



BHP BILLITON PETROLEUM PTY. LTD.
A.B.N. 97 006 918 832

MEGAMOUTH-1 & -1/ST1
VIC/P45

WELL COMPLETION REPORT

BASIC DATA VOLUME

PREPARED BY: C. Ellis

DATE: April, 2004

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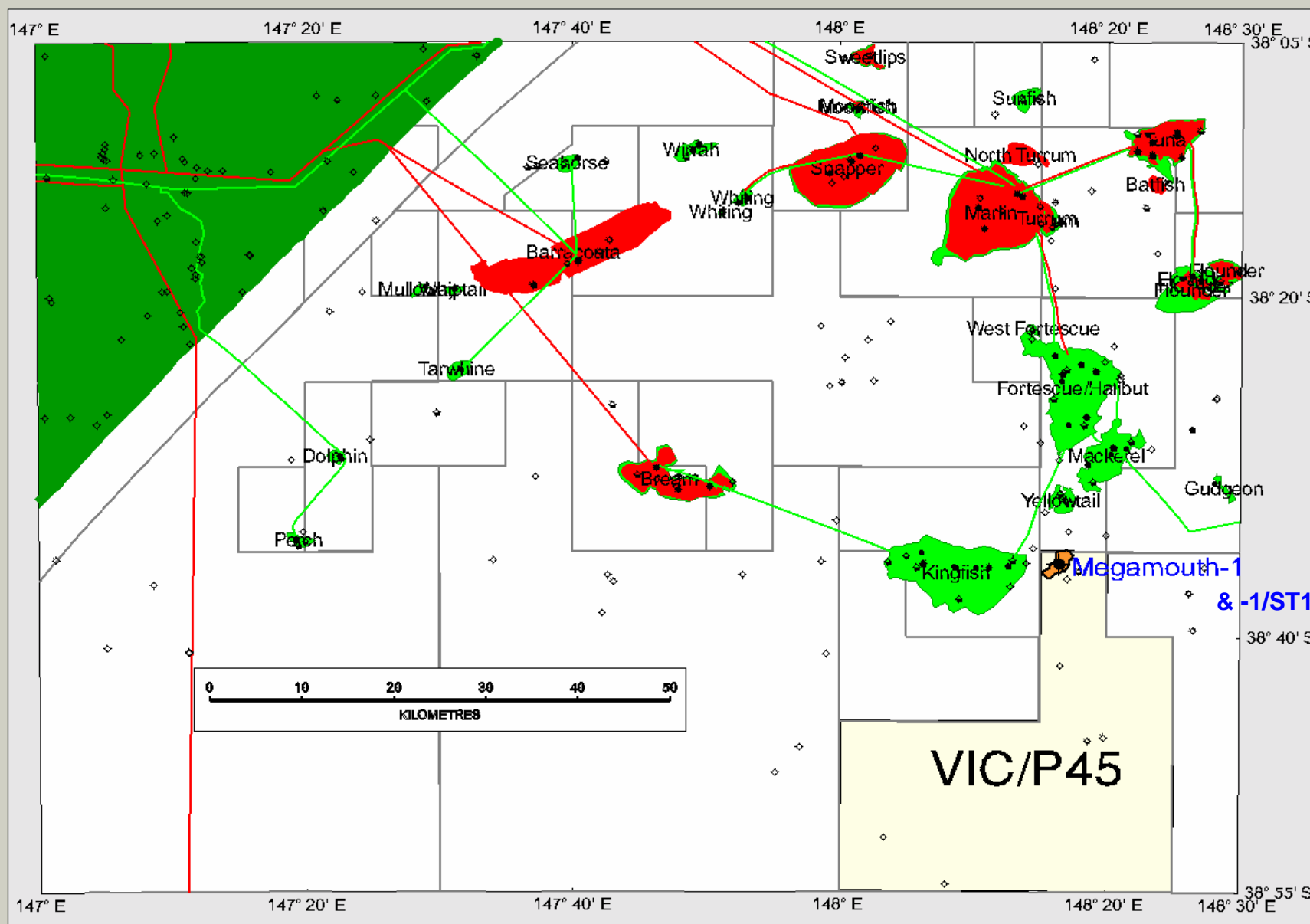
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Figure 1

Megamouth-1 & -1/ST1 Location Map



1 WELL SUMMARY SHEET

Well:	Megamouth-1 & -1/ST1	
Permit/Basin:	VIC/P45, Gippsland	
Well Path:	Vertical	
PLANNED SURFACE LOCATION		
Latitude:	38° 35' 44.23" South	
Longitude:	148° 16' 31.87" East	
Datum / Spheroid	GDA 94 / GRS80	
Seismic Reference:	HGP2002A; Inline 1707 & Xline 1361	
ACTUAL SURFACE LOCATION		
Latitude:	38° 35' 44.230" South	
Longitude:	148° 16' 31.859" East	
Datum / Spheroid	GDA 94 / GRS 80	
Easting: (m)	611 077.19	
Northing: (m)	5 727 325.06	
Projection:	MGA – Zone 55 (147° East)	
Elevation:	RT to LAT:	22.4 m
Water Depth:	LAT to Seabed:	80.2 m
Total Depth Drillers:	Megamouth-1:	2546 mRT (2522.4 mTVDSS)
	Megamouth-1/ST1:	2688 mRT (2654.9 mTVDSS)
Rig on Contract:	1900 hrs, 13-November-2003	
Rig on Location:	2108 hrs, 15-November-2003	
Spudded:	1615 hrs, 17-November-2003	
Reached TD:	1000 hrs, 26-November-2003	
Rig Released to MM-1/ST1:	1200 hrs, 28-November-2003	
Kicked off ST1:	2300 hrs, 30-November-2003	
Reached TD:	1900 hrs, 02-December-2003	
Rig Released:	0900 hrs, 05-December-2003	
Total Rig Days:	21.58 days	
Well Status:	Plugged & Abandoned – Dry Hole	
Operator:	BHP Billiton Petroleum	
Rig Name:	Ocean Epoch	
Drilling Contractor:	Diamond Offshore Drilling Inc.	
Total Hole Cost:	AUD\$7.77 MM (source: BHPBP Final Drilling Rpt)	

2 FINAL DRILLING REPORT



MEGAMOUTH-1ST

Final Drilling Report
Permit: VIC/P45

PREPARED BY: David Thorpe
Kirsty Logan

Date: 27 April 2004

BHPBilliton Petroleum PTY Ltd

Distribution List

Asset Team	1 Copy
Drilling Well File	1 Copy + Original
Exploration Information Centre	1 Copy

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1.0 WELL DATA

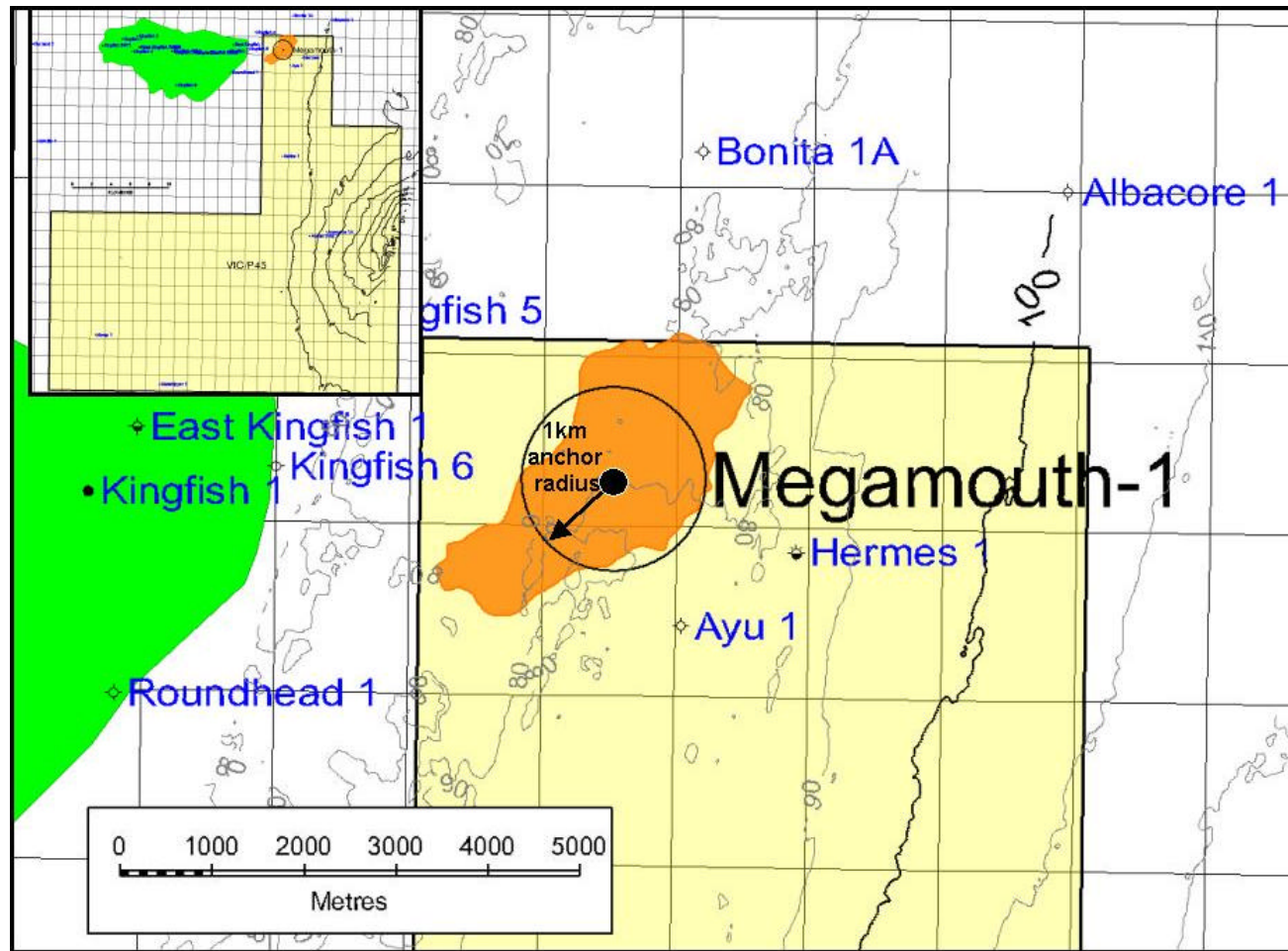
Well Name:	Megamouth-1
Well Designation:	Exploration Well
Permit:	VIC/P45
Operator:	BHP Billiton Petroleum Pty Ltd
Drilling Contractor / Rig:	Diamond Offshore Drilling Inc / Ocean Epoch
RT – LAT / Water Depth:	22.4 m / 81.5m
Geographic Location:	Latitude: 38° 35' 44.230"S Longitude: 148° 16' 31.859"E
Easting/Northing:	611077.19 E 5,727,325.06N
Rig Heading:	238.2° True
Total Depth:	2688mRT
Rig on Hire:	19:00hrs 13/11/2003
Spud Date:	16:15hrs 17/11/2003
TD Date:	19:00hrs 2/12/2003
Rig Release Date:	09:00hrs 05/12/2003
Total Well Cost (AFE / Target / Actual):	9.63 / 8.00 / 7.77 (\$AUDMM)
Total Dry Hole Time (AFE / Target / Actual):	17.95 / 13.52 / 15.74

Note: Target time and costs exclude 9 5/8" casing

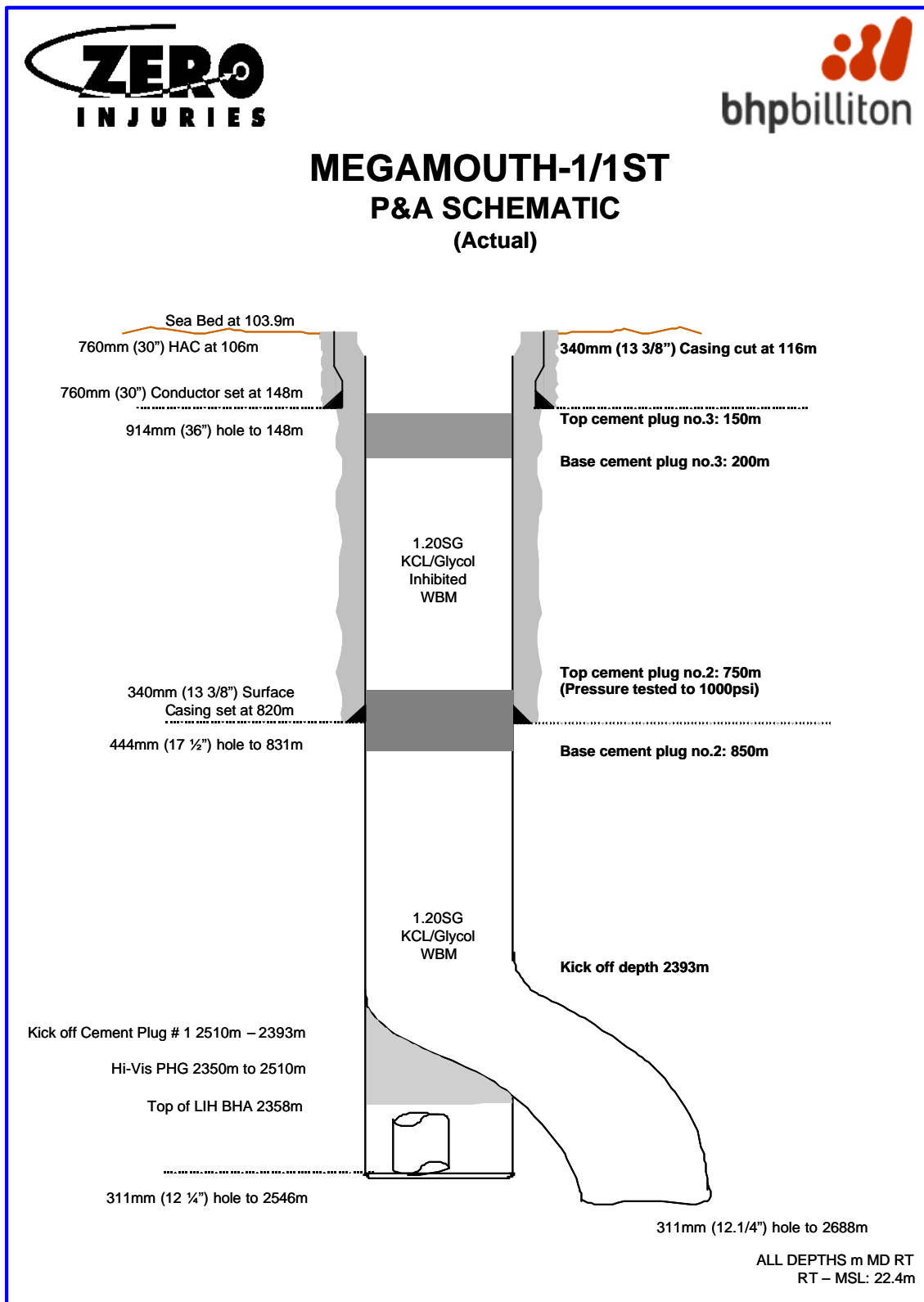
1.1 CONTRACTORS

Casing/Tubing Running:	Weatherford
Cementing:	Halliburton
Communication Services:	Telstra
Directional Drilling/Surveying:	Sperry Sun / Anadrill
Drilling Fluids:	Baker Hughes Inteq
Electric Wireline Logging	Schlumberger
Fishing Tools	Baker Oil Tools
Helicopters	Bristows Helicopters
Jars	Weatherford
Mud Logging	Geoservices
MWD	Sperry Sun
Rig & Catering	Diamond Offshore Drilling Inc
Roller Reamers	Gearhart
ROV	Total Marine Technologies
Shorebase Support	Esso Shorebase (Barry's Beach)
Supply Vessel	Swire Pacific Offshore / Farstad Shipping
Weather	Bureau of Meteorology
Wellhead Equipment	Dril-Quip
Wellhead Severance	Weatherford

1.2 LOCATION MAP



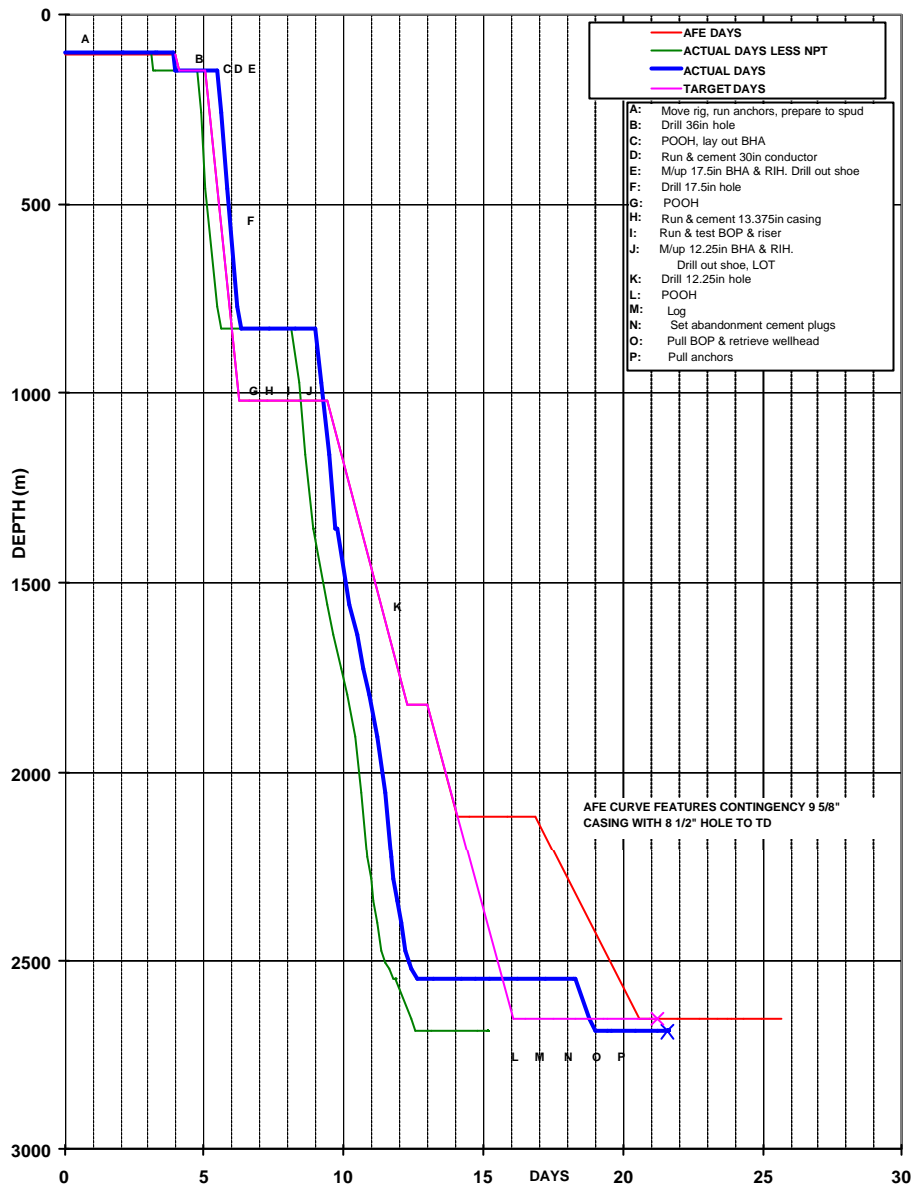
1.3 ABANDONMENT SCHEMATIC



1.4 TIME VERSUS DEPTH CHART



MEGAMOUTH-1ST
Drilling Days vs Depth
 5th December 09:00 (EDST)
 Rig off hire



2.0 OPERATIONAL SUMMARY

Mobilisation

The Ocean Epoch was on contract to BHPB at 1900hrs on 13th November 2003 when the last anchor was pulled at Santos' Casino-3 well location. The first anchor was dropped at the Megamouth-1 well location at 2100hrs on 15th November 2003.

There was no NPT during this section of the well.

Anchor Running and Preparation to Drill

High winds and an inoperable starboard crane hampered anchor running operations. Because of the starboard crane failure, it was necessary to run anchors 3, 4 and 5 by skidding the rig in the direction of the anchor, dropping the anchor and then J hooking the anchor before running it out. The rig was ballasted to drilling draft and the anchors pre-tensioned. The 26in x 36in BHA was made-up and run in hole, tagging seabed at 103.9mRT.

Total NPT for this section of the well was 18.25hrs.

36in Hole / 30in Conductor

The well was spudded at 1615hrs on 17th November 2003 and the 36in x 26in hole was drilled to 148m with hi-vis sweeps pumped mid-stand and on connections. An Anderdrift survey was taken (1.0°), the hole displaced with PHG and the BHA pulled out of hole and racked.

A 4 joint 30in x 20in conductor string was run and cemented with the 20in casing shoe set at 148m. Good returns were observed at seabed during the cement job. After waiting on cement, the running tool was released and pulled out of hole.

There was no NPT during this section of the well.

17.5in Hole / 13.375in Casing

A 17.5in rotary BHA with 9.5in MWD was made up and run in hole. The 20in shoe was drilled out and 17.5in hole drilled to TD at 831m with hi-vis sweeps mid stand and on connections. The hole was circulated clean and displaced to un-weighted PAC mud prior to pulling out of hole.

The 18.75in wellhead housing, with 20in housing extension joint and 20in x 13.375in swage and 13.375in casing string were run without problems. The wellhead was landed with the 13.375in shoe at 820.5m and latch confirmed with 50 klbs overpull. The casing string was cemented with a 1.5 SG extended Class 'G' lead slurry and 150m of 1.89 SG neat Class 'G' tail slurry and displaced with seawater. Returns were observed at the wellhead. The plug was bumped and casing successfully pressure tested to 3,500psi.

Total NPT for this section of the well was 1.50 hrs (0.5hrs checking the casing/power tong and 1.0hr laying out three damaged casing joints).

Run BOPs / Riser

The riser and BOPs were run and pressure tested with no NPT incurred.

12.25in Hole

The 12.25in BHA, including an 8in Anadril 825XP motor and a full suite of wireline replacement FEWD tools, was run in hole and the 13.375in shoetrack drilled out without problems. A leak-off test was then performed, with the formation leaking off at 1.58SG equivalent mud weight.

It was originally planned to run a 9.625in Sperry motor however, because of logistical problems. Anadril 825XP 8in motors were mobilised at short notice from Sale.

12.25in hole was drilled from 831m to 2507m without major incident. Hole inclination built to a maximum of 4.0deg by 1458m because of high dip angles in the Gippsland limestone. Build rate was controlled by reaming each stand and limiting weight-on-bit until 1907m, at which depth inclination had dropped to 1.6deg.

At 2507m, while on-bottom drilling, there was an increase in standpipe pressure that resulted in a pop-off valve blowing. It was suspected that a bit nozzle had plugged. After cycling the pumps and working the drill string, pump pressure partially returned to normal. Drilling continued at a reduced flowrate of 718gpm to 2546m. During this period the FEWD was not returning a live signal and several "measurement after drilling" passes were required.

While drilling ahead at 2546m there was an instantaneous loss of 900psi standpipe pressure. The drill string was picked up to investigate the pressure loss and on running back to bottom the string held up 3m deeper than drilled depth. The BHA was pulled out of hole to investigate.

On recovering the BHA to surface it was discovered that the 825XP motor had twisted-off at the internal connection between the top sub and the stator housing. Given that a clean fish had been left downhole, an attempt was made to fish the motor using an 11.25in overshot dressed with an 8.25in basket grapple. The fish was tagged 3.5m high, which led to some confusion while attempting to engage the overshot. Indications were that the overshot had engaged (pressure increase and overpull) and the fishing assembly was pulled out of hole. Unfortunately the motor was not recovered. It was realised that there had been a 3.5m error in the drill string tally that had caused the confusion during engagement. Although a second fishing trip would have been desirable this was not possible because the 11.25in overshot had been badly damaged during the fishing attempt. Faced with a delay while waiting for another overshot the decision was made to sidetrack the well.

A 15 joint 3.5in drill pipe cement stinger was run in hole on 5in drill pipe to set a cement plug from 2510m to 2410m. The cement job did not go smoothly, primarily because of poor cement delivery to the surge tank and operator error. This led to the cement slurry being pumped downhole in small batches. On completion of cementing operations the well was circulated clean above the plug and the stinger pulled out of hole. The well was re-named Megamouth-1ST at 1200hrs on 28th November 2003 on recovering the cementing string to surface.

A 12.25in sidetrack BHA was run in hole and cement tagged at 2446m. The BHA was washed in hole with little resistance to apparently firm cement at 2452m and an attempt made to sidetrack the well using the time drilling method. It was apparent

that the cement job had not been successful, when green cement was observed in returns. The BHA was pulled out of hole and the 3.5in cement stinger run in hole to set a second kick-off cement plug.

The cement stinger was washed in hole to set the cement plug at 2510m. Green cement was returned to surface all the way through the first cement plug interval. On attempting to pump the second kick-off cement plug it was discovered that the re-circulating mixer was plugged. After continued problems the cement job was aborted and time-out taken while Halliburton resolved the problems. A second attempt at setting the cement plug went smoothly and the stinger was pulled out of hole and the sidetrack BHA run in hole again.

The sidetrack BHA encountered ratty cement from 2346m down to 2385m where firm cement was tagged. The well was successfully sidetracked at 2393m, although a lack of formation returns initially caused some confusion while time drilling to get off the plug.

The 12.25in hole section was drilled to an extended TD at 2688m in one bit run. Hole inclination initially built rapidly from the sidetrack depth but by reaming each stand and controlling weight-on-bit, inclination was controlled to 18deg at TD.

The hole was circulated clean and the BHA pulled out of hole. Based on mudlogging and real time FEWD data, the decision was made to abandon the well without running supplementary wireline logs.

Total NPT for this section of the well was 134.50 hrs.

Well Abandonment

A 3.5in cement stinger was run in hole to 910m and a 300bbl hi-vis pill was spotted. A cement plug was set across the 13.375in shoe from 850m to 750m and pressure tested to 1000psi after waiting on cement. A second cement plug was set in 13.375in casing from 200m to 150m and the stinger pulled out of hole.

The riser was circulated to seawater and the BOP / marine riser pulled without any problems. The Weatherford MOST tool was run and the 9.625in casing cut 12m below mudline. After activating the HAC the LP and HP wellhead housings were recovered to surface without any problems.

Anchor retrieval operations commenced concurrently with the casing cutting operation and the 4 secondary anchors had been pulled by the time the wellhead housings were recovered. This was possible due to a benign weather window. The remaining 4 anchors were pulled without problem with anchor pulling operations completed at 0900rs on 5th December 2003, at which time the rig was off hire to BHPBP.

Total NPT for this section of the well was 0.50hrs.

2.1 DAILY OPERATIONS

Date of report.	Days from spud. (days)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation (hr)	Operation Phase	OPnNo	Operation Subcode	NPT	Description of Currently Highlighted Operation
13/11/2003	0	19:00	0:00	5	MOVEIN	1	a	P	UNDER TOW TO MEGAMOUTH-1 LOCATION. POSITION AT 24:00hrs 38deg 00.5min S 143deg 01.3min E COURSE 130deg AVG SPEED 3.8kts DISTANCE TRAV 19nm DISTANCE TO GO 289nm
14/11/2003	0	0:00	0:00	24	MOVEIN	1	a	P	TIME 00:00hrs LOCATION LAT 39deg 00.5min S LONG 143deg 01.3min E COURSE 130deg AVG SPEED 3.9kts DIST TRAV 19nm DIST TO GO 281nm ETA LOCATION 01:00hrs 16 NOV TIME 06:00hrs LOCATION LAT 39deg 16.7min S LONG 143deg 43.5min E COURSE 094deg AVG SPEED 4.22kts DIST TRAV 46.5nm DIST TO GO 253.5nm ETA LOCATION 06:00hrs 16NOV TIME 14:00hrs LOCATION LAT 39deg 19.6min S LONG 144deg 52.3min E COURSE 094deg AVG SPEED 5.73kts DIST TRAV 101nm DIST TO GO 199nm ETA LOCATION 22:45hrs 15NOV TIME 00:00hrs LOCATION LAT 39deg 25.5min S LONG 146deg 15.3min E COURSE 095drg AVG SPEED 5.70kts DIST TRAV 165.5nm DIST TO GO 134.5nm ETA LOCATION 21:33hrs 15NOV
15/11/2003	0	0:00	21:00	21	MOVEIN	1	a	P	TIME: 06:00hrs LOCATION: LAT 39° 22' S LONG 147° 06.8' E COURSE: 58° AVE SPEED 5.88kts DIS TRAV: 206.3nm DIST TO GO: 93.7nm ETA LOCATION: 21:00hrs TIME: 10:00hrs LOCATION: LAT 39° 04.05' S LONG 147° 40.0'E COURSE 058° AVE SPEED 6.08kts DIST TRAV 237.5nm DIST TO GO 62.5nm ETA LOCATION 20:00hrs TIME: 18:00hrS LOCATION LAT 38° 39.3'S LONG 148° 26.8' E COURSE TURNING AVE SPEED 6.07kts DIST TRAV 285.3nm DIST TO GO 14.7nm ETA LOCATION 20:30hrs ARRIVED ON LOCATION AND COMMENCED RUN IN TO DROP POINT. FIRST ANCHOR (#6) ON BOTTOM AT 21:08hrs.
15/11/2003	0	21:00	21:45	0.75	MOVEIN	1	b	P	DROPPED ANCHOR NO. 6 ON BOTTOM AT 21:08hrs.

Megamouth-1ST Final Drilling Report

Date of report.	Days from spud. (days)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation (hr)	Operation Phase	OPnNo	Operation Subcode	NPT	Description of Currently Highlighted Operation
									PULLED RIG IN TO LOCATION SLOWLY DUE TO STRONG (40kts) WINDS.
15/11/2003	0	21:45	22:00	0.25	MOVEIN	1	b	N	WAITED ON WEATHER (WINDS > 40kts).
15/11/2003	0	22:00	23:00	1	MOVEIN	1	b	P	PULLED RIG 300m NORTH OF WELL LOCATION.
15/11/2003	0	23:00	0:00	1	MOVEIN	1	b	N	ATTEMPTED TO DROP ANCHOR NO. 3. UNABLE TO DROP BECAUSE PENNANT WIRE FOULED ON ANCHOR.
16/11/2003	0	0:00	0:30	0.5	MOVEIN	1	b	N	DROPPED ANCHOR NO. 3.
16/11/2003	0	0:30	1:15	0.75	MOVEIN	1	b	N	LADY DAWN REDUCED POWER TO ASCERTAIN IF PACIFIC CHALLENGER COULD HOLD RIG IN POSITION - OK.
16/11/2003	0	1:15	4:00	2.75	MOVEIN	1	b	P	RECOVERED TWO WIRE FROM LADY DAWN. NOTE: STARBOARD CRANE INOPERABLE, USED MESSENGER LINE AND TWO BRIDLE WINCH TO RECOVER TOW WIRE.
16/11/2003	0	4:00	5:30	1.5	MOVEIN	13	b	N	WAITED ON WEATHER, UNABLE TO PASS NO. 2 PCC TO BOAT DUE TO 40kts WIND.
16/11/2003	0	5:30	9:30	4	MOVEIN	1	b	P	RAN ANCHORS NO. 2 AND NO. 7 WITH LADY DAWN WHILE PACIFIC CHALLENGER ON TOW BRIDLE.
									BOAT ANCHOR A B C D N DAWN 2 05:30 05:45 06:31 07:15 0 DAWN 7 08:22 08:31 09:25 0
16/11/2003	0	9:30	10:30	1	MOVEIN	1	b	P	RELEASED PACIFIC CHALLENGER FROM TOW BRIDLE.
16/11/2003	0	10:30	14:00	3.5	MOVEIN	1	b	N	LADY DAWN J-HOOKED NO. 3 ANCHOR CHAIN.
16/11/2003	0	14:00	14:45	0.75	MOVEIN	1	b	P	RAN ANCHOR NO. 3 WITH LADY DAWN.
									BOAT ANCHOR A B C D N DAWN 3 13:54 14:05 14:25 14:45 3:18
16/11/2003	0	14:45	17:45	3	MOVEIN	1	b	N	UNABLE TO PASS NO. 4 PENNANT TO BOAT BECAUSE STARBOARD CRANE INOPERABLE.
16/11/2003	0	17:45	20:00	2.25	MOVEIN	1	b	P	RAN ANCHORS NO. 4 AND NO. 8 WITH LADY DAWN AND PACIFIC CHALLENGER CONCURRENTLY.
									BOAT ANCHOR A B C D N DAWN 4 17:45 18:30 18:45 19:30 3:05 CHALLENGER 8 18:40 19:00 19:20 19:45 0
16/11/2003	0	20:00	22:15	2.25	MOVEIN	1	b	N	UNABLE TO PASS NO. 5 PENNANT TO BOAT BECAUSE STARBOARD CRANE INOPERABLE. SKIDDED RIG N AND DROPPED ANCHOR NO. 5.
16/11/2003	0	22:15	0:00	1.75	MOVEIN	1	b	P	LADY DAWN J-HOOKED ANCHOR CHAIN NO. 5. RAN ANCHORS NO. 5 AND NO. 1 WITH LADY DAWN AND PACIFIC CHALLENGER CONCURRENTLY.
									BOAT ANCHOR A B C D N DAWN 5 22:15 22:35 23:00 23:40 2:15 CHALLENGER 8 22:40 22:55 23:20 23:45 0
17/11/2003	0.32	0:00	3:30	3.5	MOVEIN	1	c	C	BALLASTED RIG TO DRILLING DRAFT, FINISHED ANCHOR PRETENSIONING TO 36tonnes (250kips) AT 01:20hrs. CONTINUED REPAIRS TO TOP DRIVE.
17/11/2003	0.32	3:30	5:30	2	MOVEIN	1	c	C	FINISHED REPAIRS TO TOP DRIVE. INSTALLED IRON ROUGHNECK AND PREPARED TO PICK UP DRILL PIPE. INSTALLED IRON ROUGHNECK AND PREPARED TO PICK UP DRILL PIPE. IRON ROUGHNECK NOT FUNCTIONING, REPAIRED SAME.
17/11/2003	0.32	5:30	6:30	1	MOVEIN	1	c	P	MADE UP ONE STAND OF DRILL PIPE AND MADE UP 762mm (30in) RUNNING TOOL. STOOD BACK IN DERRICK.
17/11/2003	0.32	6:30	15:30	9	MOVEIN	4	f	P	MADE UP 914mm (36in) X 660mm (26in) BHA. RIH AND TAGGED SEABED AT 103.9m. RKB-MSL = 22.4M, WATER DEPTH = 81.5m.
17/11/2003	0.32	15:30	16:15	0.75	MOVEIN	11	c	P	TOOK ANDERDRIFT SURVEY AT SEABED (1°).
17/11/2003	0.32	16:15	17:30	1.25	DRCON1	2	a	P	SPUDED WELL AT 16:15hrs. DRILLED TO 148m. PUMPED HI-VIS PILLS MID STAND AND CONNECTIONS.

Megamouth-1ST Final Drilling Report

Date of report.	Days from spud. (days)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation (hr)	Operation Phase	OPnNo	Operation Subcode	NPT	Description of Currently Highlighted Operation
17/11/2003	0.32	17:30	18:00	0.5	CSCON1	5	b	P	SURVEYED AT TD (1°). SWEPT HOLE AND SPOTTED 47.7m3 (300bbl) OF PHG.
17/11/2003	0.32	18:00	19:30	1.5	CSCON1	4	b	P	POOH. NO DRAG.
17/11/2003	0.32	19:30	20:30	1	CSCON1	6	a	P	MADE UP CEMENT STINGER AND CEMENTING STANDS.
17/11/2003	0.32	20:30	21:00	0.5	CSCON1	13	i	P	HELD JSA ON RUNNING 762mm (30in) CONDUCTOR.
17/11/2003	0.32	21:00	22:00	1	CSCON1	6	a	P	RIGGED UP TO RUN 762mm (30in) CONDUCTOR.
17/11/2003	0.32	22:00	0:00	2	CSCON1	6	c	P	RAN 762mm (30in) X 508mm (20in) SHOE AND 762mm (30in) INTERMEDIATE JOINT. NOTE: OPERATION WAS SLOW AND CAUTIOUS DUE TO HIGH WINDS AND RIG MOVEMENT.
18/11/2003	1.33	0:00	0:15	0.25	CSCON1	13	i	P	HELD JSA ON RUNNING 762mm (30in) CONDUCTOR WITH NEW CREW.
18/11/2003	1.33	0:15	1:30	1.25	CSCON1	6	c	P	RAN REMAINING JOINT OF 762mm (30in) CONDUCTOR AND DRILQUIP WELLHEAD JOINT WITH HAC.
18/11/2003	1.33	1:30	2:45	1.25	CSCON1	6	c	P	RAN 1 STAND OF DRILL PIPE STINGER INSIDE 762mm (30in) CONDUCTOR, MADE UP RUNNING TOOL AND LANDED 762mm (30in) CONDUCTOR IN PGB.
18/11/2003	1.33	2:45	3:00	0.25	CSCON1	13	i	P	HELD JSA ON OVER WATER WORK.
18/11/2003	1.33	3:00	4:00	1	CSCON1	6	c	P	LATCHED PGB TO 762mm (30in) CONDUCTOR AND RIGGED UP HAC SYSTEM.
18/11/2003	1.33	4:00	6:00	2	CSCON1	6	h	P	RAN 762mm (30in) CONDUCTOR ON LANDING STRING. STABBED INTO HOLE WITH ROV AND TUGGER ASSIST. CONTINUED RUNNING 762mm (30in) CONDUCTOR TO 148m
18/11/2003	1.33	6:00	6:30	0.5	CSCON1	7	c	P	CIRCULATED 12.7m3 (80bbl) SEAWATER WITH RIG PUMP AND WASHED CASING DOWN FROM 145m TO 148m. PGB BULLSEYE = 0.75° STBD.
18/11/2003	1.33	6:30	8:00	1.5	CSCON1	7	d	P	CEMENTED CONDUCTOR CASING AS FOLLOWS: - 3.2m3 (20bbl) SEAWATER WITH DYE - 28.3m3 (856sx/178bbl) CLASS 'G' CEMENT (1% CACL2) MIXED AT 1.9SG - DISPLACED WITH 5.25m3 (33bbl) SEAWATER - DYE AND CEMENT RETURNS OBSERVED AT SEABED.
18/11/2003	1.33	8:00	10:15	2.25	CSCON1	7	h	P	WAITED ON CEMENT. WELLHEAD 2.6m ABOVE SEABED, PGB HEADING = 240°, BULLSEYE = 0.5° STBD.
18/11/2003	1.33	10:15	11:00	0.75	CSCON1	6	h	P	RELEASED RUNNING TOOL, POOH AND LAID DOWN SAME. BROKE OUT CEMENT STAND AND LAID OUT. NOTE: STRAP OUT OF HOLE WAS 101.15mRT TO WELLHEAD.
18/11/2003	1.33	11:00	16:00	5	CSCON1	6	a	P	MADE UP 476mm (18.75in) WELLHEAD, RUNNING TOOL AND WIPER PLUGS. MADE UP CEMENT HEAD/DART LAUNCHER IN PREPARATION FOR NEXT CASING JOB. LAID OUT BOTH ON PIPE RACK.
18/11/2003	1.33	16:00	21:30	5.5	CSCON1	4	e	P	PICKED UP 30 STANDS OF DRILLPIPE AND STOOD BACK. RABBITED EACH JOINT AS PICKED UP.
18/11/2003	1.33	21:30	22:00	0.5	CSCON1	13	i	P	CLEARED RIG FLOOR AND HELD JSA ON BHA HANDLING.
18/11/2003	1.33	22:00	23:00	1	CSCON1	4	f	P	LAID DOWN 660mm (26in) BHA AND HOLE OPENER.
18/11/2003	1.33	23:00	0:00	1	CSCON1	4	f	P	COMMENCED PICKING UP 444mm (17.5in) BHA AND MWD.
19/11/2003	2.33	0:00	0:15	0.25	CSCON1	13	i	P	HELD JSA ON MAKING UP BHA.
19/11/2003	2.33	0:15	2:00	1.75	CSCON1	4	g	P	CONTINUED MAKING UP 444mm (17.5in) BHA. UPLOADED MWD.
19/11/2003	2.33	2:00	2:15	0.25	CSCON1	13	i	P	HELD JSA ON WORKING OVER WATER.
19/11/2003	2.33	2:15	2:45	0.5	CSCON1	4	b	P	INSTALLED BHA ROPES ON GUIDELINES.
19/11/2003	2.33	2:45	4:30	1.75	CSCON1	4	f	P	CONTINUED MAKING UP BHA AND RIH TO WELLHEAD.

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19/11/2003	2.33	4:30	5:00	0.5	CSCON1	4	b	P	CURRENT HAD PUSHED BHA FORWARD. ROV UNABLE TO GUIDE BHA INTO WELLHEAD HOUSING. ADJUSTED GUIDELINE TENSIONS TO CENTRALIZE BHA AND STABBED INTO WELLHEAD HOUSING.
19/11/2003	2.33	5:00	6:00	1	CSCON1	4	b	P	RIH WITH BHA AND TAGGED CEMENT AT 142.5m.
19/11/2003	2.33	6:00	7:00	1	CSCON1	2	c	P	DRILLED FIRM CEMENT AND CASING SHOE FROM 142.5m TO 148m.
19/11/2003	2.33	7:00	0:00	17	DRINT1	2	a	P	DRILLED 444mm (17.5in) HOLE FROM 148m TO 772m. PUMPED 16m3 (100bbl) GUAR MID STAND AND 16m3 (100bbl) PHG ON CONNECTIONS.
20/11/2003	3.33	0:00	3:30	3.5	DRINT1	2	a	P	DRILLED 444mm (17.5in) HOLE FROM 772m TO 831m. PUMPED 16m3 (100bbl) GUAR MID STAND AND 16m3 (100bbl) PHG ON CONNECTIONS.
20/11/2003	3.33	3:30	4:00	0.5	CSINT1	5	b	P	SWEPT HOLE WITH 48m3 (300bbl) PHG AND DISPLACED HOLE WITH 103m3 (650bbl) PAC MUD.
20/11/2003	3.33	4:00	7:00	3	CSINT1	4	a	P	POOH. 13.6mt (30kips) OVERPULL AT 430m, WIPE ONCE WITHOUT ANY DRAG.
20/11/2003	3.33	7:00	8:45	1.75	CSINT1	6	a	P	RIGGED UP TO RUN 340mm (13.375in) CASING.
20/11/2003	3.33	8:45	9:00	0.25	CSINT1	13	i	P	HELD JSA ON RUNNING CASING.
20/11/2003	3.33	9:00	10:30	1.5	CSINT1	6	b	P	RAN SHOE TRACK AND CHECKED FLOATS. OK.
20/11/2003	3.33	10:30	12:00	1.5	CSINT1	6	a	P	RIGGED UP AND TESTED TAM PACKER.
20/11/2003	3.33	12:00	13:30	1.5	CSINT1	6	c	P	RAN CASING TO WELLHEAD.
20/11/2003	3.33	13:30	14:00	0.5	CSINT1	13	a	S	LOST POWER TO CASING TONG. TROUBLESHOT AND REPAIRED SAME.
20/11/2003	3.33	14:00	14:30	0.5	CSINT1	6	c	P	ENTERED WELLHEAD AND CONTINUED RUNNING CASING.
20/11/2003	3.33	14:30	15:30	1	CSINT1	13	c	N	CROSSTHREADED A CONNECTION. ATTEMPTED A SECOND JOINT. NO GOOD. LAID OUT JOINT WITH A POSSIBLE DEFORMED BOX. TOTAL OF 3 JOINTS LAID OUT WITH DAMAGED THREADS.
20/11/2003	3.33	15:30	19:45	4.25	CSINT1	6	c	P	CONTINUED RUNNING CASING. RAN TOTAL OF 56 JOINTS OF 340mm (13.375in) 107kg/m (72ppf) L80 BUTTRESS CASING PLUS 476mm (18.75in) WELLHEAD HOUSING.
20/11/2003	3.33	19:45	20:15	0.5	CSINT1	6	e	P	RAN CASING ON DRILLPIPE. LANDED IN 762mm (30in) WELLHEAD HOUSING AND TOOK 22.7mt (50kip) OVERPULL. CASING SHOE AT 820.45m.
20/11/2003	3.33	20:15	20:45	0.5	CSINT1	6	e	P	RIGGED UP CEMENT HOSE. CIRCULATED 23.8m3 (150bbl) OF SEAWATER AND HELD PREJOB MEETING ON CEMENTING OPERATION.
20/11/2003	3.33	20:45	23:45	3	CSINT1	7	d	P	CEMENTED CASING AS FOLLOWS: - 1.6m3 (10bbl) SEAWATER WITH DYE - TESTED LINES - DROPPED BOTTOM DART - 1.6m3 (10bbl) SEAWATER WITH DYE - 50.7m3 (847sx/319bbl) OF 'G' CEMENT + ECONOLITE + HR-6L + NF-6 MIXED WITH DRILLWATER AT 1.5SG - 6.2m3 (316sx/65bbl) OF 'G' CEMENT + HR-6L + NF-6 MIXED WITH DRILLWATER AT 1.89SG - DROPPED TOP DART - DISPLACED CEMENT WITH 54.5m3 (343bbl) OF SEAWATER - BUMPED PLUG - BOTTOM PLUG SHEARED AT 4.5MPa (650psi) - TOP PLUG SHEARED AT 11.3MPa (1,650psi) - DID NOT SEE DYE BUT DID HAVE RETURNS THROUGHOUT THE JOB.
20/11/2003	3.33	23:45	0:00	0.25	CSINT1	6	f	P	BUMPED PLUG WITH 24.1MPa (3,500psi) AND HELD FOR 15min.
21/11/2003	4.33	0:00	0:15	0.25	CSINT1	6	f	P	FINISHED PRESSURE TEST ON CASING. BLED OFF PRESSURE. FLOATS HELD.
21/11/2003	4.33	0:15	0:30	0.25	CSINT1	6	e	P	RIGGED DOWN CEMENT HOSE. RELEASED RUNNING TOOL FROM WELLHEAD.
21/11/2003	4.33	0:30	1:00	0.5	CSINT1	7	a	P	LAID DOWN CEMENT STAND.
21/11/2003	4.33	1:00	2:00	1	CSINT1	6	e	P	WASHED WELLHEAD. POOH AND LAID OUT RUNNING TOOL.

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NOTE: MOVED RIG 15m AT A HEADING OF 115°.									
21/11/2003	4.33	2:00	2:30	0.5	CSINT1	7	a	P	PICKED UP CEMENT STAND AND BROKE OUT DART LAUNCHER.
21/11/2003	4.33	2:30	3:00	0.5	CSINT1	8	a	P	LAID OUT MOUSEHOLE AND ROTATING MOUSEHOLE.
21/11/2003	4.33	3:00	3:15	0.25	CSINT1	13	i	P	HELD JSA ON RUNNING RISER.
21/11/2003	4.33	3:15	4:00	0.75	CSINT1	8	a	P	RIGGED UP TO RUN RISER.
21/11/2003	4.33	4:00	5:00	1	CSINT1	8	c	P	MADE UP 2 RISER JOINTS AND STOOD BACK IN DERRICK.
21/11/2003	4.33	5:00	5:15	0.25	CSINT1	13	i	P	HELD JSA ON BOP HANDLING.
21/11/2003	4.33	5:15	7:30	2.25	CSINT1	8	b	P	MOVED BOP TO MOONPOOL. LATCHED LMRP. BULLSEYE READINGS ON BEAMS: BOP = 1° AFT, LMRP = 0.5° AFT, FLEX JT = 0.5° PORT.
21/11/2003	4.33	7:30	10:00	2.5	CSINT1	8	b	P	FUNCTION TESTED BOP FROM RIG FLOOR ON BLUE POD AND FROM TP PANEL ON YELLOW POD. PRESSURE TESTED CHOKE AND KILL FAILSAFES.
21/11/2003	4.33	10:00	14:00	4	CSINT1	8	c	P	RAN RISER. PRESSURE TESTED CHOKE AND KILL LINES EVERY 2 JOINTS.
21/11/2003	4.33	14:00	15:30	1.5	CSINT1	8	d	P	MADE UP LANDING JOINT. INSTALLED STORM LOOPS AND PRESSURE TESTED SAME.
21/11/2003	4.33	15:30	18:00	2.5	CSINT1	8	d	P	INSTALLED RISER TENSIONERS AND TENSIONED TO 102mt (224kip).
21/11/2003	4.33	18:00	19:00	1	CSINT1	8	d	P	POSITIONED RIG BACK OVER WELL. LANDED AND LATCHED BOP. TESTED LATCH WITH 22.7mt (50kip) OVERPULL. OK.
21/11/2003	4.33	19:00	20:30	1.5	CSINT1	8	d	P	PRESSURE TESTED WELLHEAD CONNECTER AND CASING AGAINST SHEAR RAMS TO 24MPa (3,500psi). STROKED OPEN SLIP JOINT AND LAID DOWN LANDING JOINT.
21/11/2003	4.33	20:30	22:30	2	CSINT1	8	e	P	INSTALLED DIVERTER HOUSING AND RIGGED UP FLOW LINE. RIGGED DOWN RISER HANDLING EQUIPMENT.
21/11/2003	4.33	22:30	23:00	0.5	CSINT1	9	f	P	MADE UP RUNNING TOOL AND WEAR BUSHING. RIH AND SET SAME WITH 13mt (30kip) OVERPULL. POOH AND LAID OUT RUNNING TOOL.
21/11/2003	4.33	23:00	23:15	0.25	CSINT1	13	i	P	HELD JSA ON BHA HANDLING.
21/11/2003	4.33	23:15	0:00	0.75	CSINT1	4	f	P	LAID DOWN 444mm (17.5in) BHA.
22/11/2003	5.33	0:00	0:15	0.25	CSINT1	13	i	P	HELD JSA WITH NEW CREW ON BHA HANDLING.
22/11/2003	5.33	0:15	1:30	1.25	CSINT1	4	f	P	CONTINUED LAYING DOWN 444mm (17.5in) BHA.
22/11/2003	5.33	1:30	4:45	3.25	CSINT1	4	f	P	PICKED UP 311mm (12.25in) BHA.
22/11/2003	5.33	4:45	5:45	1	CSINT1	4	g	P	CHANGED STANDOFF ON MWD FOR 203mm (8in) SMALLER MOTOR. UPLOADED MWD.
22/11/2003	5.33	5:45	6:45	1	CSINT1	4	b	P	RIH WITH BHA TO 149m.
22/11/2003	5.33	6:45	7:00	0.25	CSINT1	11	c	P	TESTED MWD.
22/11/2003	5.33	7:00	7:30	0.5	CSINT1	4	b	P	RIH WITH BHA TO 282m.
22/11/2003	5.33	7:30	8:00	0.5	CSINT1	13	i	P	HELD JSA ON PICKING UP DRILL PIPE.
22/11/2003	5.33	8:00	11:30	3.5	CSINT1	4	e	P	MADE UP HANG OFF TOOL AND RACKED BACK. RIH PICKING UP DRILL PIPE TO 773m. TAGGED CEMENT AT 793m.
22/11/2003	5.33	11:30	12:30	1	CSINT1	13	i	P	BROKE CIRCULATION AT 773m. PERFORMED CHOKE DRILL WITH BOTH CREWS.
22/11/2003	5.33	12:30	13:30	1	CSINT1	9	d	P	PRESSURE TESTED LMRP CONNECTOR AGAINST ANNULAR TO 24MPa (3,500psi).
22/11/2003	5.33	13:30	14:00	0.5	CSINT1	9	d	P	PERFORMED DRAW DOWN TEST ON KOOMEY UNIT.
22/11/2003	5.33	14:00	17:00	3	CSINT1	2	c	P	DRILLED FIRM CEMENT AND FLOAT EQUIPMENT FROM 793m TO SHOE AT 820m. DRILLED CEMENT IN RATHOLE PLUS 3m OF NEW HOLE TO 834m.
22/11/2003	5.33	17:00	17:30	0.5	CSINT1	5	a	P	DISPLACED HOLE TO 1.12SG KCL-PHPA-GLYCOL MUD.
22/11/2003	5.33	17:30	18:30	1	CSINT1	5	e	P	PERFORMED L.O.T. FORMATION LEAKED OFF AT 3.8MPa (550psi) WITH 1.12SG MUD. EMW = 1.58SG.

