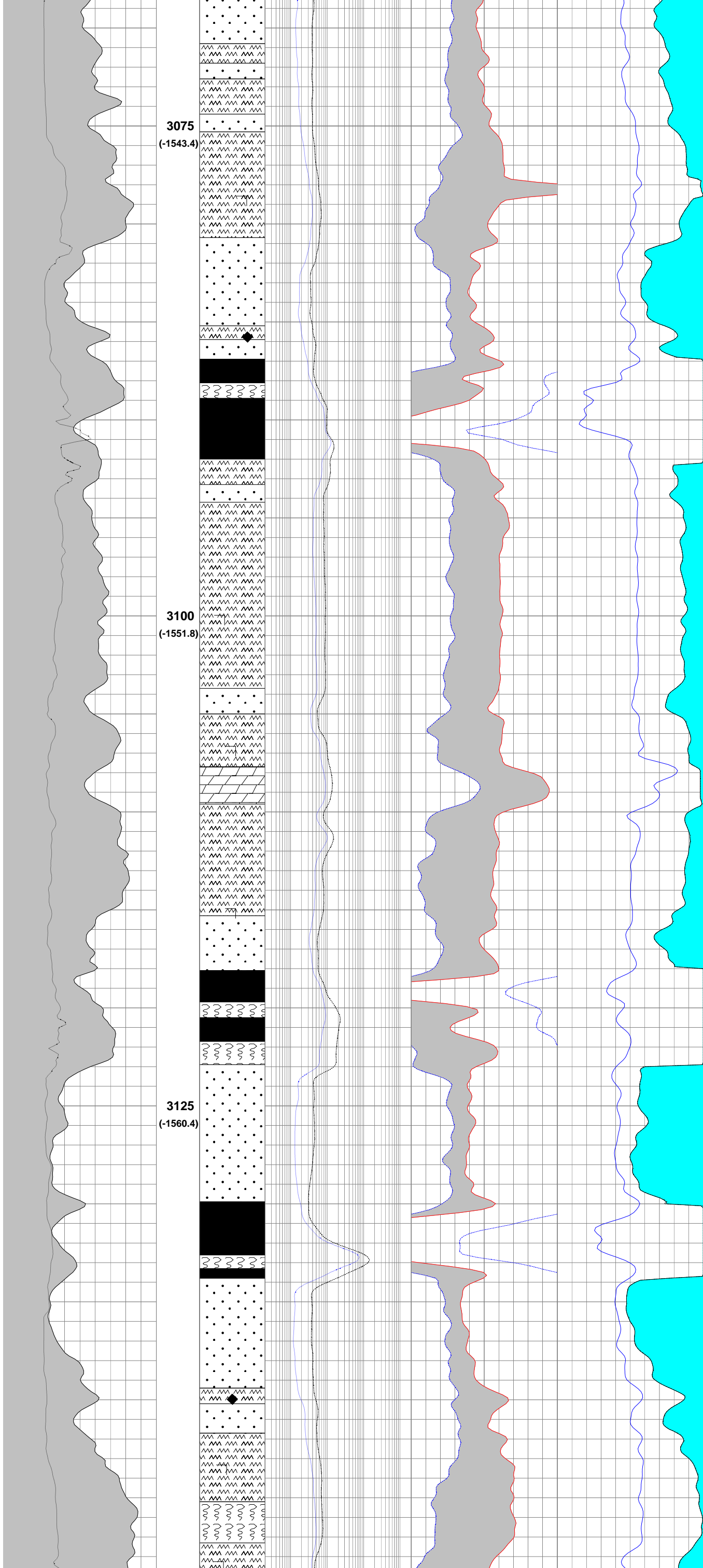


2969.6  
ANG 70  
DIR 50  
(-1507.8)

LATROBE GROUP

PALEOCENE - EARLY EOCENE

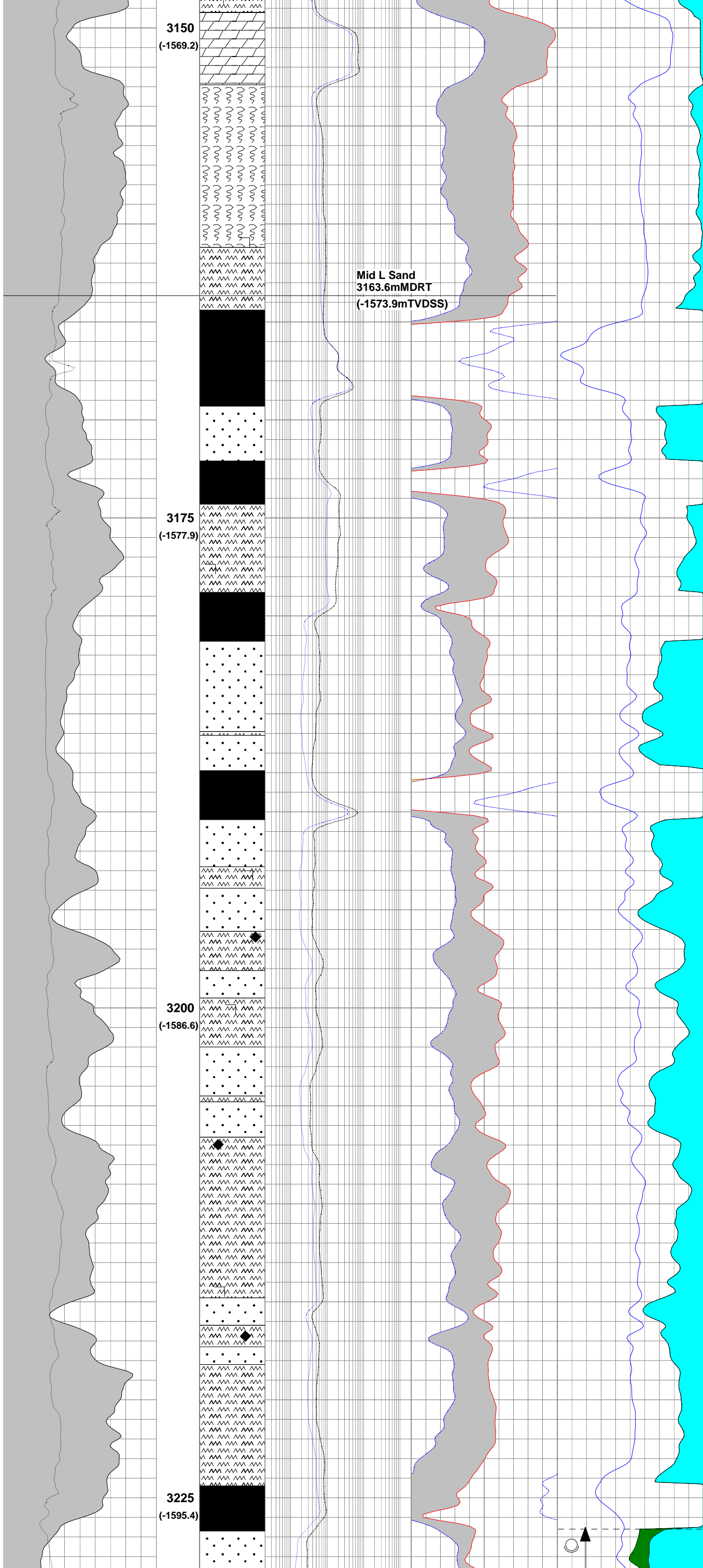




3082.6  
ANG 71  
DIR 50  
(-1545.9)

3087  
MW 10.2ppg  
FV 58sec/qt  
PV 28cP  
YP 36  
pH 9.1  
KCI 28

7"  
3117.0m



3150  
(-1569.2)

3175  
(-1577.9)

3200  
(-1586.6)

3225  
(-1595.4)