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22/11/2003	5.33	18:30	0:00	5.5	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 834m TO 970m. WOB = 1.8 - 4.5mt (4-10kip) RPM = 142 ON MOTOR PLUS 140 ROTARY PUMP = 3420lpm (890gpm) WITH 20MPa (2,900psi).
23/11/2003	6.33	0:00	12:30	12.5	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 970m TO 1,355m. WOB = 4.5 - 5.5mt (10-12kip) RPM = 142 ON MOTOR PLUS 140 ROTARY PUMP = 3420lpm (890gpm) WITH 23.4MPa (3,400psi). OBSERVED CO2 GAS STARTING AT 980m. MAXIMUM OF 4.7% CO2 AT 1,165m.
23/11/2003	6.33	12:30	13:00	0.5	DRINT2	5	d	P	TOOK SLOW PUMP RATES AT 1,355m. RATE PUMP #1 PUMP #2 30spm 2.1MPa (300psi) 2.1MPa (300psi) 40spm 2.6MPa (370psi) 2.6MPa (370psi) 50spm 3.0MPa (440psi) 3.1MPa (450psi)
23/11/2003	6.33	13:00	0:00	11	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 1,355m TO 1,557m. WOB = 4.5 - 5.5mt (10-12kip) RPM = 142 ON MOTOR PLUS 140 ROTARY PUMP = 3420lpm (890gpm) WITH 23.4MPa (3,400psi). INCREASED MUD WEIGHT TO 1.13SG. CO2 GAS CONTINUED AT +/-2%.
24/11/2003	7.33	0:00	12:00	12	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 1,557m TO 1,723m. WOB = 4.5 - 5.5mt (10-12kip) RPM = 142 ON MOTOR PLUS 160 ROTARY PUMP = 3,346lpm (850gpm) WITH 23.4MPa (3,400psi). BACKREAMED EACH CONECTION TO REDUCE HOLE ANGLE. INCREASED MUD WEIGHT TO 1.15SG.
24/11/2003	7.33	12:00	12:30	0.5	DRINT2	5	d	P	TOOK SLOW PUMP RATES AT 1,723m. RATE PUMP #2 PUMP #3 30spm 2.1MPa (300psi) 2.1MPa (300psi) 40spm 2.6MPa (380psi) 2.6MPa (370psi) 50spm 3.0MPa (440psi) 3.1MPa (450psi)
24/11/2003	7.33	12:30	0:00	11.5	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 1,723m TO 1,907m. WOB = 4.5 - 5.5mt (10-12kip) RPM = 142 ON MOTOR PLUS 160 ROTARY PUMP = 3,346lpm (870gpm) WITH 23.4MPa (3,400psi). DISCONTINUED BACKREAMING.
25/11/2003	8.33	0:00	0:00	24	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 1,907m TO 2,477m. WOB = 2.7 - 4.5mt (6-10kip) RPM = 117 ON MOTOR PLUS 150 ROTARY PUMP = 2,827lpm (735gpm) WITH 23.4MPa (3,400psi).
26/11/2003	9.33	0:00	3:00	3	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 2,477m TO 2,507m. WOB = 2.7 - 4.5mt (6-10kip) RPM = 117 ON MOTOR PLUS 150 ROTARY PUMP = 2,827lpm (735gpm) WITH 23.4MPa (3,400psi).
26/11/2003	9.33	3:00	3:30	0.5	DRINT2	13	c	N	WHILE ON BOTTOM DRILLING AT 2,507m, BIT APPEARED TO PLUG AND BLEW POP OFF. PRIOR TO PLUGGING HAD 2,825lpm (735gpm), AFTER PLUGGING HAD 2,500lpm (650gpm) AT 23.4MPa (3,400psi) ON BOTTOM PRESSURE. ATTEMPTED TO DRILL AT REDUCED RATE. MOTOR STALLED. CYCLED PUMPS AND WORKED PIPE. APPEARED TO WORK PARTIAL BIT PLUG FREE.

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26/11/2003	9.33	3:30	4:30	1	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 2,507m TO 2,514m. WOB = 1.8 - 2.7mt (4-6kip) RPM = 115 ON MOTOR PLUS 150 ROTARY PUMP = 2,760lpm (718gpm) WITH 23.4MPa (3,450psi). NOTE: FEWD TOOLS UNABLE TO RECEIVE SIGNAL AT REDUCED FLOW RATE.
26/11/2003	9.33	4:30	5:00	0.5	DRINT2	10	e	P	MADE MAD PASS FROM 2,487m TO 2,514m AT 20min PER STAND TO OBTAIN FEWD LOG.
26/11/2003	9.33	5:00	9:00	4	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 2,514m TO 2,541m. WOB = 1.8 - 2.7mt (6-10kip) RPM = 115 ON MOTOR PLUS 150 ROTARY PUMP = 2,760lpm (718gpm) WITH 23.4MPa (3,450psi). CONTROL DRILLED WITH 1MPa (150psi) DIFFERENTIAL BECAUSE OF HIGHER PRESSURE AT LOWER PUMP RATE.
26/11/2003	9.33	9:00	9:30	0.5	DRINT2	10	e	P	MADE MAD PASS FROM 2,514m TO 2,541m AT 20min PER STAND TO OBTAIN FEWD LOG.
26/11/2003	9.33	9:30	10:00	0.5	DRINT2	2	a	P	DRILLED FROM 2,541m TO 2,546m.
26/11/2003	9.33	10:00	10:30	0.5	DRINT2	12	k	N	LOST 6.2MPa (900psi) OF PRESSURE WHILE ON BOTTOM DRILLING. INVESTIGATED PRESSURE LOSS. TAGGED 'BOTTOM' 3m DEEP AT 2,549m.
26/11/2003	9.33	10:30	15:00	4.5	DRINT2	12	k	N	POOH TO SHOE. NO EXCESS DRAG.
26/11/2003	9.33	15:00	17:00	2	DRINT2	13	a	P	SLIPPED AND CUT DRILL LINE.
26/11/2003	9.33	17:00	18:00	1	DRINT2	12	k	N	FINISHED POOH TO BHA.
26/11/2003	9.33	18:00	20:30	2.5	DRINT2	12	k	N	POOH WITH BHA. DOWNLOADED MWD. FOUND MOTOR PARTED AT TOP SUB. FISH LEFT IN HOLE = 7.87m OF MOTOR PLUS 0.36m OF BIT = 8.24m TOP OF FISH = 2,538m.
26/11/2003	9.33	20:30	22:30	2	DRINT2	12	k	N	LAID DOWN, ROLLER REAMERS, FLOAT SUB AND DRILL COLLAR. NOTE: FOUND CENTRALIZER FROM INSIDE MWD TOOL ON TOP OF FLOAT. FLOAT BROKEN.
26/11/2003	9.33	22:30	23:30	1	DRINT2	12	k	N	DRESSED OVERSHOT WITH 225mm (8.875in) CONTROL AND 209mm (8.25in) BASKET GRAPPLE. SERVICED TOP DRIVE AND BLOCKS.
26/11/2003	9.33	23:30	0:00	0.5	DRINT2	12	k	N	MADE UP OVERSHOT AND RIH.
27/11/2003	10.33	0:00	6:00	6	DRINT2	12	k	N	RIH WITH OVERSHOT TO 2,528m. BROKE CIRCULATION EVERY 500m.
27/11/2003	10.33	6:00	6:15	0.25	DRINT2	12	k	N	CIRCULATED AT 2,528m.
27/11/2003	10.33	6:15	8:00	1.75	DRINT2	12	k	N	ATTEMPTED TO LATCH FISH. WASHED DOWN FROM 2,528m TO 2,538m. STRING STALLED AND OVERPULLED SEVERAL TIMES. PRESSURE INCREASED ON LAST ATTEMPT AND STRING ROTATED TO LEFT INDICATING THE MOTOR WAS TURNING.
27/11/2003	10.33	8:00	13:00	5	DRINT2	12	k	N	POOH. DID NOT RECOVER FISH.
27/11/2003	10.33	13:00	14:00	1	DRINT2	12	k	N	ATTEMPTED TO BREAK OUT OVERSHOT. NO SUCCESS, SHOE BENT.
27/11/2003	10.33	14:00	15:30	1.5	DRINT2	12	k	N	RIGGED UP DRILL FLOOR TO RUN 89mm (3.5in) DRILL PIPE.
27/11/2003	10.33	15:30	16:00	0.5	DRINT2	12	k	N	SERVICED TOP DRIVE AND BLOCKS.
27/11/2003	10.33	16:00	17:00	1	DRINT2	12	k	N	MADE UP MULESHOE AND PICKED UP 15 JOINTS 89mm (3.5in) DRILL PIPE.
27/11/2003	10.33	17:00	21:00	4	DRINT2	12	k	N	RIH WITH CEMENT STINGER TO 2,530m.
27/11/2003	10.33	21:00	22:00	1	DRINT2	12	k	N	CIRCULATED AND CONDITIONED MUD FOR CEMENT PLUG.
27/11/2003	10.33	22:00	22:30	0.5	DRINT2	12	k	N	SPOTTED 1.6m3 (10bbl) OF HIVIS MUD FROM 2,530m TO 2,510m. POOH TO 2,500m.
27/11/2003	10.33	22:30	0:00	1.5	DRINT2	12	k	N	CIRCULATED WHILE CONTINUING TO BUILD CEMENT SPACER.
28/11/2003	11.33	0:00	2:15	2.25	DRINT2	12	k	N	CONTINUED CIRCULATING WHILE WAITING ON SPACER AND MIX WATER TO BE MADE. SPACER MIXING VERY SLOW, PARTLY DUE TO SLOW BARITE ADDITION FROM HOPPER.

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28/11/2003	11.33	2:15	2:45	0.5	DRINT2	12	k	N	PUMPED SPACER AND PRESSURE TESTED CEMENT LINES.
28/11/2003	11.33	2:45	4:45	2	DRINT2	12	k	N	COULD NOT GET CEMENT DELIVERY TO CEMENT SURGE TANK. TROUBLESHOT PROBLEM AND UNPLUGGED VENT LINE.
28/11/2003	11.33	4:45	6:00	1.25	DRINT2	12	k	N	MIXED AND PUMPED KICK OFF PLUG AS FOLLOWS: - 3.2m3 (20bbl) TUNED SPACER AT 1.68SG - PRESSURE TESTED LINES TO 17.2MPa (2,500psi) - 1.6m3 (10bbl) TUNED SPACER - 10.3m3 (339sx/65bbl) OF 'G' CEMENT PLUS ADDITIVES - 0.5m3 (3bbl) TUNED SPACER - DISPLACED CEMENT WITH 21m3 (132bbl) MUD.
28/11/2003	11.33	6:00	6:30	0.5	DRINT2	12	k	N	POOH 7 STANDS TO 2,298m.
28/11/2003	11.33	6:30	8:30	2	DRINT2	12	k	N	CIRCULATED 2 X BOTTOMS UP.
28/11/2003	11.33	8:30	12:00	3.5	DRINT2	12	k	N	POOH. NOTE: WELL NAME CHANGED TO MEGAMOUTH-1ST AT 12:00hrs.
28/11/2003	11.33	12:00	13:30	1.5	DRINT2	4	g	N	LAID DOWN MWD.
28/11/2003	11.33	13:30	18:00	4.5	DRINT2	4	g	N	MADE UP SIDETRACK BHA. UPLOADED MWD AND SHALLOW TESTED. OK
28/11/2003	11.33	18:00	22:30	4.5	DRINT2	4	a	N	RIH TO 2,386m.
28/11/2003	11.33	22:30	23:00	0.5	DRINT2	4	a	N	WASHED DOWN AT 660lpm (170gpm) FROM 2,386m TO 2,430m. NO CEMENT.
28/11/2003	11.33	23:00	23:15	0.25	DRINT2	5	b	N	CIRCULATED WHILE DISCUSSING OPTIONS.
28/11/2003	11.33	23:15	0:00	0.75	DRINT2	4	a	N	WASHED DOWN AT 660lpm (170gpm) FROM 2,430m TO 2,446m. TAGGED CEMENT AT 2,446m. WASHED DOWN AT 1,920lpm (500gpm) TO FIRM CEMENT AT 2,452m.
29/11/2003	12.33	0:00	0:30	0.5	DRINT2	2	b	N	SLIDE DRILLED FROM 2,452m TO 2,456m WITH 1960lpm (510gpm), 1.8mt (4kip) WOB WITH DIFFERENTIAL PRESSURE FROM MOTOR.
29/11/2003	12.33	0:30	6:00	5.5	DRINT2	2	d	N	TIME DRILLED FROM 2,456m TO 2,478m WITH 2,730lpm (710gpm), 0 WOB.
29/11/2003	12.33	6:00	7:00	1	DRINT2	2	b	N	ATTEMPTED TO PUSH ON SIDETRACK ASSEMBLY. DID NOT TAKE WEIGHT. STOPPED PUMPS AND RAN IN HOLE TO 2,483m - NO CEMENT.
29/11/2003	12.33	7:00	8:00	1	DRINT2	5	b	N	CIRCULATED HOLE CLEAN. HAD GREEN CEMENT RETURNS.
29/11/2003	12.33	8:00	12:30	4.5	DRINT2	4	a	N	POOH TO BHA.
29/11/2003	12.33	12:30	15:00	2.5	DRINT2	4	b	N	POOH WITH BHA. UNLOADED MWD SOURCES.
29/11/2003	12.33	15:00	16:00	1	DRINT2	4	a	N	CHANGED OUT TO 89mm (3.5in) EQUIPMENT AND RIH WITH STINGER.
29/11/2003	12.33	16:00	20:00	4	DRINT2	4	a	N	RIH TO 2,471m.
29/11/2003	12.33	20:00	20:30	0.5	DRINT2	4	a	N	WASHED DOWN FROM 2,471m TO 2,530m. TOOK WEIGHT AT 2,490m TO 2,492m BUT WASHED OFF.
29/11/2003	12.33	20:30	22:00	1.5	DRINT2	7	c	N	CIRCULATED BOTTOMS UP. HAD GREEN CEMENT RETURNS ON BOTTOMS UP.
29/11/2003	12.33	22:00	23:00	1	DRINT2	7	c	N	SPOTTED 1.6m3 (10bbl) OF HIVIS MUD ON BOTTOM.
29/11/2003	12.33	23:00	0:00	1	DRINT2	7	d	S	PUMPED SEAWATER SPACER AND MIXED CEMENT FOR SIDETRACK PLUG. RECIRCULATING MIXER PLUGGED. UNPLUGGED MIXER AND RESUMED MIXING CEMENT.
30/11/2003	13.33	0:00	0:30	0.5	DRINT2	7	d	S	RESUMED MIXING AND PUMPING CEMENT. MIXER COULD NOT BE CONTROLLED MIXING IN EXCESS OF 1.7m3/min (11bpm). CEMENT WEIGHT AND VOLUMES UNCERTAIN (APPROX. 8m3 (50bbl) OF SLURRY).
30/11/2003	13.33	0:30	3:00	2.5	DRINT2	7	e	S	ABORTED CEMENT JOB. ATTEMPTED TO REVERSE CIRCULATE CEMENT OUT, NO SUCCESS. CIRCULATED CEMENT OUT THE LONG WAY. HALLIBURTON TROUBLESHOT PROBLEM.
30/11/2003	13.33	3:00	3:30	0.5	DRINT2	7	a	S	HALLIBURTON TESTED CEMENT UNIT.

Megamouth-1ST Final Drilling Report

Date of report.	Days from spud. (days)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation (hr)	Operation Phase	OPnNo	Operation Subcode	NPT	Description of Currently Highlighted Operation
30/11/2003	13.33	3:30	5:00	1.5	DRINT2	7	d	N	PUMPED BALANCED CEMENT PLUG AS FOLLOWS: - 3.2m3 (20bbl) SEAWATER - PRESSURE TESTED LINES - 1.6m3 (10bbl) SEAWATER - 16m3 (530sx/100bbl) OF 'G' CEMENT PLUS ADDITIVES - 0.5m3 (3bbl) SEAWATER - DRILLED CEMENT WITH 21m3 (132bbl) MUD CIP AT 04:50
30/11/2003	13.33	5:00	5:30	0.5	DRINT2	4	a	N	POOH 10 STANDS TO 2,266m.
30/11/2003	13.33	5:30	8:00	2.5	DRINT2	5	b	N	CIRCULATED BOTTOMS UP, NO CEMENT ON BOTTOMS UP. FUNCTIONED BOP'S TO CLEAR CEMENT FROM RAM CAVITIES.
30/11/2003	13.33	8:00	11:00	3	DRINT2	4	a	N	POOH.
30/11/2003	13.33	11:00	13:00	2	DRINT2	9	h	N	RIH WITH WASH TOOL, FUNCTIONED AND FLUSHED BOP'S.
30/11/2003	13.33	13:00	14:00	1	DRINT2	13	a	N	SERVICED RIG.
30/11/2003	13.33	14:00	17:00	3	DRINT2	4	b	N	RIH WITH BHA, SHALLOW TESTED MWD.
30/11/2003	13.33	17:00	17:30	0.5	DRINT2	13	a	C	REPAIRED HYDRAULIC LINE ON IRON ROUGHNECK.
30/11/2003	13.33	17:30	20:30	3	DRINT2	4	a	N	RIH TO 2,270m.
30/11/2003	13.33	20:30	23:00	2.5	DRINT2	4	a	N	WASHED FROM 2,270m TO 2,371m AND REAMED FROM 2,371m TO 2,385m. DRILLED FROM 2,385m TO 2,393m. RATTY CEMENT FROM 2,346m TO 2,371m. GOOD CEMENT FROM 2,385m TO 2,393m.
30/11/2003	13.33	23:00	0:00	1	DRINT2	2	d	N	TIME DRILLED FROM 2,393m TO 2,397m.
1/12/2003	14.33	0:00	12:00	12	DRINT2	2	b	N	SIDETRACKED WELL, SLIDING FROM 2,397m TO 2,448m. TIME DRILLED AT 3-4m/hr FROM 2,393m TO 2,406m. AT 2,406m LOST WEIGHT ON BIT TO 2,418m. RECOMMENCED TIME DRILLING AT 2,418m. HAD TROUBLE GETTING WEIGHT TO BIT, APPEARED THAT STABILISERS WERE HANGING UP FROM 2,422m TO 2,428m. CONTINUED SLIDING FROM 2,428m TO 2,448m. 100% CEMENT RETURNS. PUMPED HIVIS SWEEP AND HAD FORMATION RETURNS.
1/12/2003	14.33	12:00	19:00	7	DRINT2	2	a	N	DRILLED 311mm (12.25in) HOLE FROM 2,448m TO 2,500m. WOB = 9mt (20kip) RPM = 114 ON MOTOR PLUS 30 ROTARY PUMPS = 2,810lpm (730gpm) WITH 21.4MPa (3,150psi)
1/12/2003	14.33	19:00	20:00	1	DRINT2	2	g	N	SURVEYS INDICATED THAT HOLE ANGLE HAD BUILT FROM 7° AT 2,441m TO 14° AT 2,466m. BACKREAMED FROM 2,500m TO 2,444m AND REAMED BACK TO 2,500m.
1/12/2003	14.33	20:00	0:00	4	DRINT2	2	a	N	CONTINUED DRILLING FROM 2,500m TO 2,533m SURVEYING EACH JOINT TO MONITOR HOLE ANGLE AND BACKREAMING EACH STAND.
2/12/2003	15.33	0:00	2:00	2	DRINT2	2	a	N	DRILLED 311mm (12.25in) HOLE FROM 2,533m TO 2,546m. WOB = 4.5mt (10kip) RPM = 114 ON MOTOR PLUS 30 ROTARY PUMPS = 2,810lpm (730gpm) WITH 21.4MPa (3,150psi) BACKREAMED EACH STAND.
2/12/2003	15.33	2:00	14:30	12.5	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 2,546m TO 2,652m. WOB = 9mt (20kip) RPM = 114 ON MOTOR PLUS 50 ROTARY PUMPS = 2,810lpm (730gpm) WITH 21.4MPa (3,200psi)
2/12/2003	15.33	14:30	19:00	4.5	DRINT2	2	a	P	DRILLED 311mm (12.25in) HOLE FROM 2,652m TO 2,688m. WOB = 9mt (20kip) RPM = 114 ON MOTOR PLUS 50 ROTARY PUMPS = 2,810lpm (730gpm) WITH 21.4MPa (3,200psi)

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2/12/2003	15.33	19:00	20:30	1.5	ABANDN	5	b	P	PUMPED 8m3 (50bbl) OF HIVIS AND CIRCULATED BOTTOMS UP.
2/12/2003	15.33	20:30	21:30	1	ABANDN	4	a	P	POOH 11 STANDS WET TO ABOVE KICK OFF POINT.
2/12/2003	15.33	21:30	23:00	1.5	ABANDN	4	a	P	FLOW CHECKED WELL, PUMPED SLUG AND POOH 24 STANDS.
2/12/2003	15.33	23:00	23:15	0.25	ABANDN	13	i	P	HELD JSA ON LAYING DOWN DRILLPIPE.
2/12/2003	15.33	23:15	0:00	0.75	ABANDN	4	e	P	POOH LAYING DOWN DRILLPIPE.
3/12/2003	16.33	0:00	4:30	4.5	ABANDN	4	e	P	POOH LAYING DOWN DRILLPIPE.
3/12/2003	16.33	4:30	5:00	0.5	ABANDN	13	a	C	REPAIRED IRON ROUGHNECK.
3/12/2003	16.33	5:00	6:00	1	ABANDN	4	e	P	POOH LAYING DOWN DRILLPIPE.
3/12/2003	16.33	6:00	10:00	4	ABANDN	4	g	P	POOH WITH BHA, LAID DOWN MWD.
3/12/2003	16.33	10:00	12:30	2.5	ABANDN	4	a	P	RIH WITH 89mm (3.5in) CEMENT STINGER AND DRILL PIPE TO 910m.
3/12/2003	16.33	12:30	13:30	1	ABANDN	7	c	P	CIRCULATED BOTTOMS UP AND SPOTTED 4.8m3 (30bbl) HIVIS.
3/12/2003	16.33	13:30	14:30	1	ABANDN	7	d	P	SET BALANCED CEMENT PLUG FROM 850m TO 750m AS FOLLOWS: - 4.8m3 (30bbl) DRILL WATER - PRESSURE TESTED LINES - 1.6m3 (10bbl) DRILL WATER - 11.6m3 (350sx/73bbl) 'G' CEMENT PLUS ADDITIVES AT 1.9SG - 0.5m3 (3bbl) DRILL WATER - 5.6m3 (35bbl) MUD CIP AT 14:30
3/12/2003	16.33	14:30	15:00	0.5	ABANDN	4	a	P	POOH TO 705m.
3/12/2003	16.33	15:00	16:00	1	ABANDN	5	b	P	CIRCULATED BOTTOMS UP, NO CEMENT RETURNS.
3/12/2003	16.33	16:00	17:00	1	ABANDN	4	e	P	POOH LAYING DOWN DRILL PIPE TO 420m.
3/12/2003	16.33	17:00	22:00	5	ABANDN	4	e	P	MADE UP BHA AND RIH WITH SAME. POOH LAYING DOWN BHA. LAID DOWN HANG OFF TOOL.
3/12/2003	16.33	22:00	23:00	1	ABANDN	6	f	P	RIGGED UP AND PRESSURE TESTED CEMENT PLUG TO 6.9MPa (1,000psi) FOR 15min.
3/12/2003	16.33	23:00	0:00	1	ABANDN	4	e	P	RIH 7 STANDS FROM DERRICK. POOH LAYING DOWN DRILL PIPE.
4/12/2003	17.33	0:00	2:30	2.5	ABANDN	4	e	P	POOH LAYING DOWN DRILL PIPE AND CEMENT STINGER.
4/12/2003	17.33	2:30	3:00	0.5	ABANDN	4	a	P	RIH TO 250m.
4/12/2003	17.33	3:00	3:30	0.5	ABANDN	7	c	P	SPOTTED 8.7m3 (55bbl) HIVIS AT 250m. POOH TO 200m.
4/12/2003	17.33	3:30	4:00	0.5	ABANDN	7	d	P	SPOTTED BALANCED CEMENT PLUG FROM 200m TO 150m AS FOLLOWS: - 4.8m3 (30bbl) SEAWATER - PRESSURE TESTED LINES - 1.6m3 (10bbl) SEAWATER - 4m3 (120sx/25bbl) 'G' CEMENT WITH ADDITIVES AT 1.89SG - 0.3m3 (2bbl) SEAWATER - 0.8m3 (5bbl) MUD CIP AT 04:12
4/12/2003	17.33	4:00	4:30	0.5	ABANDN	4	a	P	POOH TO 139m.
4/12/2003	17.33	4:30	5:30	1	ABANDN	5	a	P	CIRCULATED AND DISPLACED RISER AND CHOKE AND KILL LINES TO SEAWATER.
4/12/2003	17.33	5:30	6:00	0.5	ABANDN	4	e	P	POOH LAYING DOWN DRILL PIPE.
4/12/2003	17.33	6:00	6:15	0.25	ABANDN	13	i	P	HELD JSA ON PULLING BOP AND RISER.
4/12/2003	17.33	6:15	7:30	1.25	ABANDN	8	a	P	RIGGED UP TO PULL BOP AND RISER.
4/12/2003	17.33	7:30	10:00	2.5	ABANDN	8	d	P	LAID DOWN DIVERTER HOUSING. MADE UP LANDING JOINT AND UNLATCHED BOP.
4/12/2003	17.33	10:00	12:00	2	ABANDN	8	d	P	MOVED RIG OFF LOCATION. RIGGED DOWN RUCKER LINES AND CHOKE AND KILL LINES. NOTE: ROV ACTIVATED HOT STAB DISCONNECT OF HAC JOINT.
4/12/2003	17.33	12:00	15:00	3	ABANDN	8	c	P	PULLED SLIP JOINT PLUS 3 JOINTS OF RISER. LANDED BOP ON BEAMS.
4/12/2003	17.33	15:00	17:30	2.5	ABANDN	8	b	P	REMOVED POD HOSES, SPLIT LMRP / BOP AND SET BOTH ON STUMPS.
4/12/2003	17.33	17:30	18:30	1	ABANDN	8	c	P	LAID DOWN DOUBLE OF RISER AND RIGGED DOWN RISER HANDLING EQUIPMENT.

Megamouth-1ST Final Drilling Report

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4/12/2003	17.33	18:30	20:30	2	ABANDN	6	i	P	MADE UP CASING CUTTING TOOLS, SURFACE TESTED SAME AND RIH. STABBED INTO WELLHEAD WITH ROV ASSIST. LATCHED WELLHEAD AND TESTED WITH OVERPULL.
4/12/2003	17.33	20:30	23:30	3	ABANDN	6	i	P	CUT 340mm (13.625in) CASING (7min). POOH WITH WELLHEADS AND PGB. LANDED PGB ON BEAMS.
4/12/2003	17.33	23:30	0:00	0.5	ABANDN	6	j	P	RIGGED UP DRILQUIP RUNNING TOOL TO LATCH WELLHEAD. NOTE: COMMENCED PULLING ANCHORS WHILE COMPLETING P&A PROGRAM: BOAT ANCHOR A B C D L. DAWN 5 1555 1617 1621 1721 L. DAWN 1 1916 1938 1944 2040 L. DAWN 8 2050 2119 2124 2229 L. DAWN 4 2242 2305 2311 0027 A=PCC TO BOAT B=CHASED OUT C=ANCHOR OFF BOTTOM D=PCC TO RIG
5/12/2003	19.49	0:00	9:00	9	MOVOUT	1	b	P	LADY DAWN ON TOW BRIDLE AT 0029 CONTINUED PULLING ANCHORS: BOAT ANCHOR A B C D P. CHALLENGER 6 0109 0131 0158 0300 P. CHALLENGER 2 0346 0413 0415 0511 P. CHALLENGER 3 0555 0605 0607 0637 CONNECTED RIG TO TOW BRIDLE P. CHALLENGER 7 0755 0815 0825 0859

2.2 MUD PROPERTIES RECORD

Date	Mud Type	Hole Sz. (in)	Depth (m)	In/ Out	Density (S.G.)	Visc. (cP/g)	PV/YP (cp)/(ps/100m)	RPM	Gels 5/10 (lb/100m)	API WL (sec/30sec)	MBT (ppb)	pH	Solids (%)	HGS (ppb)	LGS (ppb)	Sand (%)	Ca+ (mg/L)	Cl- (%)	K+ (mg/L)	Temp (°C)	Additional Properties		ES (mV)	Cl (%)	H2O (%)	O/W Ratio	Polymer (ppb)	Oil Rat
																					1D/1V	2D/2V						
7/11/2003	PREHYDRATED	36.000	148.00	IN	1.00	136	19/71																					
18/11/2003	PREHYDRATED	36.000	148.00	IN	1.04	135	21/66					9.00																
19/11/2003	PREHYDRATED	17.500	772.00	IN	1.04	136	22/65					9.00																
20/11/2003	PREHYDRATED	17.500	831.00	IN	1.04	132	20/67					9.00																
22/11/2003	KCL GLYCOL PH	12.250	970.00	IN	1.12	74	16/23	7 / 16	6.0	2.50	9.50		29.00	8.70					43850	49							0.50	
23/11/2003	KCL GLYCOL PH	12.250	1667.0	IN	1.13	75	21/33	8 / 16	5.0	2.50	9.25		29.00	11.00	0.25				43660	44							1.00	
24/11/2003	KCL GLYCOL PH	12.250	1907.0	OUT	1.15	71	24/32	7 / 15	5.5	5.00	9.00		40.06	9.31	0.25				43720	47							1.00	
25/11/2003	KCL GLYCOL PH	12.250	2477.0	IN	1.15	68	25/34	8 / 16	5.0	5.00	9.50		40.92	9.54	0.25				43400	49							1.00	
26/11/2003	KCL GLYCOL PH	12.250	2546.0	IN	1.16	75	26/34	8 / 15	5.2	7.50	9.00		47.42	7.86	0.50				42100	0							1.00	
27/11/2003	KCL GLYCOL PH	12.250	2646.0	IN	1.16	70	27/34	8 / 15	5.5	5.00	9.00		47.42	7.86	0.50				42100	0							1.00	
29/11/2003	KCL GLYCOL PH	12.250	2646.0	IN	1.20	71	24/37	7 / 14	5.5	5.00	9.50		57.38	14.91	0.50				43800	0							1.00	
30/11/2003	KCL GLYCOL PH	12.250	2393.0	IN	1.24	71	26/29	7 / 12	6.5	7.50	10.00		72.61	22.73	0.50				42650	0							0.80	
1/12/2003	KCL GLYCOL PH	12.250	2533.0	IN	1.20	68	25/35	7 / 14	5.5	5.00	10.00		64.01	10.01	0.25				42620	49							0.60	
2/12/2003	KCL GLYCOL PH	12.250	2668.0	IN	1.20	78	25/36	7 / 15	5.2	5.00	10.20		56.14	19.94	0.25				42350	0							0.70	
3/12/2003	KCL GLYCOL PH	12.250	2668.0	IN	1.20	79	25/37	8 / 15	5.4	5.00	11.00		54.69	21.50	0.25				43600	0							0.70	
28/11/2003	KCL GLYCOL PH	12.250	2546.0	IN	1.20	72	25/35	8 / 15	4.5	7.50	9.50		61.92	11.87	0.75				44220	0							1.00	

3.0 BIT RECORD

Bit No	Run No	New Used Rebuilt	Size (in)	Bit Type	Jets								Depth (m)	Drilled (m)	Drilling Hours	ROP (m/hr)	WOB(kip) (Min/Max)	RPM (Min/Max)	Flow (gpm)	IADC Bit Grading Comments
			Make	Serial No.	Bit Group				TFA (in²)				In/Out						Pressure (psi)	
1	1	N	26.000	XN1C	18	18	18	20					103.90	44.10	1.25 1.25	35.28	/5	50/150	1050	0-0-NO-A 0-1-NO-TD
			SECURITY	668369									148.00						1200	
2	2	N	17.500	XT1	22	22	24	20					148.00	683.00	20.25 21.50	33.73	10/20	100/150	1111	1-1-NO-A E-I-NO-TD
			SECURITY	736733									831.00						2700	
3	3	N	12.250	FS2563	14	14	14	14	14	14	14		831.00	1715.00	85.00 106.50	20.18	4/12	240/300	717	-- - - - - LOST IN HOLE
			SECURITY DBS	50-13908									2546.00						3450	
4	4	N	12.250	MX20DX	24	24	24						2446.00	37.00	7.00 113.50	5.29		115/115	710	0-0-NO-A E-I-NO-DP
			HUGHES	6008950									2483.00						3000	
5	4RR1	U	12.250	MX20DX	24	24	24						2393.00	303.00	44.00 157.50	6.89	/25	110/164	730	3-4-WT-A E-1-BT-TD
			HUGHES	6008950									2688.00						3200	

3.1 BHA SUMMARY

BHA No./Name : 1 / 914mm (36in) HO.
 Bit No. : 1
 Purpose : SPUD WELL

Depth In : 103.90 (m)
 Depth Out : 148.00 (m)

Date In : 16:15 Hrs, 17/11/03
 Date Out : 17:30 Hrs, 17/11/03

Joints	BHA Item	O.D (in)	Length (m)
1	BIT		0.61
1	DRILL COLLAR	9.500	3.11
1	HOLE OPENER		3.21
1	BIT SUB		1.23
1	ANDERDRIFT TOOL		3.35
1	DRILL COLLAR	9.500	27.06
1	CROSS OVER		0.90
1	DROP-IN DART SUB		0.64
1	DRILL COLLAR	9.500	27.65
1	JARS		9.75
1	DRILL COLLAR	9.500	18.92
1	CROSS OVER		1.11
Total BHA Length (m) :			97.54

BHA No./Name : 2 / 444mm (17.5in)
 Bit No. : 2
 Purpose : DRILL

Depth In : 148.00 (m)
 Depth Out : 831.00 (m)

Date In : 07:00 Hrs, 19/11/03
 Date Out : 03:15 Hrs, 20/11/03

Joints	BHA Item	O.D (in)	Length (m)
1	BIT	17.500	0.43
1	NEAR BIT STABILIZER	17.500	2.37
1	MWD TOOL	9.500	4.72
1	STRING STABILIZER	17.500	2.04
1	DRILL COLLAR	9.000	8.98
1	STRING STABILIZER	17.500	1.99
1	DRILL COLLAR	9.000	9.09
1	CROSS OVER	8.250	1.92
6	DRILL COLLAR	8.250	55.78
1	JARS	8.000	9.75
2	DRILL COLLAR	8.250	18.92
1	CROSS OVER	6.625	1.11
1	HEVI-WATE DRL PIPE	5.000	9.47
1	DROP-IN DART SUB	6.625	0.64
14	HEVI-WATE DRL PIPE	5.000	132.42
Total BHA Length (m) :			259.63

BHA No./Name : 3 / 311mm (12.25in) Depth In : 831.00 (m) Date In : 18:30 Hrs, 22/11/03
 Bit No. : 3 Depth Out : 2546.00 (m) Date Out : 10:00 Hrs, 26/11/03
 Purpose : DRILL

Joints	BHA Item	O.D (in)	Length (m)
1	BIT	12.250	0.36
1	POSITIVE DISP.MOTOR	8.000	8.29
1	FLOAT SUB	8.000	0.77
1	ROLLER REAMER - 3 POINT	12.250	2.90
1	DRILL COLLAR	9.000	9.02
1	ROLLER REAMER - 3 POINT	12.250	2.74
1	MWD TOOL	8.000	15.80
1	MWD TOOL	8.000	5.84
1	MWD TOOL	9.500	6.92
1	CROSS OVER	8.250	1.92
6	DRILL COLLAR	8.250	55.78
1	JARS	8.000	9.75
2	DRILL COLLAR	8.250	18.92
1	CROSS OVER	6.625	1.11
1	HEVI-WATE DRL PIPE	5.000	9.47
1	DROP-IN DART SUB	6.625	0.64
14	HEVI-WATE DRL PIPE	5.000	132.42
Total BHA Length (m) :			282.65

BHA No./Name : 4 / 311mm (12.25in) Depth In : 2446.00 (m) Date In : 23:59 Hrs, 28/11/03
 Bit No. : 4 RR Depth Out : 2483.00 (m) Date Out : 07:00 Hrs, 29/11/03
 Purpose : SIDETRACK & DRILL

Joints	BHA Item	O.D (in)	Length (m)
1	BIT	12.250	0.35
1	POSITIVE DISP.MOTOR	8.000	8.29
1	FLOAT SUB	8.000	0.77
1	ROLLER REAMER - 3 POINT	12.250	2.32
1	MWD TOOL	8.000	13.68
1	MWD TOOL	8.000	5.88
1	MWD TOOL	9.500	6.92
1	CROSS OVER	8.250	1.92
6	DRILL COLLAR	8.250	55.78
1	JARS	8.000	9.75
2	DRILL COLLAR	8.250	18.92
1	CROSS OVER	6.625	1.11
1	HEVI-WATE DRL PIPE	5.000	9.47
1	DROP-IN DART SUB	6.625	0.64
8	HEVI-WATE DRL PIPE	5.000	75.65
Total BHA Length (m) :			211.45

BHA No./Name : 5 / 311mm (12.25in) Depth In : 2393.00 (m) Date In : 23:00 Hrs, 30/11/03
 Bit No. : 4 Depth Out : 2688.00 (m) Date Out : 19:00 Hrs, 02/12/03
 Purpose : SIDETRACK AND DRILL

Joints	BHA Item	O.D (in)	Length (m)
1	BIT	12.250	0.35
1	POSITIVE DISP.MOTOR	8.000	8.29
1	FLOAT SUB	8.000	0.77
1	ROLLER REAMER - 3 POINT	12.250	2.32
1	MWD TOOL	8.000	13.68
1	MWD TOOL	8.000	5.88
1	MWD TOOL	9.500	6.92
1	CROSS OVER	8.250	1.92
6	DRILL COLLAR	8.250	55.78
1	JARS	8.000	9.75
2	DRILL COLLAR	8.250	18.92
1	CROSS OVER	6.625	1.11
1	HEVI-WATE DRL PIPE	5.000	9.47
1	DROP-IN DART SUB	6.625	0.64
8	HEVI-WATE DRL PIPE	5.000	75.65
Total BHA Length (m) :			211.45

3.2 DEVIATION SUMMARY/SURVEY

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
81.50	0.00	0.00	81.50	0.00 N	0.00 E	0.00	TIE-IN
166.00	0.62	207.17	166.00	0.41 S	0.21 W	-0.40	0.22
195.90	0.61	179.98	195.90	0.71 S	0.28 W	-0.70	0.29
250.50	0.57	192.84	250.49	1.27 S	0.34 W	-1.25	0.07
279.30	0.44	183.73	279.29	1.52 S	0.38 W	-1.50	0.16
367.30	0.37	206.52	367.29	2.11 S	0.53 W	-2.08	0.06
454.00	0.50	187.15	453.99	2.73 S	0.70 W	-2.70	0.07
541.50	0.15	197.89	541.49	3.23 S	0.79 W	-3.19	0.12
628.70	0.26	209.80	628.69	3.51 S	0.92 W	-3.47	0.04
684.50	0.13	189.38	684.49	3.69 S	1.00 W	-3.64	0.08
714.20	0.13	239.71	714.19	3.74 S	1.03 W	-3.69	0.11
821.00	0.19	228.46	820.99	3.92 S	1.27 W	-3.86	0.02
827.40	0.20	228.02	827.39	3.93 S	1.29 W	-3.87	0.02
769.89	0.28	307.01	769.88	3.82 S	1.15 W	-3.76	0.02
845.67	0.09	72.72	845.66	3.95 S	1.30 W	-3.89	0.45
875.61	0.14	47.32	875.59	3.92 S	1.25 W	-3.86	0.07
905.10	0.26	40.22	905.08	3.84 S	1.18 W	-3.79	0.12
933.83	0.28	47.23	933.81	3.75 S	1.09 W	-3.69	0.04
962.40	0.35	27.79	962.38	3.62 S	1.00 W	-3.57	0.13
991.89	0.31	21.75	991.87	3.47 S	0.92 W	-3.42	0.05
1021.90	0.50	21.35	1021.88	3.27 S	0.85 W	-3.23	0.18
1049.70	0.49	8.82	1049.68	3.04 S	0.78 W	-3.00	0.12
1107.73	0.64	8.83	1107.71	2.47 S	0.70 W	-2.44	0.07
1136.80	0.91	4.66	1136.78	2.08 S	0.65 W	-2.05	0.29
1195.40	1.47	359.86	1195.36	0.87 S	0.62 W	-0.84	0.29
1282.00	2.90	3.60	1281.90	2.43 N	0.48 W	2.45	0.50
1312.10	3.07	3.39	1311.96	3.99 N	0.39 W	4.01	0.17
1397.40	3.67	2.54	1397.11	9.00 N	0.13 W	9.00	0.21
1458.10	4.02	1.09	1457.67	13.07 N	0.00 W	13.06	0.18
1484.80	3.92	0.93	1484.31	14.92 N	0.03 E	14.91	0.12
1514.41	3.77	0.58	1513.85	16.91 N	0.06 E	16.89	0.15
1539.66	3.69	1.00	1539.05	18.55 N	0.08 E	18.53	0.10
1570.32	3.85	1.88	1569.64	20.56 N	0.13 E	20.54	0.16
1597.80	3.86	0.11	1597.06	22.41 N	0.16 E	22.38	0.13
1627.80	3.73	359.86	1626.99	24.39 N	0.16 E	24.36	0.13
1654.50	3.53	1.04	1653.64	26.08 N	0.17 E	26.05	0.24
1716.00	2.75	0.13	1715.05	29.45 N	0.21 E	29.41	0.38
1744.20	2.57	359.92	1743.22	30.76 N	0.21 E	30.72	0.19
1773.87	2.29	358.46	1772.86	32.02 N	0.19 E	31.98	0.29
1801.50	2.06	358.97	1800.47	33.06 N	0.17 E	33.02	0.25

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
1831.75	1.87	355.50	1830.70	34.10 N	0.12 E	34.06	0.23
1861.75	1.82	353.71	1860.69	35.06 N	0.03 E	35.02	0.08
1887.01	1.74	356.67	1885.94	35.84 N	0.03 W	35.80	0.14
1917.63	1.57	355.94	1916.54	36.72 N	0.09 W	36.69	0.17
1949.31	1.51	352.76	1948.21	37.57 N	0.17 W	37.54	0.10
1974.67	1.50	351.45	1973.56	38.23 N	0.27 W	38.20	0.04
2003.17	1.49	349.21	2002.05	38.96 N	0.39 W	38.94	0.06
2032.80	1.37	350.27	2031.67	39.68 N	0.52 W	39.67	0.12
2121.70	1.27	350.42	2120.55	41.70 N	0.87 W	41.70	0.03
2209.50	1.05	346.85	2208.33	43.45 N	1.21 W	43.46	0.08
2297.70	0.88	349.11	2296.52	44.90 N	1.52 W	44.92	0.06
2354.83	0.88	347.07	2353.64	45.76 N	1.70 W	45.79	0.02
2383.08	0.83	351.30	2381.89	46.17 N	1.78 W	46.20	0.09
2466.60	0.69	350.51	2465.40	47.27 N	1.96 W	47.31	0.05
2546.00	0.69	350.51	2544.80	48.21 N	2.11 W	48.25	0.00

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
2383.08	0.83	351.30	2381.89	46.19 N	1.78 W	46.19	TIE-IN
2384.75	0.76	350.33	2383.56	46.21 N	1.78 W	-41.05	1.22
2412.80	0.28	303.92	2411.61	46.43 N	1.87 W	-41.22	0.65
2443.80	7.35	186.91	2442.53	44.51 N	2.17 W	-39.34	7.23
2469.50	14.35	185.33	2467.75	39.70 N	2.67 W	-34.78	8.18
2499.76	15.12	185.79	2497.02	32.04 N	3.41 W	-27.54	0.78
2528.50	15.52	186.75	2524.73	24.49 N	4.24 W	-20.35	0.49
2553.50	16.08	187.06	2548.79	17.73 N	5.06 W	-13.89	0.68
2585.90	16.57	187.44	2579.88	8.70 N	6.21 W	-5.22	0.47
2614.75	17.07	187.73	2607.50	0.42 N	7.31 W	2.73	0.53
2656.60	17.94	187.31	2647.41	12.06 S	8.96 W	14.73	0.63
2688.00	17.94	187.31	2677.28	21.65 S	10.19 W	23.93	0.00

4.0 CASING REPORTS

30" CONDUCTOR

CASING FLANGE/WELLHEAD

Date	: 18/11/2003	Report No.	: 1	Manufacturer	: DRILQUIP
Hole Depth MD	: 148.00 (m)	Casing Shoe at	: 147.99 (m)	Model	: SS-10-C
Hole Depth TVD	: 148.00 (m)	Top of Casing	: 101.20 (m)	Size	: 30.000 (in)
RT to W/head	: 22.40 (m)	Liner Overlap	:	Rating	: 2000 (psi)

CASING DATA

Description	Manufacturer	Size (in)	Weight (lb/ft)	Grade	Threads	Jnts.	Length (m)	Depth (m)
WELLHEAD	DRILQUIP	30.000	456.00	X-52	D90	1	11.75	112.95
CASING	DRILQUIP	30.000	373.00	X-52	D60	2	23.74	136.69
SHOE JOINT		20.000	267.00	X-52		1	11.30	147.99

NON-INTEGRAL CASING ACCESSORIES

Accessory	Manufacturer	Number	Spacing (m)	Interval (m)	How Fixed

Remarks :

30in WELLHEAD INCLUDES HAC.
4.65m FROM TOP OF WH TO HAC.

SHOE JOINT SWEDGED DOWN FROM 30in TO 20in.
8.3m FROM 20in SWEDGE TO 20in CASING SHOE.

13 3/8" INTERMEDIATE CASING**CASING FLANGE/WELLHEAD**

Date	: 19/11/2003	Report No.	: 2	Manufacturer	: DRILQUIP
Hole Depth MD	: 831.00 (m)	Casing Shoe at	: 820.49 (m)	Model	: SS-10-C
Hole Depth TVD	: 831.00 (m)	Top of Casing	: 101.30 (m)	Size	: 18.750 (in)
RT to W/head	: 22.40 (m)	Liner Overlap	:	Rating	: 1000 (psi)

CASING DATA

Description	Manufacturer	Size (in)	Weight (lb/ft)	Grade	Threads	Jnts.	Length (m)	Depth (m)
WELLHEAD	DRILQUIP	18.750		X-56		1	10.50	111.80
CROSS OVER	DRILQUIP	20.000	202.90	L-80	BTC	1	13.00	124.80
CASING	SUMITOMO	13.375	72.00	L-80	BTC	52	657.12	781.92
FLOAT JOINT	SUMITOMO	13.375	72.00	L-80	BTC	1	12.96	794.88
CASING	SUMITOMO	13.375	72.00	L-80	BTC	1	12.69	807.57
SHOE JOINT	SUMITOMO		72.00	L-80	BTC	1	12.92	820.49

NON-INTEGRAL CASING ACCESSORIES

Accessory	Manufacturer	Number	Spacing (m)	Interval (m)	How Fixed
CENTRALIZER	WEATHERFORD	5	12.60	814.00 - 763.12	STOPCOLLAR

Remarks :

EXPERIENCED 0.5HR LOST TIME TROUBLESHOOTING PROBLEM WITH CASING POWER TONGS.

CROSSTHREADED ONE JOINT AND LAID OUT TOTAL OF THREE JOINTS WITH DAMAGED THREADS.

NO HOLE PROBLEMS RUNNING CASING OR LANDING OUT IN WELLHEAD HOUSING.

CONFIRMED LAND OUT WITH 50kib OVER PULL.

4.1 CEMENTING REPORTS

30" CONDUCTOR

Date : 18/11/2003 Job Type : Primary
Cement Company : HALLIBURTON

STAGE NUMBER : 1 of 1

Cemented Interval : 148.00 (m) to 103.00 (m)

Mixing Time : 0.10 hrs Displacement Fluid : SEAWATER Bump Plug : N
Pumping Time : 0.60 hrs Fluid Density : 1.01 (S.G.) Returns % : YES
Avg. Displac't Rate : 252 (gpm) Top of Cement : 103.00 (m) Total Mud Lost :
Max. Displac't Rate : 252 (gpm) Determined by : THEORETICAL Casing Pressure Held :
Pressure Held for :

Remarks :

Volumes	
Stage Number	1
Slurry Number	1
Slurry Type	TAIL SLURRY
Cement Class	CLASS G
Cement Volume (ft ³)	590.0
Slurry Volume (bbl)	105.0
Mixwater Type	DRILLWATER
Mixwater Volume (bbl)	105.0
From/To (m)	148.00 / 103.00
Properties	
Density (S.G.)	1.90
Yield (ft ³ /sk)	1.17
Mix Water (gal/sk)	5.15
Thickening Time (hr)	2.40
Fluid Loss (cc)	
Comp. Strength (psi)	1000
BHST (°C)	13
BHCT (°C)	13

Additives : 1.00 % BWOC CALC2 (S-001)
0.25 gl/10b NF-4

13 3/8" CASING

Date : 20/11/2003 Job Type : Primary
Cement Company : HALLIBURTON

STAGE NUMBER : 1 of 1

Cemented Interval : 820.00 (m) to 104.00 (m)

Mixing Time : 0.12 hrs Displacement Fluid : SEAWATER Bump Plug : N
Pumping Time : 1.38 hrs Fluid Density : 1.01 (S.G.) Returns % : FLUID RE
Avg. Displac't Rate : 440 (gpm) Top of Cement : 104.00 (m) Total Mud Lost :
Max. Displac't Rate : 440 (gpm) Determined by : THEORETICAL Casing Pressure Held : 3500 (psi)
Pressure Held for : 15 (min)

Remarks :

Volumes	
Stage Number	1
Slurry Number	1
Slurry Type	LEAD SLURRY
Cement Class	CLASS G
Cement Volume (ft³)	847.0
Slurry Volume (bbl)	319.0
Mixwater Type	DRILLWATER
Mixwater Volume (bbl)	238.0
From/To (m)	720.00 / 104.00
Properties	
Density (S.G.)	1.50
Yield (ft³/sk)	2.12
Mix Water (gal/sk)	12.33
Thickening Time (hr)	5.00
Fluid Loss (cc)	
Comp. Strength (psi)	400
BHST (°C)	52
BHCT (°C)	35

Volumes	
Stage Number	1
Slurry Number	2
Slurry Type	TAIL SLURRY
Cement Class	CLASS G
Cement Volume (ft³)	316.0
Slurry Volume (bbl)	65.0
Mixwater Type	DRILLWATER
Mixwater Volume (bbl)	36.7
From/To (m)	820.00 / 720.00
Properties	
Density (S.G.)	1.89
Yield (ft³/sk)	1.16
Mix Water (gal/sk)	4.88
Thickening Time (hr)	3.00
Fluid Loss (cc)	
Comp. Strength (psi)	2000
BHST (°C)	52
BHCT (°C)	35

Additives : 15.00 gl/10b ECONOLITE
2.00 gl/10b HR6-L
0.25 gl/10b NF-6

Additives : 2.00 gl/10b HR6-L
0.25 gl/10b NF-6

KICK OFF PLUG No 1

Date	: 28/11/2003	Job Type	: Plug
Cement Company	: HALLIBURTON	Cemented Interval	: 2510.00 (m) to 2360.00 (m)

STAGE NUMBER : 1 of 1

Mixing Time	: 1.23 hrs	Displacement Fluid	: KCL GLYCOL PHPA	Bump Plug	: N
Pumping Time	: 0.55 hrs	Fluid Density	: 1.20 (S.G.)	Returns %	:
Avg. Displac't Rate	: 285 (gpm)	Top of Cement	: 2446.00 (m)	Total Mud Lost	:
Max. Displac't Rate	: 285 (gpm)	Determined by	: TAGGED	Casing Pressure Held	:
				Pressure Held for	:

Remarks :

PROBLEMS DURING JOB SUMMARISED AS FOLLOWS:

1. DELAYS IN COMMENCING JOB BECAUSE TUNED SPACER WAS BEING MIXED ON CRITICAL PATH.
2. PROBLEMS WITH CEMENT DELIVERY DURING JOB BECAUSE VENT LINE WAS PLUGGED AT THE WATER LINE.
3. ADC WAS INITIALLY CALIBRATED CORRECTLY AGAINST DRILL WATER. HOWEVER, DURING THE JOB AN UNPRESSURISED MUD BALANCE WAS USED WHICH, BY THEORY, MUST READ LESS THAN THE ACTUAL SLURRY WEIGHT. THE UNPRESSURISED MUD BALANCE READ 1ppg LOW VERSUS ACTUAL SLURRY WEIGHT. THE ADC WAS ADJUSTED TO READ THE SAME AS THE UNPRESSURISED MUD BALANCE DURING THE JOB. THE ADC READ 16.5PPG AS PROGRAMMED WHEN ACTUAL SLURRY WEIGHT WAS 17.5ppg.
4. BOOST PUMP LOST PRIME BECAUSE OF THE 17.5ppg SLURRY DENSITY AND THEREFORE VISCOSITY AND A UNIFORM SLURRY DENSITY COULD NOT BE MAINTAINED.
5. SLURRY WAS FINALLY MIXED AND PUMPED IN 5BBL BATCHES TO ALLEVIATE PROBLEMS OUTLINED ABOVE.

AT COMPLETION OF THE JOB THE CEMENT UNIT WAS STRIPPED DOWN.

CEMENT WAS TAGGED AT 2446m WITH FIRM CEMENT AT 2452m. KICK OFF WAS NOT SUCCESSFUL. CEMENT WAS CIRCULATED OUT AT 2483m AND GREEN CEMENT RETURNED TO SURFACE.

Volumes	
Stage Number	1
Slurry Number	1
Slurry Type	PLUG SLURRY
Cement Class	CLASS G
Cement Volume (ft ³)	339.0
Slurry Volume (bbl)	65.0
Mixwater Type	DRILLWATER
Mixwater Volume (bbl)	35.0
From/To (m)	2510.00 / 2360.00
Properties	
Density (S.G.)	1.98
Yield (ft ³ /sk)	1.06
Mix Water (gal/sk)	4.39
Thickening Time (hr)	4.52
Fluid Loss (cc)	75
Comp. Strength (psi)	2000
BHST (°C)	113
BHCT (°C)	93

Additives :

2.00 gl/10b HALAD-413L

0.50 gl/10b HR6-L

0.03 gl/10b NF-6

KICK OFF PLUG No 2.

Date	: 29/11/2003	Job Type	: Plug
Cement Company	: HALLIBURTON	Cemented Interval	: 2510.00 (m) to 2360.00 (m)

STAGE NUMBER : 1 of 1

Mixing Time	: 0.00 hrs	Displacement Fluid	: KCL GLYCOL PHPA	Bump Plug	: N
Pumping Time	: 0.00 hrs	Fluid Density	: 1.20 (S.G.)	Returns %	:
Avg. Displac't Rate	:	Top of Cement	:	Total Mud Lost	:
Max. Displac't Rate	:	Determined by	:	Casing Pressure Held	:
				Pressure Held for	:

Remarks :

SLURRY WAS INITIALLY WEIGHTED UP USING ADC TO PROGRAM DENSITY OF 16.5PPG. AN UNPRESSURISED MUD BALANCE WAS USED TO CHECK 16.5PPG ADC DENSITY SLURRY AND READ 15.5PPG.

CEMENTER ADJUSTED ADC DENSITY FROM 16.5PPG TO READ 15.5PPG. THE ADC THEN AUTOMATICALLY ADJUSTED THE SLURRY DENSITY TO 16.5PPG (ACTUAL SLURRY DENSITY WAS 17.5PPG) AS PER PROGRAM. CEMENT SLURRY BECAME TOO VISCOUS AND BOOST PUMP LOST PRIME.

CONCURRENTLY, MIX WATER DELIVERY PROBLEMS WERE OBSERVED WITH MIXING RATES OF UP TO 11bpm.

80bbl OF SLURRY HAD BEEN MIXED AND PUMPED BEFORE CEMENT JOB WAS ABANDONED.

ATTEMPTED TO REVERSE CIRCULATE CEMENT OUT. NOT SUCCESSFUL. CIRCULATED CEMENT OUT CONVENTIONALLY.

HALLIBURTON TROUBLESHOT PROBLEMS WITH CEMENT UNIT.

KICK OFF PLUG No 3

Date	: 1/12/2003	Job Type	: Plug
Cement Company	: HALLIBURTON	Cemented Interval	: 2360.00 (m) to 2510.00 (m)

STAGE NUMBER : 1 of 1

Mixing Time	: 0.08 hrs	Displacement Fluid	: KCL GLYCOL PHPA	Bump Plug	: N
Pumping Time	: 0.42 hrs	Fluid Density	: 1.20 (S.G.)	Returns %	:
Avg. Displac't Rate	: 285 (gpm)	Top of Cement	: 2385.00 (m)	Total Mud Lost	:
Max. Displac't Rate	: 285 (gpm)	Determined by	: TAGGED FIRM CEM	Casing Pressure Held	:
				Pressure Held for	:

Remarks :

30BBL SEAWATER SPACER WAS PUMPED AHEAD AND LINES PRESSURE TESTED.

SLURRY DENSITY WAS CONTROLLED BY ADC ONLY.

AUTOMATIC WATER SUPPLY CONTROL VALVE WAS OVERRIDDEN AND MANUALLY SET TO MAINTAIN A CONSTANT DELIVERY RATE OF 89GPM.

JOB WENT AS PLANNED WITH 95% OF CEMENT SLURRY AT PROGRAMMED 16.5PPG DENSITY.

SLURRY WAS DISPLACED WITH 132BBL MUD.

AT COMPLETION OF CEMENT JOB, WATER SUPPLY VALVE WAS STRIPPED DOWN AND KNIFE VALVE WAS FOUND TO HAVE BEEN INSTALLED UPSIDE DOWN.

TOP OF FIRM CEMENT WAS TAGGED AT 2385m.

WELL WAS SUCCESSFULLY KICKED OFF FROM 2393m.

Volumes	
Stage Number	1
Slurry Number	1
Slurry Type	PLUG SLURRY
Cement Class	CLASS G
Cement Volume (ft ³)	530.0
Slurry Volume (bbl)	100.0
Mixwater Type	DRILLWATER
Mixwater Volume (bbl)	55.0
From/To (m)	2510.00 / 2385.00
Properties	
Density (S.G.)	1.98
Yield (ft ³ /sk)	1.06
Mix Water (gal/sk)	4.39
Thickening Time (hr)	4.52
Fluid Loss (cc)	75
Comp. Strength (psi)	2000
BHST (°C)	113
BHCT (°C)	93

Additives :

2.00 gl/10b HALAD-413L

0.50 gl/10b HR6-L

0.03 gl/10b NF-6

ABANDONMENT PLUG No 2

Date : 4/12/2003 Job Type : Plug
 Cement Company : DOWELL SCHLUMBERGER

STAGE NUMBER : 1 of 1

Cemented Interval : 200.00 (m) to 150.00 (m)

Mixing Time : 0.10 hrs Displacement Fluid : KCL GLYCOL PHPA Bump Plug : N
 Pumping Time : 0.10 hrs Fluid Density : 1.18 (S.G.) Returns % : NO RETU
 Avg. Displac't Rate : 180 (gpm) Top of Cement : 150.00 (m) Total Mud Lost :
 Max. Displac't Rate : 180 (gpm) Determined by : THEORETICAL Casing Pressure Held :
 Pressure Held for :

Remarks :

NO RETURNS WHEN CHECKED FOR BACKFLOW

Volumes	
Stage Number	1
Slurry Number	1
Slurry Type	PLUG SLURRY
Cement Class	CLASS G
Cement Volume (ft ³)	120.0
Slurry Volume (bbl)	25.0
Mixwater Type	SEAWATER
Mixwater Volume (bbl)	14.8
From/To (m)	200.00 / 150.00
Properties	
Density (S.G.)	1.89
Yield (ft ³ /sk)	1.17
Mix Water (gal/sk)	5.20
Thickening Time (hr)	2.32
Fluid Loss (cc)	
Comp. Strength (psi)	1500
BHST (°C)	15
BHCT (°C)	15

Additives : 1.00 % BWOC CALC2 S-001
 0.03 gl/10b NF-6

4.2 LEAK OFF TEST DIAGRAMS



LOT / FIT FORM



RIG:	WELL:	DATE:
Ocean Epoch	Megamouth - 1	22/11/2003

CSG SIZE	WEIGHT	GRADE
13.375in	72	L-80
BURST RATING	TEST PRESSURE	
100%	80%	
5380	4304	3500psi

SHOE DEPTH MD	Waterdepth
820	81.5
SHOE DEPTH TVD	RKB
820	22.4

MUD PROPERTIES		
MW	PV	YP
1.12		
VIS	GELS m/s	WL
75	7/16	6.2

PLANNED FIT VALUE (SG)	leak off
ESTIMATED SURFACE PRESSURE	
MAX ALLOWABLE SURFACE PRESSURE	

CALCULATIONS:

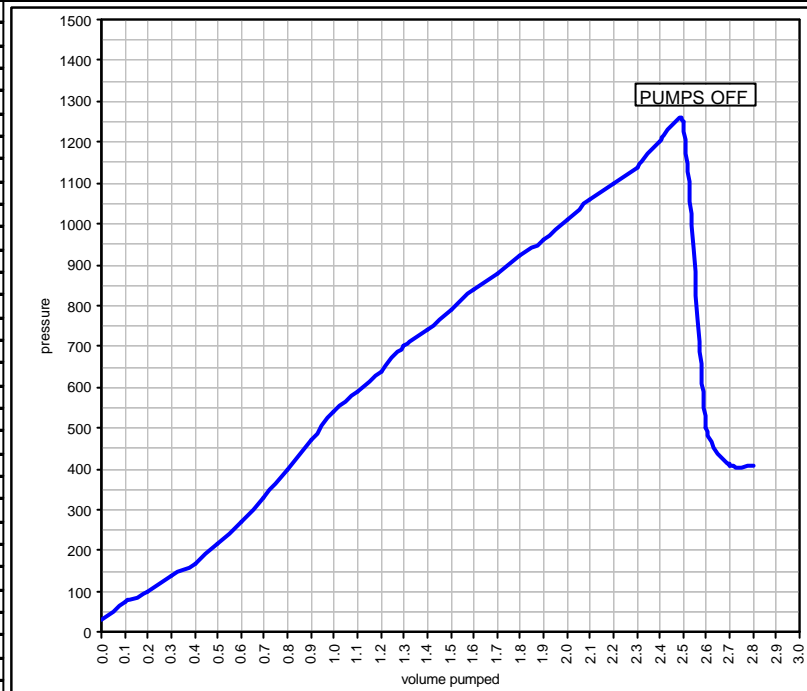
$$P / (1.421 \times D) + MW = EMW$$

$$540 / (1.421 \times 820) + 1.12 = 1.58\text{sg}$$

LOT AT CASING SHOE	1.58	(SG)
LOT AT CURRENT TVD		(SG)

CONDUCTED BY: Peter Devine - Jeff Hammett

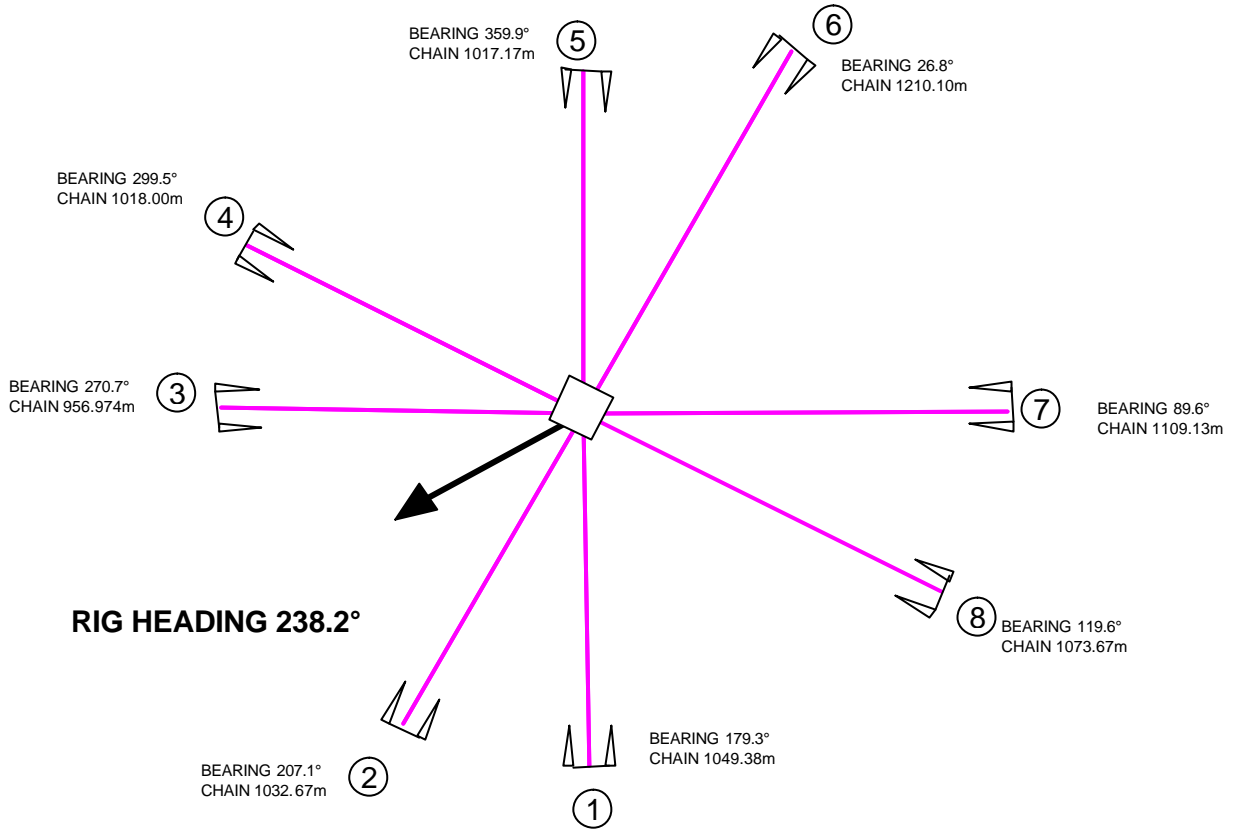
VOLUME	PRESSURE	dP
0.00	30	
0.10	75	45
0.20	100	25
0.30	140	40
0.40	170	30
0.50	215	45
0.60	270	55
0.70	330	60
0.80	400	70
0.90	470	70
1.00	540	70
1.10	590	50
1.20	640	50
1.30	700	60
1.40	740	40
1.50	790	50
1.60	840	50
1.70	880	40
1.80	920	40
1.90	960	40
2.00	1010	50
2.10	1060	50
2.20	1100	40
2.30	1140	40
2.40	1200	60
2.50	1250	
2.60	500	
2.70	410	1 min
2.80	410	2 min
2.90	410	3 min

**REMARKS:**

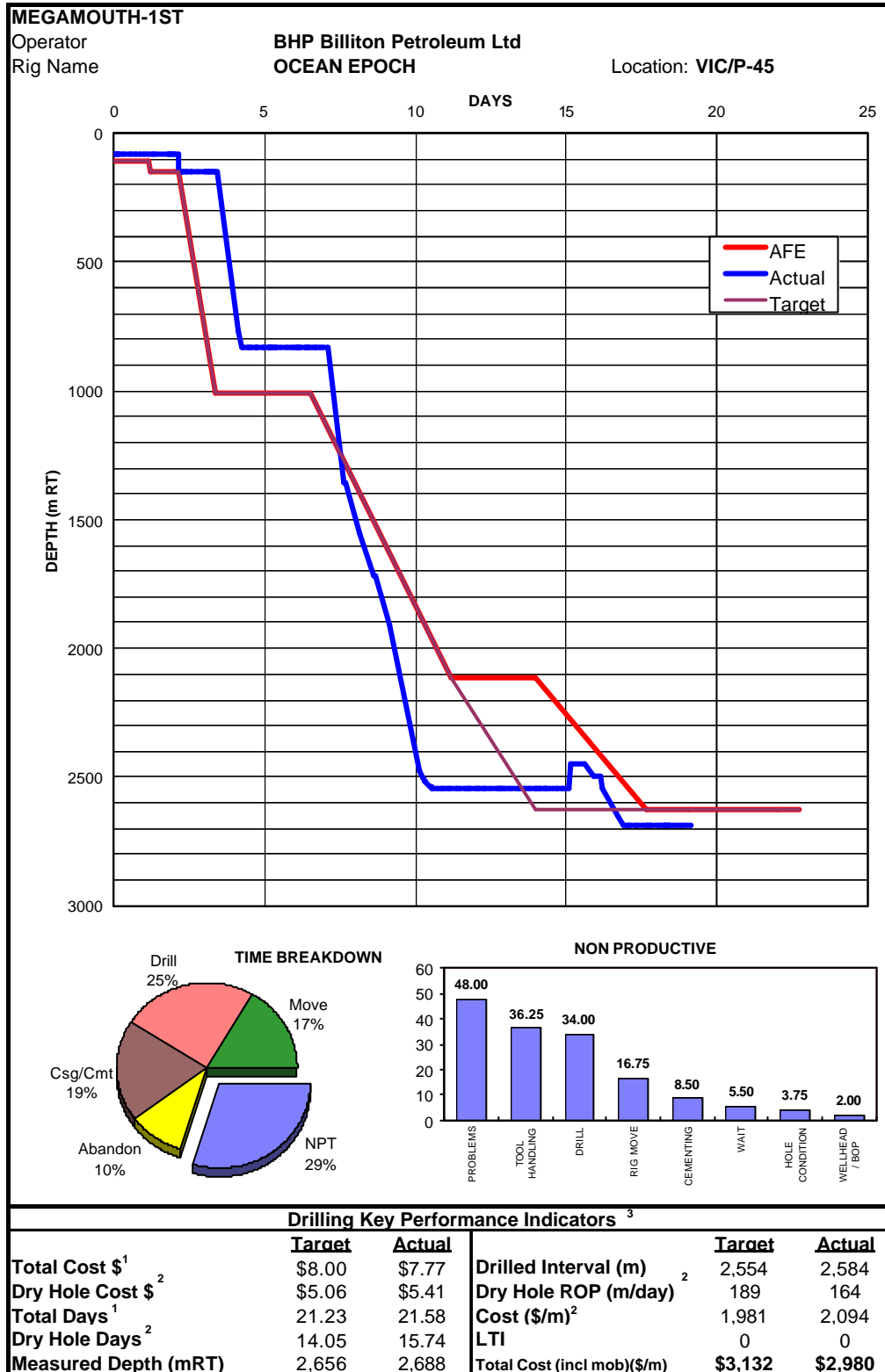
2.5bbbls pumped, 1.0bbbls returned Lost 1.5bbbls

Formation leaked off at 540psi. Pressure taken up to 1250psi, pumps off. Pressure dropped to 500psi, then held 410psi for 3 minutes

5.0 MOORING DIAGRAM



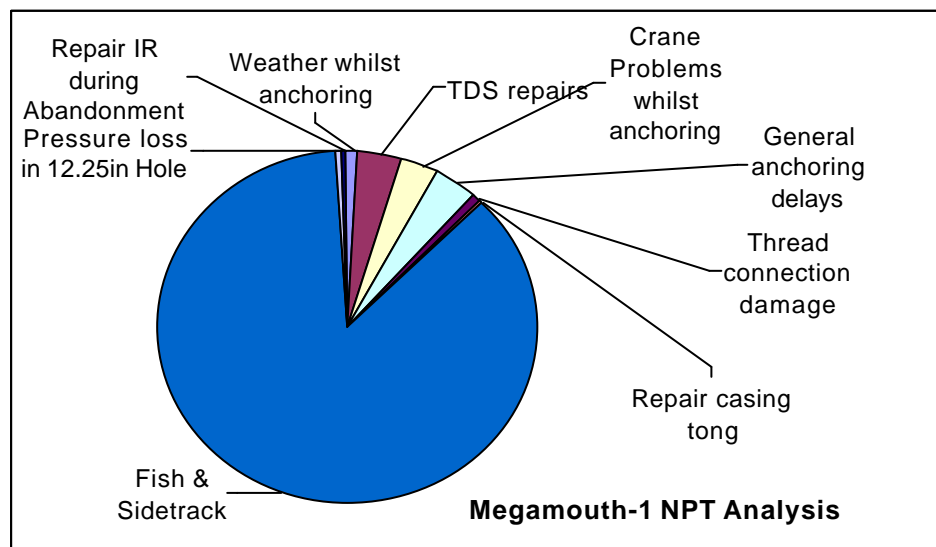
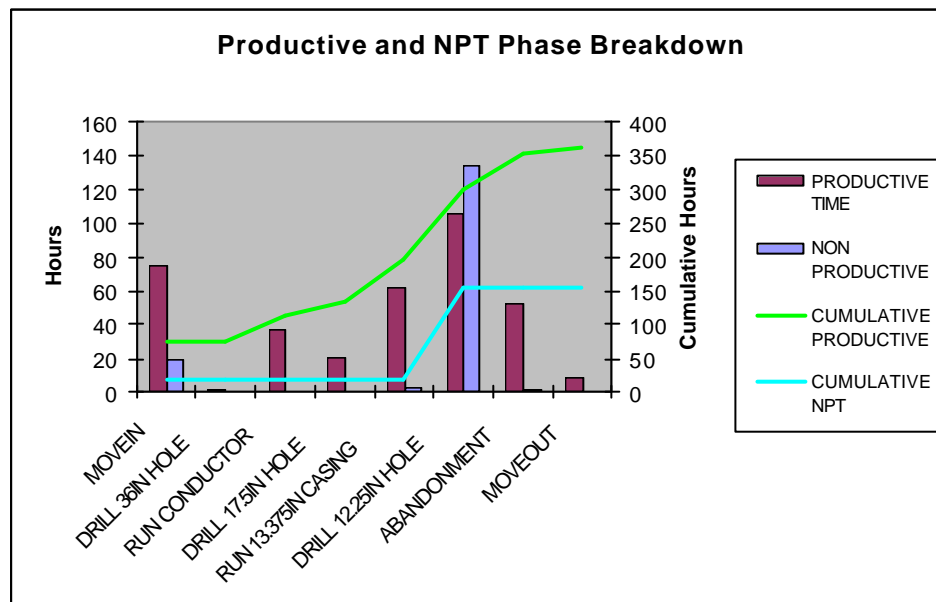
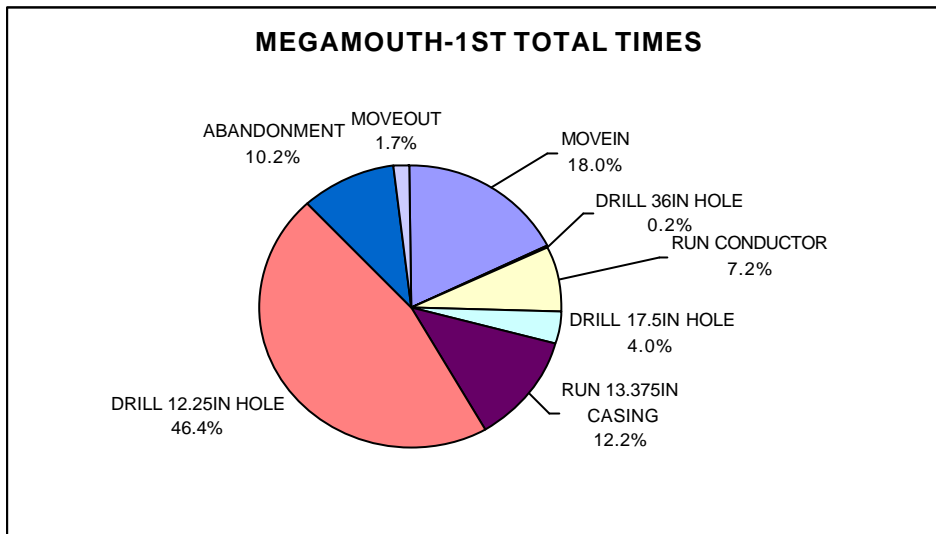
6.0 WELL PERFORMANCE SUMMARY



***NOTE:**

- 1 Time and Cost includes mobilisation, drilling and completion activities.
- 2 Spud to end of wireline logging
- 3 All costs in Australian Dollars

6.1 PRODUCTIVE & NON PRODUCTIVE TIME ANALYSIS



7.0 APPROVALS

Compiled by :

Signature / Date

Kirsty Logan
Technical Assistant

David Thorpe
Senior Drilling Engineer

Reviewed by :

Andy Reed
Drilling Engineering Supervisor

Brian Teggart
Drilling Superintendent

Approved By :

Doug Berean
Drilling Manager

3 SAMPLES, SIDEWALL CORES, CONVENTIONAL CORES

3.1 Cuttings

COLLECTION INTERVAL(mRT)	TREATMENT
Megamouth-1: 831 - 2546 (TD)	- 3 sets washed & dried
	- 1 set unwashed
Megamouth-1/ST1: 2393 – 2688 (TD)	- 2 sets samplex trays

Cuttings Descriptions - Appendix 1.

3.2 Percussion Sidewall Cores/Rotary Sidewall Cores

Sidewall cores were not acquired in Megamouth-1 or -1/ST1.

3.3 Conventional Cores

No conventional cores were cut in Megamouth-1 or -1/ST1.

3.4 Palynology

Palynological analysis was not performed for Megamouth-1 or -1/ST1.

3.5 Micropalaeontology

Micropalaeontological analysis was not carried out for Megamouth-1 or -1/ST1.

3.6 Geochemistry

Geochemical analyses were not performed for Megamouth-1 or -1/ST1.

3.7 Other Analyses

No other analyses were undertaken for Megamouth-1 or -1/ST1.

4 LOGGING AND SURVEYS

4.1 Mudlogging/Measurement While Drilling

Mudlogging was provided by Geoservices Overseas SA. MWD/LWD was provided by Sperry-Sun Drilling Services.

Intervals: Mudlogging: Megamouth-1: 831 - 2546 mRT (TD)
Megamouth-1/ST1: 2448 – 2688 mRT (TD)

MWD/LWD:

Hole	Run No.	Hole Size	Log Type	Interval (mRT)
OH	1	17.5"	DM	148.1 - 831
	2	12.25"	DGR-EWR-P4-SLD-CNP-ACAL-BAT-DM	831 - 2546 (T.D.)
ST1	3	12.25"	DGR-EWR-P4-SLD-CNP-BAT-DM	2450 - 2483
	4	12.25"	DGR-EWR-P4-SLD-CNP-BAT-DM	2393 – 2688 (T.D.)

Mudlogging Report - Appendix 2.

Megamouth-1 MWD/LWD End of Well Report - Appendix 3.

Megamouth-1/ST1 MWD/LWD End of Well Report - Appendix 4.

MWD/LWD Logs – please refer to the “MWD Logs” sub-directory on this CD.

4.2 Wireline Logs

Logging was not undertaken in Megamouth-1 or -1/ST1.

4.3 Processed Logs

There are no processed logs for Megamouth-1 or -1/ST1.

4.4 Velocity Surveys

A Velocity Survey was not performed in Megamouth-1 or -1/ST1.

4.5 Site Survey

Site surveying for Megamouth-1 was not conducted prior to drilling.

4.6 Rig Location Survey

Survey was conducted by Thales GeoSolution (Australasia) Ltd.

Rig Positioning Report - Appendix 5.

5 FORMATION TESTING

5.1 RFT/MDT/RCI

RFTs/MDTs/RCIs were not acquired in Megamouth-1 or -1/ST1.

5.2 DST

No drillstem tests were run in Megamouth-1 or -1/ST1.

- 6.1 APPENDIX 1 Cuttings Descriptions
- 6.2 APPENDIX 2 Mudloggers End of Well Report
- 6.3 APPENDIX 3 Megamouth-1 MWD/LWD End of Well Report
- 6.4 APPENDIX 4 Megamouth-1/ST1 MWD/LWD End of Well Report
- 6.5 APPENDIX 5 Rig Positioning Report

6.1 APPENDIX 1 Cuttings Descriptions

Well Name : Megamouth-1				Print Date 21/01/2004		
Wellsite Geologist(s) :						
Interval (m)		%	Lithology / Show Descriptions		Ca (%)	Mg (%)
Main						
831.0 - 840.0	50.0	CEMENT:				
	50.0	CALCAREOUS CLAYSTONE:				
840.0 - 850.0	80.0	MARL: Light grey, pale brownish grey, soft, dispersive, amorphous, trace lithics.				
	20.0	CALCAREOUS CLAYSTONE: Light grey, minor pale brownish grey,soft, amorphous, trace very finely arenaceous, trace carbonaceous specks,				
850.0 - 860.0	80.0	MARL: as above		80		
	20.0	CALCAREOUS CLAYSTONE: Light grey, minor pale brownish grey,soft, amorphous, minor firm, trace very fine sand and silt, trace carbonaceous specks.				
860.0 - 870.0	80.0	MARL: Light grey, pale brownish grey, soft, dispersive, amorphous, trace lithics.				
	20.0	CALCAREOUS CLAYSTONE: Light grey, minor pale brownish grey,soft, amorphous, minor firm, trace very fine sand and silt, trace carbonaceous specks				
870.0 - 880.0	80.0	MARL: as above		75		
	20.0	CALCAREOUS CLAYSTONE: as above				
880.0 - 890.0	80.0	MARL: as above, trace very fine glauconite.				
	20.0	CALCAREOUS CLAYSTONE: as above				
890.0 - 900.0	80.0	MARL: as above, trace very fine glauconite.		71		
	20.0	CALCAREOUS CLAYSTONE: as above				
900.0 - 910.0	80.0	MARL: as above				
	20.0	CALCAREOUS CLAYSTONE: as above				
910.0 - 920.0	80.0	MARL: as above, occasional firm to hard calcite grains.				
	20.0	CALCAREOUS CLAYSTONE: as above.				
920.0 - 930.0	80.0	MARL: as above.				
	20.0	CALCAREOUS CLAYSTONE: as above				
930.0 - 940.0	80.0	MARL: as above		66	0	
	20.0	CALCAREOUS CLAYSTONE: as above				
940.0 - 950.0	80.0	MARL: as above				
	20.0	CALCAREOUS CLAYSTONE: as above				
950.0 - 960.0	80.0	MARL: Light grey, light brownish grey, mostly soft and amorphous, occasional firm calcite grains, trace lithics.		72	2	
	20.0	CALCAREOUS CLAYSTONE: Light grey, soft, amorphous, dispersive, trace very fine and silt sized quartz, trace lithics, trace carbonaceous specks.				
960.0 - 970.0	80.0	MARL: as above				
	20.0	CALCAREOUS CLAYSTONE: as above				
970.0 - 980.0	80.0	MARL: Light grey, light brownish grey, very soft to dispersive, amorphous, argillaceous and grading to calcareous claystone, trace lithics,		75		
	20.0	CALCAREOUS CLAYSTONE: as above				

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
980.0 - 990.0	90.0	MARL: as above	71	
	20.0	CALCAREOUS CLAYSTONE: as above		
990.0 - 1000.0	80.0	MARL: as above		
	20.0	CALCAREOUS CLAYSTONE: as above		
1000.0 - 1010.0	90.0	MARL: as above	68	
	10.0	CALCAREOUS CLAYSTONE: as above		
1010.0 - 1020.0	90.0	MARL: as above		
	10.0	CALCAREOUS CLAYSTONE: as above		
1020.0 - 1030.0	90.0	MARL: Light grey, white, light brownish grey, very soft, dispersive, amorphous, occasionally firm to moderately hard calcite grains, trace lithics.	68	
	10.0	CALCAREOUS CLAYSTONE: Very light brown, light brownish grey, soft, grades to marl, occasional lithics.		
1030.0 - 1040.0	90.0	MARL: as above		
	10.0	CALCAREOUS CLAYSTONE: as above		
1040.0 - 1050.0	90.0	MARL: as above	69	
	10.0	CALCAREOUS CLAYSTONE: as above		
1050.0 - 1060.0	90.0	MARL: Very light grey, light brownish grey, soft, dispersive, occasionally firm and subblocky, argillaceous, trace lithics.		
	10.0	CALCAREOUS CLAYSTONE: as above		
1060.0 - 1070.0	90.0	MARL: as above	69	0
	10.0	CALCAREOUS CLAYSTONE: as above		
1070.0 - 1080.0	90.0	MARL: as above		
	10.0	CALCAREOUS CLAYSTONE: as above		
1080.0 - 1090.0	90.0	MARL: as above	68	1
	10.0	CALCAREOUS CLAYSTONE: as above		
1090.0 - 1100.0	90.0	MARL: Very light grey to light brownish grey, soft and dispersive, occasionally firm and subblocky, argillaceous, trace lithics.		
	10.0	CALCAREOUS CLAYSTONE: Light brownish grey, soft, subblocky, grades to marl, trace lithics.		
1100.0 - 1110.0	90.0	MARL: as above	61	2
	10.0	CALCAREOUS CLAYSTONE:		
1110.0 - 1120.0	90.0	MARL: as above		
	10.0	CALCAREOUS CLAYSTONE:		
1120.0 - 1130.0	90.0	MARL: as above	71	3
	10.0	CALCAREOUS CLAYSTONE: light grey to light brownish grey, slightly micromaceous in part, occasional trace very fine quartz and lithic grains, dispersive to firm.		
1130.0 - 1140.0	90.0	MARL: as above		
	10.0	CALCAREOUS CLAYSTONE:		
1140.0 - 1150.0	90.0	MARL: as above	69	2
	10.0	CALCAREOUS CLAYSTONE: as above		
1150.0 - 1160.0	90.0	MARL: very light grey to light brownish grey, soft to firm, blocky to amorphous, slightly arenaceous in part		
	10.0	CALCAREOUS CLAYSTONE: Light to medium greyish brown, soft, occasionally dispersive, silty.		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
1160.0 - 1170.0	90.0	MARL: as above	66	1
	10.0	CALCAREOUS CLAYSTONE:		
1170.0 - 1180.0	90.0	MARL: as above	66	1
	10.0	CALCAREOUS CLAYSTONE:		
1180.0 - 1190.0	80.0	MARL: very light grey to light brownish grey, soft to firm, blocky to amorphous, slightly arenaceous in part	60	2
	10.0	CALCAREOUS CLAYSTONE:		
	10.0	LIMESTONE: Light grey to greyish brown, speckled in part, calcarenite to calcilutite, argillaceous, trace fine carbonaceous fragments.		
1190.0 - 1200.0	80.0	MARL:	60	2
	10.0	CALCAREOUS CLAYSTONE:		
	10.0	LIMESTONE:		
1200.0 - 1210.0	70.0	MARL:	58	2
	20.0	LIMESTONE:		
	10.0	CALCAREOUS CLAYSTONE:		
1210.0 - 1220.0	40.0	MARL: very light grey, soft to firm, blocky to amorphous. Grades to limestone.	58	2
	30.0	CALCAREOUS CLAYSTONE:		
	30.0	LIMESTONE:		
1220.0 - 1230.0	50.0	MARL: light grey to greyish brown, microcrystalline with very fine sucrosic texture, trace very fine carbonaceous fragments and occasional trace glauconite, firm to moderately hard, blocky to amorphous.	58	2
	30.0	CALCAREOUS CLAYSTONE: medium to light greyish brown to very light grey, blocky to dispersive, soft to firm, grades to Marl.		
	20.0	ARGILLACEOUS LIMESTONE: light greyish brown, microcrystalline, moderately hard to hard.		
1230.0 - 1240.0	60.0	MARL: as above	59	3
	30.0	CALCAREOUS CLAYSTONE: as above		
	10.0	ARGILLACEOUS LIMESTONE: as above		
1240.0 - 1250.0	70.0	MARL: as above	62	3
	30.0	CALCAREOUS CLAYSTONE:		
1250.0 - 1260.0	90.0	MARL: as above	62	3
	10.0	CALCAREOUS CLAYSTONE: as above		
1260.0 - 1270.0	90.0	MARL: as above	58	2
	10.0	CALCAREOUS CLAYSTONE: as above		
1270.0 - 1280.0	80.0	MARL: as above	58	2
	30.0	CALCAREOUS CLAYSTONE: as above		
1280.0 - 1290.0	70.0	MARL: as above	58	3
	30.0	CALCAREOUS CLAYSTONE: as above		
1290.0 - 1300.0	60.0	MARL: as above	58	3
	40.0	CALCAREOUS CLAYSTONE: as above		
1300.0 - 1310.0	60.0	MARL: as above	55	3
	40.0	CALCAREOUS CLAYSTONE: as above		
1310.0 - 1320.0	70.0	MARL: light grey to light brownish grey, soft to occasional hard, subfissile in part, trace lithic grains, grades to calcareous claystone.	55	3
	30.0	CALCAREOUS CLAYSTONE: light grey to light brownish grey, slightly		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
		to firm.		
1320.0 - 1330.0	80.0	MARL: as above		
	20.0	CALCAREOUS CLAYSTONE: as above		
1330.0 - 1340.0	70.0	MARL: as above	64	1
	30.0	CALCAREOUS CLAYSTONE: as above		
1340.0 - 1350.0	70.0	MARL: as above		
	30.0	CALCAREOUS CLAYSTONE: as above		
1350.0 - 1360.0	60.0	MARL: as above	59	1
	40.0	CALCAREOUS CLAYSTONE: as above		
1360.0 - 1370.0	70.0	MARL: as above		
	30.0	CALCAREOUS CLAYSTONE: as above		
1370.0 - 1380.0	70.0	MARL: as above	64	3
	30.0	CALCAREOUS CLAYSTONE: medium to light greyish brown to very light grey, blocky to dispersive, soft to firm, grades to Marl.		
1380.0 - 1390.0	60.0	MARL: very light greyish brown, soft/amorphous to microcrystalline/hard, slightly silty, trace very fine carbonaceous fragments		
	40.0	CALCAREOUS CLAYSTONE: light to medium grey to greyish brown, variably calcareous, slightly silty, soft to firm grades to MARL		
1390.0 - 1400.0	70.0	MARL: as above	63	3
	40.0	CALCAREOUS CLAYSTONE: as above		
1400.0 - 1410.0	80.0	MARL: as above		
	20.0	CALCAREOUS CLAYSTONE: as above		
1410.0 - 1420.0	60.0	MARL: as above	59	1
	40.0	CALCAREOUS CLAYSTONE: as above		
1420.0 - 1430.0	60.0	MARL: as above		
	40.0	CALCAREOUS CLAYSTONE: as above		
1430.0 - 1440.0	60.0	MARL: as above	63	2
	40.0	CALCAREOUS CLAYSTONE: as above		
1440.0 - 1450.0	60.0	MARL: as above		
	40.0	CALCAREOUS CLAYSTONE: as above		
1450.0 - 1460.0	70.0	MARL: as above	65	4
	30.0	CALCAREOUS CLAYSTONE: as above		
1460.0 - 1470.0	60.0	MARL: as above		
	40.0	CALCAREOUS CLAYSTONE: as above		
1470.0 - 1480.0	70.0	MARL: as above	72	3
	30.0	CALCAREOUS CLAYSTONE: as above		
1480.0 - 1490.0	70.0	MARL: Very light grey, light brownish grey, mostly soft, dispersive and amorphous, occasionally firm and microcrystalline, trace silt, trace microcarbonaceous.		
	30.0	CALCAREOUS CLAYSTONE: light to medium grey to greyish brown, variably calcareous, slightly silty, soft to firm, grades to MARL		
1490.0 - 1500.0	70.0	MARL: as above	75	4
	30.0	CALCAREOUS CLAYSTONE: as above		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
1500.0 - 1510.0	70.0	MARL: as above	74	3
	30.0	CALCAREOUS CLAYSTONE: as above		
1510.0 - 1520.0	70.0	MARL: as above	70	1
	30.0	CALCAREOUS CLAYSTONE: as above		
1520.0 - 1530.0	70.0	MARL: as above	63	1
	30.0	CALCAREOUS CLAYSTONE: as above		
1530.0 - 1540.0	70.0	MARL: as above	63	1
	40.0	CALCAREOUS CLAYSTONE: as above		
1540.0 - 1550.0	80.0	MARL: light grey, light brownish grey, firm, microcrystalline, subblocky to subfissile, commonly soft and dispersive, amorphous trace quartz silt, trace microcarbonaceous.	63	1
	20.0	CALCAREOUS CLAYSTONE: light to medium grey to greyish brown, variably calcareous, slightly silty, soft to firm, grades to MARL		
1550.0 - 1560.0	90.0	MARL: as above	63	1
	10.0	CALCAREOUS CLAYSTONE: as above		
1560.0 - 1570.0	90.0	MARL: light grey, light brownish grey, firm, microcrystalline, subblocky to subfissile, commonly soft and dispersive, amorphous trace quartz silt, trace microcarbonaceous.	63	1
	10.0	CALCAREOUS CLAYSTONE: light to medium grey to greyish brown, variably calcareous, slightly silty, soft to firm, grades to MARL		
1570.0 - 1580.0	80.0	MARL: as above	63	1
	20.0	CALCAREOUS CLAYSTONE: as above		
1580.0 - 1590.0	90.0	MARL: as above	65	2
	10.0	CALCAREOUS CLAYSTONE: as above		
1590.0 - 1600.0	90.0	MARL: light to very light grey, light to medium brownish grey, speckled to occasionally mottled, fine to very finely crystalline calcite with 30-40% clay, trace very fine carbonaceous and lithic grains, occasional patches of white diagenetic kaolin, soft to firm, friable, grades to CALCAREOUS CLAYSTONE	65	2
	10.0	CALCAREOUS CLAYSTONE: very light brownish grey, homogeneous firm to soft / dispersive.		
1600.0 - 1610.0	90.0	MARL: as above	57	2
	10.0	CALCAREOUS CLAYSTONE: as above		
1610.0 - 1620.0	90.0	MARL: as above	57	2
	10.0	CALCAREOUS CLAYSTONE: as above		
1620.0 - 1630.0	90.0	MARL: as above	62	2
	10.0	CALCAREOUS CLAYSTONE: as above		
1630.0 - 1640.0	90.0	MARL: light to very light grey, light to medium brownish grey, speckled to occasionally mottled, fine to very finely crystalline calcite with 30-40% clay, trace very fine carbonaceous and lithic grains, occasional patches of white diagenetic kaolin, soft to firm, friable, grades to CALCAREOUS CLAYSTONE	62	2
	10.0	CALCAREOUS CLAYSTONE: very light brownish grey, homogeneous firm to soft / dispersive.		
1640.0 - 1650.0	80.0	MARL: as above	58	2
	20.0	CALCAREOUS CLAYSTONE: as above		
1650.0 - 1660.0	90.0	MARL: as above	58	2
	10.0	CALCAREOUS CLAYSTONE: as above		
1660.0 - 1670.0	90.0	MARL: as above		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
1660.0 - 1670.0	10.0	CALCAREOUS CLAYSTONE: as above		
1670.0 - 1680.0	80.0	MARL: light to very light grey, occasionally light to medium brownish grey, blocky, sucrosic microcrystalline, trace fine carbonaceous material and occasional lithic grains and patchy diagenetic kaolin, soft/friable to firm.	73	2
	10.0	CALCAREOUS CLAYSTONE: very light grey, predominantly soft, dispersive, amorphous.		
	10.0	LIMESTONE: medium greyish to yellowish brown, translucent in part, very argillaceous, hard.		
1680.0 - 1690.0	90.0	MARL: as above.		
	10.0	LIMESTONE:		
	10.0	CALCAREOUS CLAYSTONE: as above		
1690.0 - 1700.0	80.0	MARL: as above	76	0
	10.0	CALCAREOUS CLAYSTONE: as above		
	10.0	LIMESTONE:		
1700.0 - 1710.0	80.0	MARL: as above		
	10.0	CALCAREOUS CLAYSTONE: as above		
	10.0	LIMESTONE:		
1710.0 - 1720.0	80.0	MARL: as above	73	2
	20.0	CALCAREOUS CLAYSTONE: as above		
	10.0	LIMESTONE: as above		
1720.0 - 1730.0	70.0	MARL: as above	84	3
	20.0	LIMESTONE: light to medium grey to greyish brown, speckled, calcarenite, argillaceous		
	10.0	CALCAREOUS CLAYSTONE: as above		
1730.0 - 1740.0	80.0	MARL: light to very light grey, occasionally light to medium brownish grey, blocky, sucrosic microcrystalline, trace fine carbonaceous material and occasional lithic grains and patchy diagenetic kaolin, soft/friable to firm.	77	3
	10.0	CALCAREOUS CLAYSTONE: as above		
	10.0	LIMESTONE: as above		
1740.0 - 1750.0	80.0	MARL:	78	0
	20.0	LIMESTONE:		
	10.0	CALCAREOUS CLAYSTONE: very light grey, predominantly soft, dispersive, amorphous.		
1750.0 - 1760.0	80.0	MARL: light to very light grey, occasionally light to medium brownish grey, blocky, sucrosic microcrystalline, trace fine carbonaceous material and occasional lithic grains, trace glauconite, and patchy diagenetic kaolin, soft/friable to firm.	79	2
	20.0	LIMESTONE: medium greyish to yellowish brown, translucent in part, very argillaceous, hard.		
1760.0 - 1770.0	80.0	MARL:	75	2
	20.0	LIMESTONE:		
1770.0 - 1780.0	80.0	MARL:	75	1
	20.0	LIMESTONE:		
1780.0 - 1790.0	80.0	MARL:	83	1
	20.0	LIMESTONE:		
1790.0 - 1800.0	80.0	MARL:	79	2
	20.0	CALCAREOUS CLAYSTONE: light grey to medium light grey, light brownish grey, soft to firm, subblocky to occasionally subfissile, very calcareous and grading to MARL, slightly silty, trace carbonaceous material.		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
1800.0 - 1810.0	80.0	MARL: as above		
	20.0	LIMESTONE:		
1810.0 - 1820.0	90.0	MARL: light to very light grey, occasionally light to medium brownish grey, blocky, soft to friable to firm, microcrystalline in part with sucrosic texture, trace fine carbonaceous material and occasional lithic grains, trace glauconite.	68	1
	10.0	LIMESTONE: medium greyish to yellowish brown, translucent in part, very argillaceous, hard.		
1820.0 - 1830.0	90.0	MARL: as above.	72	1
	10.0	LIMESTONE: as above.		
1830.0 - 1840.0	90.0	MARL: as above	72	2
	10.0	LIMESTONE: as above		
1840.0 - 1850.0	80.0	MARL: light grey, occasionally light brownish grey, soft to moderately hard, subblocky to subfissile, dispersive in part, silty, trace microcarbonaceous specks, rare glauconite.	84	1
	20.0	LIMESTONE: medium grey to yellowish brown, translucent in part, very argillaceous, hard, angular break.		
1850.0 - 1860.0	80.0	MARL: as above	80	1
	20.0	LIMESTONE: as above		
1860.0 - 1870.0	80.0	MARL: as above	76	1
	20.0	LIMESTONE: as above		
1870.0 - 1880.0	80.0	MARL: as above	79	2
	20.0	LIMESTONE: as above		
1880.0 - 1890.0	80.0	MARL: as above	77	1
	20.0	LIMESTONE: as above		
1890.0 - 1900.0	80.0	MARL: as above	68	1
	20.0	LIMESTONE: as above		
1900.0 - 1910.0	50.0	MARL: as above	40	3
	40.0	CALCAREOUS CLAYSTONE: light grey to medium light grey, light brownish grey, soft, subblocky, very calcaeous, slightly silty.		
	10.0	LIMESTONE: as above		
1910.0 - 1920.0	70.0	CALCAREOUS CLAYSTONE: light grey to medium light grey, light brownish grey, soft to firm, subblocky to subfissile in part, very calcaeous, slightly silty, trace carbonaceous material.	45	1
	30.0	MARL: as above		
1920.0 - 1930.0	80.0	CALCAREOUS CLAYSTONE: as above		
	20.0	MARL: as above		
1930.0 - 1940.0	90.0	CALCAREOUS CLAYSTONE: as above	34	2
	10.0	MARL: as above		
1940.0 - 1950.0	90.0	CALCAREOUS CLAYSTONE: as above		
	10.0	MARL: as above		
1950.0 - 1960.0	90.0	CALCAREOUS CLAYSTONE: as above	33	2
	10.0	MARL: as above		
1960.0 - 1970.0	90.0	CALCAREOUS CLAYSTONE: as above		
	10.0	CLAYSTONE: very light to light brownish grey, predominantly homogeneous, occasionally with disseminated pyrite, moderately calcaeous, soft to firm.		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
1970.0 - 1980.0	80.0	CALCAREOUS CLAYSTONE: as above	23	3
	20.0	MARL: as above		
1980.0 - 1990.0	90.0	CALCAREOUS CLAYSTONE: light grey to medium light grey, light brownish grey, soft to firm, subblocky to occasionally subfissile, very calcaeous and grading to MARL, slightly silty, trace carbonaceous material.		
	10.0	MARL: as above		
1990.0 - 2000.0	80.0	CALCAREOUS CLAYSTONE: as above	31	2
	20.0	MARL: as above		
2000.0 - 2010.0	90.0	CALCAREOUS CLAYSTONE: as above		
	10.0	MARL: as above		
2010.0 - 2020.0	90.0	CALCAREOUS CLAYSTONE: as above	17	3
	10.0	MARL: as above		
2020.0 - 2030.0	90.0	CALCAREOUS CLAYSTONE: as above		
	10.0	MARL: as above		
2030.0 - 2040.0	90.0	CALCAREOUS CLAYSTONE: as above	20	2
	10.0	MARL: as above		
2040.0 - 2050.0	90.0	CALCAREOUS CLAYSTONE: as above		
	10.0	MARL: as above		
2050.0 - 2060.0	90.0	CALCAREOUS CLAYSTONE: light grey to medium light grey, light brownish grey, soft to firm, subblocky to occasionally subfissile, very calcaeous and grading to MARL, slightly silty, trace carbonaceous material.	19	2
	10.0	MARL: as above		
2060.0 - 2070.0	100.0	CLAYSTONE: light to medium grey to greyish brown, variably silty and calcareous, soft to firm.		
2070.0 - 2080.0	90.0	CALCAREOUS CLAYSTONE: as above	15	2
	10.0	MARL: as above		
2080.0 - 2090.0	100.0	CLAYSTONE: as above		
2090.0 - 2100.0	100.0	CLAYSTONE: as above	18	2
2100.0 - 2110.0	100.0	CLAYSTONE: as above		
2110.0 - 2120.0	80.0	SILTY CLAYSTONE: very light to medium grey brownish grey to grey, very finely sandy in part, occasional soft pyrite nodules, moderately calcareous grades to Calcareous Claystone	27	1
	20.0	CALCAREOUS CLAYSTONE: light grey, silty in part, soft to firm, blocky,		
2120.0 - 2130.0	80.0	SILTY CLAYSTONE: very light to medium grey brownish grey to grey, very finely sandy in part, occasional soft pyrite nodules, moderately calcareous grades to Calcareous Claystone		
	20.0	CALCAREOUS CLAYSTONE: light grey, silty in part, soft to firm, blocky,		
2130.0 - 2140.0	100.0	CLAYSTONE: as above, becoming increasingly silty.	23	2
2140.0 - 2150.0	100.0	SILTY CLAYSTONE: as above		
2150.0 - 2160.0	100.0	SILTY CLAYSTONE: as above	18	1
2160.0 - 2170.0	100.0	SILTY CLAYSTONE: as above	19	1
	100.0	SILTY CLAYSTONE: as above		
2170.0 - 2180.0	100.0	SILTY CLAYSTONE: as above	20	1