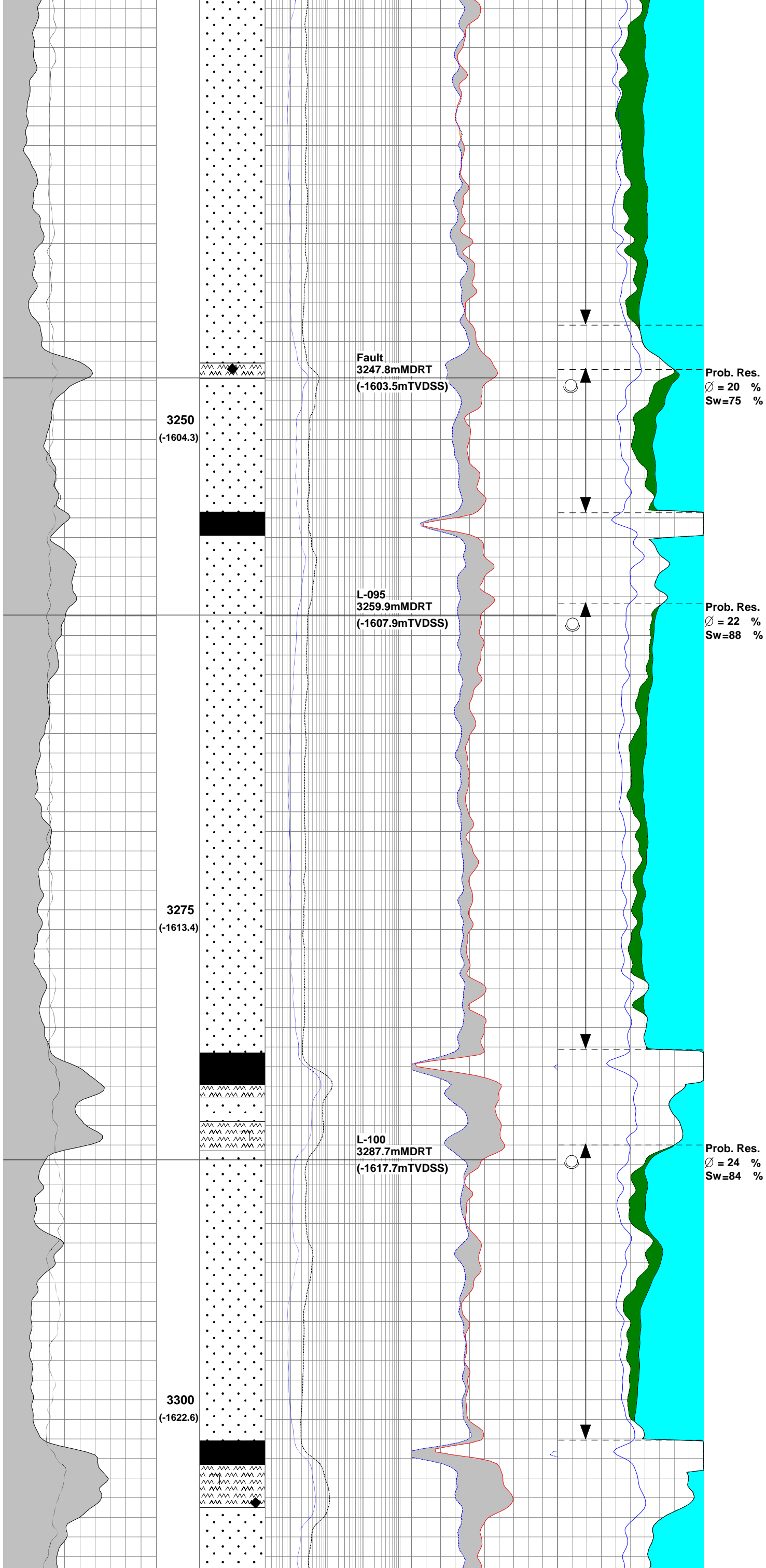
Mid L Sand  
3163.6mMDRT  
(-1573.9mTVDSS)