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
2180.0 - 2190.0	100.0	SILTY CLAYSTONE: as above		
2190.0 - 2200.0	100.0	SILTY CLAYSTONE: as above	32	1
2200.0 - 2210.0	95.0	SILTY CLAYSTONE: as above	32	1
	5.0	KAOLINITIC SILTSTONE: White to very light grey, very finely sandy with well rounded quartz grains supported in silt & kaolin matrix, trace finely crystalline pyrite, moderately calcareous.		
2210.0 - 2220.0	95.0	SILTY CLAYSTONE: as above	22	1
	5.0	KAOLINITIC SILTSTONE: as above		
2220.0 - 2230.0	95.0	SILTY CLAYSTONE: as above		
	5.0	KAOLINITIC SILTSTONE: as above		
2230.0 - 2240.0	100.0	CLAYSTONE: very light to light brownish grey, rarely patchy white, predominantly homogeneous, occasionally with disseminated pyrite, moderately calcareous, soft to firm.	20	1
2240.0 - 2250.0	100.0	SILTY CLAYSTONE: very light to medium grey brownish grey to grey, very finely sandy in part, occasional soft pyrite nodules, moderately calcareous.		
2250.0 - 2260.0	100.0	SILTY CLAYSTONE: as above	19	1
2260.0 - 2270.0	100.0	SILTY CLAYSTONE: as above		
2270.0 - 2280.0	80.0	SILTY CLAYSTONE: as above	24	1
	10.0	KAOLINITIC SILTSTONE:		
	10.0	CLAYSTONE:		
2280.0 - 2290.0	10.0	SILTY CLAYSTONE:		
2290.0 - 2300.0	100.0	SILTY CLAYSTONE: as above	23	1
2300.0 - 2310.0	90.0	CLAYSTONE:		
	10.0	CLAYSTONE: as above, also 20% dark yellowish orange, soft, dispersive.		
2310.0 - 2320.0	100.0	CLAYSTONE: light to medium brownish grey, blocky to amorphous, silty in part, moderately calcareous, rare very fine quartz sand grains.	21	2
2320.0 - 2330.0	100.0	CLAYSTONE: as above		
2330.0 - 2340.0	100.0	CLAYSTONE: as above	24	2
2340.0 - 2350.0	100.0	CLAYSTONE: as above		
2350.0 - 2360.0	100.0	CLAYSTONE: light to medium brownish grey, soft, blocky to amorphous, silty in part, moderately calcareous, rare very fine quartz sand grains, trace carbonaceous, trace disseminated pyrite.	25	1
2360.0 - 2370.0	90.0	CLAYSTONE: as above		
	10.0	MARL: very light grey, soft, blocky to amorphous, grades to CALCAREOUS CLAYSTONE.		
2370.0 - 2380.0	100.0	CLAYSTONE: as above	22	1
2380.0 - 2390.0	90.0	CLAYSTONE: as above		
	10.0	MARL: as above, grades to CALCAREOUS CLAYSTONE.		
2390.0 - 2400.0	90.0	CLAYSTONE: as above, trace glauconite.		
	10.0	MARL: as above		
2400.0 - 2410.0	90.0	CLAYSTONE: as above		
	10.0	MARL: as above		
2410.0 - 2420.0	90.0	CLAYSTONE: as above, trace glauconite.	15	1

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
2410.0 - 2420.0	10.0	MARL: as above	15	1
2420.0 - 2424.0	90.0	CLAYSTONE: mostly light grey grading to medium brownish grey, soft, blocky to amorphous, silty in part, moderately calcareous, , trace carbonaceous, trace disseminated pyrite, trace glauconite.	15	1
	10.0	MARL: as above.		
2424.0 - 2427.0	90.0	CLAYSTONE: as above		
	10.0	MARL: as above.		
2427.0 - 2430.0	90.0	CLAYSTONE: as above, slightly more silty.	16	1
	10.0	MARL: as above		
2430.0 - 2433.0	90.0	CLAYSTONE: as above, trace disseminated pyrite, trace glauconite.		
	10.0	MARL: as above, grades to CALCAREOUS CLAYSTONE.		
2433.0 - 2436.0	90.0	CLAYSTONE: as above		
	10.0	MARL: as above		
2436.0 - 2439.0	90.0	CLAYSTONE: as above		
	10.0	MARL: as above		
2439.0 - 2442.0	90.0	CLAYSTONE: as above, very fine darker laminations with disseminated pyrite.	20	0
	10.0	MARL: as above		
2442.0 - 2445.0	90.0	CLAYSTONE: as above, disseminated pyrite and trace glauconite.		
	10.0	MARL: as above		
2445.0 - 2448.0	90.0	CLAYSTONE: as above, trace pyrite, trace glauconite.		
	10.0	MARL: as above		
2448.0 - 2451.0	70.0	CLAYSTONE: as above	14	3
	20.0	SANDSTONE: clear, milky, mostly fine grained, trace medium, rare coarse, well sorted, subangular, loose, fair porosity.		
	10.0	MARL: as above		
2451.0 - 2454.0	50.0	SANDSTONE: clear, translucent, milky, mostly fine, minor medium, trace coarse, well sorted, subangular, trace pyrite on coarse grains, loose, good porosity.		
	50.0	CLAYSTONE: as above, approx 50% is yellowish orange, trace glauconite, trace pyrite, remainder is light to medium grey.		
2454.0 - 2457.0	50.0	SANDSTONE: as above, more coarse grains.		
	50.0	CLAYSTONE: as above but only 10% orange coloured.		
2457.0 - 2460.0	50.0	CLAYSTONE: as above, only trace orange.	1	1
	50.0	SANDSTONE: clear, translucent, milky, mostly fine, minor medium, trace coarse, well sorted, subangular, trace pyrite on coarse grains, loose, common clay matrix, good porosity.		
2460.0 - 2463.0	70.0	SANDSTONE: clear, translucent, milky, fine to very coarse grained, poorly sorted, subangular to subrounded (occasionally rounded where coarse and very coarse), loose.		
	30.0	CLAYSTONE: light to occasionally medium grey, soft to minor firm, trace carbonaceous, trace glauconite.		
2463.0 - 2466.0	80.0	SANDSTONE: clear, translucent, milky, fine to coarse, mostly fine to medium, subangular, moderately to poorly sorted, trace glauconite, common clay matrix, no visible cement, good porosity.		
	20.0	CLAYSTONE: as above		
2466.0 - 2469.0	80.0	SANDSTONE: clear, translucent, milky, fine to very coarse, mostly fine to medium, moderately to poorly sorted, mostly subangular to subrounded, occasional rounded coarse grains, bitumenous broken coarser grains, loose, no visible cement, common clay matrix, good porosity.	5	1

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
2466.0 - 2469.0	20.0	CLAYSTONE: as above	5	1
2469.0 - 2472.0	80.0	SANDSTONE: clear, translucent, milky, fine to coarse, trace very coarse, moderately sorted, subangular to sub-rounded, trace pyrite cement, loose, good porosity.		
	20.0	CLAYSTONE: light brownish grey, soft to occasionally firm, dispersive to subblocky, slightly silty, trace pyrite.		
2472.0 - 2475.0	80.0	SANDSTONE: as above		
	20.0	CLAYSTONE: as above		
2475.0 - 2478.0	70.0	SANDSTONE: as above, rounded coarse grains.		
	30.0	CLAYSTONE: as above		
2478.0 - 2481.0	70.0	SANDSTONE: generally as above, 80% fine, 20% coarse and very coarse, bimodal sorting.	6	1
	30.0	CLAYSTONE: as above		
2481.0 - 2484.0	60.0	SANDSTONE: as above.		
	40.0	CLAYSTONE: as above		
2484.0 - 2487.0	50.0	SANDSTONE: clear, translucent, milky, fine to very coarse, poorly sorted, subangular to occasionally rounded, trace pyrite cement, common clay matrix, loose, good porosity.		
	50.0	CLAYSTONE: brownish grey, soft to firm, subblocky to amorphous, dispersive in part, trace pyrite.		
2487.0 - 2490.0	70.0	SANDSTONE: as above		
	30.0	CLAYSTONE: as above		
2490.0 - 2493.0	70.0	SANDSTONE: as above	2	1
	30.0	CLAYSTONE: as above		
2493.0 - 2496.0	80.0	SANDSTONE: as above		
	20.0	CLAYSTONE: as above		
2496.0 - 2499.0	90.0	SANDSTONE: as above, fine to very coarse, poorly sorted, subangular to rounded, trace pyrite cement, good porosity.	4	0
	10.0	CLAYSTONE: as above		
2499.0 - 2502.0	80.0	SANDSTONE: clear, translucent, milky, fine to coarse, trace very coarse, poor to moderately sorted, subangular to subrounded, occasional rounded where coarse and very coarse, common argillaceous matrix, common disseminated glauconite and occasional pellets, trace pyrite nodules, fair porosity.		
	20.0	CLAYSTONE: light brownish grey, soft to firm, subblocky to amorphous, silty in part.		
2502.0 - 2505.0	80.0	SANDSTONE: as above		
	20.0	CLAYSTONE: as above		
2505.0 - 2508.0	70.0	SANDSTONE: as above, less glauconite.	0	0
	30.0	CLAYSTONE: as above		
2508.0 - 2511.0	80.0	SANDSTONE: as above, fine to coarse, trace very coarse, dominantly fine to medium, moderately sorted, subangular to subrounded, trace pyrite.		
	20.0	CLAYSTONE: as above		
2511.0 - 2514.0	70.0	SANDSTONE: very light brown to occasionally green, very fine to very coarse grained, predominantly fine, poorly sorted, subangular to subrounded, predominantly loose grains ?washing out of argillaceous matrix, slightly calcareous, trace Foraminifera, grades to siltstone.		
	20.0	CLAYSTONE: medium yellowish to brownish grey, silty in part, blocky, soft to firm.		
	10.0	SILTSTONE: predominantly green/glauconitic, in part light brown, sandy, soft, sticky to dispersive.		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
2514.0 - 2517.0	50.0	SANDSTONE: as above becoming increasingly argillaceous	2	1
	30.0	CLAYSTONE: as above becoming smooth to waxy, non silty.		
	20.0	SILTSTONE: as above		
2517.0 - 2520.0	60.0	SANDSTONE: as above, matrix decreasing, visual porosity in part fair. also 20% of sample is rock flour.		
	30.0	CLAYSTONE: as above, also green, glauconitic in part.		
	10.0	SILTSTONE: as above, very glauconitic in part.		
2520.0 - 2523.0	50.0	CLAYSTONE: as above, blocky to occasionally splintery.		
	30.0	SANDSTONE: as above, becoming very fine to coarse grained, silty, very glauconitic in part, grades in part to sandy glauconitic siltstone.		
	20.0	SILTSTONE: as above, becoming sandy, very glauconitic in part, grades to silty sandstone.		
2523.0 - 2526.0	40.0	CLAYSTONE: as above, firm to hard, silty in part.	0	0
	40.0	SANDSTONE: as above, occasionally green with abundant glauconite laminations, very fine to very coarse, argillaceous with light brown silt/clay matrix and irregular patchy white kaolin? in part. trace fine to coarse biotite flakes.		
	20.0	SILTSTONE: as above grades to silty sandstone, in part glauconitic		
2526.0 - 2529.0	50.0	SANDSTONE: as above, predominantly loose quartz washing out of silty clay matrix, visible porosity trace		
	40.0	CLAYSTONE: as above		
	10.0	SILTSTONE: as above		
2529.0 - 2532.0	50.0	SANDSTONE: as above, very glauconitic in part, visible porosity trace		
	30.0	CLAYSTONE: as above		
	20.0	SILTSTONE: as above		
2532.0 - 2535.0	50.0	CLAYSTONE: as above	2	0
	30.0	SANDSTONE: as above, trace pyrite, visible porosity nil to trace.		
	20.0	SILTSTONE: as above		
2535.0 - 2538.0	30.0	CLAYSTONE: as above		
	30.0	SANDSTONE: as above		
	20.0	SILTSTONE: as above		
2538.0 - 2541.0	40.0	SANDSTONE: as above, predominantly very fine to fine grained with argillaceous matrix grades to siltstone, 10% loose very coarse to granular milky quartz grains, angular to occasionally rounded, occurs as discreet laminae within sand?		
	40.0	CLAYSTONE: medium grey to brownish and yellowish grey, smooth waxy to very silty, firm to hard, subfissile, splintery in part.		
	20.0	SILTSTONE: Light brownish grey, very finely sandy, grades to sandstone,		

Well Name : Megamouth-1 ST1			Print Date 21/01/2004	
Wellsite Geologist(s) :				
Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
ST1				
2393.0 - 2395.0	100.0	CEMENT: Spot sample from top shaker.		
2395.0 - 2397.5	100.0	CEMENT: Spot sample from top shaker. 100% cement.		
2397.5 - 2400.0	100.0	CEMENT: Spot sample from top shaker. 100% cement.		
2400.0 - 2402.5	100.0	CEMENT: Spot sample from top shaker. 100% cement.		
2402.5 - 2406.0	100.0	CEMENT: Spot sample from top shaker. 100% cement.		
2406.0 - 2409.5	100.0	CEMENT: Spot sample from top shaker. 100% cement. Trace filter cake.		
2409.5 - 2413.0	100.0	CEMENT: Spot sample. 100% cement.		
2413.0 - 2416.5	100.0	CEMENT:		
	0.0	CLAYSTONE: Trace only		
		Trace claystone.		
2416.5 - 2419.0	100.0	CEMENT:		
2419.0 - 2421.0	100.0	CEMENT:		
2421.0 - 2422.5	100.0	CEMENT:		
2422.5 - 2424.5	100.0	CEMENT:		
2424.5 - 2426.0	100.0	CEMENT:		
2426.0 - 2428.0	100.0	CEMENT:		
2428.0 - 2430.0	100.0	CEMENT:		
2430.0 - 2431.5	100.0	CEMENT:		
2431.5 - 2433.5	100.0	CEMENT:		
2433.0 - 2435.0	100.0	CEMENT:		
2435.0 - 2437.0	100.0	CEMENT:		
2437.0 - 2438.5	100.0	CEMENT:		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
2438.5 - 2440.0	100.0	CEMENT:		
2440.0 - 2442.0	100.0	CEMENT:		
2442.0 - 2444.5	100.0	CEMENT:		
	0.0	CLAYSTONE: Few grains in sample tray, medium grey, very silty.		
2444.5 - 2448.0	60.0	CEMENT: variable hardness, predominantly soft to firm.		
	40.0	SILTY CLAYSTONE: Lighth grey, soft to hard, blocky.		
2448.0 - 2450.0	40.0	CEMENT:		
	30.0	OXIDISED CLAYSTONE: Yellow to yellowish brown, silty to sandy, soft, limonitic, trace glauconite grains, black to dark green.		
	20.0	SILTY CLAYSTONE: as above		
	10.0	SANDSTONE: light grey, very fine grained, silty, argillaceous, grades to silty claystone.		
2450.0 - 2451.0	40.0	SANDSTONE: clear to white, yellowish grey, light grey, very fine to very coarse, poorly sorted, ?bimodal, in part loose grains with white clay adhering, in part silty with matrix washing out. common pyrite nodules and as coarsley crystalline cement, common rock flour and filter cake material.		
	20.0	OXIDISED CLAYSTONE: as above, mottled in part, in part sandy with very fine quartz and fine grained glauconite, soft.		
	20.0	SILTSTONE: light grey, soft, very finely sandy, speckled, trace glauconite,		
	20.0	CEMENT: as above, mixed w/ filter cake & old cuttings.		
2451.0 - 2454.0	60.0	SANDSTONE: as above, becoming predominantly loose, silty matrix washing out in part,		
	20.0	SILTSTONE: as above		
	10.0	CEMENT: as above		
	10.0	OXIDISED CLAYSTONE: as above, increasingly sandy, glauconitic		
2454.0 - 2457.0	70.0	SANDSTONE: clear to white, predominantly loose grains, fine to medium occasionally coarse, poorly sorted, subangular to subrounded, in part clean, n part with abundant white kaolinitic matrix, in part silty. inferred porosity fair to nil.		
	15.0	SILTY CLAYSTONE: light to medium grey, soft to firm.		
	10.0	SILTSTONE: as above		
	5.0	CEMENT: as above trace only		
2457.0 - 2460.0	80.0	SANDSTONE: clear to white, fine to coarse grained, poorly sorted, abundant white kaolinitic matrix - also common white rock flour. trace glauconite.		
	10.0	SILTY CLAYSTONE: as above		
	10.0	SANDY CLAYSTONE: white, blocky, friable, finely sandy w/ quartz, grades to sandstone.		
2460.0 - 2463.0	90.0	SANDSTONE: as above		
	10.0	SILTY CLAYSTONE: as above		
2463.0 - 2466.0	90.0	SANDSTONE: clear, fine to medium grained, predominantly fine grained, predominantly clean, occasionally with firm white clay matrix. inferred porosity fair.		
	10.0	SILTSTONE: as above		
2466.0 - 2469.0	100.0	SANDSTONE: clear, fine grained, occasionally medium and coarse grained, moderately sorted, frosted grains, predominantly clean loose quartz, occasionally with abundant soft to friable kaolinitic matrix ?washing out. inferred porosity fair. Common rock flour. trace hard black lithic grains. Inferred porosity fair.		
	5.0	SILTSTONE: as above		
2469.0 - 2472.0	100.0	SANDSTONE: as above fine to coarse, poorly sorted, abundant rock flour.		
2472.0 - 2475.0	100.0	SANDSTONE: as above, predominantly coarse grained, abundant rock flour.		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
2475.0 - 2478.0	100.0	SANDSTONE: as above, fine to medium grained with rare coarse quartz grains.		
2478.0 - 2481.0	100.0	SANDSTONE: as above, becoming silty in part.		
2481.0 - 2484.0	100.0	SANDSTONE: clear, translucent, frosted, fine to very coarse grained, poorly sorted to bi-modally sorted (f-m and c-vc), subrounded to angular, coarser grains are bitumenous fractured in part, also occasional welded coarse - very coarse aggregates, trace black and green inclusions in coarser grains, mostly loose quartz, common (20-30%) white to light grey clay matrix, trace glauconite in matrix, poor inferred porosity.		
2484.0 - 2487.0	100.0	SANDSTONE: as above, slightly less very coarse grains.		
2487.0 - 2490.0	100.0	SANDSTONE: as above, bi-modally sorted.		
2490.0 - 2493.0	100.0	SANDSTONE: as above, bi-modal sorting (f-m and c-vc), common white, light grey and minor pale yellowish orange matrix with trace glauconite and trace pyrite.		
2493.0 - 2496.0	100.0	SANDSTONE: as above, dominantly fine to medium grained, less coarse and very coarse, moderately sorted, subrounded to angular, poor to fair inferred porosity.		
2496.0 - 2499.0	100.0	SANDSTONE: as above		
2499.0 - 2502.0	90.0	SANDSTONE: as above.		
	10.0	CLAYSTONE: brownish grey, greenish grey, common disseminated pyrite, trace glauconite.		
2502.0 - 2505.0	50.0	CLAYSTONE: dark greenish grey, olive grey, abundant disseminated glauconite, rare pellets, common disseminated pyrite, trace nodules, soft, amorphous, non-calcareous.		
	50.0	SANDSTONE: as above		
2505.0 - 2508.0	80.0	CLAYSTONE: as above		
	30.0	SANDSTONE: as above		
2508.0 - 2511.0	70.0	SANDSTONE: as above with 30% white clay matrix.		
	30.0	CLAYSTONE: as above		
2511.0 - 2514.0	90.0	SANDSTONE: as above with 10% white clay matrix.		
	10.0	CLAYSTONE: as above		
2514.0 - 2517.0	100.0	SANDSTONE: clear, translucent, frosted, fine to occasionally very coarse grained quartz, poorly to moderately sorted, trace pyrite cement on coarse grains, 25% white, pale tellowish orange, clay matrix. Matrix is soft, amorphous, common quartz silt, trace glauconite, trace pyrite.		
2517.0 - 2520.0	100.0	SANDSTONE: as above, 30% matrix as above.		
2520.0 - 2523.0	100.0	SANDSTONE: as above, 40% clay matrix as above.		
2523.0 - 2526.0	100.0	SANDSTONE: as above		
2526.0 - 2529.0	100.0	SANDSTONE: clear, translucent, frosted, fine to occasionally very coarse grained quartz, moderately sorted, trace pyrite cement on coarse grains, 25% white, pale tellowish orange, clay matrix. Matrix is soft, amorphous, common quartz silt, trace glauconite, trace pyrite.		
2529.0 - 2532.0	100.0	SANDSTONE: clear, translucent, frosted, fine to medium grained, loose quartz, well sorted, sub-angular, 40% white, pale yellowish orange clay matrix, soft, amorphous, common quartz silt, trace glauconite, fair to poor inferred porosity. common rock flour.		
2532.0 - 2535.0	100.0	SANDSTONE: as above, 50% clay matrix.		
2535.0 - 2538.0	100.0	SANDSTONE: as above, 50% clay matrix.		
2538.0 - 2541.0	100.0	SANDSTONE: as above, 50% clay matrix.		
2541.0 - 2544.0	100.0	SANDSTONE: as above, 50% clay matrix.		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
2544.0 - 2547.0	100.0	SANDSTONE: clear, translucent, frostedined, occasional coarse grains, moderately well sorted, sub-angular with 50% white, pale yellowish orange clay matrix, soft, amorphous, poor inferred porosity.		
2547.0 - 2550.0	100.0	SANDSTONE: as above		
2550.0 - 2553.0	100.0	SANDSTONE: clear to white, fine to coarse, moderately sorted, angular to subrounded, loose quartz grains with trace clay matrix washing out, trace grey lithic grains, inferred porosity fair to poor. Abundsnt rock flour		
2553.0 - 2556.0	100.0	SANDSTONE: as above becoming fine grained. abundant rock flour		
2556.0 - 2559.0	90.0	SANDSTONE: clear to white, very fine to rarely coarse grained predominantly very fine grained, moderately sorted, argillaceous, abundant silt & clay matrix washing out, inferred porosity trace, grades to siltstone.		
	10.0	SILTSTONE: very light grey, speckled, very finely sandy, very soft, dispersive, abundant clay, fine micromicaceous laminations in part, trace glauconite.		
2559.0 - 2562.0	90.0	SANDSTONE: as above		
	10.0	SILTSTONE:		
2562.0 - 2565.0	80.0	SANDSTONE: as above		
	20.0	SILTY CLAYSTONE: very light grey, speckled, very finely sandy, very soft, dispersive, fine micromicaceous laminations in part, trace glauconite.		
2565.0 - 2568.0	80.0	SANDSTONE: as above		
	20.0	SILTY CLAYSTONE: as above		
2568.0 - 2571.0	90.0	SANDSTONE: as above		
	10.0	SILTY CLAYSTONE: as above		
2571.0 - 2574.0	80.0	SANDSTONE: clear to white, occasionally very light grey, very fine to fine grained, silty clay matrix ing out, grades to silty calystone		
	20.0	SILTY CLAYSTONE: as above		
2574.0 - 2577.0	100.0	SANDSTONE: clear to very light grey, predominantly very fine to occasionally coarse grained, predominantly loose quuartz with clay matrix and with occasional aggregates with silty matrix and slight silica cement, trace feldspar, glauconite and fine carbonaceous material. visible porosity poor to nil.		
2577.0 - 2580.0	100.0	SANDSTONE: as above becoming fine to very coarse.		
2580.0 - 2583.0	90.0	SANDSTONE: as above		
	10.0	SILTY CLAYSTONE: as above		
2583.0 - 2586.0	100.0	SANDSTONE: as above		
2586.0 - 2589.0	100.0	SANDSTONE: clear to white, very fine to very coarse grained bimodally sorted, poorly sorted, angular to subrounded, quartzose, variable slight to moderately clay matrix washing out, trace feldspar and glauconite, visible porosity poor to good.		
2589.0 - 2592.0	100.0	SANDSTONE: as above becoming cleaner visible porosity fair to good.		
2592.0 - 2595.0	100.0	SANDSTONE: as above, pyritic cement in part		
2595.0 - 2598.0	100.0	SANDSTONE: as above becoming predominantly very fine, pyritic cement in part, visible porosity fair.		
2598.0 - 2601.0	100.0	SANDSTONE: as above, inferred porosity poor		
2601.0 - 2604.0	100.0	SANDSTONE: as above		
2604.0 - 2607.0	100.0	SANDSTONE: as above		
2607.0 - 2610.0	100.0	SANDSTONE: as above		
2610.0 - 2613.0	100.0	SANDSTONE: as above, moderate to strong silica cement and white clay matrix		

Interval (m)	%	Lithology / Show Descriptions	Ca (%)	Mg (%)
		washing out. poorly sorted, visible porosity poor, abundant rock flour		
2613.0 - 2616.0	100.0	SANDSTONE: as above trace pyrite		
2616.0 - 2619.0	100.0	SANDSTONE: as above trace lithics.		
2619.0 - 2622.0	100.0	SANDSTONE: as above fine to coarse,		
2622.0 - 2625.0	100.0	SANDSTONE: as above, fine to very coarse grained, silica cement, rock flour, trace lithics.		
2625.0 - 2628.0	100.0	SANDSTONE: as above, medium to coarse, common fractured grains, silica cement,		
2628.0 - 2631.0	100.0	SANDSTONE: as above trace glauconitic clay, dense silica cement, inferred porosity poor.		
2631.0 - 2634.0	100.0	SANDSTONE: as above predominantly coarse grained.		
2634.0 - 2637.0	100.0	SANDSTONE: as above, fine to very coarse grained, silica cement, rock flour, trace lithics.		
2637.0 - 2640.0	100.0	SANDSTONE: as above		
2640.0 - 2643.0	100.0	SANDSTONE: as above		
	0.0	CLAYSTONE: grey, very hard, splintery.		
2643.0 - 2646.0	100.0	SANDSTONE: as above, silica cement, common rock flour		
2646.0 - 2649.0	100.0	SANDSTONE: as above		
2649.0 - 2652.0	100.0	SANDSTONE: as above, fine to very coarse.		
2652.0 - 2655.0	100.0	SANDSTONE: as above		
2655.0 - 2658.0	100.0	SANDSTONE: as above		
2658.0 - 2661.0	100.0	SANDSTONE: as above		
2661.0 - 2664.0	100.0	SANDSTONE: as above		
2664.0 - 2667.0	100.0	SANDSTONE: as above		
2667.0 - 2670.0	100.0	SANDSTONE: as above		
2670.0 - 2673.0	100.0	SANDSTONE: as above		
2673.0 - 2676.0	100.0	SANDSTONE: as above		
2676.0 - 2679.0	100.0	SANDSTONE: clear, translucent, frosted, fine to very coarse grained, poorly to moderately sorted, subangular, mostly loose, silica cement and trace pyrite cemented coarser grains, common rock flour/clay matrix, trace lithics, fair to poor inferred porosity..		
2679.0 - 2682.0	100.0	SANDSTONE: as above		
2682.0 - 2685.0	100.0	SANDSTONE: as above		
2685.0 - 2688.0	100.0	SANDSTONE: as above		

6.2 APPENDIX 2 Mudloggers End of Well Report



MEGAMOUTH 1 & 1 ST

FINAL WELL REPORT

Prepared by



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 6.0 <u>ENCLOSURES</u>	
A. CD Data containing: Ascii; Final Well Report (PDF format); & Logs (PDF format)	
B. Formation Evaluation Log	Scale 1:500
C. Drilling Data Log	Scale 1:1000
D. Gas Ratio Log	Scale 1:500
E. Pressure Evaluation Log	Scale 1:2500

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1.0 WELL DATA SUMMARY

(All depths are measured depths from rotary table (MDRT) unless otherwise specified.)

Well name	: Megamouth-1 & 1 ST
Basin	: Gippsland
Permit	: VIC/P-45
Operator	: BHP Billiton Petroleum
Drilling Rig	: Ocean Epoch
Well Classification	: Exploration
Surface Location	
Latitude	: 38° 35' 44.230" S
Longitude	: 148° 16' 31.859" E
Depth Reference	: L.A.T. (lowest astronomical tide)
Water Depth	: 80.2 m
Rotary Table	: 22.4 m
Rotary Table to Seabed	: 102.6 m
Casing Data	: (1) 762/500 mm (30"/20") Casing Shoe at 148.0 m : (2) 340 mm (13 ³ / ₈ ") Casing Shoe at 820.5 m
Hole Sizes	: (1) 914 mm (36") Hole from 102.6 m to 148.0 m : (2) 445 mm (17½") Hole from 148.0 to 831.0 m : (3) 311 mm (12¼") Hole from 831.0 to 2546.0 m :(ST) 311 mm (12¼") Hole from 2393.0 to 2688.0m
Mud Types	: (1) Seawater/Hi-Vis Gel Sweeps : (2, 3, ST) Aqua-Drill
Offset Wells	: Hermes-1, Ayu-1, East Kingfish-1, Roundhead-1
Proposed Total Depth	: 2652 m
Actual Total Depth	: 2688 m MDRT
Total Vertical Depth	: 2677.23 m TVDRT
Date arrived on Location	: 15 th November 2003
Date departed Location	: 5 th December 2003
Date Spudded	: 16:15 hours on 17 th November 2003
Date TD Reached	: 19:00 hours on 2 nd December 2003
Well Status	: Plugged and Abandoned

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2.0 GENERAL INFORMATION

2.1 **Executive Summary**

Megamouth-1 was drilled as an oil exploration well in the northern edge of Permit VIC/P45. The primary objective was to evaluate the hydrocarbon potential of a sandstone within the Palaeocene Latrobe Group, thought to be structurally sealed beneath the 60Ma shale. Offset wells used for correlation were Hermes-1, Ayu-1, East Kingfish-1 and Roundhead-1. The Megamouth location is 8 km east of the large Kingfish field and 2.1 km WNW of Hermes 1 and 1.7 km NW of Ayu 1.

Megamouth 1 was officially spudded at 16:15 hours on the 17th of November 2003. The well was spudded with a 660 mm (26") bit and 914 mm (36") hole opener. After tagging the seafloor at 102.6 mRT, the 36" hole was drilled to 148.0 m. A combination 762 mm (30") and 500 mm (20") conductor casing was run on a PGB and cemented with the shoe set at 148.0 m.

A 445 mm (17½") bit was run in, tagging the TOC at 142.5 m and was drilled down to the phase TD of 831.0 m. This section was cased off with a 340 mm (13⅜") casing string with the shoe set at 820.5 m.

The subsea stack and riser were lowered and tested. The flowline and diverter were rigged up and function tested and the LMRP was tested as per specifications.

The 311 mm (12¼") phase was begun, tagging the TOC at 793.0 m. The cement and shoe was drilled out and 3.0 m of new hole was made to 834.0 m. The hole was displaced to 1.13 SG Aqua-Drill mud prior to performing a Leak Off test that resulted in an EMW of 18.0 ppg.

311 mm (12¼") hole was drilled ahead from 834.0 m down to 2546.0 m with a PDC and performance mud motor. Due to a sudden pressure loss of about 900 psi, drilling was terminated and the string was pulled out of hole minus most of the motor and bit. A fishing trip was made with an overshot and grapple to retrieve the fish. The attempt to retrieve the fish was unsuccessful so a cement plug was set and the well sidetracked.

A 12¼" (311 mm) Hughes MX20DX bit was run in hole to kick off. As hard cement was not encountered, the drill string was pulled out and a second cement plug was pumped. The same 12¼" bit and BHA was run in and the cement plug was tagged at 2347.0 m. Megamouth-1 ST was kicked off from 2393.0 m with the first indication of formation recorded at 2448.0 m. The sidetrack was drilled down to a TD of 2688.0 m MDRT with a maximum hole angle of 17.94° at 2656.6m.

There were no shows recorded while drilling and wireline logs were not required at TD. No casing was run and the hole was immediately plugged with cement plugs and abandoned.

Geoservices provided a full mud logging service from spud to TD during this well.

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2.2 Geoservices Personnel

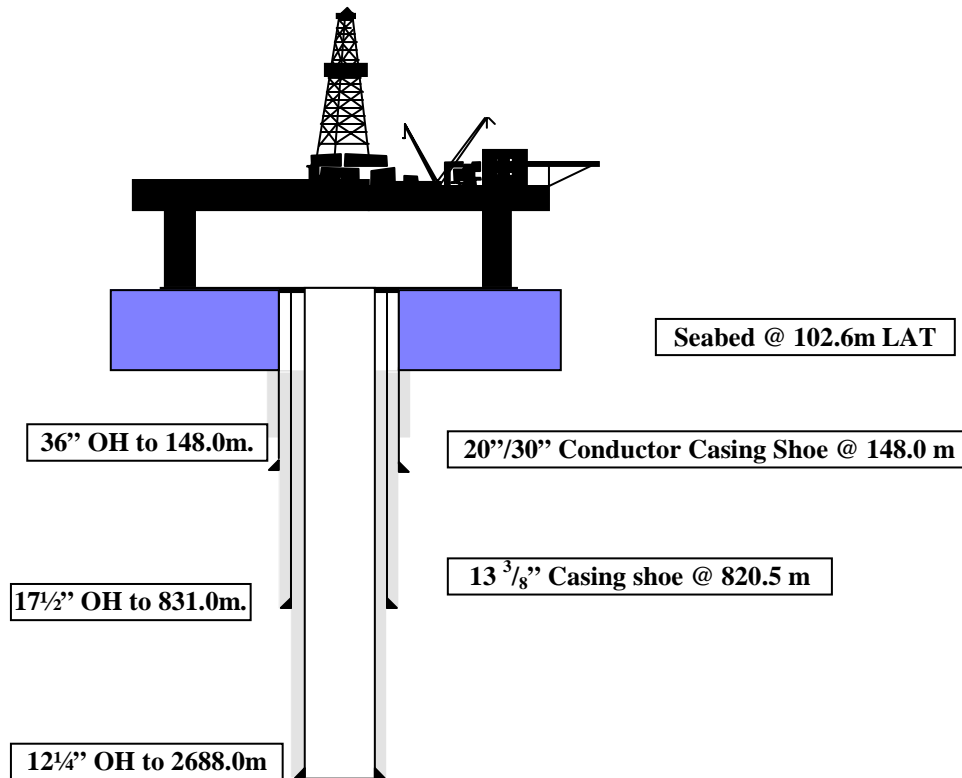
ALS Engineers	: Fernandes, Gavin : Dóczy, Gedeon : Willson, Stan : Misquitta, Patrick
Mudloggers	: Adderley, David : Babu, J.V.
Sample Catchers	: Dower, Leigh : Tipple, Corey

2.3 Contractor Information

Drilling	: Diamond Offshore
Rig name	: Ocean Epoch
Rig type	: Semi-Submersible
Mud logging	: Geoservices Overseas S.A.
Mud engineering	: Baker Hughes INTEQ
Directional/MWD/FEWD	: Sperry Sun
Wireline logging	: Schlumberger Oilfield Australia
Cementing	: Halliburton
Well head completion	: Weatherford
ROV	: Total Marine Technology
Casing	: Weatherford
Work boats	: Lady Dawn, Pacific Challenger
Helicopters	: Bristows
Catering	: Eurest

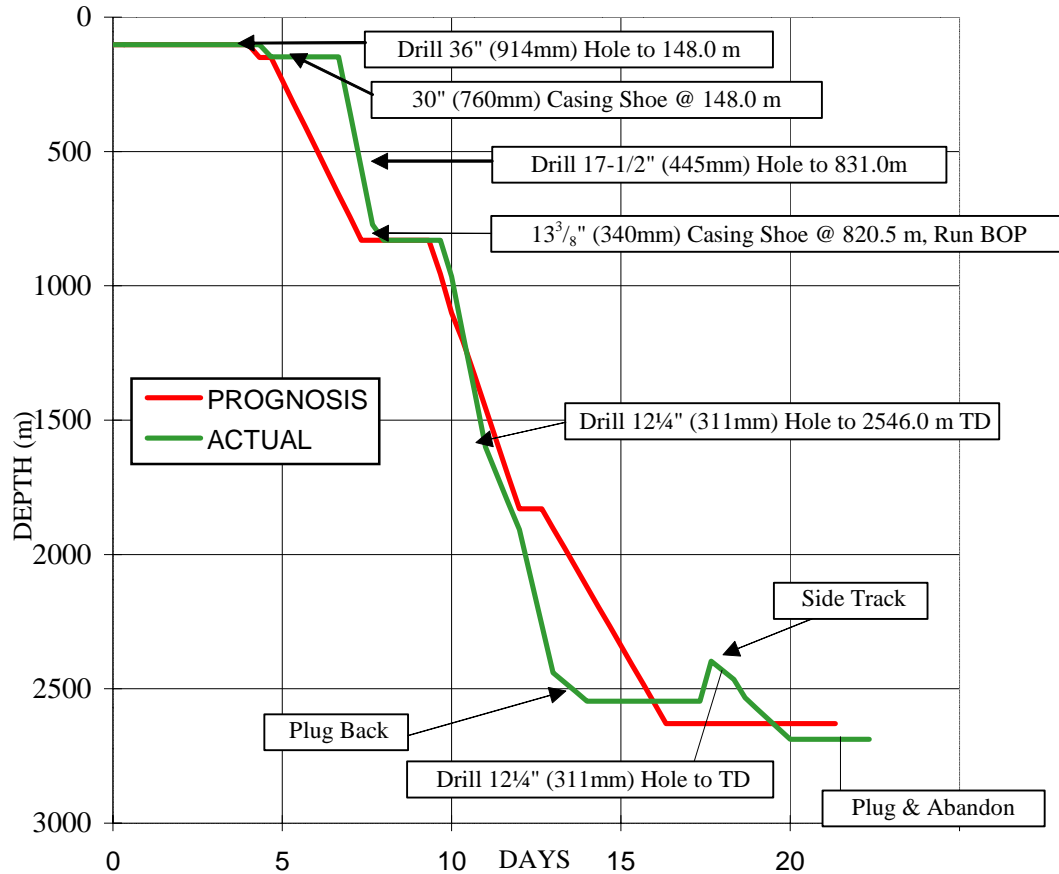
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2.4 Well Profile



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2.5 Days Versus Depth



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2.6 Sample Collection Summary

1 set of Unwashed Cuttings, 3 sets of Washed and dried cuttings, and 2 sets of Samplex trays were collected on this well.

From 835 m to 2420 m the collection interval was 10 m and from 2420 m to 2546 m, the collection interval was 3 m.

Samples for Megamouth-1 ST were collected from 2448 m, at 3 m intervals.

Sample distribution was as follows:

Recipient	Wet Cuttings	Washed and Dried	Samplex Trays
BHP Billiton Petroleum	1 x 200 gm (set A)	1 x 200 gm (set B)	1 x 25 gm (set C)
Inpex Alpha Ltd			1 x 25 gm (set D)
Geoscience Australia		1 x 200 gm (set E)	
Dept. Primary Industry		1 x 250 gm (set F)	
	1	3	2

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3.0 GEOLOGICAL INFORMATION

3.1 **Lithology and Show Summary**

From Spud to 831 m returns were to the seafloor. Samples were taken from 831 m down to TD at 2688 m.

831 - 1902 m					Drilling Parameters: WOB: 2-18 klbs RPM: 180-326 TRQ: 3-10 klbs*ft MF : 830-906 gpm SPP: 2300-3500 psi							
Lithology	Lithology description	ROP m/hr			Depth m	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm
		avg.	max.	min.								
MARL	Predominately pale grey, pale grey brown, occasionally off white, occasionally pale green, commonly argillaceous, grading to CALCAREOUS CLAYSTONE in part, occasional lithics, predominately dispersive, very soft becoming firm with depth, occasionally moderately hard, commonly amorphous, sub - blocky to rare blocky in part.	25	78	7	831-1902	0.01-1.01	81-5807	0-212	0-113	0-17	0-14	0-17
CLAYSTONE	Pale grey, pale brown, pale to occasionally medium brown grey, commonly calcareous, grading to MARL, silty in part, occasional lithics, occasional carbonaceous specks, trace micro micaceous, very soft to firm, becoming firm to moderately hard with depth, sub - blocky to blocky, occasionally sub – fissile.											
LIMESTONE	Pale brown, pale grey, brown grey, off white, lutitic argillaceous, microcrystalline, moderately hard to hard, sub - blocky.											

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1902 - 2110 m					Drilling Parameters: WOB: 3.5-12 klbs MF : 802-854gpm RPM: 300-318 SPP: 3250-3540psi TRQ: 4.5-7.5 klbs*ft							
Lithology	Lithology description	ROP m/hr			Depth m	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm
		avg.	max.	min.								
CLAYSTONE	Very pale grey to pale grey brown, occasionally medium grey, occasionally locally silty, commonly moderately to strongly calcareous, grading to MARL in part, occasional localised disseminated pyrite increasing with depth, dispersive, very soft to firm, occasionally moderately hard, sub - blocky, occasionally blocky.	34	69	10	1902 – 2110	0.15- 1.83	665- 11736	17- 222	1-103	0-24	0- 15	0- 18
MARL	Very pale brown grey, occasionally grading to CALCAREOUS CLAYSTONE, soft to very soft, occasionally dispersive, amorphous, sub - blocky.											

2110 - 2448 m					Drilling Parameters: WOB: 1-11 klbs MF : 790-830 gpm RPM: 203-318 SPP: 3200-3540psi TRQ: 4-9 klbs*ft							
Lithology	Lithology description	ROP m/hr			Depth m	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm
		avg.	max.	min.								
CLAYSTONE	Pale to medium grey, pale brown grey, occasionally off white, occasionally silty, slightly to moderately calcareous, trace micro micaceous, locally disseminated pyrite, occasional glauconite grains, soft to occasionally moderately hard, blocky to sub - fissile.	28.83	93	9.5	2110- 2448	0.25- 2.1	1484- 12448	38 – 343	20– 190	1-147	0- 52	0- 61
SILTSTONE	Pale to medium grey, occasionally light medium brown grey, commonly argillaceous occasionally grading to CLAYSTONE, trace micro micaceous, trace micro carbonaceous specks, firm to occasionally moderately hard, sub - fissile to sub - blocky.											

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2448 - 2546 m (T.D.)					Drilling Parameters: WOB: 1-10 klbs RPM: 203-308 TRQ: 4.7-10 klbs*ft								MF : 677-807 gpm SPP: 3200-3560 psi	
Lithology	Lithology description	ROP m/hr			Depth m	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm		
		avg.	max.	min.										
SANDSTONE	Off white, clear to translucent, occasionally milky, occasionally pale to medium green, predominately very fine to fine, occasionally medium to coarse, rare to occasionally very coarse, generally poorly sorted, moderately to moderately well sorted in part, sub-angular to predominately sub-round, occasionally round, weak to moderate silicious cement, occasionally weak calcareous cement, occasionally off white argillaceous matrix, occasional quartz overgrowths, occasional to locally common glauconite, generally loose, poor to occasionally fair visible and inferred porosity, no fluorescence.	11.39	61	5	2448 - 2546	0.12 - 0.95	419 - 4577	26 – 253	1 – 133	0 –87	0 – 43	0 – 48		
CLAYSTONE	Pale brown to pale grey, pale brown grey, occasionally orange yellow, locally silty, grading to SILTSTONE in part, occasionally disseminated pyrite, occasionally weakly calcareous, dispersive, very soft to firm, occasionally moderately hard, sub - blocky to blocky, amorphous.													
SILTSTONE	Pale to dark grey brown, argillaceous in part, moderately to weakly calcareous, moderately hard to hard, fissile to sub - fissile.													

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MEGAMOUTH 1 ST

2448 - 2546 m (T.D.)					Drilling Parameters: WOB: 7-40 klbs MF : 640-730 gpm RPM: 103-171 SPP: 2535-3280 psi TRQ: 0-9 klbs*ft							
Lithology	Lithology description	ROP m/hr			Depth m	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm
		avg.	max.	min.								
SANDSTONE	Off white, clear to translucent, occasionally milky, occasionally pale to medium green, predominately very fine to fine, occasionally medium to coarse, rare to occasionally very coarse, generally poorly sorted, moderately to moderately well sorted in part, sub-angular to predominately sub-round, occasionally round, weak to moderate silicious cement, occasionally weak calcareous cement, occasionally off white argillaceous matrix, occasional quartz over growths, occasional to locally common glauconite, generally loose, poor to occasionally fair visible and inferred porosity, no fluorescence.	8.26	19.54	3.68	2448 - 2688	0.01 - 0.06	11 - 521	0-39	0-13	0	0	0
CLAYSTONE	Pale brown to pale grey, pale brown grey, occasionally orange yellow, locally silty, grading to SILTSTONE in part, occasionally disseminated pyrite, occasionally weakly calcareous, dispersive, very soft to firm, occasionally moderately hard, sub - blocky to blocky, amorphous.											
SILTSTONE	Pale to dark grey brown, argillaceous in part, moderately to weakly calcareous, moderately hard to hard, fissile to sub - fissile.											

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3.2 Gas Ratio Interpretation - Introduction

Gas composition and total gas in mud were measured using the standard Geoservices FID Chromatograph Panel (FCP) and FID Gas Panel (FGP). Both these panels which are independent of each other, use the same principle, of measuring ions released when organic material, actively released from the mud, is burnt. The mud is degassed at the flow line by a degasser which is essentially an agitator inside a chamber through which the mud passes. The gas is then drawn back to the unit where it is analysed for hydrocarbons. H₂S and CO₂ are measured by independent sensors/panels.

Although both systems use the FID (flame ionization detector) principle, the chromatograph first separates the hydrocarbon gases by passing the sample through a column where heavier gases take longer to pass through than lighter ones. After the hydrocarbon gases are separated, they are burned at the detector in the presence of hydrogen (which maintains combustion). Each burnt hydrocarbon molecule releases ions proportional to the number of carbon atoms in the molecule. These free ions (C+) will reduce the resistivity of the air in a filament allowing a voltage to pass from the cathode to the anode. This created voltage is proportional to the gas burned. Note: as the FGP (total gas) burns all the gases simultaneously, values are recorded in methane equivalent.)

The composition of the gas in mud from the formation is significant in determining the geochemical origin and value of a show. There are several methods which can be used to determine whether the hydrocarbon gas in mud comes from a potential gas or oil zone. Amongst these methods are the Triangle Diagram (also known as the gas composition diagram), Pixler Diagram (also known as the gas ratios method) and the Wetness/Balance/Character plots.

3.3 Explanation of Gas Composition Diagrams

The composition of entrained reservoir gas in mud is significant in determining the origin and value of a show. The Gas Composition Diagram is used to graphically represent the hydrocarbon distribution in the gas and to determine whether it corresponds to a gas or oil reservoir.

The triangular diagram is obtained by tracing lines on three scales at 120° to each other, corresponding respectively to the ratios of ethane, propane and normal butane to the total gas. The scales are arranged in such a way that if the apex of the triangle is upward, the diagram represents the analysis of gas from a gas zone, while if the apex points downwards, the diagram represents the analysis of gas from an oil zone. A large triangle diagram represents dry gas or low GOR oil, while small triangles represent wet gases or high GOR oils.

The homothetic centre of the triangle should fall inside the area delineated by the dotted line, which encircles compositions which are 'normal'. If the triangle area is outside this area the gas indicates that the reservoir is not exploitable and that the heavier hydrocarbons composition is 'abnormal' (hydrocarbons chemically altered or dysmigrated or gases with special compositions which are not associated with oil) and may indicate a dead show.

The Gas Ratio Analysis Diagram is a plot of the ratio of C1 to the other gas elements. The magnitude of the methane to ethane ratio determines if the reservoir contains gas or oil or if it is non-productive. The following conclusions are possible:

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Ratio C1/C2:	< 2	non-productive zone
	2 - 15	oil present
	15 - 65	gas present
	> 65	non-productive zone

The slope of the line of the ratio plot of C1/C2, C1/C3, C1/C4 and C1/C5 indicates whether the reservoir will produce hydrocarbons or hydrocarbons and water. Positive line slopes indicate production; negative line slopes indicate water bearing formations. When using the slope of the gas ratios plot as an indicator of a possibly productive zone the following points should be borne in mind:

1. Productive dry gas zones may show only C1, but abnormally high shows of C1 are usually indicative of salt water zones.
2. If the ratio C1/C2 is low in the oil section and the ratio C1/C4 is high in the gas section, the zone is probably non-productive.
3. If any ratio (C1/C5 excepted in an oil based mud) is lower than the preceding ratio then the zone is probably non-productive.
4. The ratios may not be definitive for zones of low permeability.
5. Steep gas ratio plots may be indicative of tight zones.

3.4 Explanation of Wetness/Balance/Character Curves

Another method for evaluating gas zones uses three ratios: hydrocarbon Wetness (W_h), hydrocarbon Balance (B_h) and hydrocarbon Character (C_h) plotted against depth where:

$$W_h = \frac{(C_2 + C_3 + C_4 + C_5)}{(C_1 + C_2 + C_3 + C_4 + C_5)} \times 100 (\%)$$

$$B_h = \frac{(C_1 + C_2)}{(C_3 + C_4 + C_5)}$$

$$C_h = \frac{(C_4 + C_5)}{C_3}$$

Wetness (W_h) is the primary zone indicator and provides a measure of the relative proportion of heavier gases in the overall gas show as follows:-

$W_h < 0.5$	Light non-associated gas with low productivity potential or only geo-pressured methane.
$0.5 < W_h < 17.5$	Potentially productive gas with gas density increasing with W_h .
$17.5 < W_h < 40.0$	Potentially productive oil with gravity decreasing as W_h increases.

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$W_h > 40.0$ Heavy or residual oil with low productivity potential.

Balance (B_h) and Wetness (W_h) move closer together and eventually cross as reservoir hydrocarbons become denser in transition from gas to oil. The zone guidelines for B_h combine with those for W_h to improve reliability of show evaluation as follows:

$W_h < 0.5$ Very light, dry gas which is almost certainly non-productive.
and $B_h > 100$

$0.5 < W_h < 17.5$ Productive gas with gas increasing in wetness and density as
and $W_h < B_h < 100$ the two curves converge.

$0.5 < W_h < 17.5$ Productive gas condensate or a high gravity gas/oil ratio.
and $B_h < W_h$

$17.5 < W_h < 40$ Productive oil with oil gravity decreasing - density
increasing
and $B_h < W_h$ as the curves diverge.

$17.5 < W_h < 40$ Non-productive residual oil.
and $B_h > W_h$

Character (C_h) serves to resolve ambiguities between oil or gas indications by defining the following:

$0.5 < W_h < 17.5$ Productive wet gas or condensate.
and $B_h < W_h$
and $C_h < 0.5$

$0.5 < W_h < 17.5$ Productive high gravity and/or high GOR oil.
and $B_h < W_h$
and $C_h > 0.5$

It is important to note that in the conclusion to each of the interpretive tools, the terms 'productive' and 'non-productive' are used in a geochemical sense. Ultimate production of a zone is dependent upon reservoir thickness and extent as well as other physical and economic factors, which are not taken into account when analysing gas compositions. The methods discussed here are intended to assist the interpretive skills of the geologist or log analyst. We do not advocate their use blindly or in ignorance of the underlying geological and chemical principles of hydrocarbon occurrence.

Please refer to the Gas Ratio Log enclosure.

Abbreviation : GOR - Gas Oil Ratio

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3.5 Gas Composition Discussion

From Spud to the TD of the 17½" phase at 831 m, returns were dumped to the seabed so no samples were collected nor was any gas monitored. Gas was first recorded in Megamouth-1 at the start of the 12¼" (311 mm) hole at 831m, and gas was recorded continuously from here down to the TD of the well.

From 831 m down to 980 m, the background gas was very low and ranged from 0.05 to 0.1% with the gas consisting predominantly of Methane with minor Ethane and traces of Propane. There was no real peak of note in this interval.

From 980 m down to 1900 m, there was a slight increase in the background gas, which ranged from 0.3 to 0.5%, with a small ROP related peak of 1% recorded from 1474 m.

The background gas increased a fraction in the interval from 1900 m to 2226 m and ranged from 0.7 to 0.9%. This gas comprised of gas components from Methane to Propane with minor to traces of Butane. There was no real gas peak in this interval, though a maximum of 1.88 % was recorded at 2171 m.

The background gas dropped a fraction in the interval from 2226 m to 2370 m, ranging from 0.3 to 0.5%. This gas comprised of components from Methane to Butane with a ROP related peak of 2.10% recorded from 2322 m.

From 2370 m to 2460 m, the background gas increased a fraction and ranged from 0.8 to 0.9%, consisting of all the gas components from Methane through to Pentane. The maximum gas recorded however was just 1.46% at 2381 m.

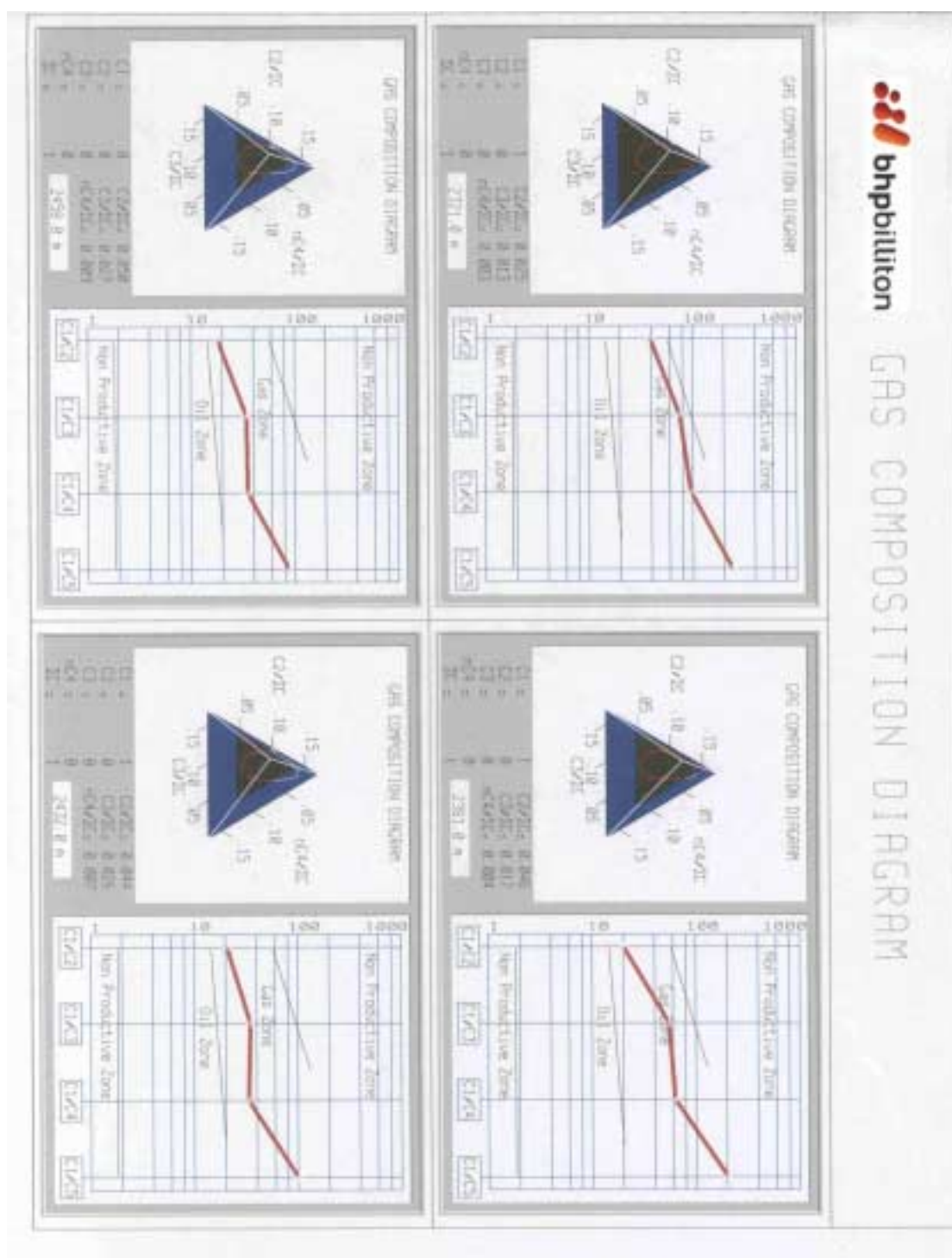
In a predominantly Sandstone interval from 2460 m to 2546 m, the gas levels dropped and ranged from 0.1 to 0.3% consisting predominantly of Methane and ethane with minor Propane and traces of Butane. There was no real gas peak in this interval.

Gas levels throughout the sidetrack section of this well were extremely low, which appeared to be due to the increased mud weight of 1.20 sg. From 2448 m down to the TD of 2688 m, the background gas was 0.01-0.02% consisting predominantly of Methane with the occasional trace of Ethane. The maximum gas recorded in this interval was 0.06% at 2565.5 m, consisting predominantly of Methane with minor Ethane and Propane.

In summary, gas levels in this well were both very low in quantity and mostly dry in composition. Though the gas readings in the basal Lakes Entrance clays and the Latrobe reservoir sand section when analysed indicate a commercial gas zone, the very low background levels that were measured mean that it is non-productive. The reservoir sands are essentially water-wet. See the diagrams on the following page where depths 2321 m, 2381 m and 2432 m represent basal Lakes Entrance gas peaks and 2458 m is the top Latrobe. The ratios give promising indications but these values were all from peaks less than 2%.

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3.6 Gas Ratio Diagrams



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4.0 PRESSURE ANALYSIS

4.1 Pressure Summary

Formation pressures were monitored throughout this well by recording a range of indicators. These indicators vary from direct observations of background gas and cuttings, to drilling characteristics such as torque and tight hole, as well as quantitative methods like the d exponent.

Most indicators pointed to a normally pressured environment from surface to TD for Megamouth-1. Two gas peaks seen at 1470 m (0.6% ABG) and 1498 m (0.4% ABG) may have been connection gas but no steady increase of background gas occurred after this. There were no serious hole problems, excessive or deformed cavings or high torque readings noted while drilling.

A twist off at 2546 m was due to mudmotor failure, not hole instability. During the sidetrack phase from 2393 m to 2688 m TD, no other pressure indicators were noted.

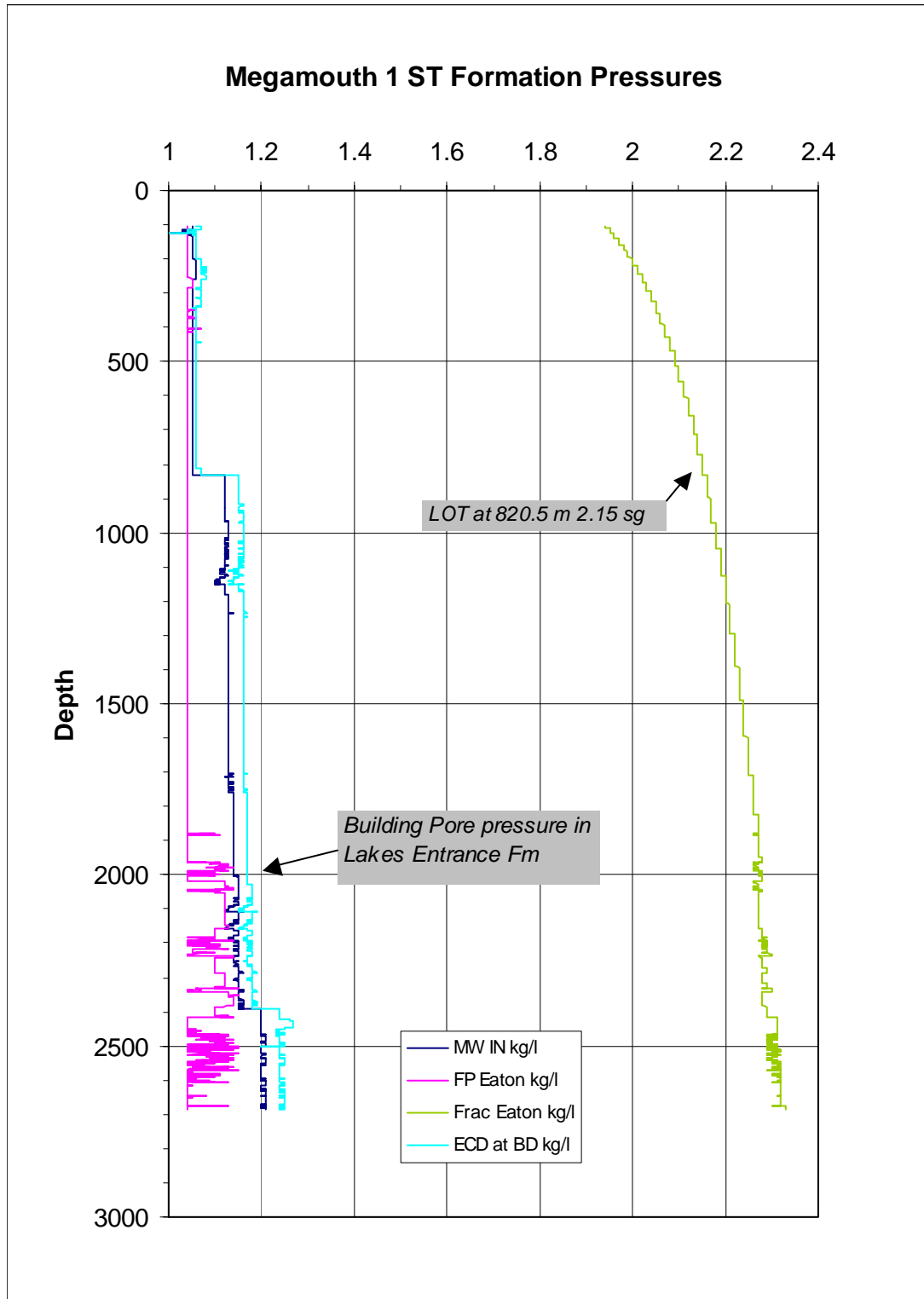
The d Exponent plot for this well shows a definite leftward trend in the interval corresponding to the argillaceous Lakes Entrance Formation from 1902 m to 2450 m. While this formation is known to be normally pressured throughout the Gippsland Basin, it may represent a zone of increasing pore pressure from essentially hydrostatic in the overlying carbonates to around 1.12 sg just above the top of the Latrobe sands.

4.2 Coefficients used for Megamouth-1 ST

Sources	: Local (from LOT)		
Poisson	: Ak = 0.07041	Bk = -0.43106	
Overburden	: As = 0.00308	Bs = -0.03701	Cs = 1.08502
Normal Trend slope values	104 m to 831 m:	a = 0.0001601	
		b = -0.3586671	
		offset = -0.012	
	831 m to 2688 m:	a = 0.0001601	
		b = -0.3586671	
		offset = -0.032	

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4.3 D-Exponent Plot



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5.0 DRILLING INFORMATION

5.1 Mud Record

From Spud to 831.0 m Megamouth-1 was drilled with Seawater, Guar gum and high viscosity sweeps with returns to the seabed.

From 831.0 m to 2688.0 m an Aqua-drill gel based mud system was used.

Depth m	MW SG	FV sec/qt	PV cps	YP lb/100ft	Gels	WL	Solids %	Sand %	Chlorides mg/l	Cake /32"
903	1.125	74	49	16	7 / 16	6.0	5.2	0.0	39500	1
1090	1.12	75	20	3	7 / 16	5.5	4.7	0.1	39000	1
1276	1.13	76	20	33	7 / 16	5.0	5.2	0.25	39250	1
1449	1.135	75	20	33	7 / 15	5.0	5.2	0.25	39300	1
1500	1.13	75	21	33	8 / 16	5.0	5.5	0.25	39400	1
1606	1.133	68	21	31	7 / 16	4.8	5.5	0.25	39100	1
1692	1.137	68	22	34	7 / 15	5.2	6.2	0.25	39500	1
1796	1.14	70	25	35	8 / 15	5.2	5.5	0.25	39500	1
1874	1.15	71	24	32	7 / 15	5.5	6.0	0.25	39500	1
1998	1.15	71	25	35	7 / 15	5.0	6.0	0.25	39500	1
2189	1.15	71	25	34	7 / 14	5.0	6.0	0.25	39500	1
2282	1.15	70	25	35	8 / 15	5.0	6.0	0.25	39000	1
2440	1.15	68	25	34	8 / 16	5.0	6.0	0.25	39000	1
2513	1.16	76	26	34	8 / 16	4.7	6.0	0.5	39000	1
2535	1.17	76	27	34	8 / 16	5.3	7.2	0.6	38000	1
2546	1.16	75	27	34	8 / 16	5.2	6.3	0.5	38000	1

MEGAMOUTH 1 ST

Depth m	MW SG	FV sec/qt	PV cps	YP lb/100ft	Gels	WL	Solids %	Sand %	Chlorides mg/l	Cake /32"
2415	1.2	73	24	27	6/12	7.0	8.5	0.6	38500	1
2425	1.2	75	24	29	7/14	7.0	8.5	0.5	38500	1
2504	1.2	70	25	35	7/15	5.5	7.55	0.25	38500	1
2517	1.2	68	25	35	7/14	5.5	7.55	0.25	38500	1
2585	1.2	79	25	36	7/15	5.0	8.0	0.30	39500	1
2668	1.2	80	25	37	7/15	4.8	8.1	0.25	38500	1
2688	1.2	78	25	36	7/15	5.2	8.1	0.25	38500	1

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5.2 Bit Record

Bit #	Size (in)	Make	Type	Jets	TFA In ²	In (m)	Out (m)	Run (m)	Hrs	WOB	RPM	TORQ kft*lbs	SPP	GPM	Grading
1	26 / 36 HO	Security	XN1C	3 x 18 1 x 20	1.05	102.6	148	45.4	1.8	0-3	45-55	2 - 4.1	1270	1050	0-0-NO-A-O-I-NO-TD
2	17½	Security	XT1	3 x 22 1 x 24 1 x 20	1.86	148	831	683	14.7	10-20	90-160	4 - 7	2650 - 2770	1110	1-1-NO-A-E-I-NO-TD
3	12¼	Security DBS	E52563	8 x 14	1.20	831	2546	1715	69.6	4-12	205-325	3 - 8	2700 - 3500	780-890	Lost In Hole; Plugged Back
4RR	12¼	Hughes	MX20DX	3 x 24		2393	2688	295	35.7	0-40	160-170	0 – 9	2700 - 3280	620-730	3-4-WT-A-E-1/16-BT-TD

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5.3 Hydraulic Listing Summary

Depth	Mud Weight	ECD	Flow Rate	Total Pressure Loss	Pressure Loss Across Bit	Mud Velocity Through bit	Bit Hydraulic Power	Mud Impact at Bit	Total Hydraulic Power	Ratio (Bit Pwr/Total Pwr)
(m)	(sg)	(sg)	(gpm)	(psi)	(psi)	(m/sec)	(hp)	(lbf)	(hp)	(%)
975	1.12	1.13+	894	2743	614	83	324	1169	1448	22.4
1565	1.13	1.15+	890	3338	628	83	330	1184	1754	18.8
1910	1.15	1.18+	843	3498	573	78	286	1081	1742	16.4
2477	1.15	1.18+	797	3528	512	74	241	965	1660	14.5
2546	1.15	1.18+	704	3093	399	65	166	752	1285	12.9
2688	1.20	1.23+	730	2734	283	54	122	672	1179	10.4

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5.4 Drilling Phase Summary

5.4.1 914 mm (36") Hole Section

Dates	: 17 th November 2003
Measured depth	: 102.6 m to 148.0 m
TVDSS	: 80.2 m to 125.6 m
Number of bits used	: 1 x 26" bit & 1 x 36" H/O
Mud type	: Seawater, Guar gum & gel sweeps

The well was spudded with a 660 mm (26") Security XN1C bit with 3 x 18, 1 x 20 jets and a 914 mm (36") hole opener, tagging the seafloor at 102.6 m RT. Megamouth-1 was spudded at 16:15 hrs on the 17th of November 2003 and 660/914 mm hole was drilled to 148.0 m. This section was drilled with seawater, Guar gum sweeps and Hi-Vis gel sweeps with returns to the seafloor. 45.4 m were drilled in 1.8 hrs for an average ROP of 24 m/hr and the bit was graded: 0-0-NO-A-O-I-NO-TD

A combination 762 mm (30") and 500 mm (20") conductor casing was run on a PBG and cemented as per programme with the shoe at 148.0 m.

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5.4.2 445 mm (17½") Hole Section

Dates	: 19 th & 20 th November 2003
Measured depth	: 148.0 m to 831.0 m
TVDSS	: 125.6 m to 808.6 m
Number of bits used	: 1
Mud type	: Seawater, Guar gum & gel sweeps

Bit #2, a 445 mm (17½") Security DBS XTISC with 2 x 22 and 1 x 24 and 1 x 20 (centre) nozzles was then made up and run in hole. The TOC was tagged at 142.5 m and drilled out, and new hole was drilled from 148.0 m to TD of the 445 mm (17½") section at 831.0 m. This bit drilled 683.0 m in 14.7 on bottom hours for an average ROP of 46.5 m/hr with no problems and was graded: 1-1-NO-A-E-I-NO-TD.

After conditioning the hole, 55 joints of L-80 grade 340 mm (13⅜") casing were run and cemented, with the shoe set at 820.5 m.

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5.4.3 311 mm (12¼") Hole Section

Dates	: 22 nd to 27 th November 2003
Measured depth	: 831.0 m to 2546.0 m
TVDSSLAT	: 808.6 m to 2523.6 m
Number of bits used	: 1
Mud type	: Aqua-drill

The BOP stack and riser were run, and tested as per programme.

Bit #3, a 311 mm (12¼") security DBS E52563 PDC bit, dressed with 8 x 14 nozzles was made up with an Anadrill mud motor and Sperry Sun MWD / EMW tools and run into the hole tagging the TOC at 793.0 m. After drilling out the cement and shoe and washing the rathole, 3.0 m of new formation was drilled to 834.0 m. A Leak Off Test was conducted to 1250 psi surface pressure with 1.12 sg mud, resulting in an EMW of 2.19 sg. The 311 mm (12¼") hole was drilled from 834.0 to 2546.0 m where a sudden pressure loss of 900 psi was seen. It was thought at this point that the mud motor had parted and on pulling the string back to surface this was seen to be the case. This bit drilled 1715.0 m in 69.6 on-bottom hours, for an average ROP of 24.6 m/hr.

A fishing trip was made with an overshot and grapple, this was RIH on 5" HWDP and 5"DP. The fishing trip was unsuccessful, so a cement plug was set at bottom. However, on attempting to tag cement for kick-off, no firm cement was found and time drilling was conducted with no evident success. The kick-off / drilling assembly was pulled out and a second cement plug was set successfully after one incorrectly mixed slurry was circulated out of the hole and discarded overboard. The cementing string was POOH, the BOP was function tested and the choke and kill lines were flushed and the same kick-off / drilling assembly was rerun to begin the sidetrack and drill to TD.

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Megamouth-1 ST











































5.4.4 311 mm (12¼") Hole Section

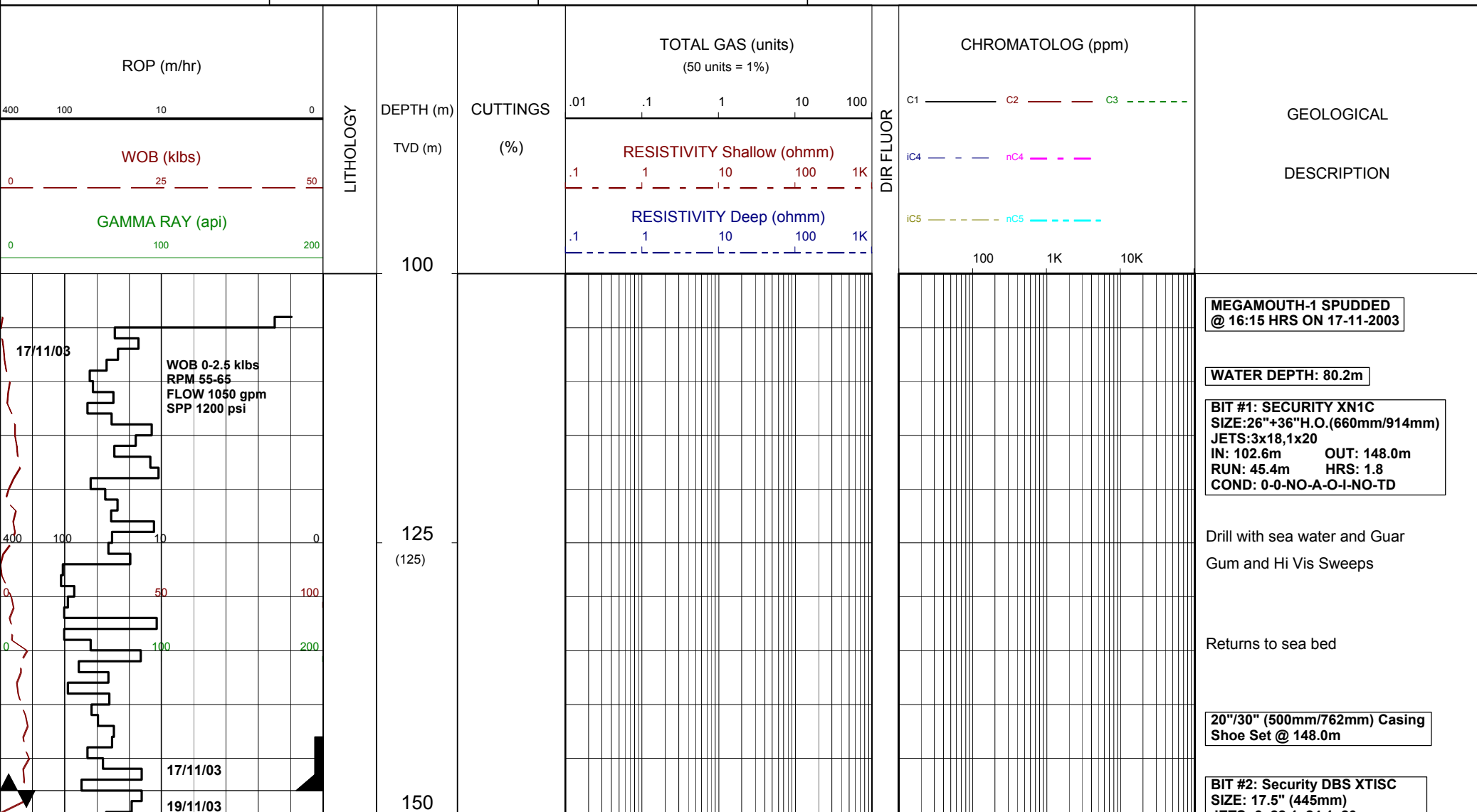
Dates	: 30 th Nov to 2 nd Dec 2003
Measured depth	: 2393.0 m to 2688.0 m
TVDSS	: 2370.6 m to 2654.9 m
Number of bits used	: 1
Mud type	: Aqua-drill

The hole was sidetracked with Bit #4RR, a 311 mm (12¼") Hughes MX20DX PDC bit, which was made up with a BHA incorporating Sperry Sun MWD tools and a Schlumberger mud motor. The first traces of soft cement were tagged at 2347.0 m and the kick-off commenced at 2393.0 m when hard cement was encountered. The first traces of formation were collected at depth 2448.0 m. This assembly drilled down to the final TD of 2688.0 m MDRT (2677.3 m TVDRT), taking surveys as per requirements to attain and maintain the desired well path. The maximum hole deviation in the sidetrack was 17.94° at 2656.6m. This bit drilled 295.0 m in 35.7 drilling hrs for an average ROP of 8.26 m/hr. The bit was graded as: 3-4-WT-A-E-1/16-BT-TD

Two abandonment plugs were set as per plan, after which the casing was cut and the BOP stack unlatched. The Marine riser and BOP stack were then pulled to surface. The anchors were then pulled back and the rig was released.

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LITHOLOGY	ACCESSORIES	DRILLING DATA	ABBREVIATIONS	
 Conglomerate	 Pyrite	 Casing Shoe	BOPD - Barrels of Oil Per Day	OG - Over Gauge
 Coarse Sandstone	 Siderite	 Bit Trip	BWPD - Barrels of Water Per Day	OH - Open Hole
 Med Sandstone	 Glauconite	 Wiper Trip	CG - Connection Gas	OTS - Oil To Surface
 Fine Sandstone	 Feldspar	 Core	CO - Circulate Out	Q - Flow Rate
 VF Sandstone	 Mica	 DST	COND - Condensate	REC - Recovery
 Siltstone	 Ferrous	 Deviation Survey	c/c - Crush Cut	Rmf - Resistivity Mud Filtrate
 Carb. Siltstone	 Chert	<div>MUD DATA</div> <div>MW - Mud Weight</div> <div>FV - Funnel Viscosity (s/qt)</div> <div>PV - Plastic Viscosity (cps)</div> <div>YP - Yield Point (lb/100ftsq)</div> <div>Gel - Gel Strength (10sec)</div> <div>WL - Water Loss (cc/30min)</div> <div>pH - Acidity / Alkalinity</div> <div>Ck - Cake (32nd/inch)</div> <div>Sol - Solids (% vol)</div> <div>Cl - Chlorides (mg/l)</div>	DST - Drill Stem Test	ROP - Rate Of Penetration
 Calc. Siltstone	 Calcareous		FLOW - Flow Rate (gal/min)	RPM - Revolutions Per Minute
 Clay	 Dolomitic		GCM - Gas Cut Mud	RTSTM- Rate Too Small To Measure
 Limestone	 Carbonaceous		GCW - Gas Cut Water	Rw - Resistivity water
 Dolomite	 Lithoclast		GTS - Gas To Surface	r/r - Ring Residue
 Coal	 Breccia		INJ - Injection of Mist (bbbls/hr)	SCFM - Standard Cubic ft/min (air)
 Anhydrite	 Foraminifera		LCM - Lost Circulation Material	SGCM - Slightly Gas Cut Mud
 Marl	 Corals		MMCFD- Million Cubic Feet / Day	SPM - Strokes Per Minute
 Gypsum	 Inoceramus		NGTS - No Gas To Surface	SPP - Stand Pipe Pressure
 Volcanic	 Bryozoa		NOTS - No Oil To Surface	SWC - Side-Wall Core
 Metamorphic	 Plant remains		NR - No Returns	TG - Trip Gas
 Cement	 Fossils		OCM - Oil Cut Mud	WOB - Weight On Bit



JEYS: 3x22,1x24,1x20
IN: 148.0m OUT: 831.0m
RUN: 683.0m HRS: 14.66
COND: 1-1-NO-A-E-I-NO-TD

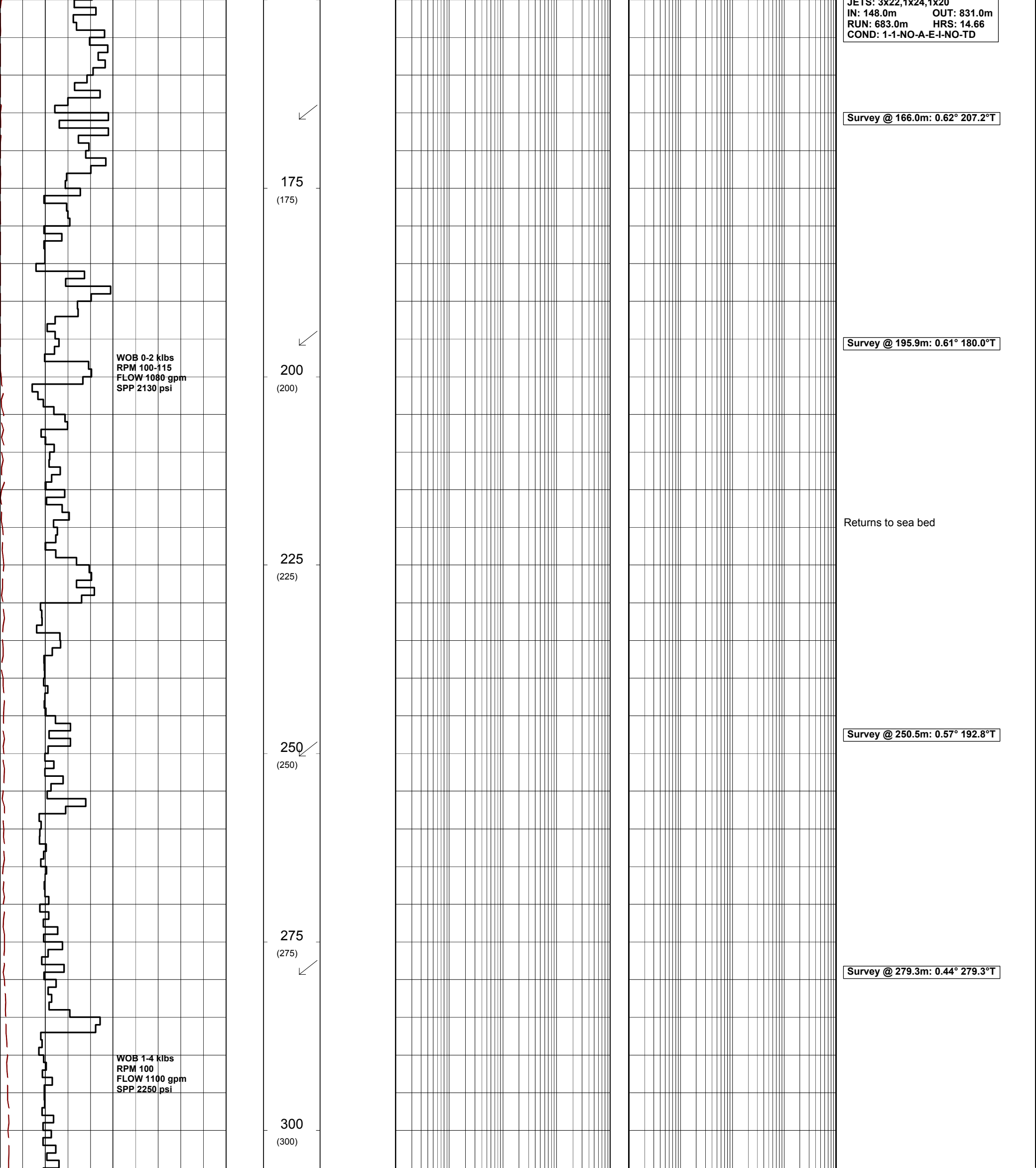
Survey @ 166.0m: 0.62° 207.2°T

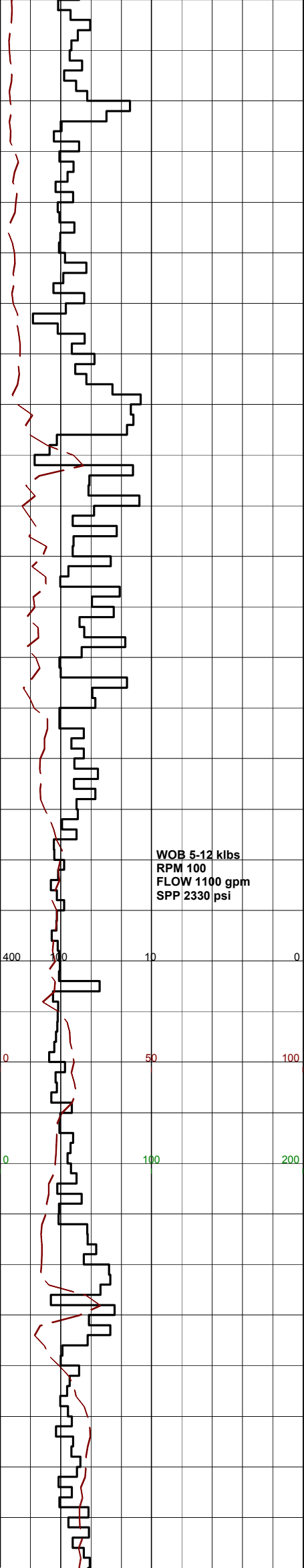
Survey @ 195.9m: 0.61° 180.0°T

Returns to sea bed

Survey @ 250.5m: 0.57° 192.8°T

Survey @ 279.3m: 0.44° 279.3°T





325
(325)

350
(350)

375
(375)

400
(400)

425
(425)

450
(450)

.01 .1 1 10 100

.1 1 10 100 1K

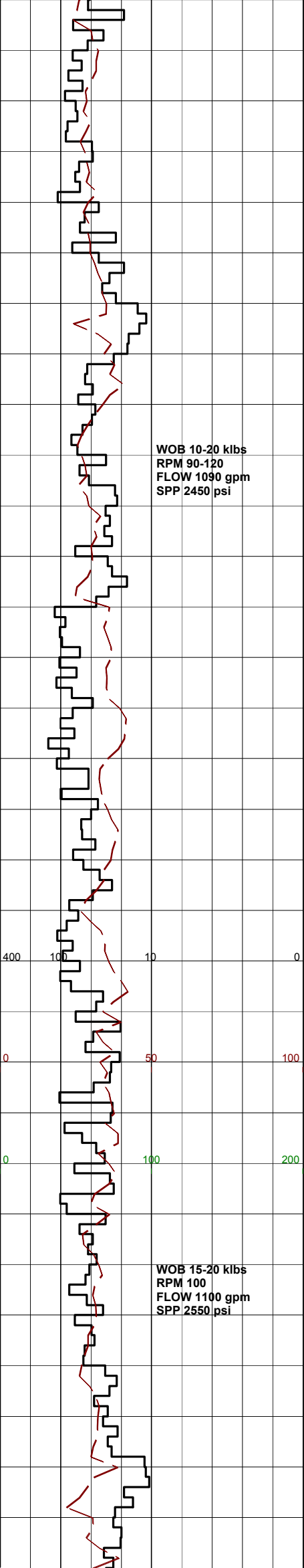
.1 1 10 100 1K

100 1K 10K

Returns to Sea bed.

Survey @ 367.3m: 0.37° 206.52°T

Survey @ 454.0m: 0.50° 187.1°T



475
(475)

500
(500)

525
(525)

550
(550)

575
(575)

600
(600)

WOB 10-20 klbs
RPM 90-120
FLOW 1090 gpm
SPP 2450 psi

WOB 15-20 klbs
RPM 100
FLOW 1100 gpm
SPP 2550 psi

.01 .1 1 10 100

.1 1 10 100 1K

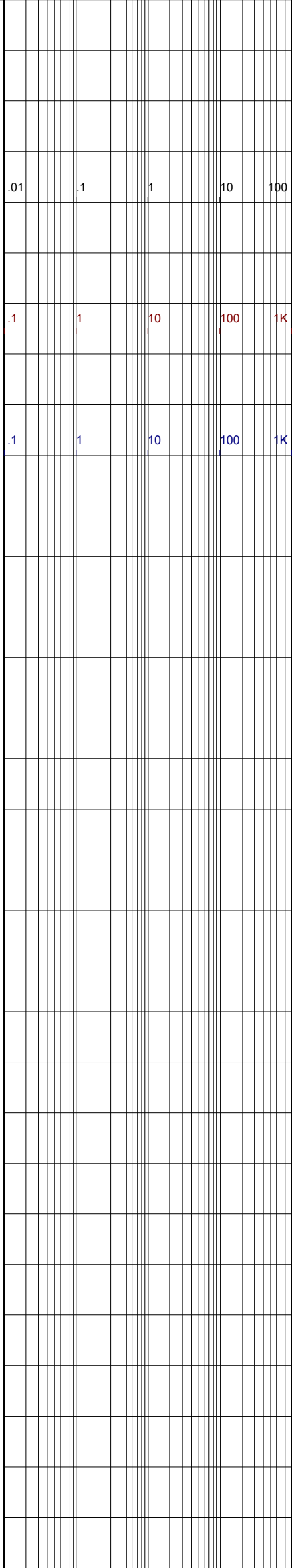
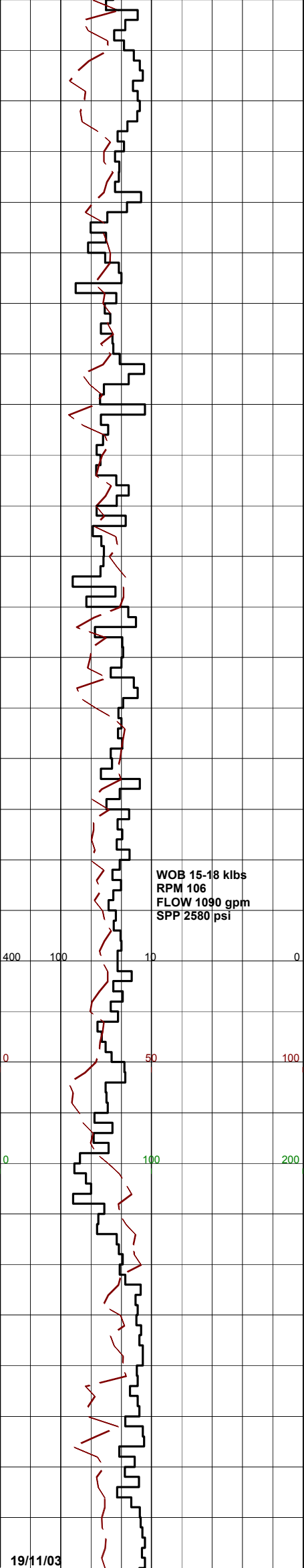
.1 1 10 100 1K

100 1K 10K

Drill with Sea water and Guar

Survey @ 541.5m: 0.15° 197.9T°

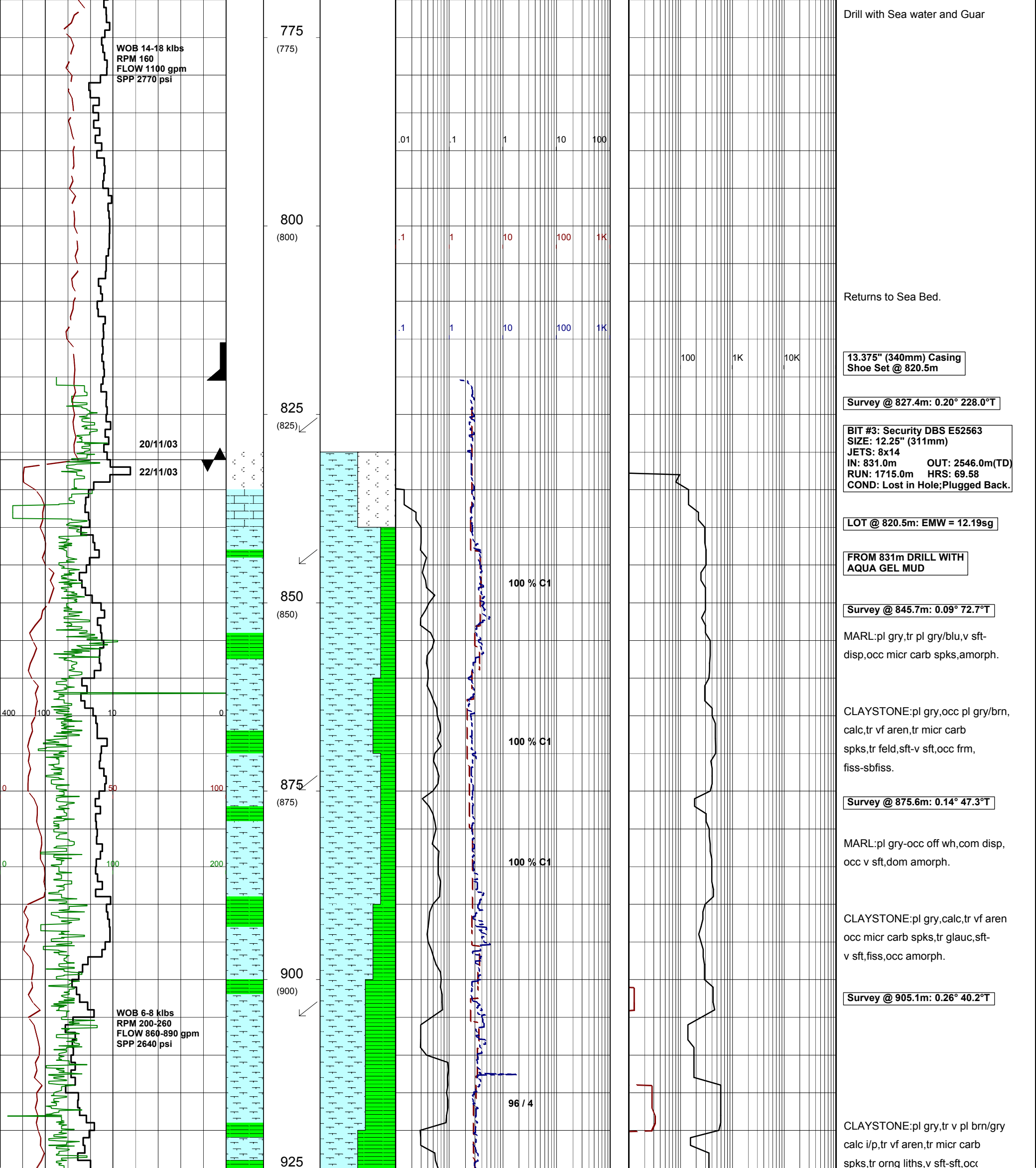
Returns to Sea Bed.