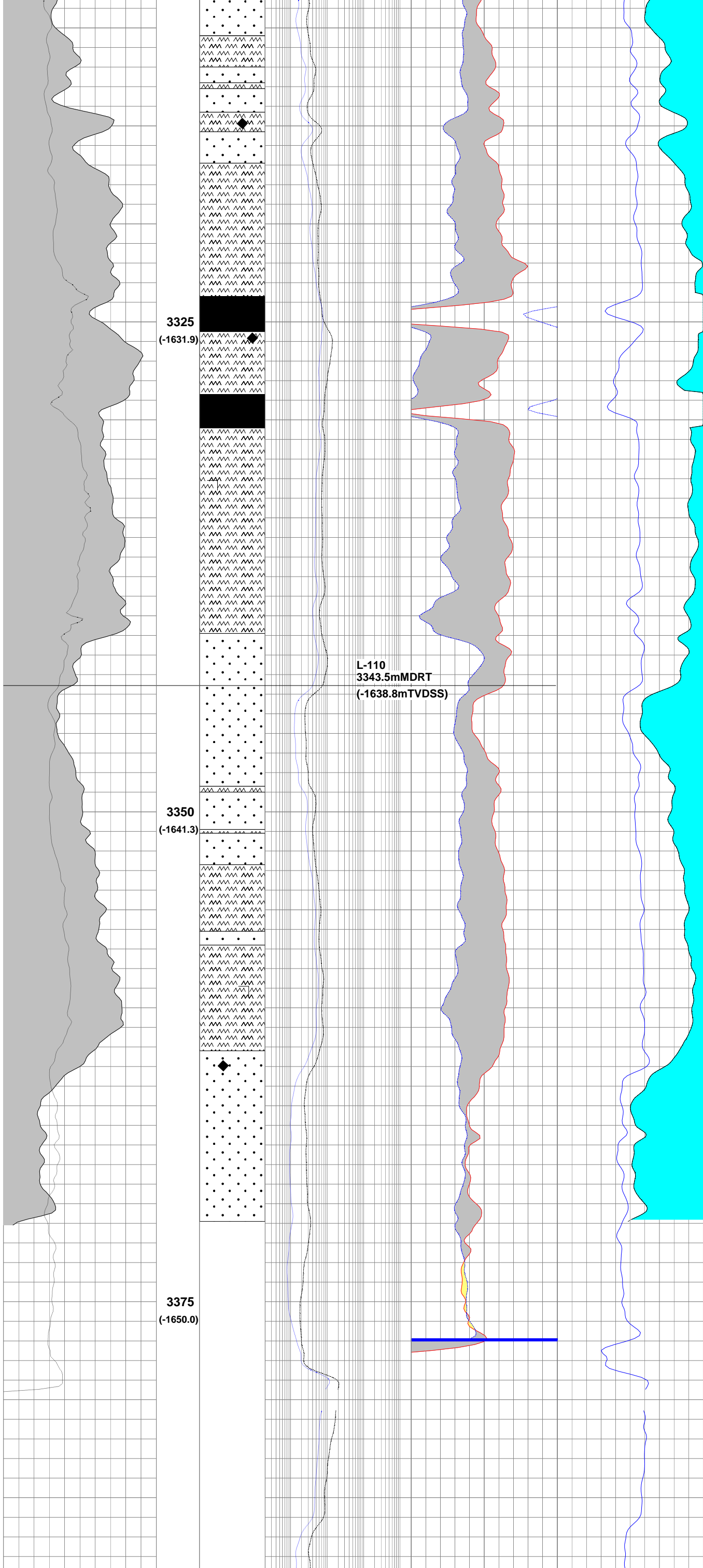
3200.2  
ANG 70  
DIR 50  
(-1586.7)