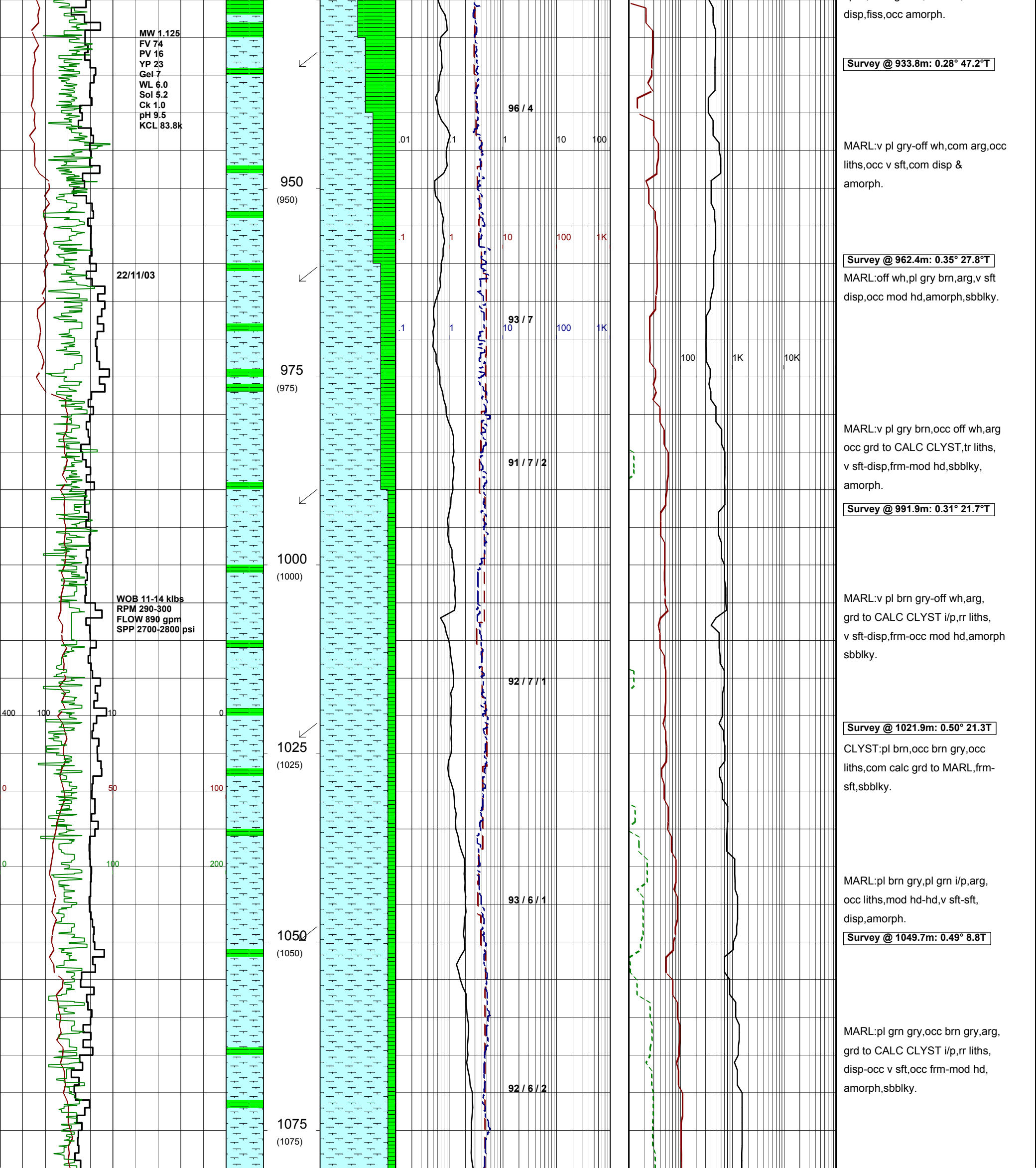


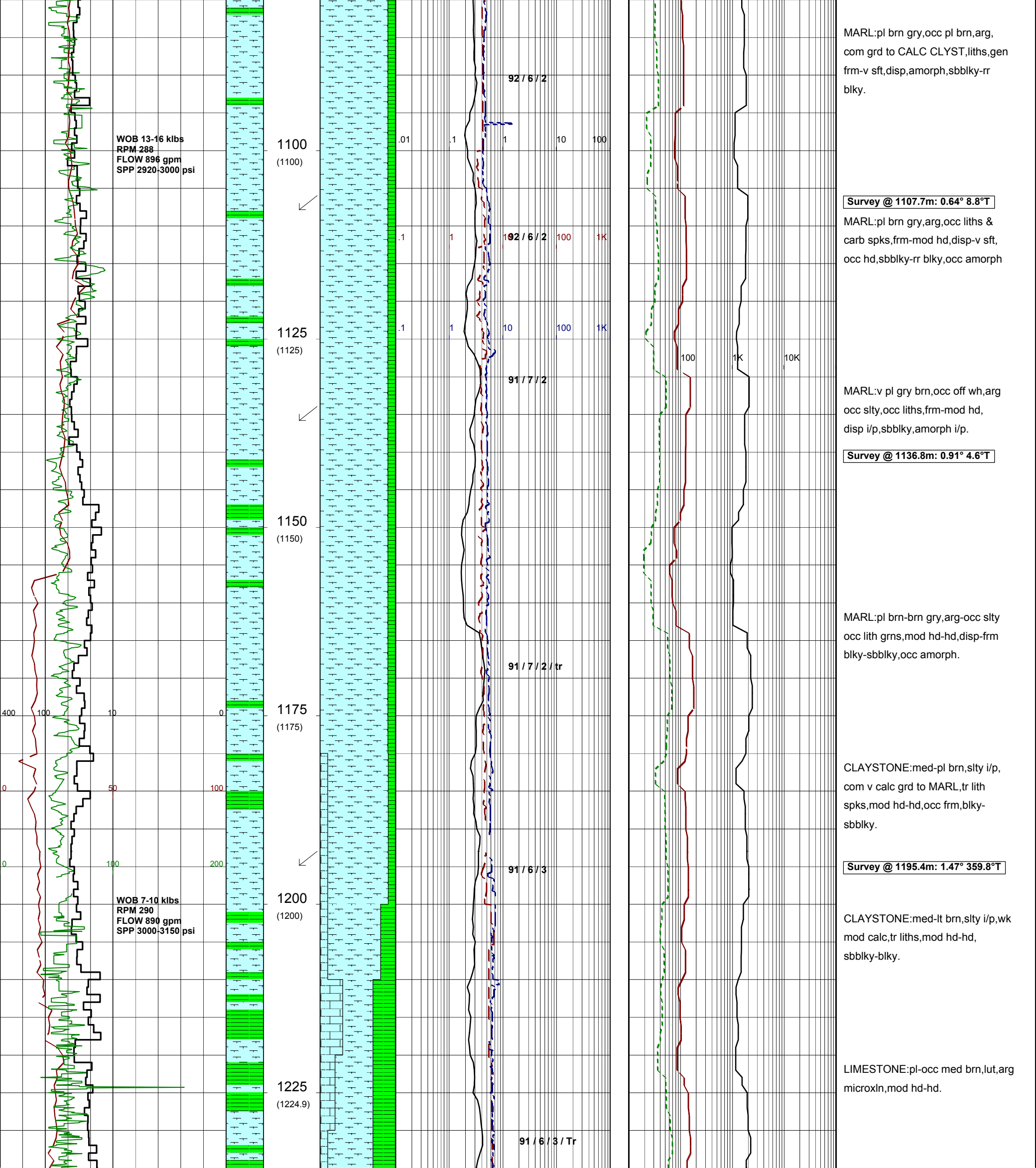
Survey @ 628.7m: 0.26° 209.8°T

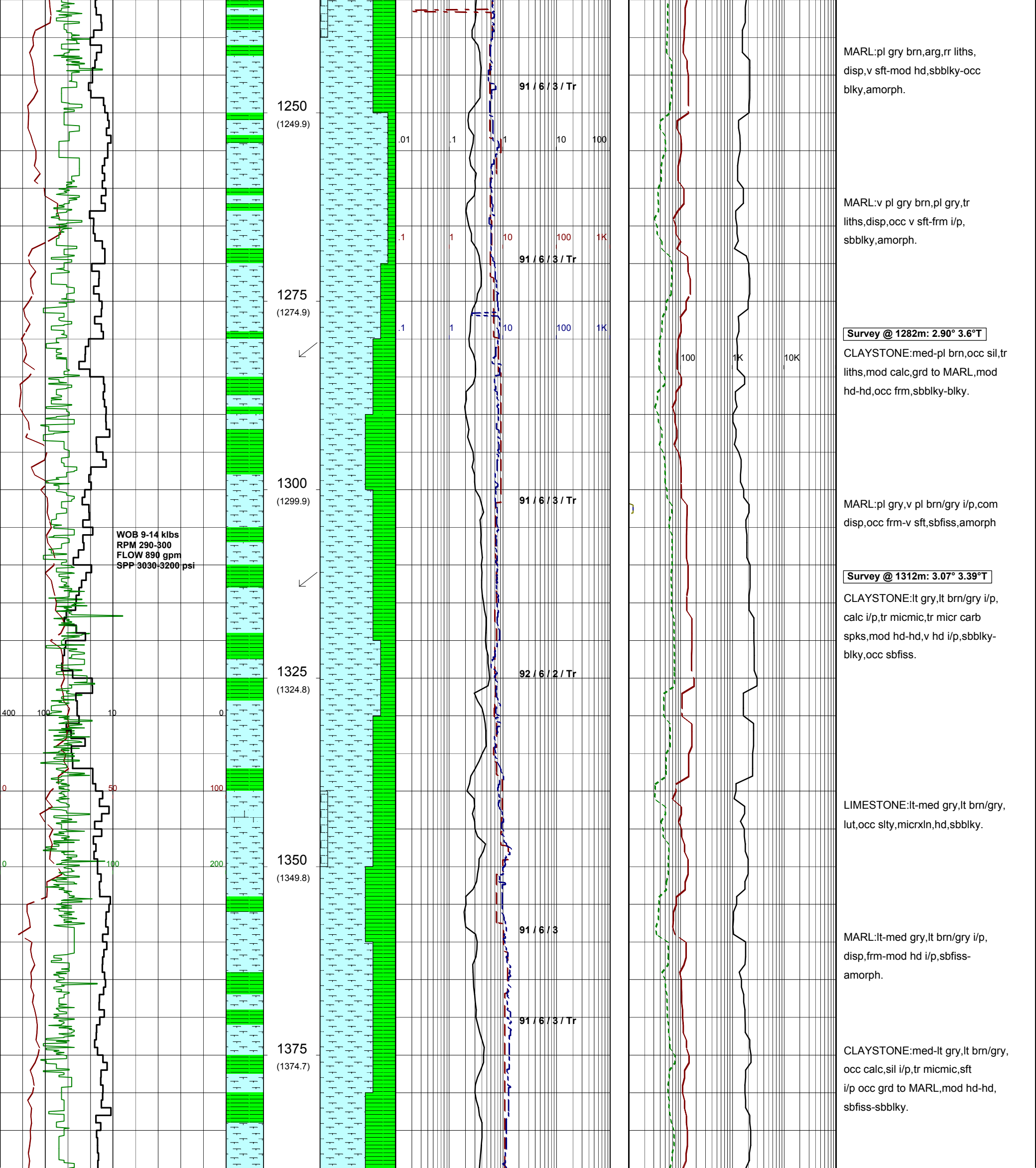
Survey @ 684.5m: 0.13° 189.4°T

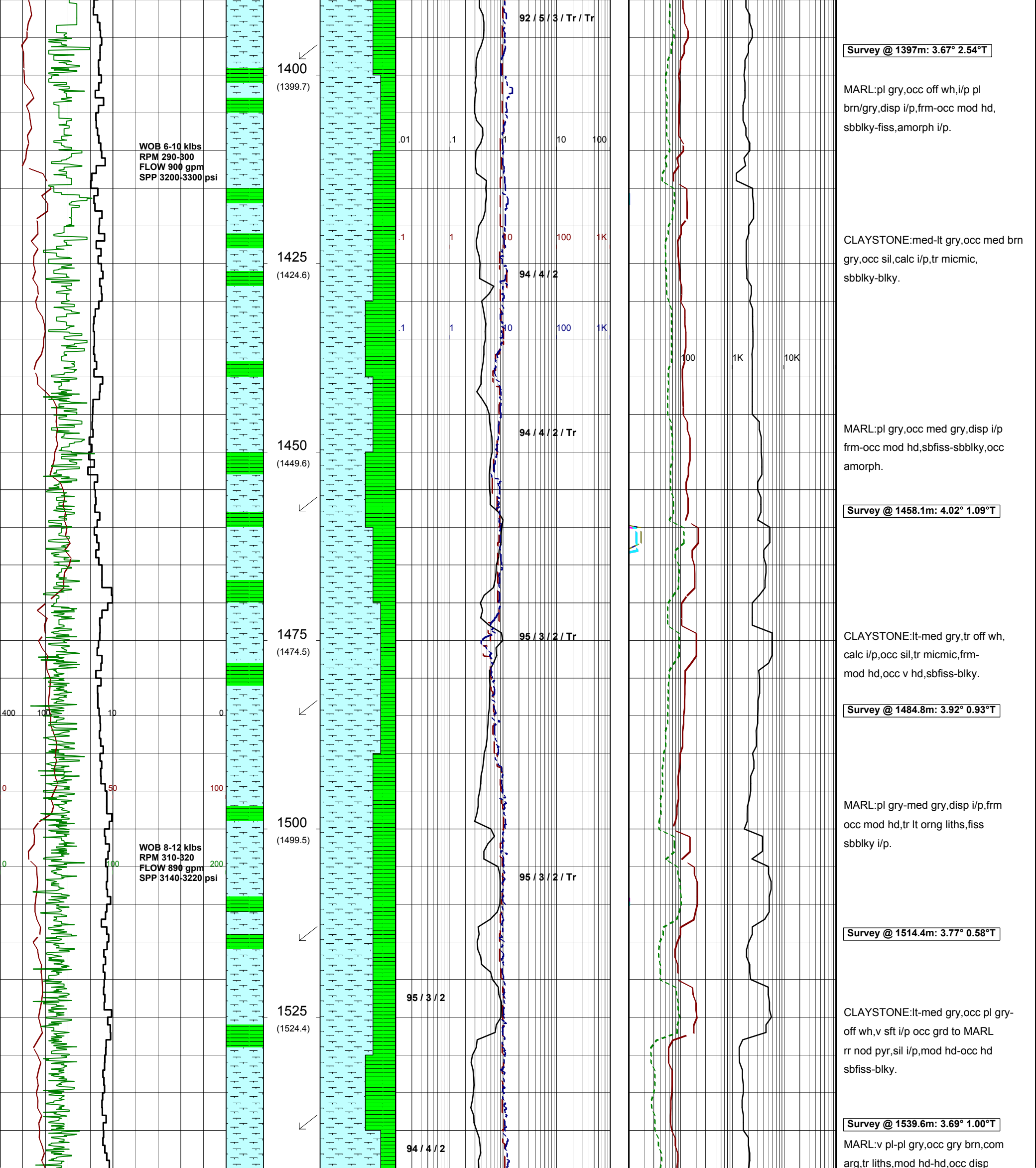
Survey @ 714.2m: 0.13° 239.7°T

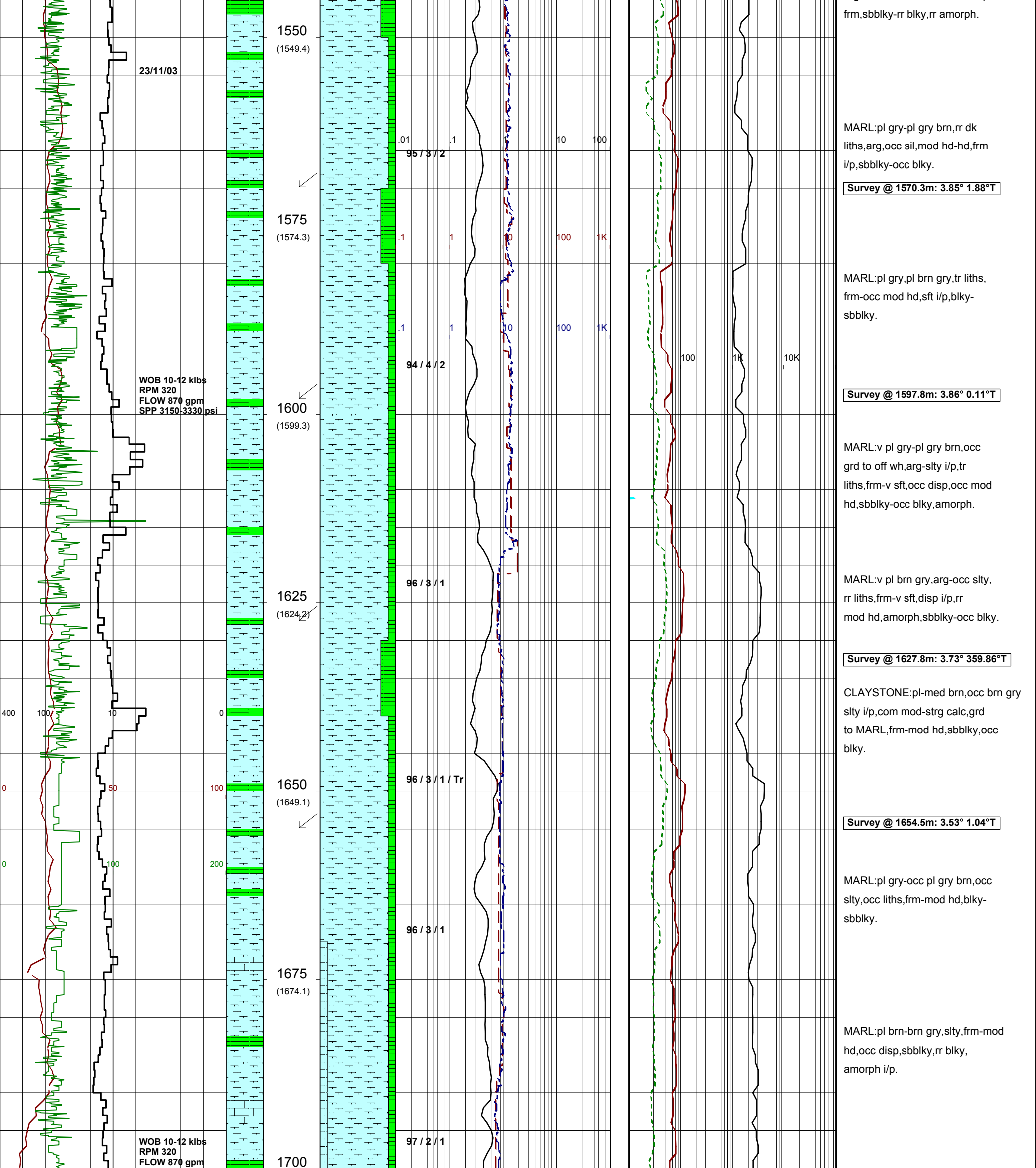


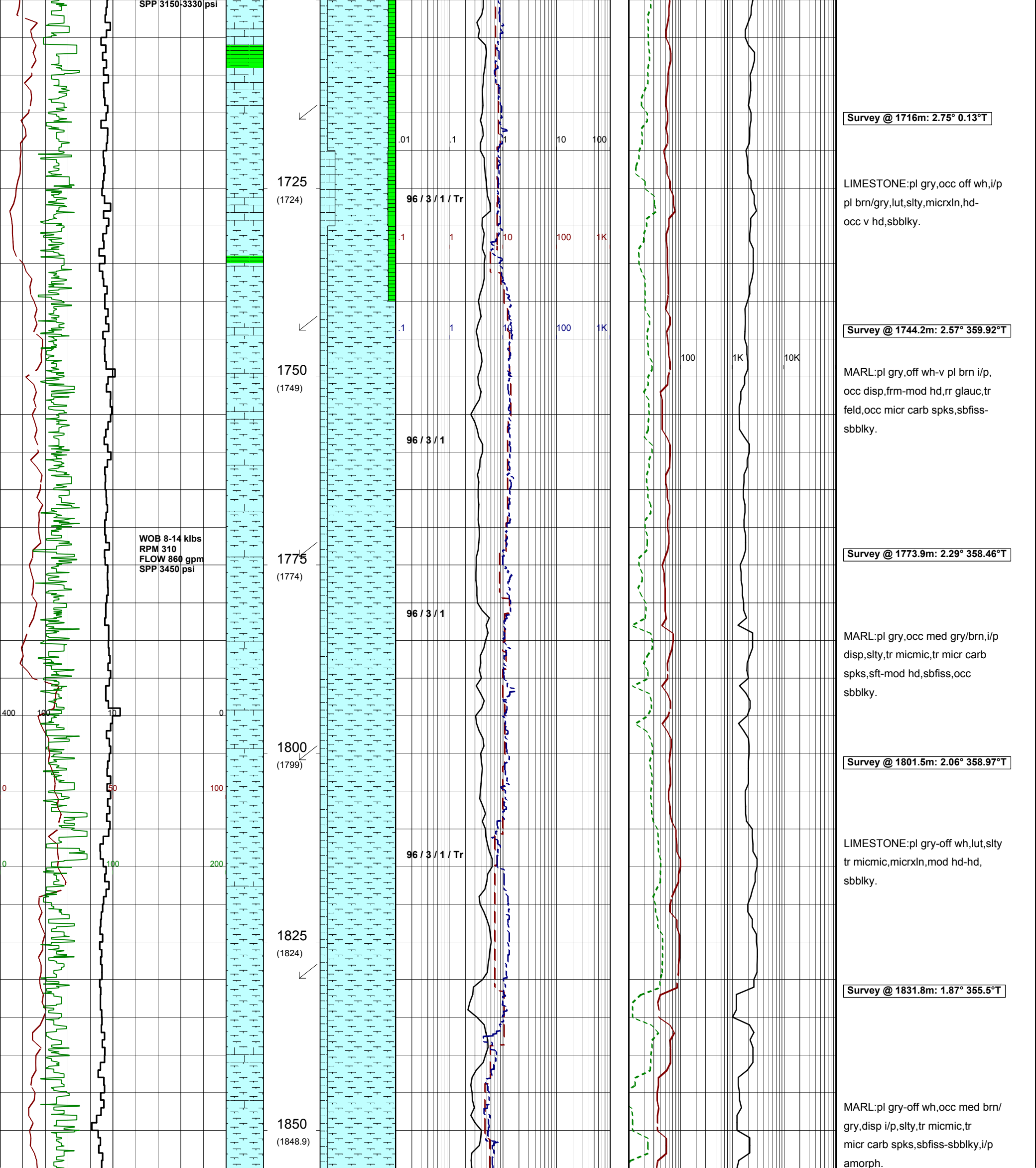


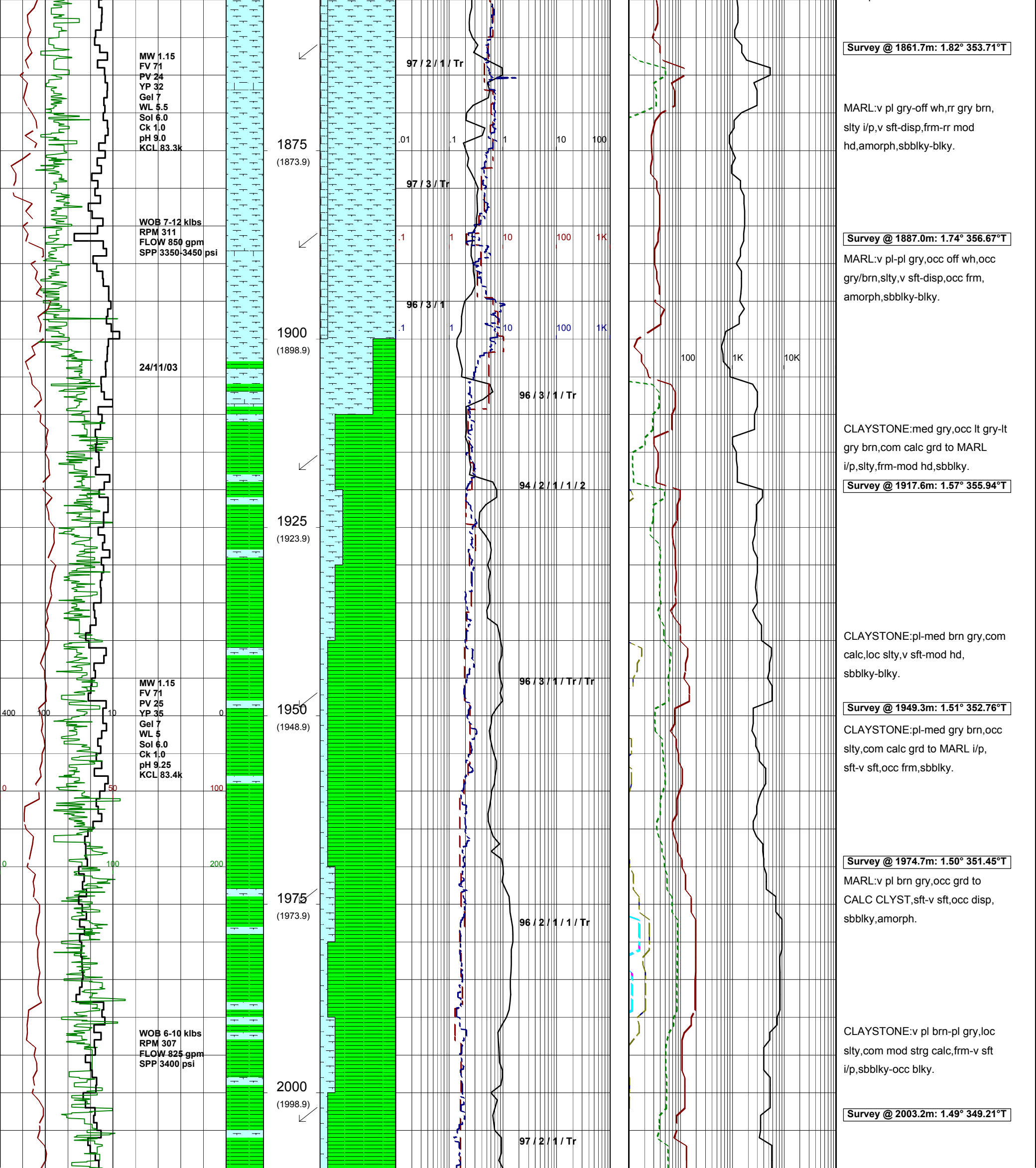


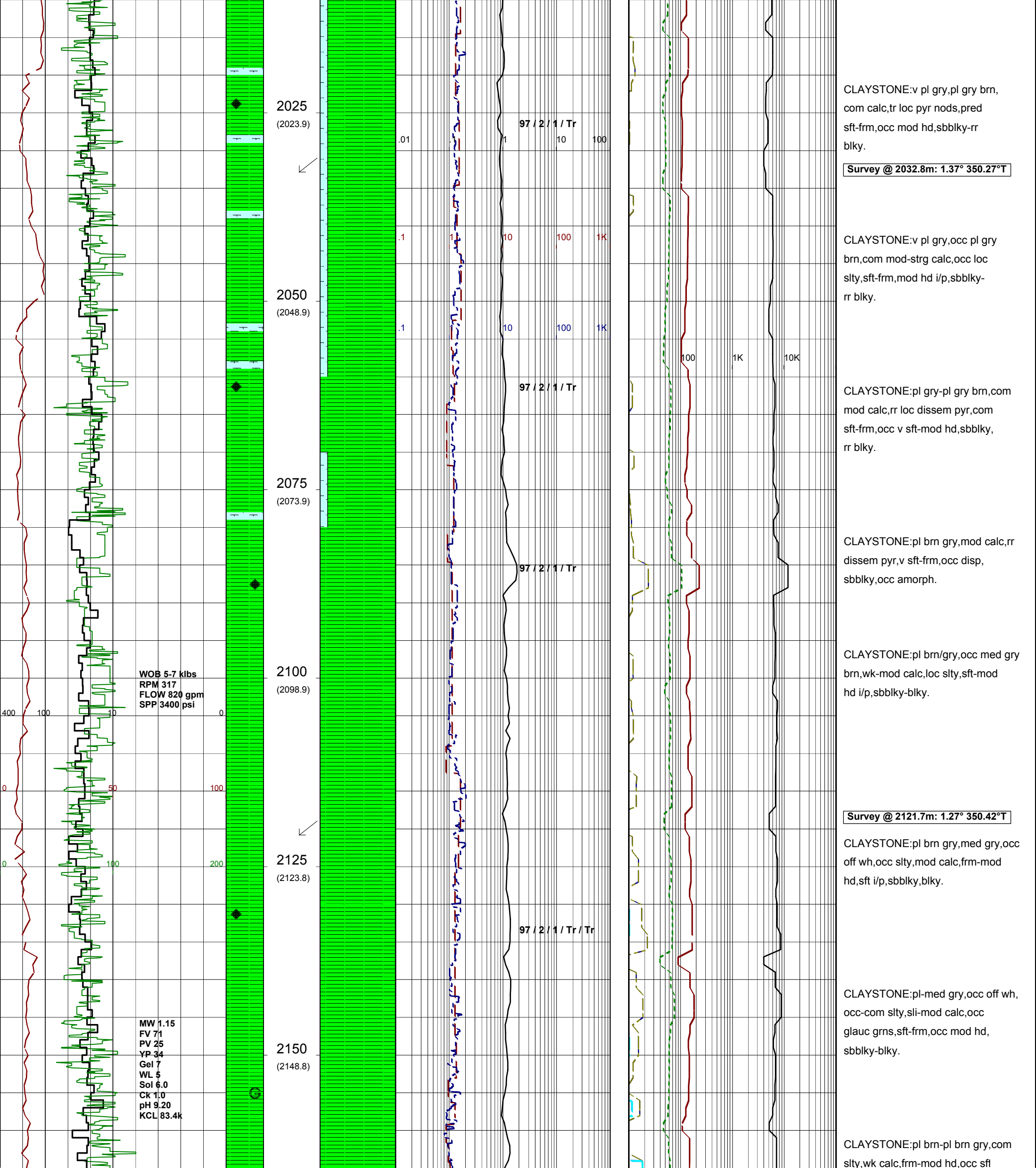


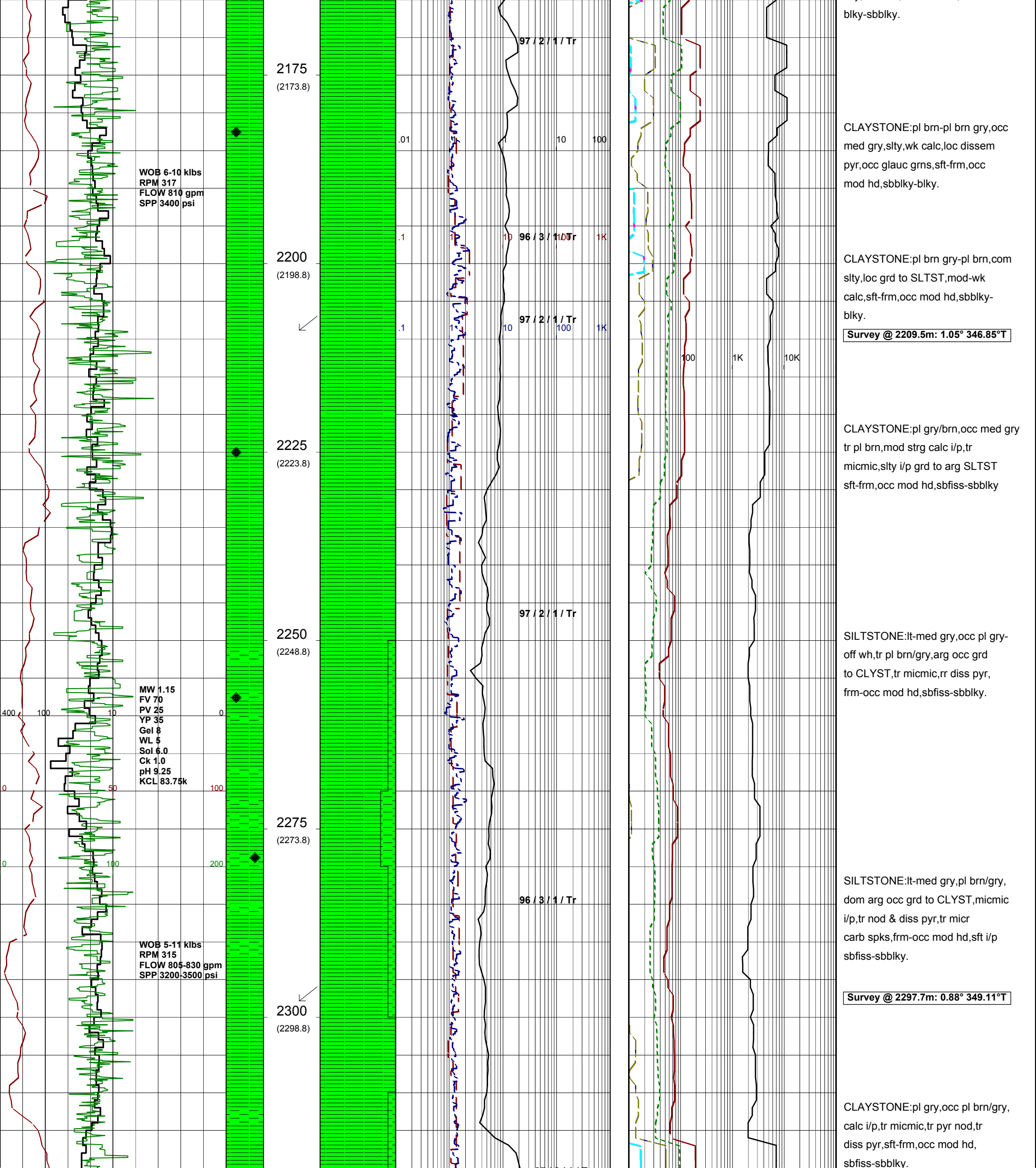


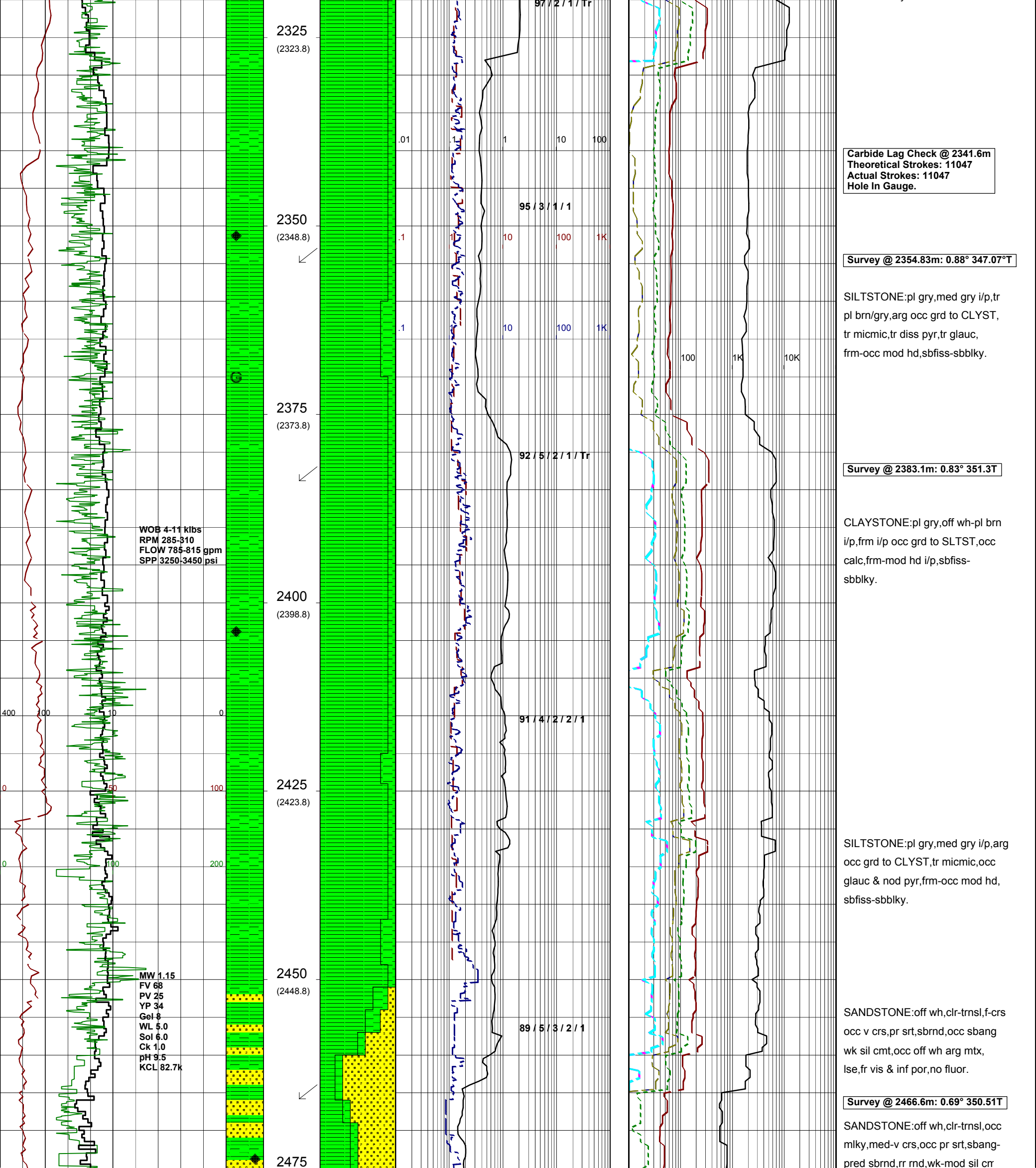


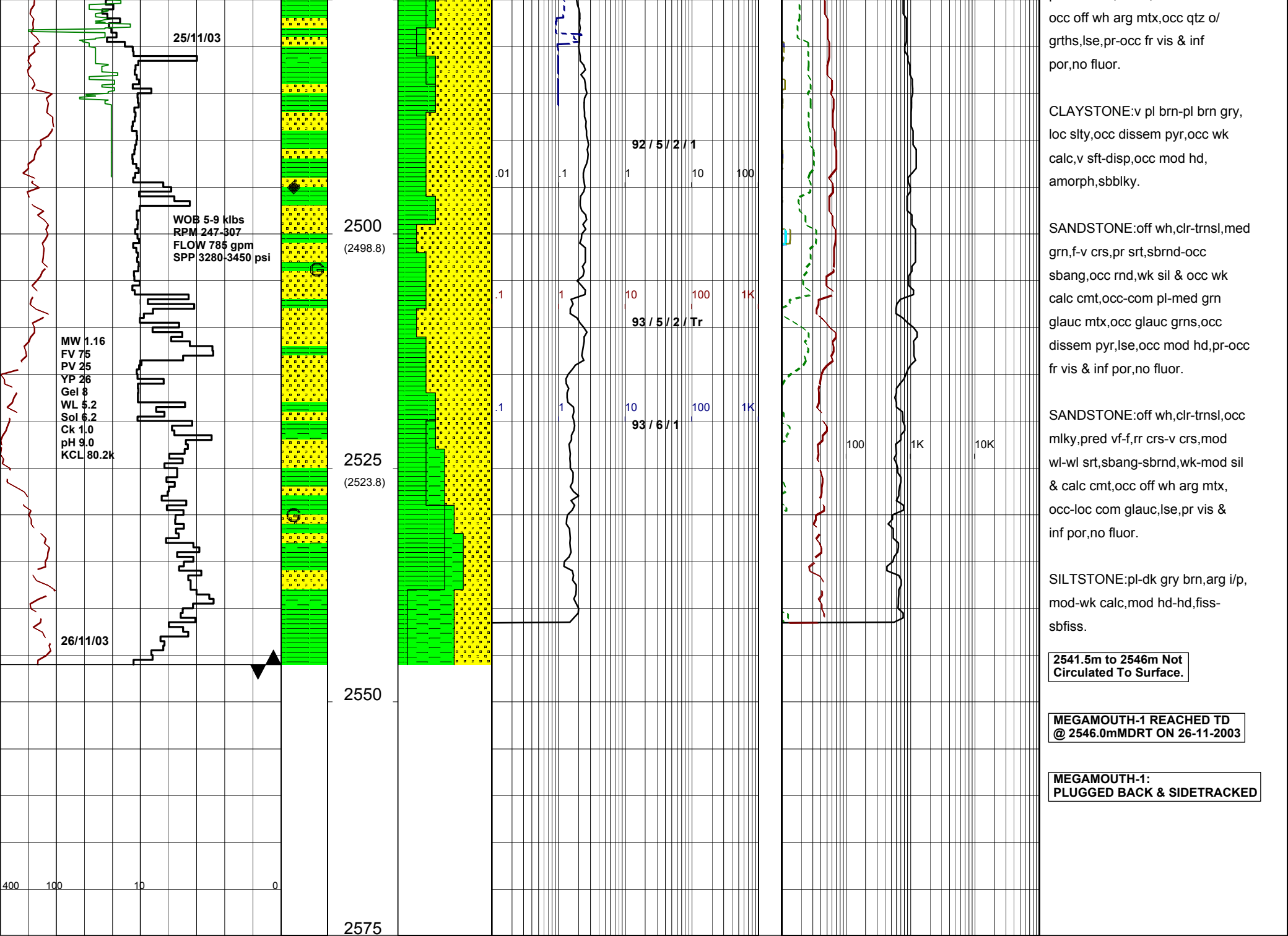






















































occ off wh arg mtx,occ qtz o/
grths,lse,pr-occ fr vis & inf
por,no fluor.

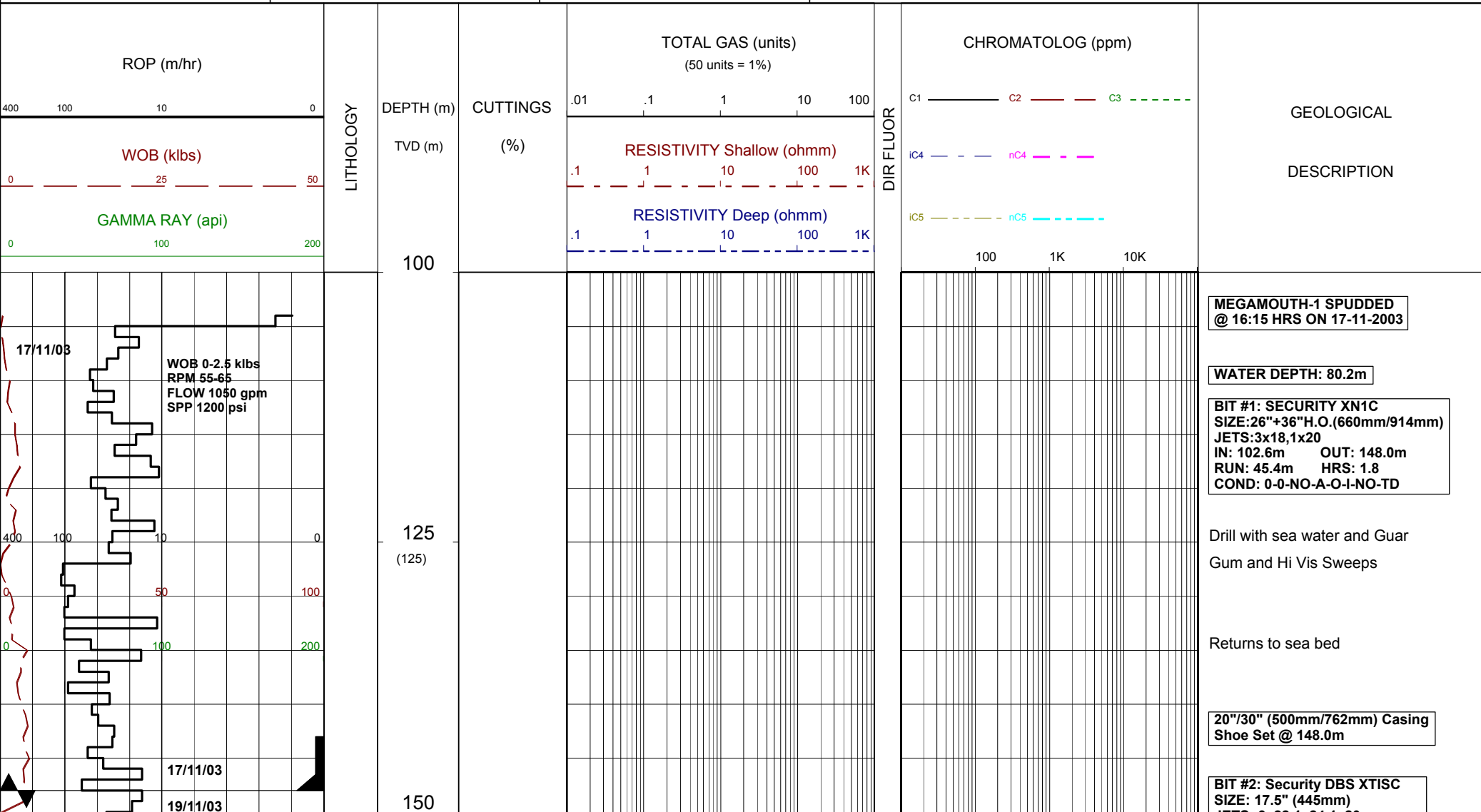
CLAYSTONE:v pl brn-pl brn gry,
loc slty,occ dissem pyr,occ wk
calc,v sft-disp,occ mod hd,
amorph,sbblky.

SANDSTONE:off wh,clr-trnsl,med
grn,f-v crs,pr srt,sbrnd-occ
sbang,occ rnd,wk sil & occ wk
calc cmt,occ-com pl-med grn
glauc mtx,occ glauc grns,occ
dissem pyr,lse,occ mod hd,pr-occ
fr vis & inf por,no fluor.

SANDSTONE:off wh,clr-trnsl,occ
mlky,pred vf-f,rr crs-v crs,mod
wl-wl srt,sbang-sbrnd,wk-mod sil
& calc cmt,occ off wh arg mtx,
occ-loc com glauc,lse,pr vis &
inf por,no fluor.

SILTSTONE:pl-dk gry brn,arg i/p,
mod-wk calc,mod hd-hd,fiss-
sbfiss.

LITHOLOGY		ACCESSORIES		DRILLING DATA		ABBREVIATIONS	
	Conglomerate		Pyrite		Casing Shoe	BOPD	- Barrels of Oil Per Day
	Coarse Sandstone		Siderite		Bit Trip	BWPD	- Barrels of Water Per Day
	Med Sandstone		Glauconite		Wiper Trip	CG	- Connection Gas
	Fine Sandstone		Feldspar		Core	CO	- Circulate Out
	VF Sandstone		Mica		DST	COND	- Condensate
	Siltstone		Ferrous		Deviation Survey	c/c	- Crush Cut
	Carb. Siltstone		Chert			DST	- Drill Stem Test
	Calc. Siltstone		Calcareous			FLOW	- Flow Rate (gal/min)
	Clay		Dolomitic			GCM	- Gas Cut Mud
	Limestone		Carbonaceous			GCW	- Gas Cut Water
	Dolomite		Lithoclast			GTS	- Gas To Surface
	Coal		Breccia			INJ	- Injection of Mist (bbls/hr)
	Anhydrite		Foraminifera			LCM	- Lost Circulation Material
	Marl		Corals			MMCFD	- Million Cubic Feet / Day
	Gypsum		Inoceramus			NGTS	- No Gas To Surface
	Volcanic		Bryozoa			NOTS	- No Oil To Surface
	Metamorphic		Plant remains			NR	- No Returns
	Cement		Fossils			OCM	- Oil Cut Mud
						OG	- Over Gauge
						OH	- Open Hole
						OTS	- Oil To Surface
						Q	- Flow Rate
						REC	- Recovery
						Rmf	- Resistivity Mud Filtrate
						ROP	- Rate Of Penetration
						RPM	- Revolutions Per Minute
						RTSTM	- Rate Too Small To Measure
						Rw	- Resistivity water
						r/r	- Ring Residue
						SCFM	- Standard Cubic ft/min (air)
						SGCM	- Slightly Gas Cut Mud
						SPM	- Strokes Per Minute
						SPP	- Stand Pipe Pressure
						SWC	- Side-Wall Core
						TG	- Trip Gas
						WOB	- Weight On Bit



JEYS: 3x22,1x24,1x20
IN: 148.0m OUT: 831.0m
RUN: 683.0m HRS: 14.66
COND: 1-1-NO-A-E-I-NO-TD

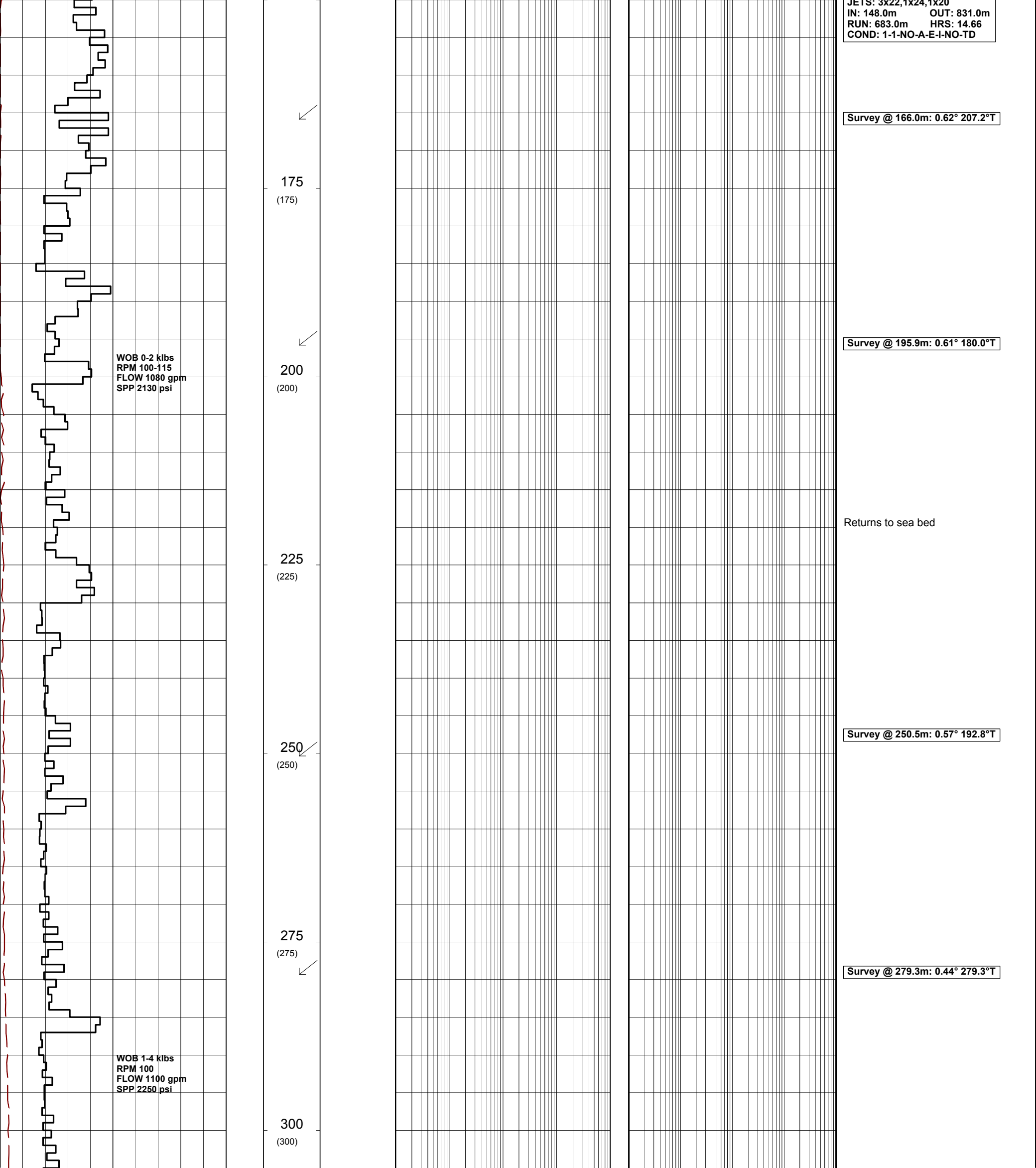
Survey @ 166.0m: 0.62° 207.2°T

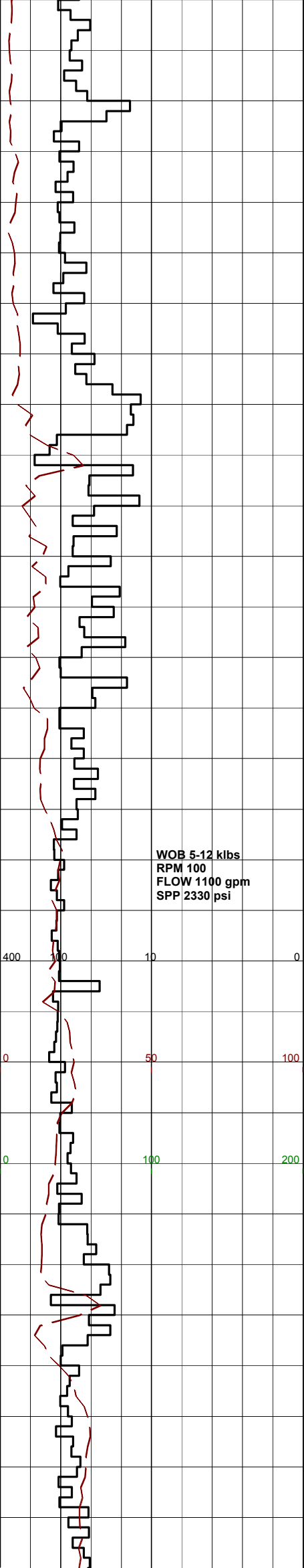
Survey @ 195.9m: 0.61° 180.0°T

Returns to sea bed

Survey @ 250.5m: 0.57° 192.8°T

Survey @ 279.3m: 0.44° 279.3°T





325
(325)

350
(350)

375
(375)

400
(400)

425
(425)

450
(450)

WOB 5-12 klbs
RPM 100
FLOW 1100 gpm
SPP 2330 psi

.01 .1 1 10 100

.1 1 10 100 1K

.1 1 10 100 1K

100

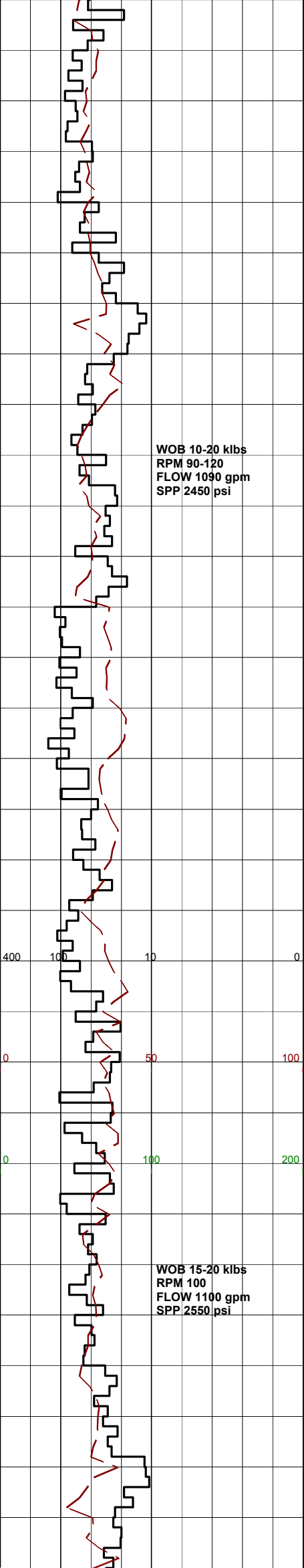
1K

10K

Returns to Sea bed.

Survey @ 367.3m: 0.37° 206.52°T

Survey @ 454.0m: 0.50° 187.1°T



475
(475)

500
(500)

525
(525)

550
(550)

575
(575)

600
(600)

.01 .1 1 10 100

.1 1 10 100 1K

.1 1 10 100 1K

100

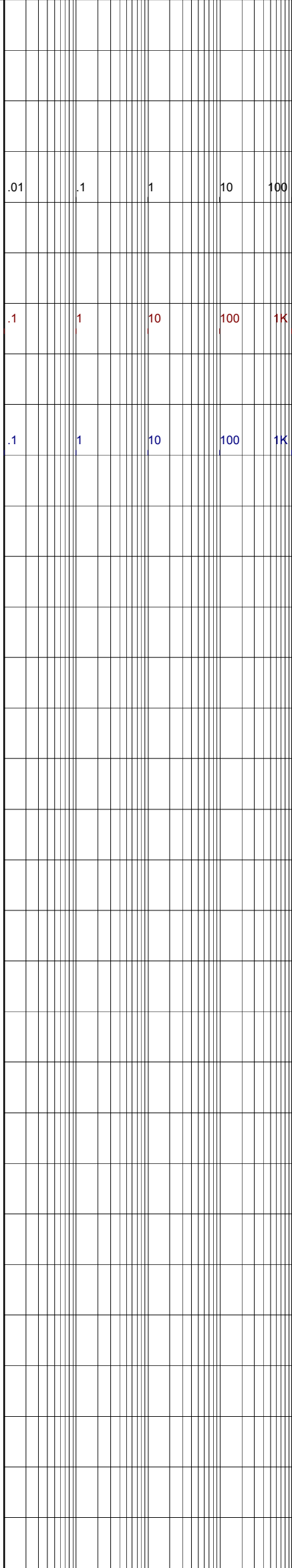
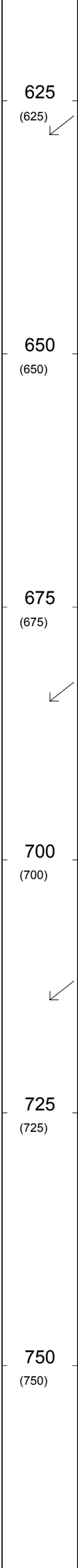
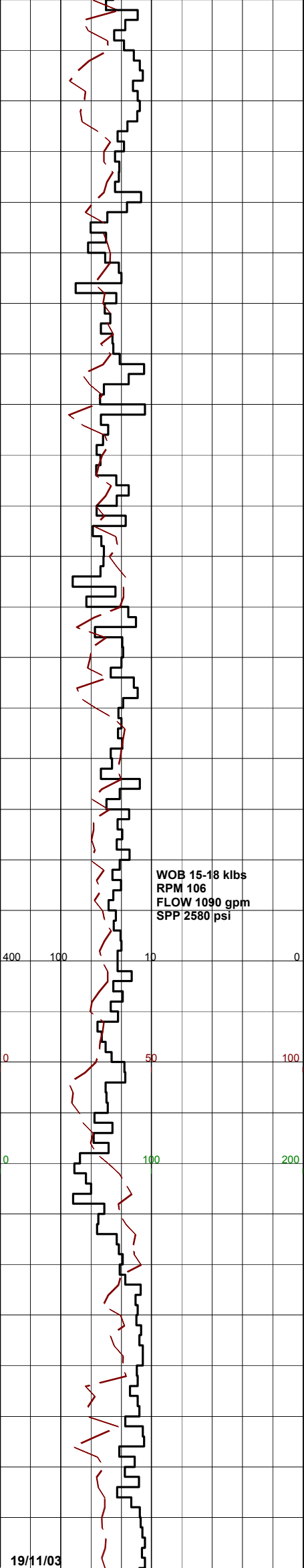
1K

10K

Drill with Sea water and Guar

Survey @ 541.5m: 0.15° 197.9T°

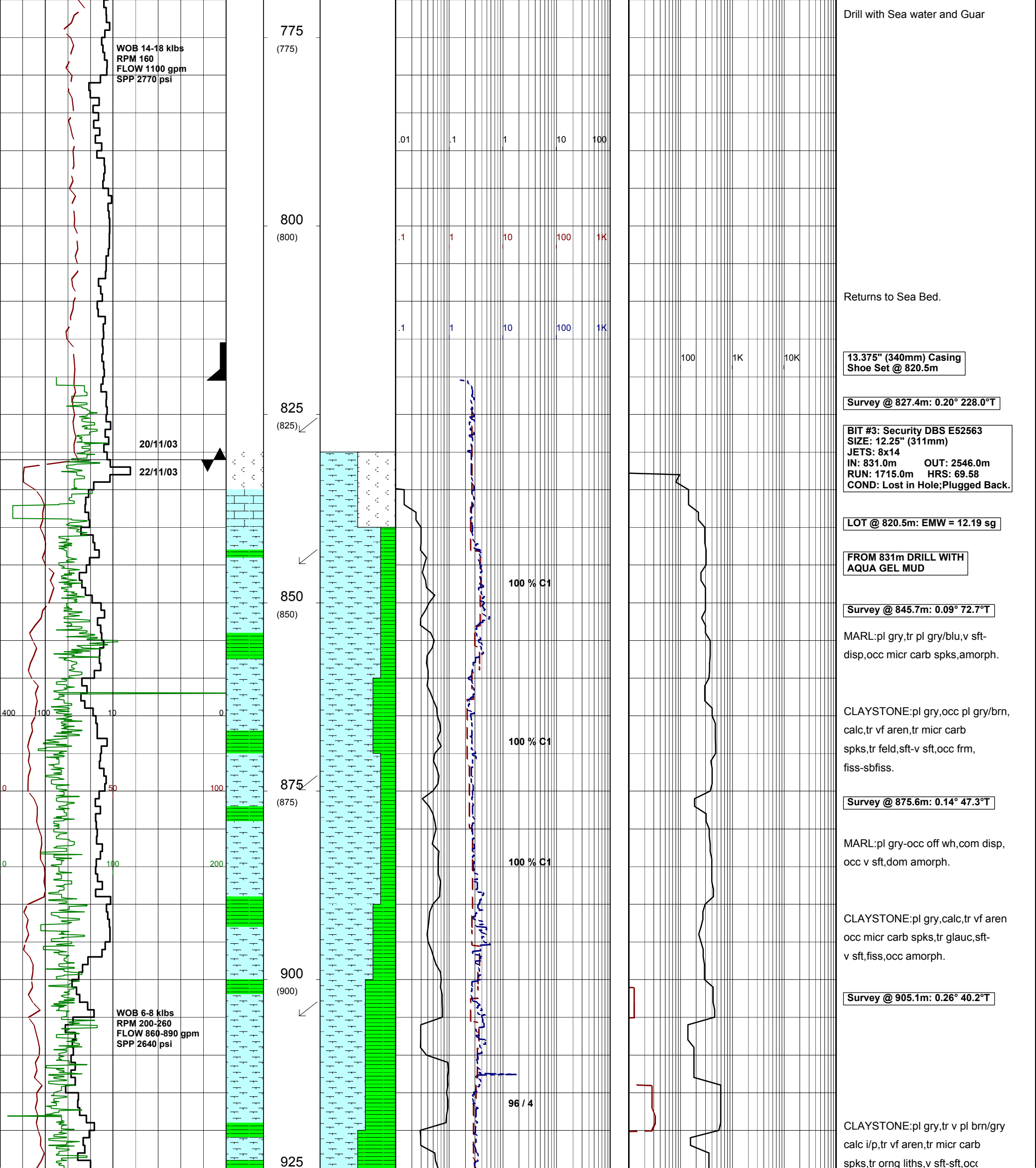
Returns to Sea Bed.

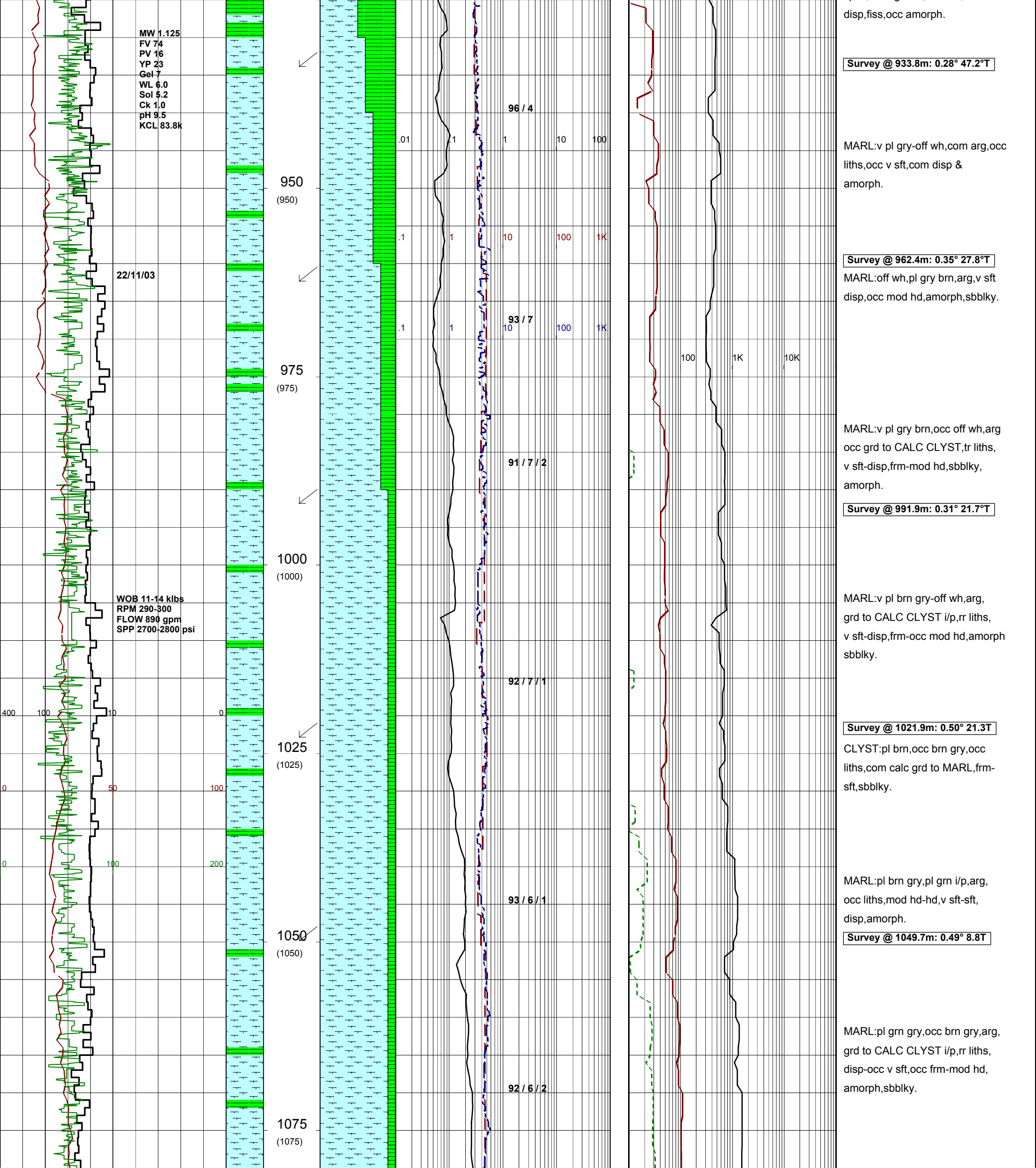


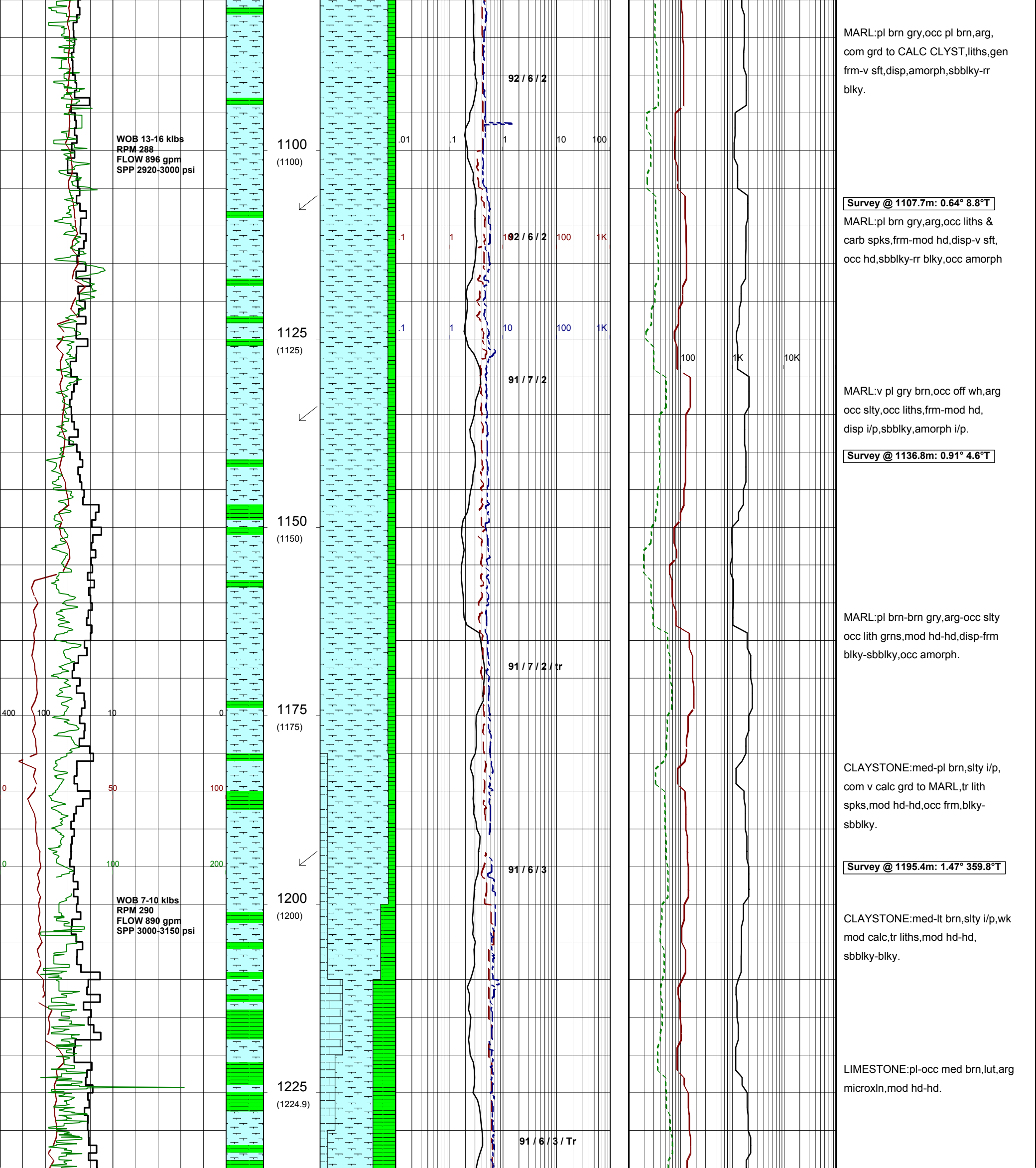
Survey @ 628.7m: 0.26° 209.8°T

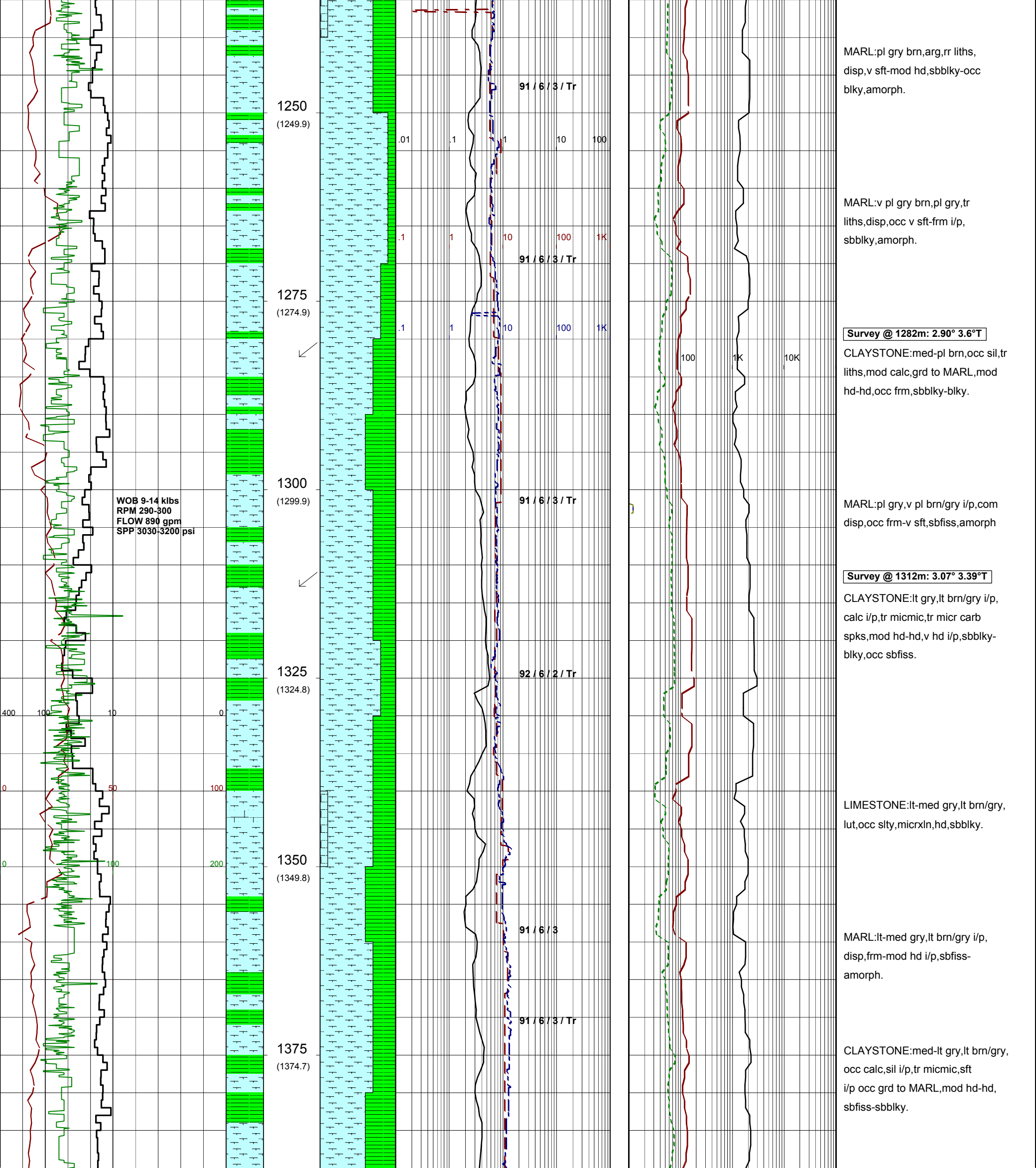
Survey @ 684.5m: 0.13° 189.4°T

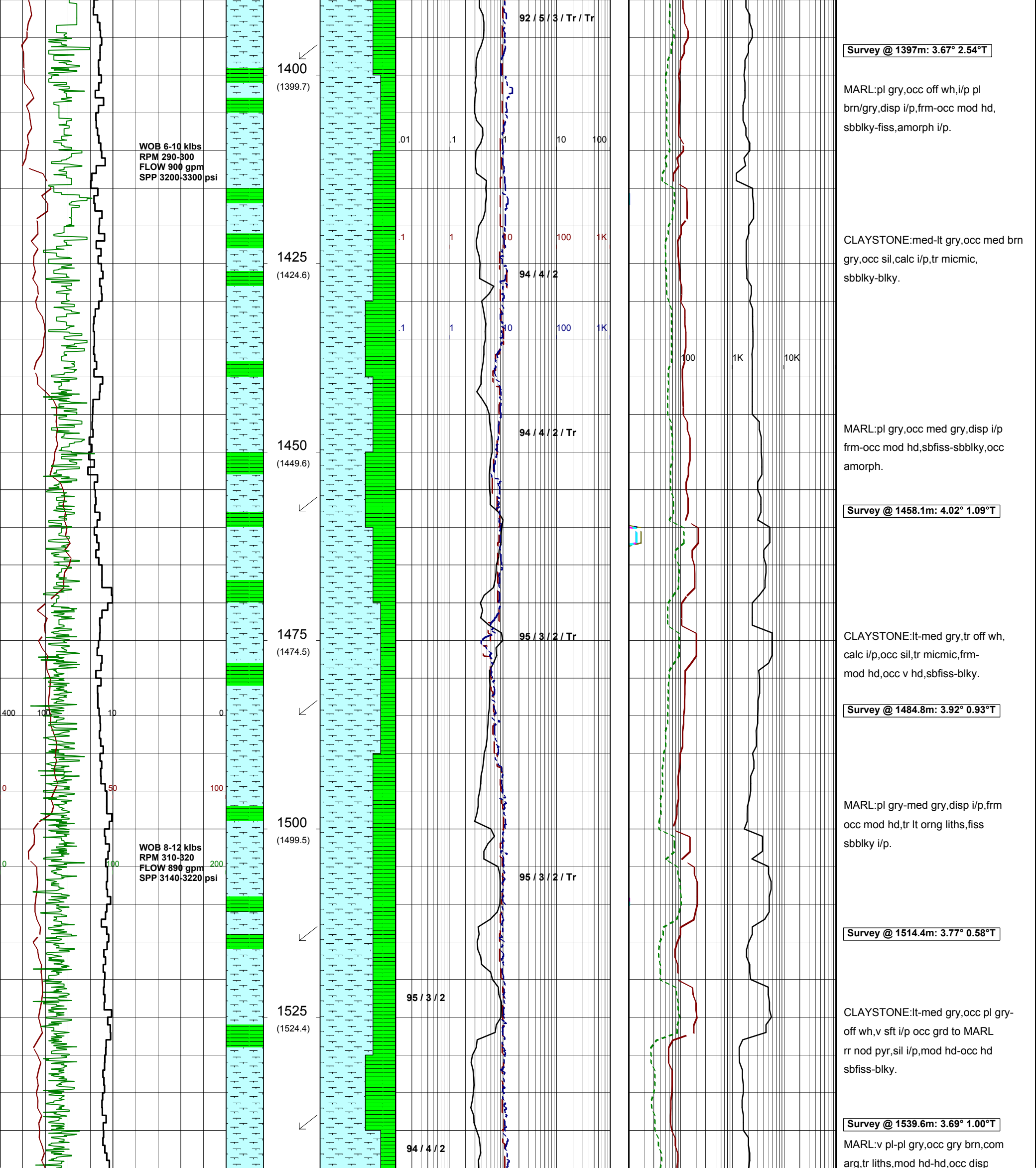
Survey @ 714.2m: 0.13° 239.7°T

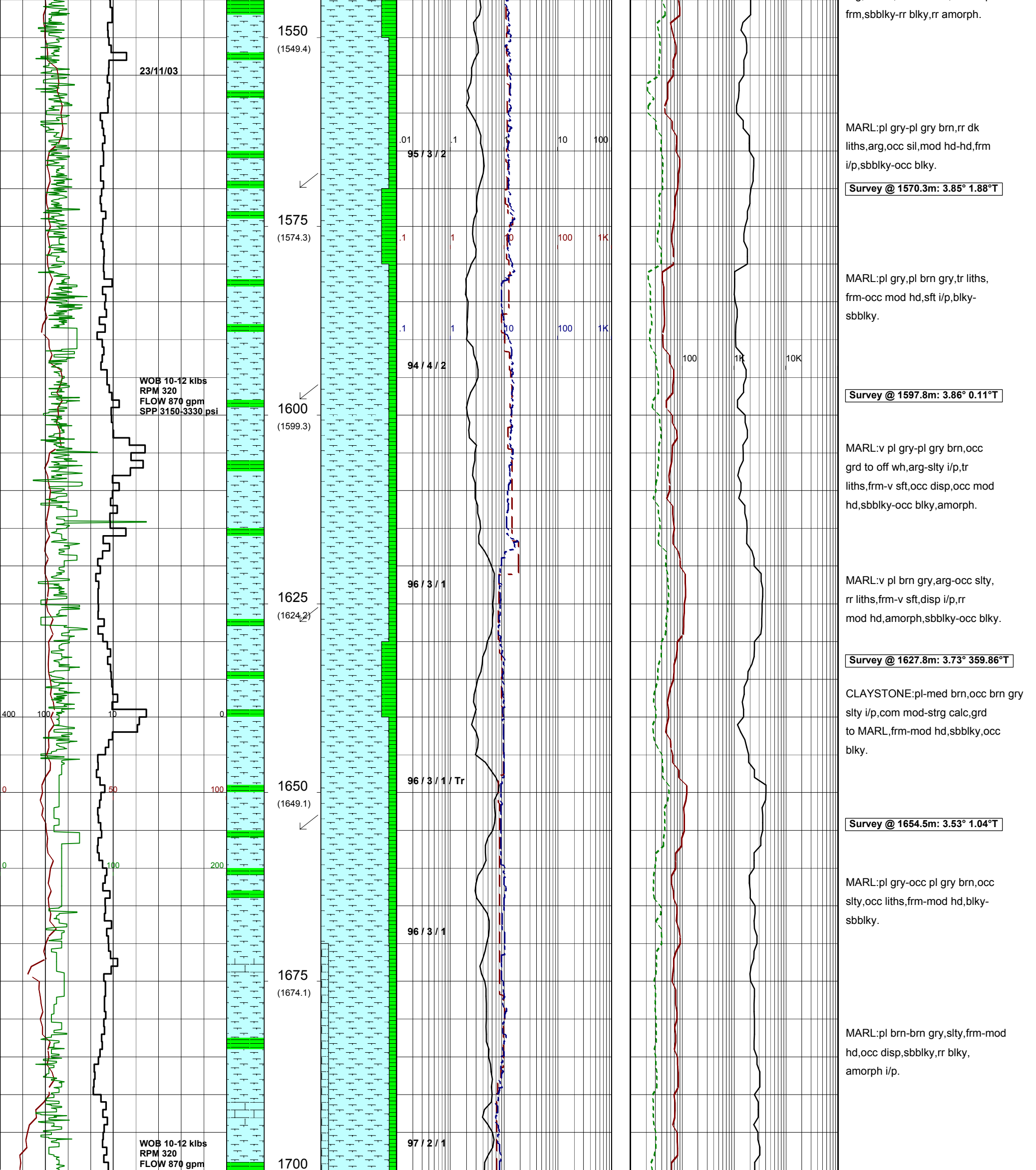


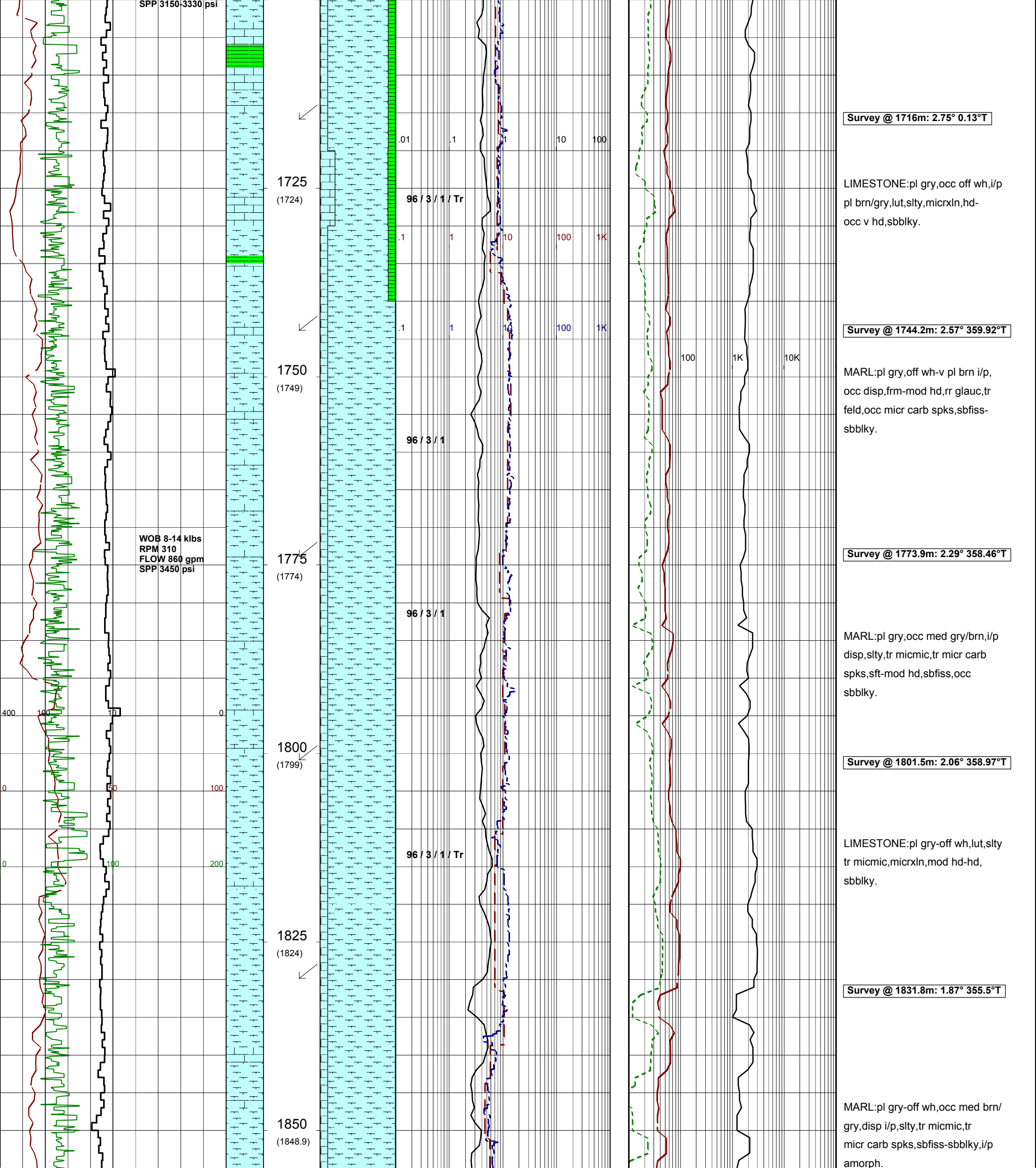


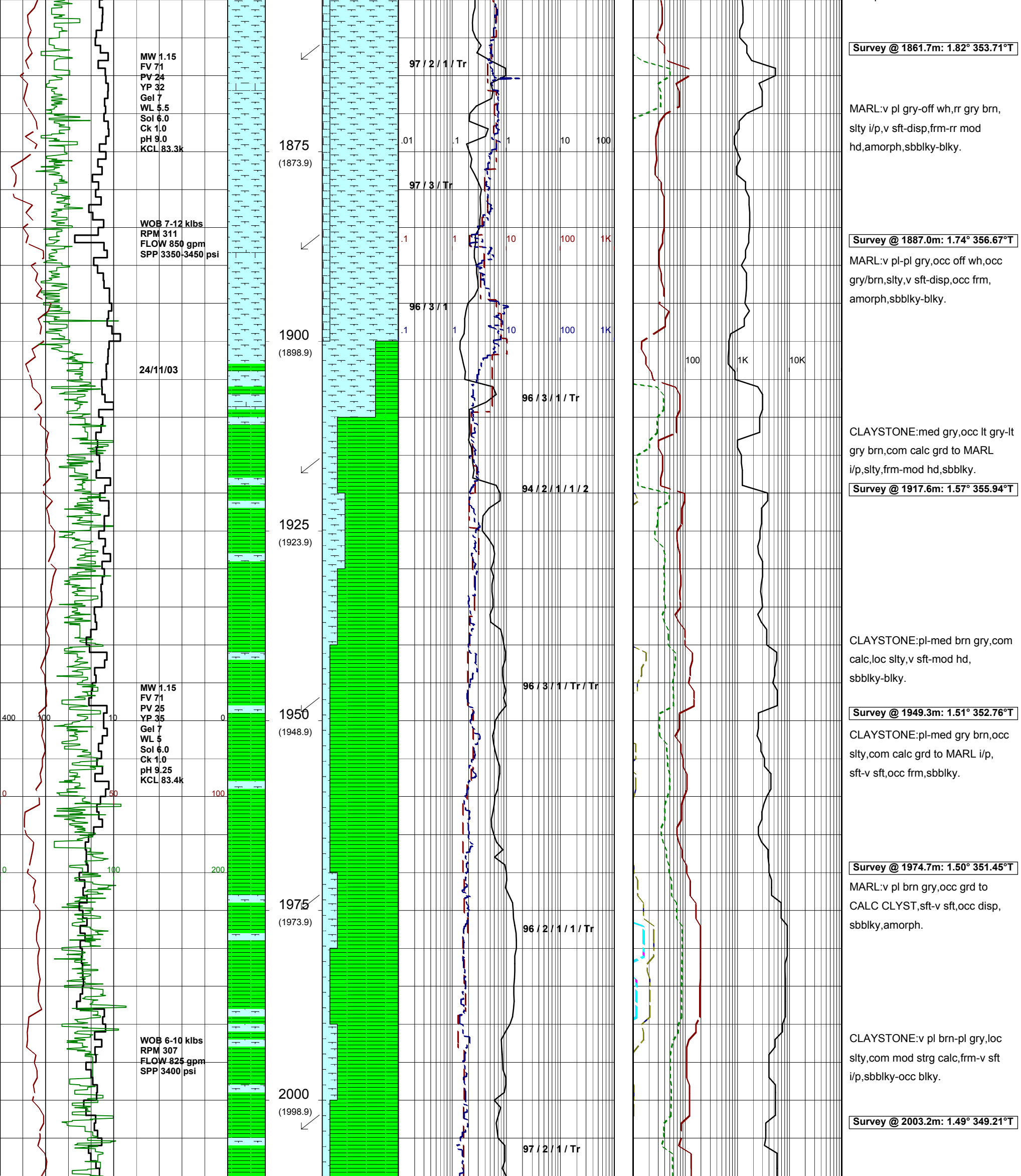


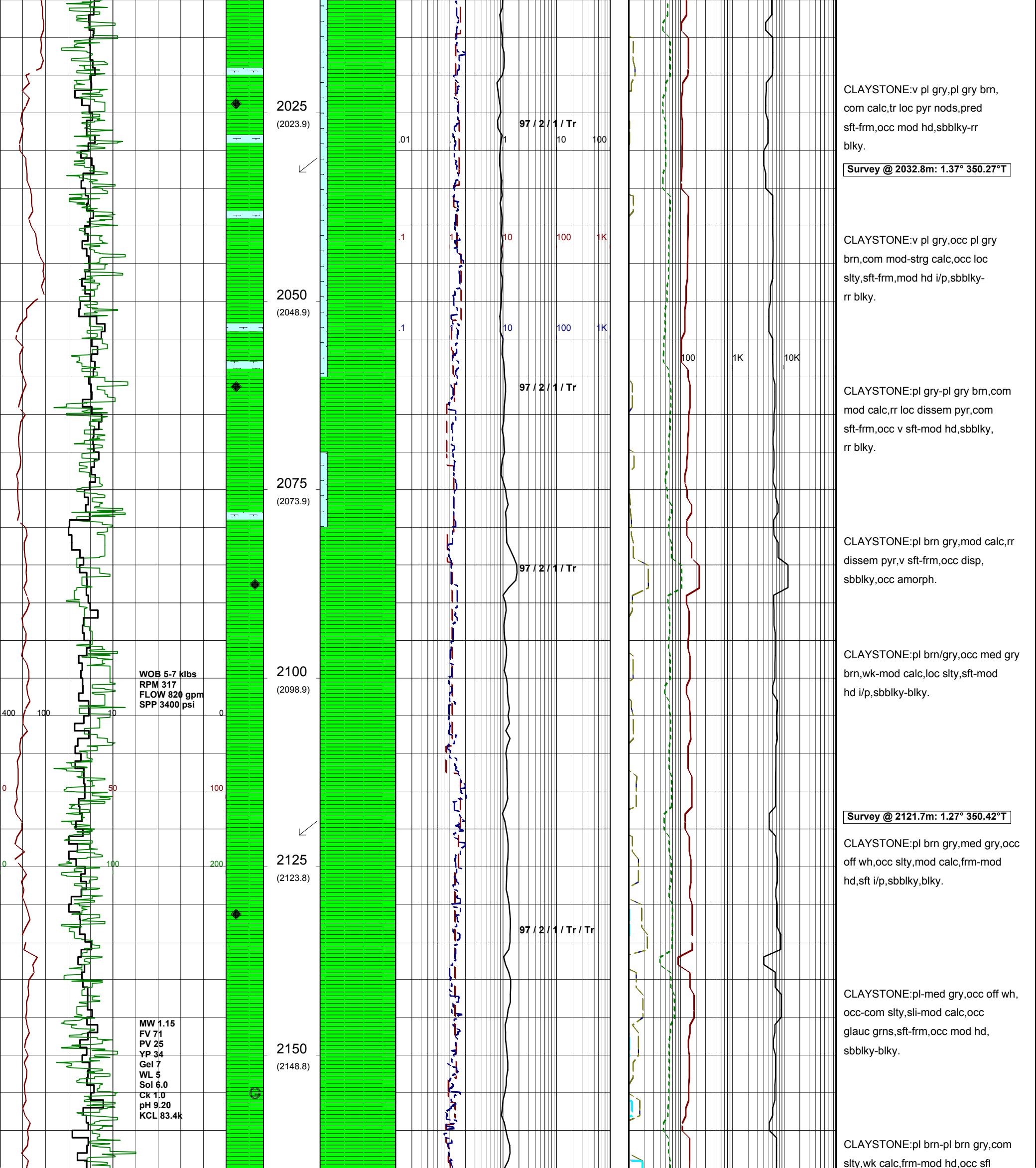


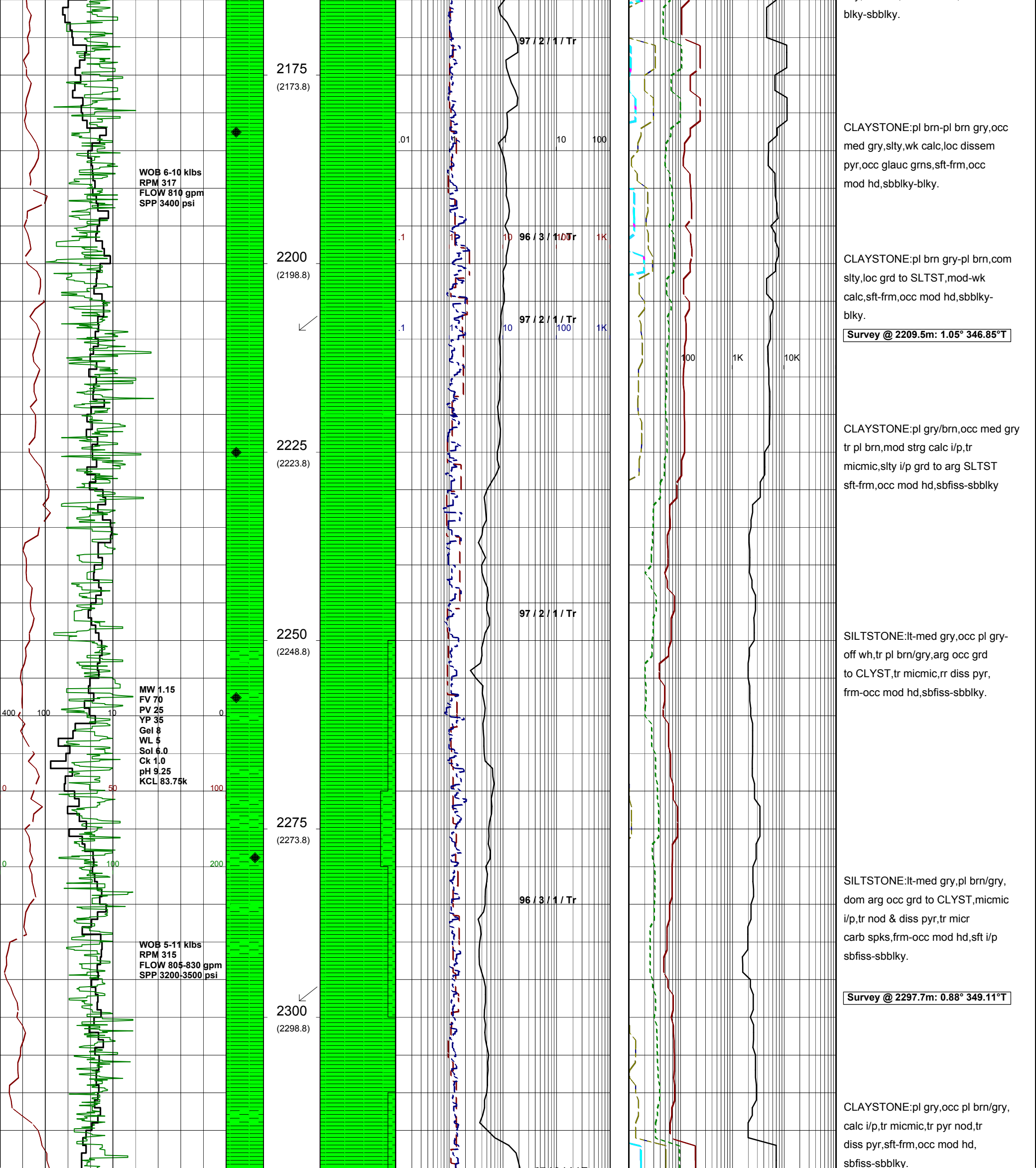


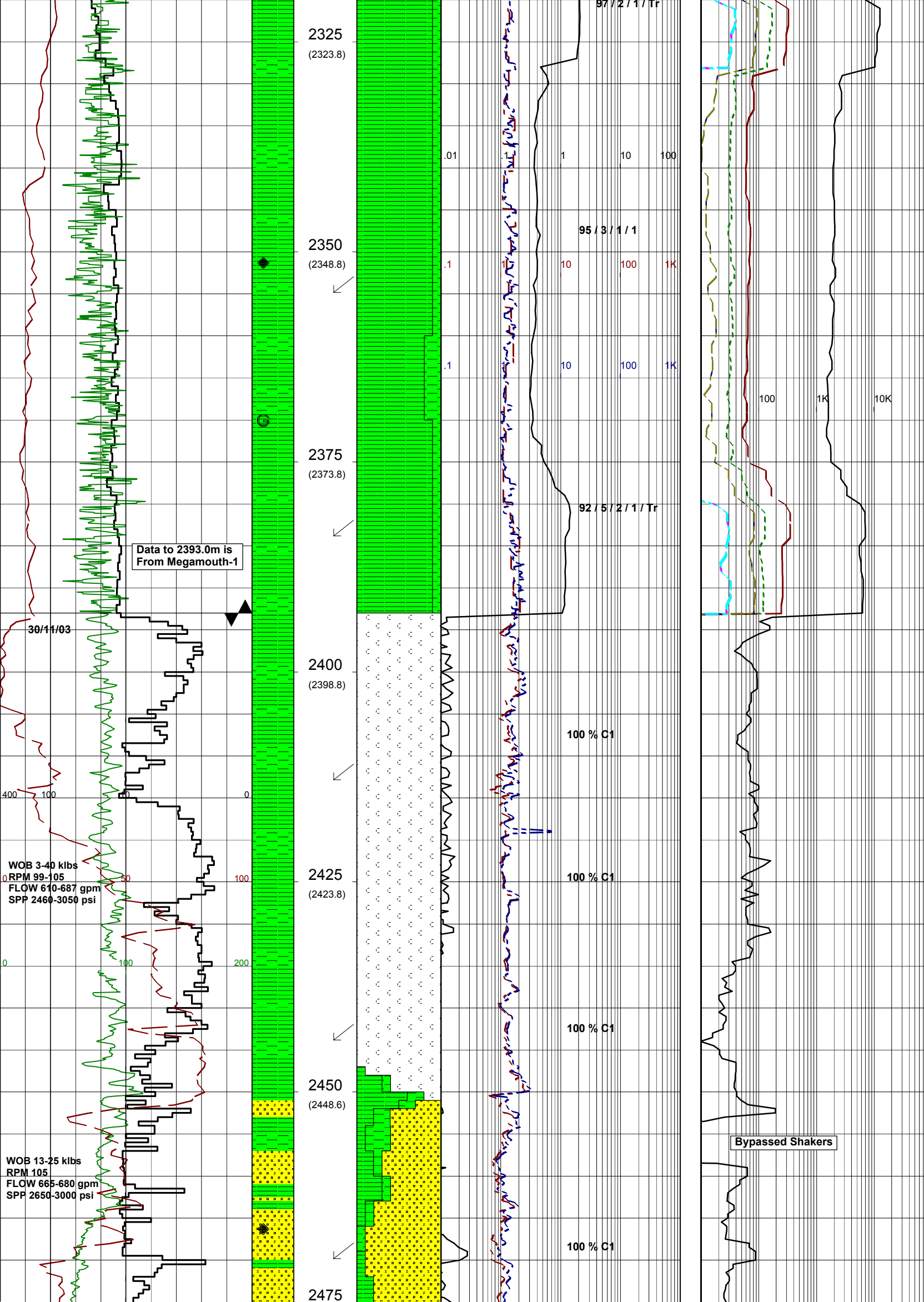












Data to 2393.0m is
From Megamouth-1

30/11/03

WOB 3-40 kibs
RPM 99-105
FLOW 610-687 gpm
SPP 2460-3050 psi

WOB 13-25 kibs
RPM 105
FLOW 665-680 gpm
SPP 2650-3000 psi

Carbide Lag Check @ 2341.6m
Theoretical Strokes: 11047
Actual Strokes: 11047
Hole In Gauge.

Survey @ 2354.83m: 0.88° 347.07°T

SILTSTONE:pl gry,med gry i/p,tr
pl brn/gry,arg occ grd to CLYST,
tr micmic,tr diss pyr,tr glauc,
frm-occ mod hd,sbfiss-sbblyk.

Survey @ 2383.1m: 0.83° 351.3°T

CLAYSTONE:pl gry,off wh-pl brn
i/p,frm i/p occ grd to SLTST,sft
sbfiss-fiss.

START TO KICK OFF
MEGAMOUTH-1ST @ 2393.0m
ON 30-11-2003

BIT #4RR: Hughes MX20DX
SIZE: 12.25"(311mm) JETS: 3x24
IN: 2393.0m OUT: 2688.0m(TD)
RUN: 295.0m HRS: 35.67
COND: 3-4-WT-A-E-1/16-BT-TD

Survey @ 2412.80m: 0.28° 303.92°T

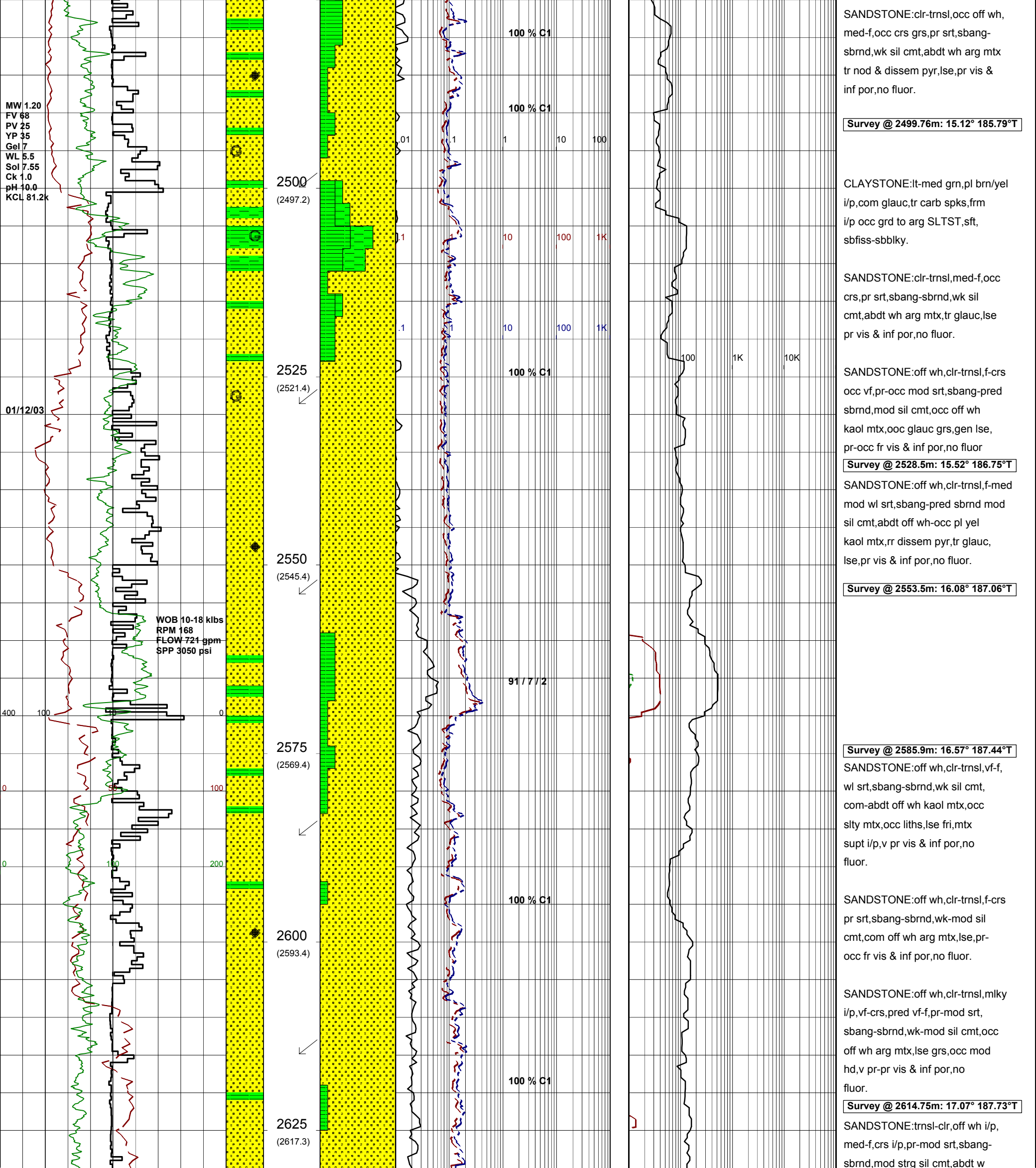
Survey @ 2443.8m: 7.35° 186.91°T

CLAYSTONE:pl gry,occ off wh,brn,
v sft,frm i/p occ grd to arg
SLTST,oxidised i/p,sbfiss-fiss.

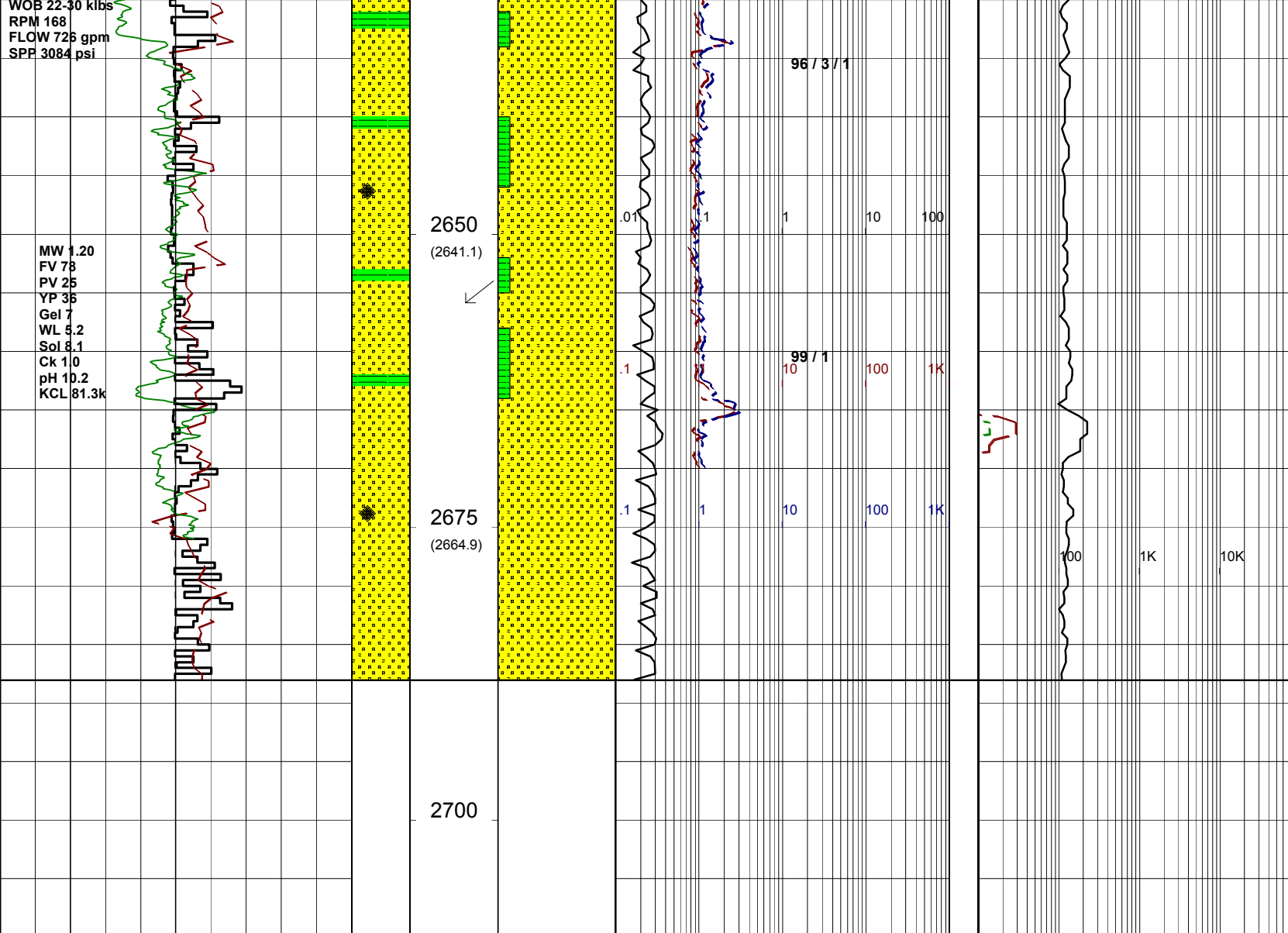
SANDSTONE:trnsl-off wh,clr i/p,
crs-f,com v crs mlky wh qtz grs,
pr srt,sbang-sbrnd,wk sil cmt,wh
arg mtx i/p,tr glauc,tr yel/brn
liths,lse,pr vis & inf por,no
fluor.