3212  
MW 10.2ppg  
FV 56sec/qt  
PV 27cP  
YP 25  
pH 8.9  
KCl 28



Prob. Res.  
Ø = 26 %  
Sw=76 %





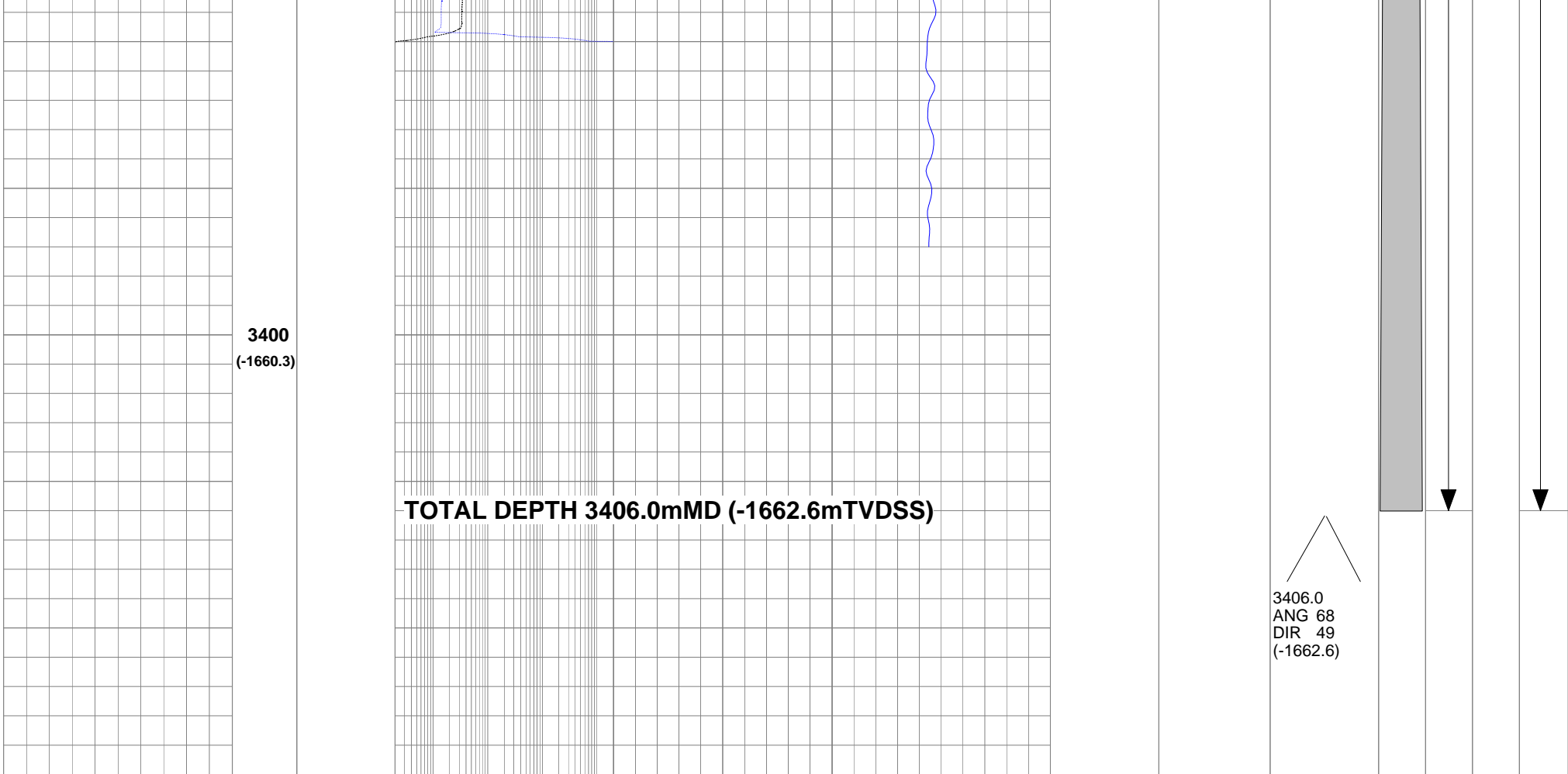
3325  
(-1631.9)

3350  
(-1641.3)

3375  
(-1650.0)

L-110  
3343.5mMDRT  
(-1638.8mTVDSS)

3314.7  
ANG 68  
DIR 49  
(-1628.0)



GRGC	Gamma Ray	<div>Tuna A31a</div> <div>Initial Production Date: 28/01/2005</div> <div>75kL/day, 0%watercut</div>
CLDC	Density Caliper	
DDLL	Deep Laterolog	
DSSL	Medium Laterolog	
DEN	Compensated Density	
NPRL	Neutron Porosity	
DT35	Compensated Sonic	
PHIE	Effective Porosity	
VUWA	Bulk Volume Water	