Survey @ 2469.5m: 14.35° 185.33°T

Bypassed Shakers



	MW 1.20	
	FV 78	
	PV 25	
	YP 36	
	Gel 7	
	WL 5.2	
	Sol 8.1	
	Ck 10	
	pH 10.2	
	KCL 81.3k	



SANDSTONE:trnsi-clr,occ v pl gry
f-med,crs i/p,pr srt,sbang-sbrnd
mod strg sil cmt,abdt wh arg mtx
tr liths,mod hd-hd aggs,lse i/p,
ti-pr vis & inf por,no fluor.

DRILLERS TOTAL DEPTH:
MDRT: 2688m
TVDRT: 2677.3m
TVDSS: 2654.9m

**MEGAMOUTH-1 ST:
PLUGGED & ABANDONED**



DRILLING DATA PLOT

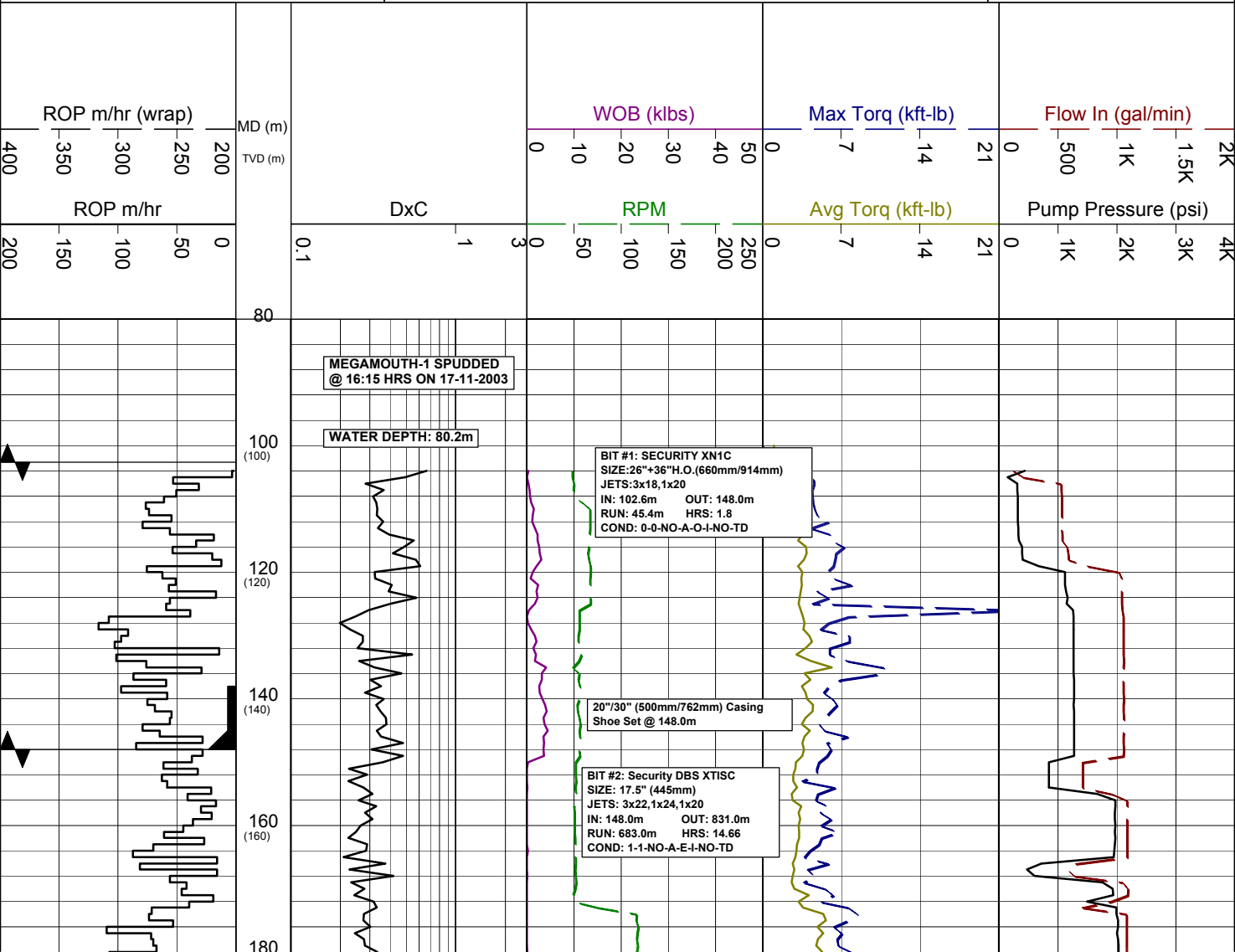
MEGAMOUTH-1ST

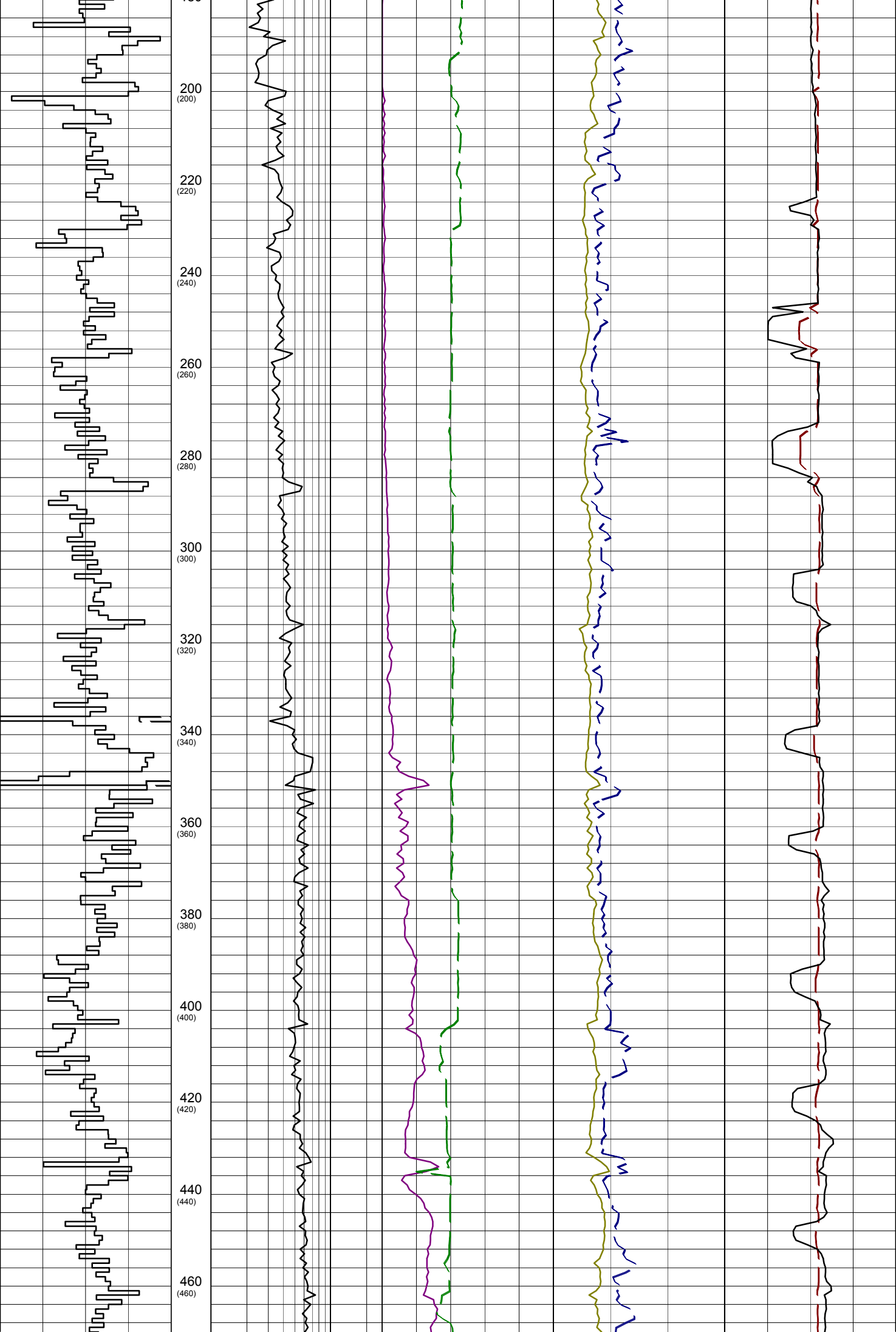


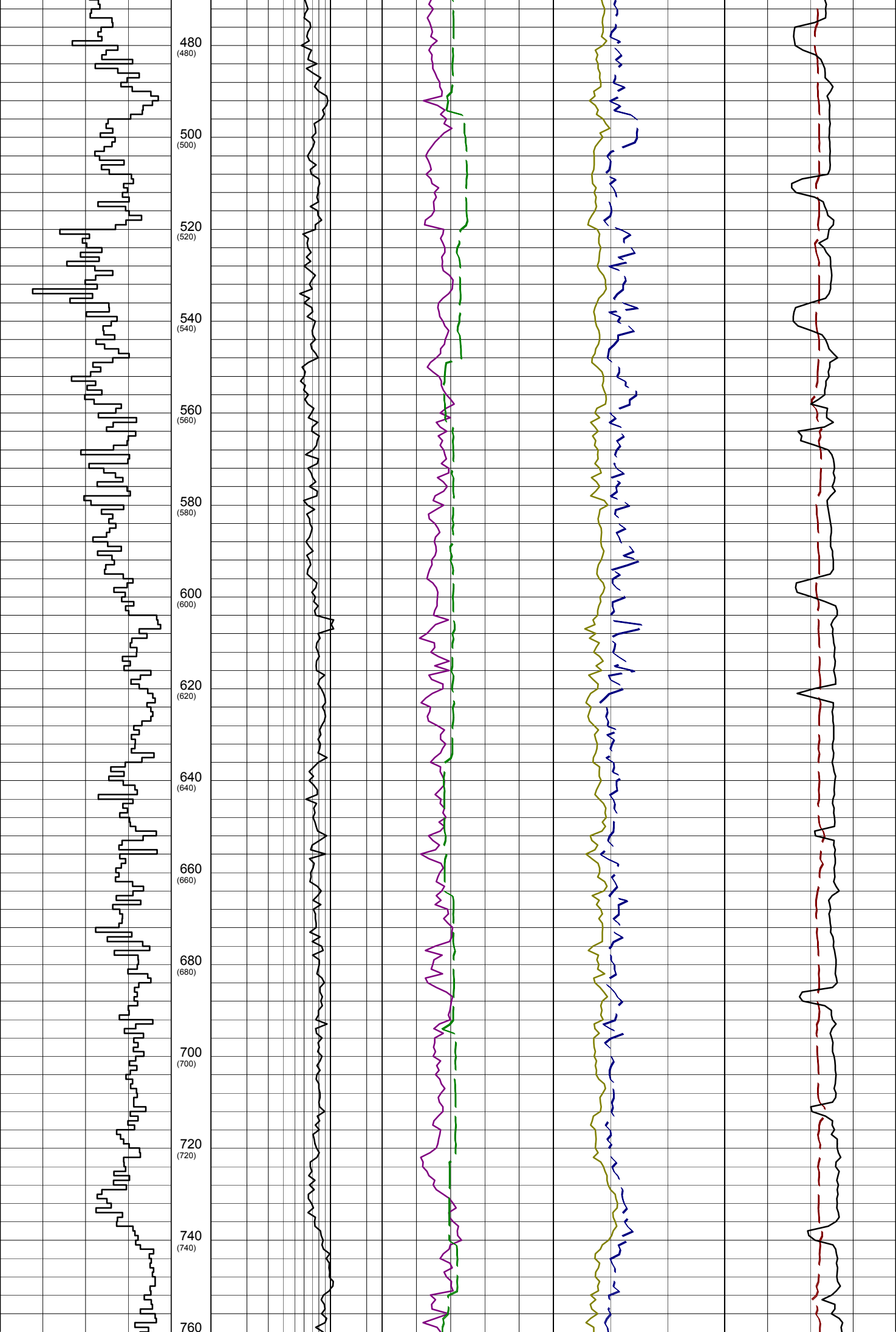
SCALE : 1\ 1000

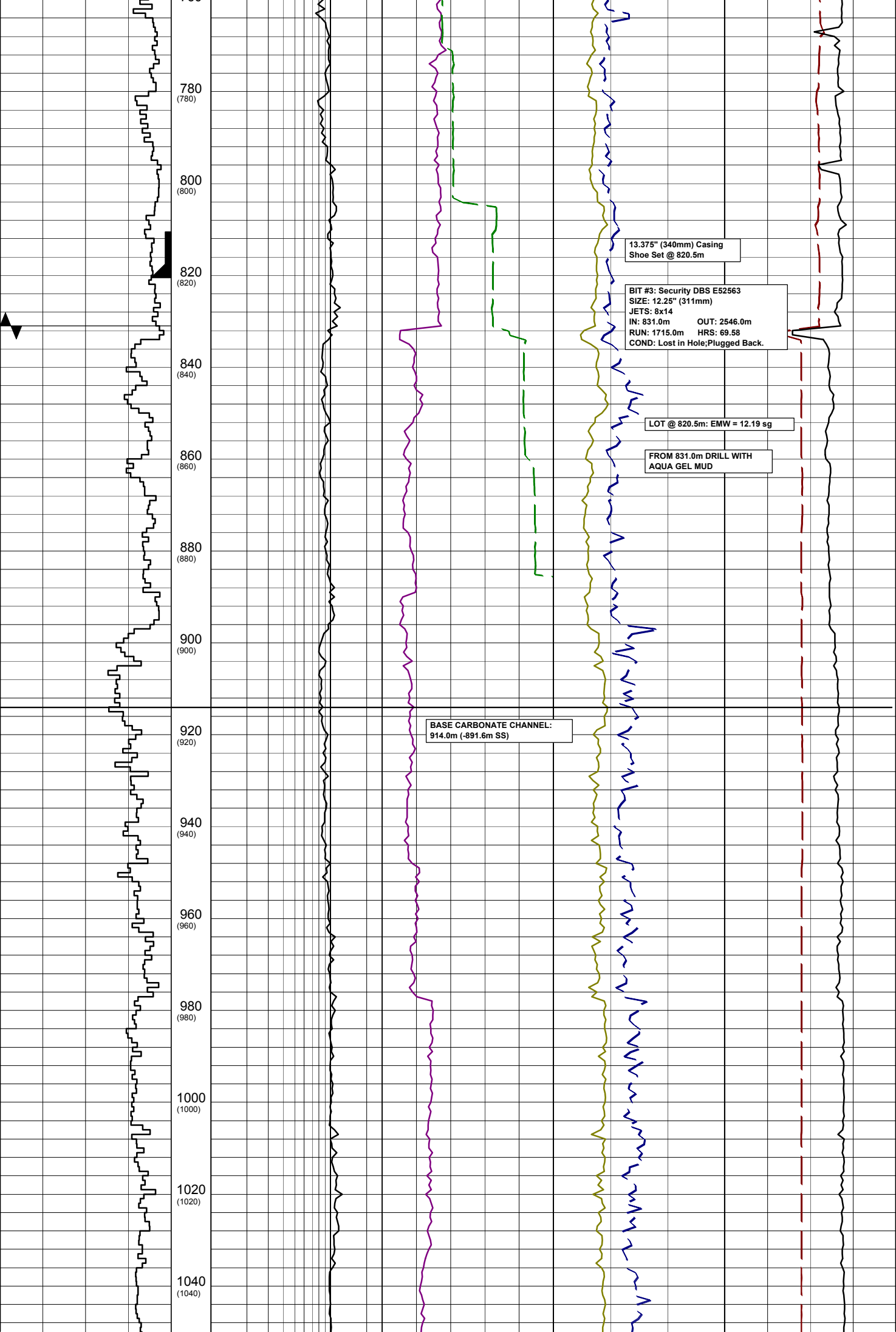
Operator : BHP Billiton	POSITION Latitude : 38° 35' 44.230" S Longitude : 148° 16' 31.859" E	CASING 762/500mm (30"/20") Shoe at: 148.0 m 340mm (13.375") Shoe at: 820.5m	Spud Date : 17-11-2003 Total Depth Date : 02-12-2003 Total Depth (mRT) : 2688.0 m T.V.D. (mRT) : 2677.3 m
Country : Australia			
Basin : Bass Strait			
Permit : VIC/P45			
Well Type : Exploration	RT-LAT (m) : 22.4		
Rig Name : Ocean Epoch	RT-Seabed (m) : 102.6		

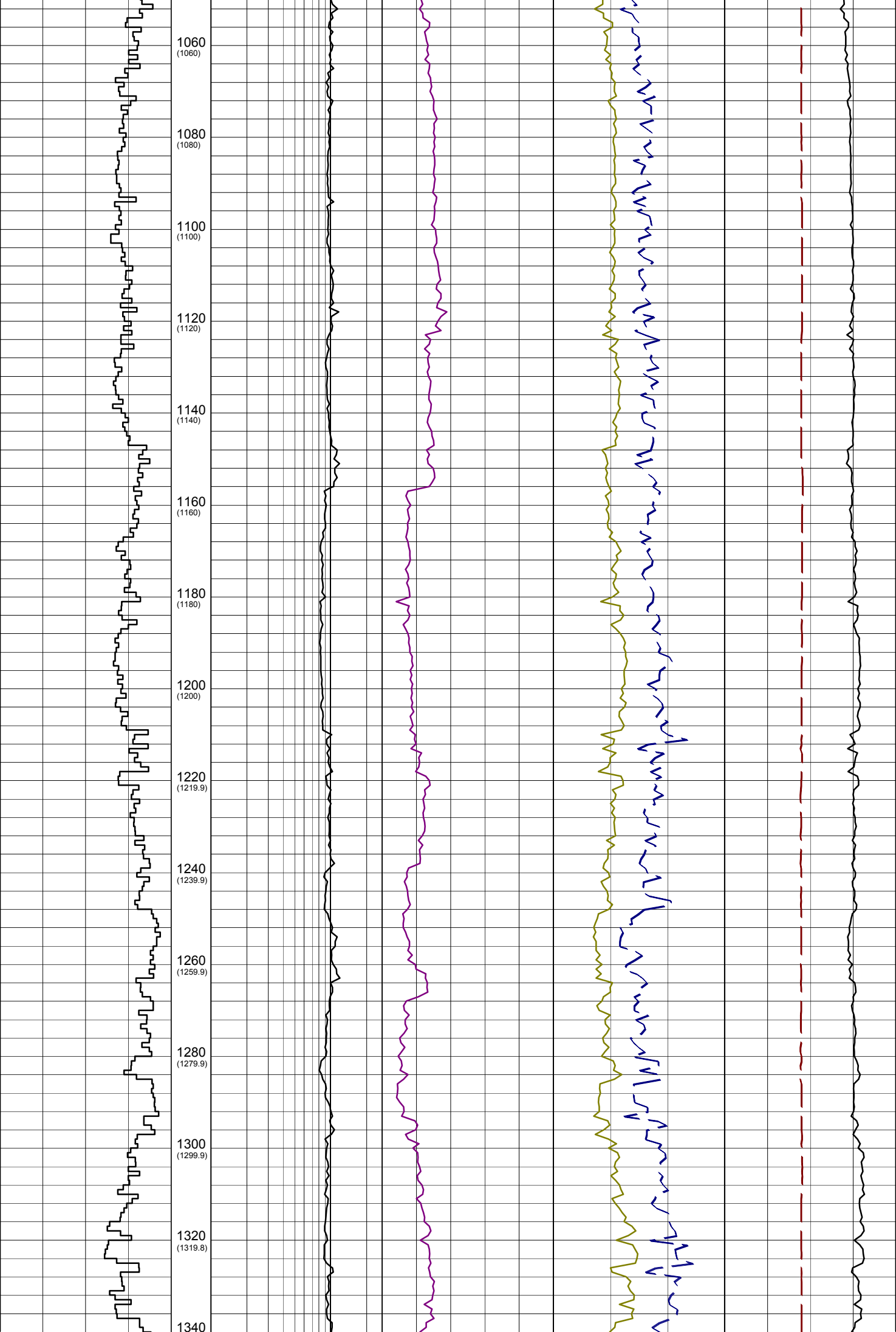
ABBREVIATIONS		LITHOLOGY LEGEND			ENGINEERING LEGEND
MW MUD WEIGHT	NB NEW BIT	Limestone	Conglomerate	Mica	Deviation Survey
FV FUNNEL VISCOSITY	RR RERUN BIT	Coal	Marl	Ferrous	Wiper Trip
PV PLASTIC VISCOSITY	CB CORE BIT	Clay	Carb. Siltstone	Chert	SWC (rec)
YP YIELD POINT	WOB WEIGHT ON BIT	Siltstone	Calc. Siltstone	Calcareous	SWC (unrec)
FC FILTER CAKE	RPM REVS PER MINUTE	Med Sandstone	Pyrite	Dolomitic	Casing Shoe
SOL SOLIDS	FLC FLOW CHECK	Coarse Sandstone	Siderite	Carbonaceous	Bit Trip
WL FILTRATE	CR CIRCULATE RETURNS	Fine Sandstone	Glauconite	Lithoclast	Core
SD SAND-%	PR POOR RETURNS	VF Sandstone	Feldspar	Breccia	DST
S SALINITY-PPM	NR NO RETURNS				
RM MUD RESISTIVITY	BG BACKGROUND GAS				
RMF MUD FILTRATE	TG TRIP GAS				
C CARBIDE TEST	STG SHORT TRIP GAS				
LAT LOGGED AFTER TRIP	CG CONNECTION GAS				
DS DEVIATION SURVEY	SG SWAB GAS				
SWC SIDE-WALL CORE	SVG SURVEY GAS				

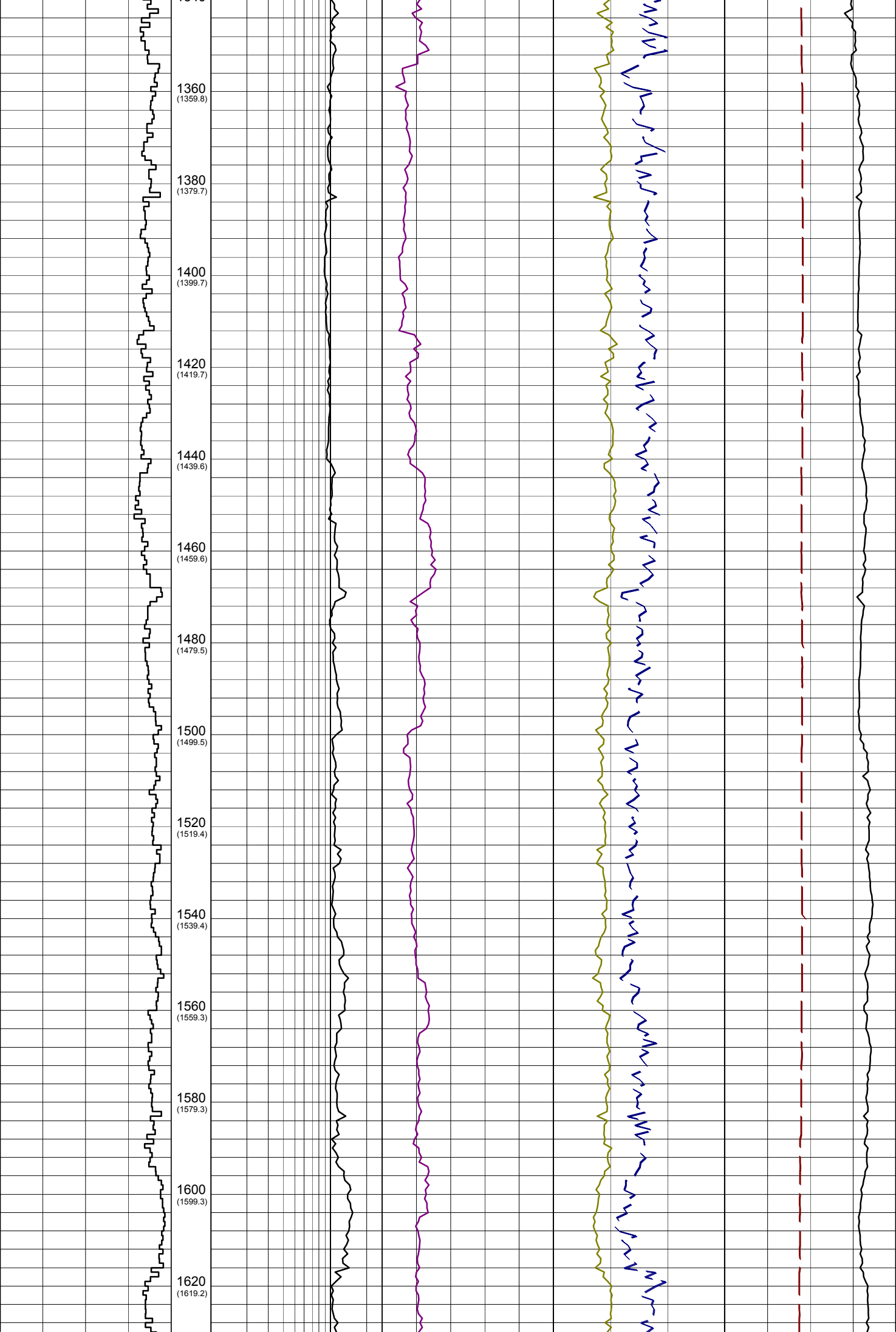


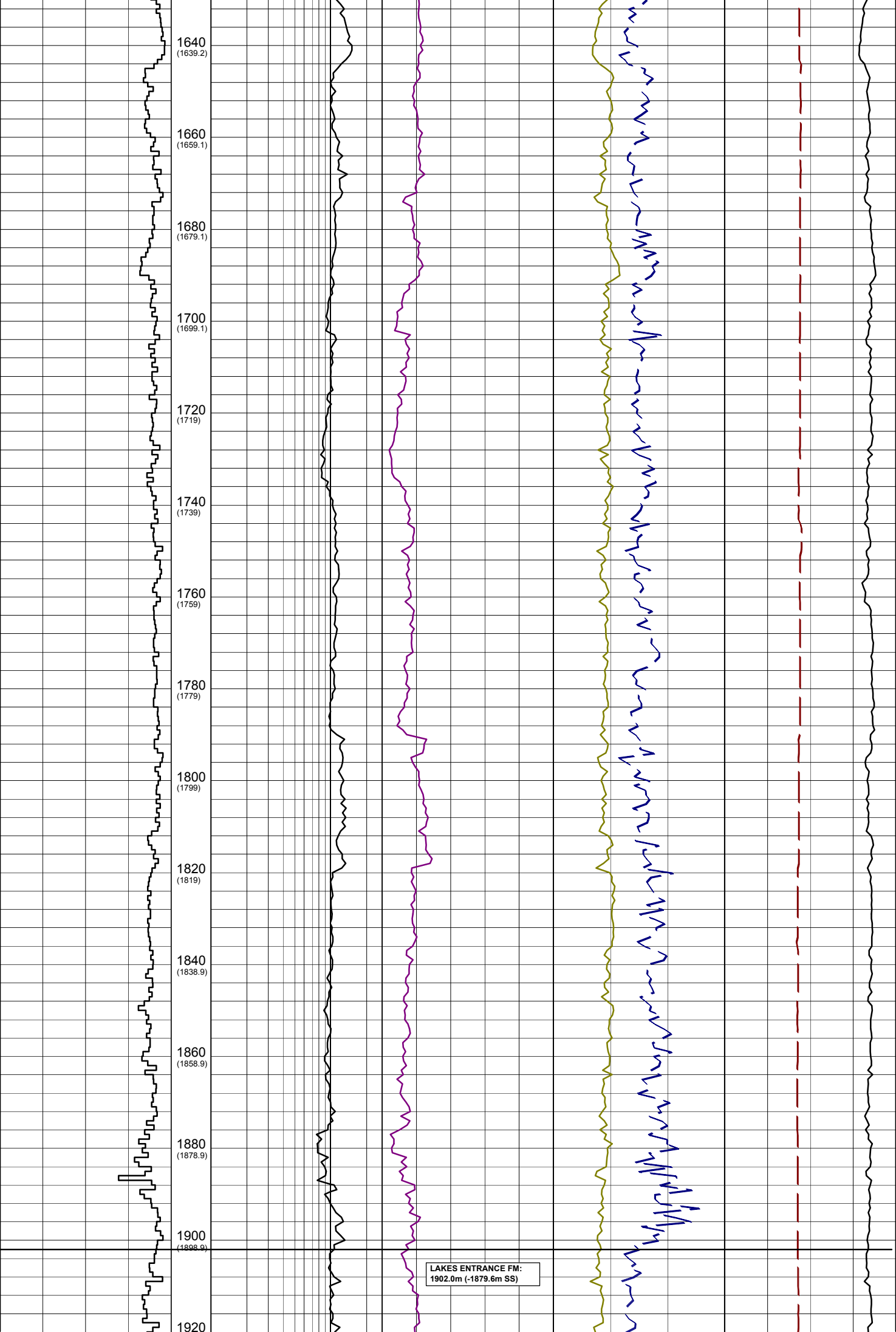


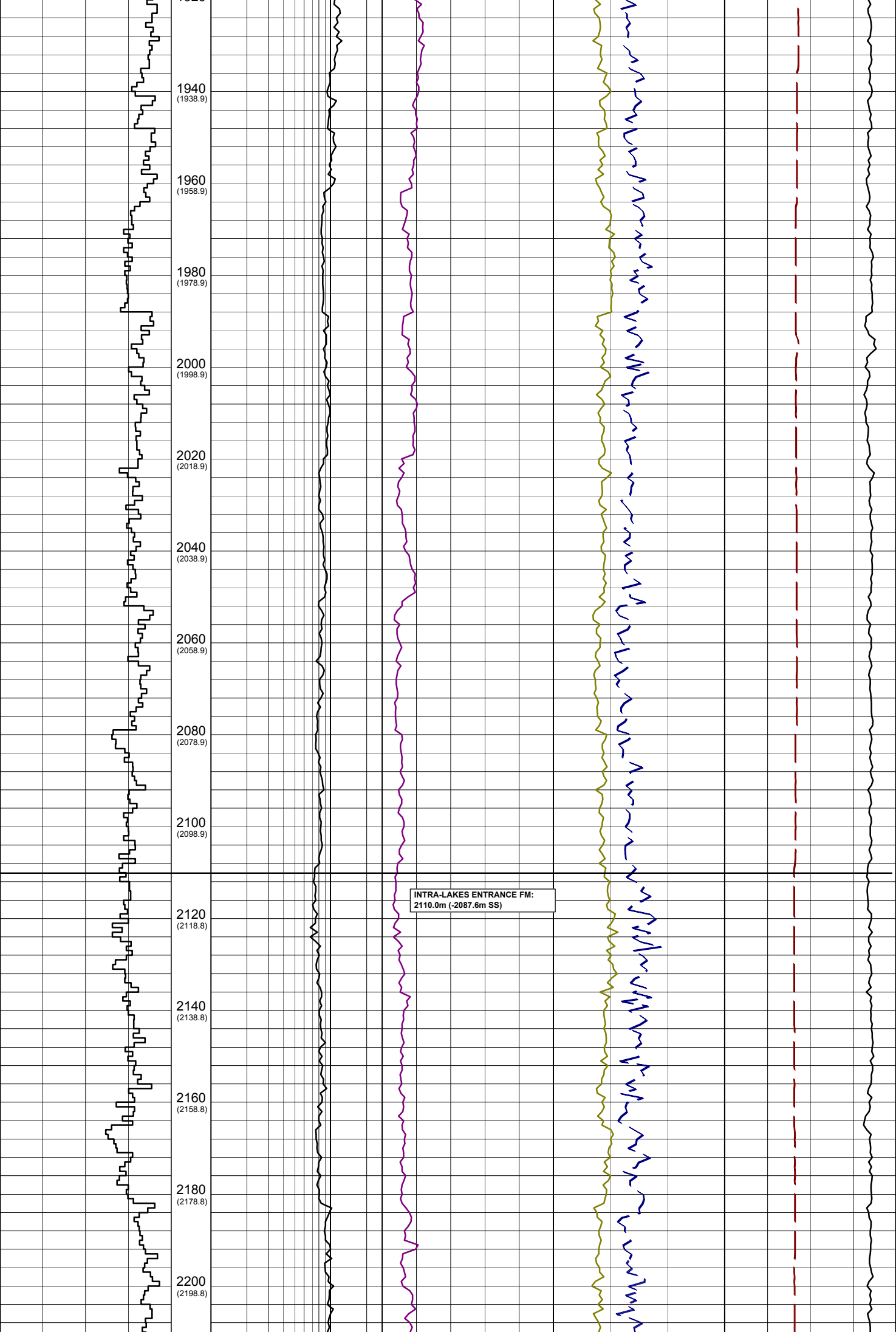


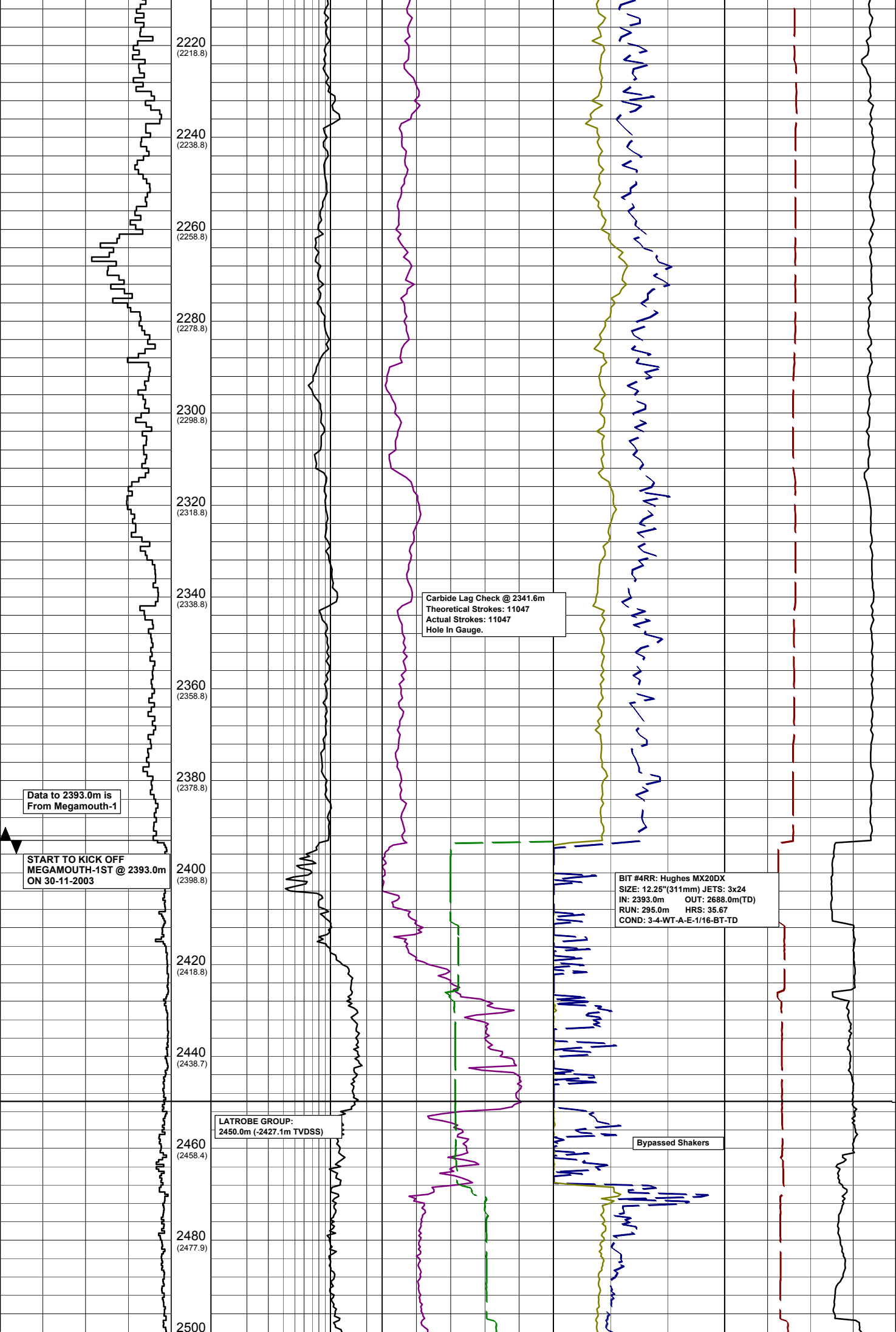


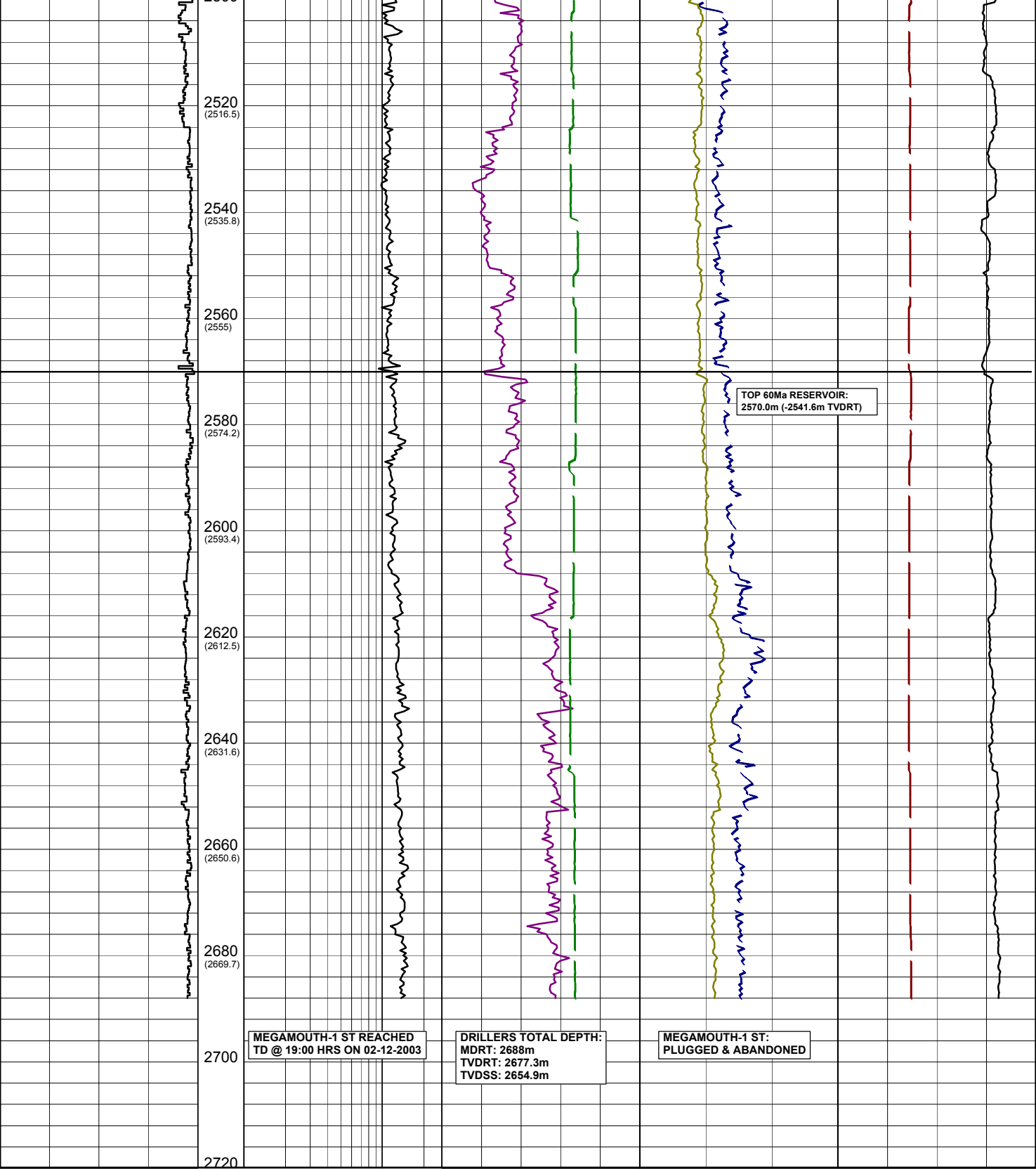


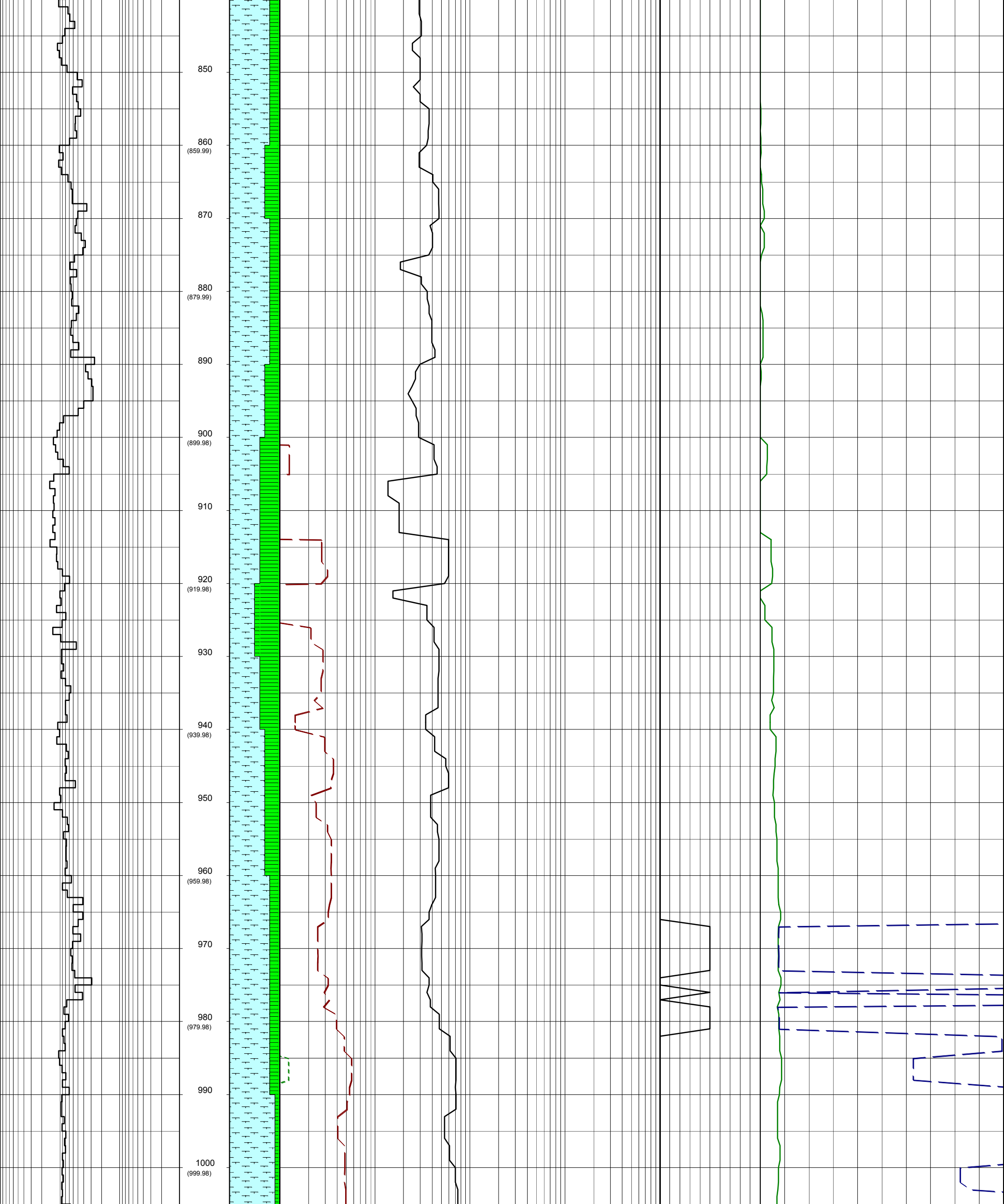


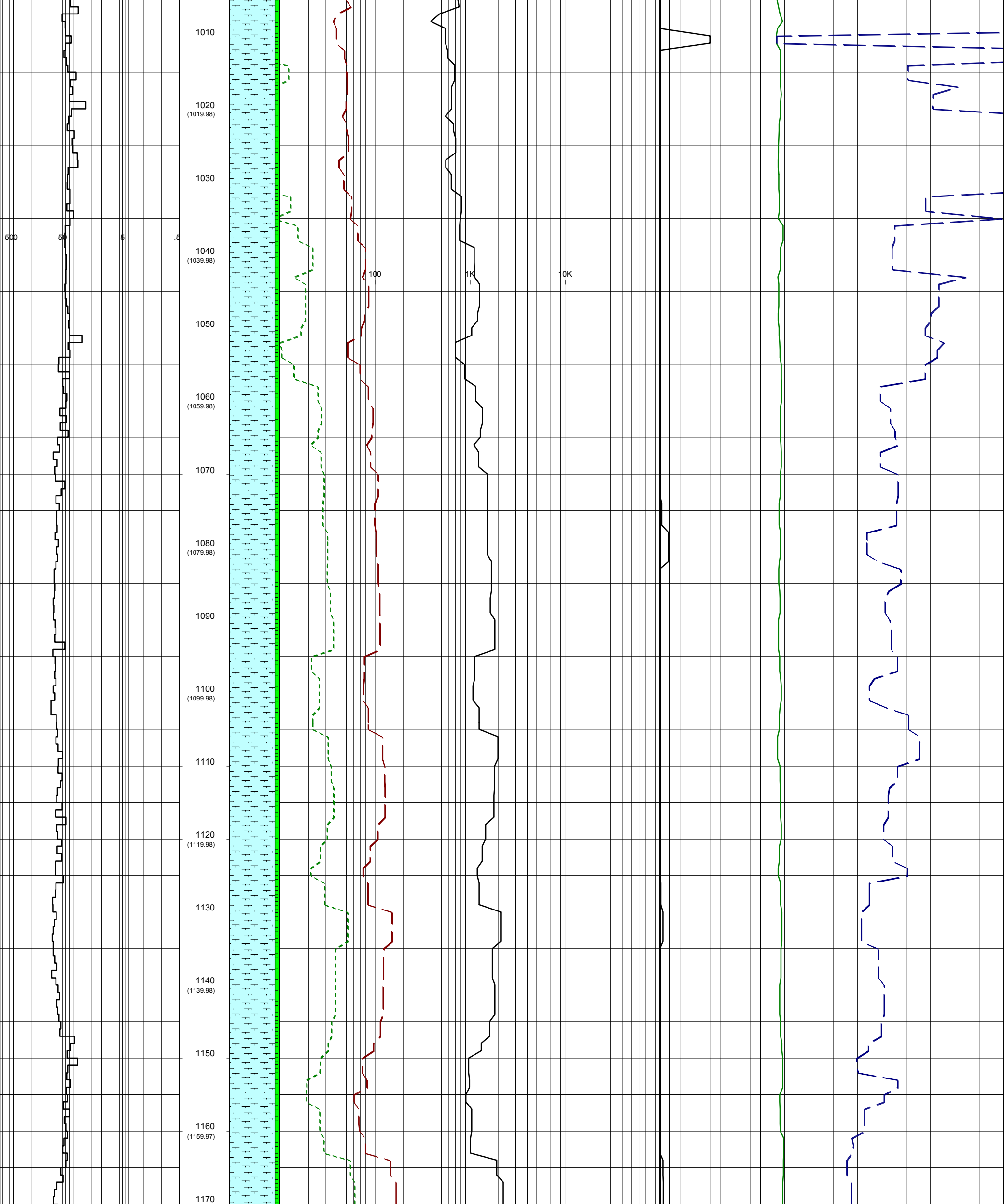


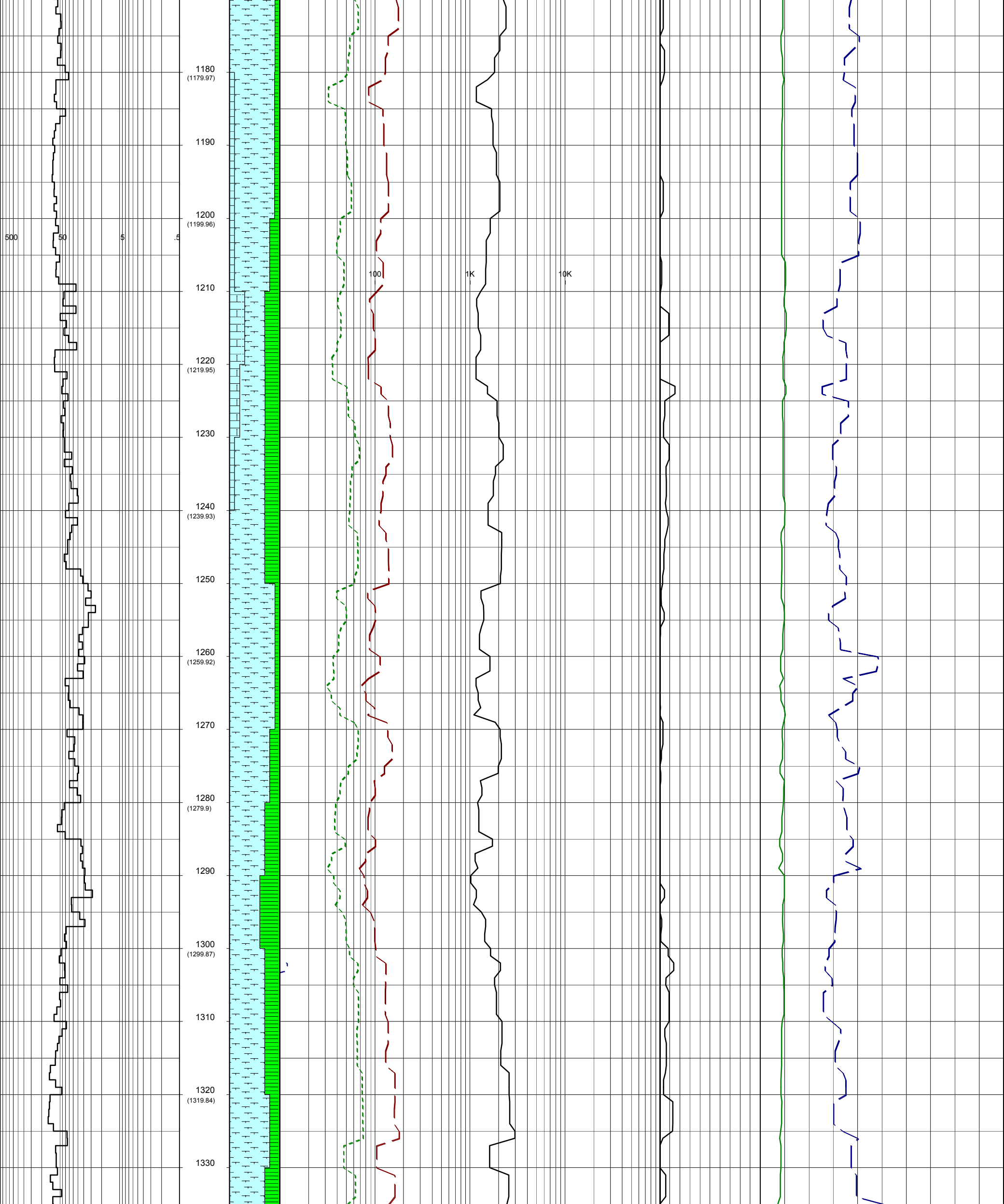


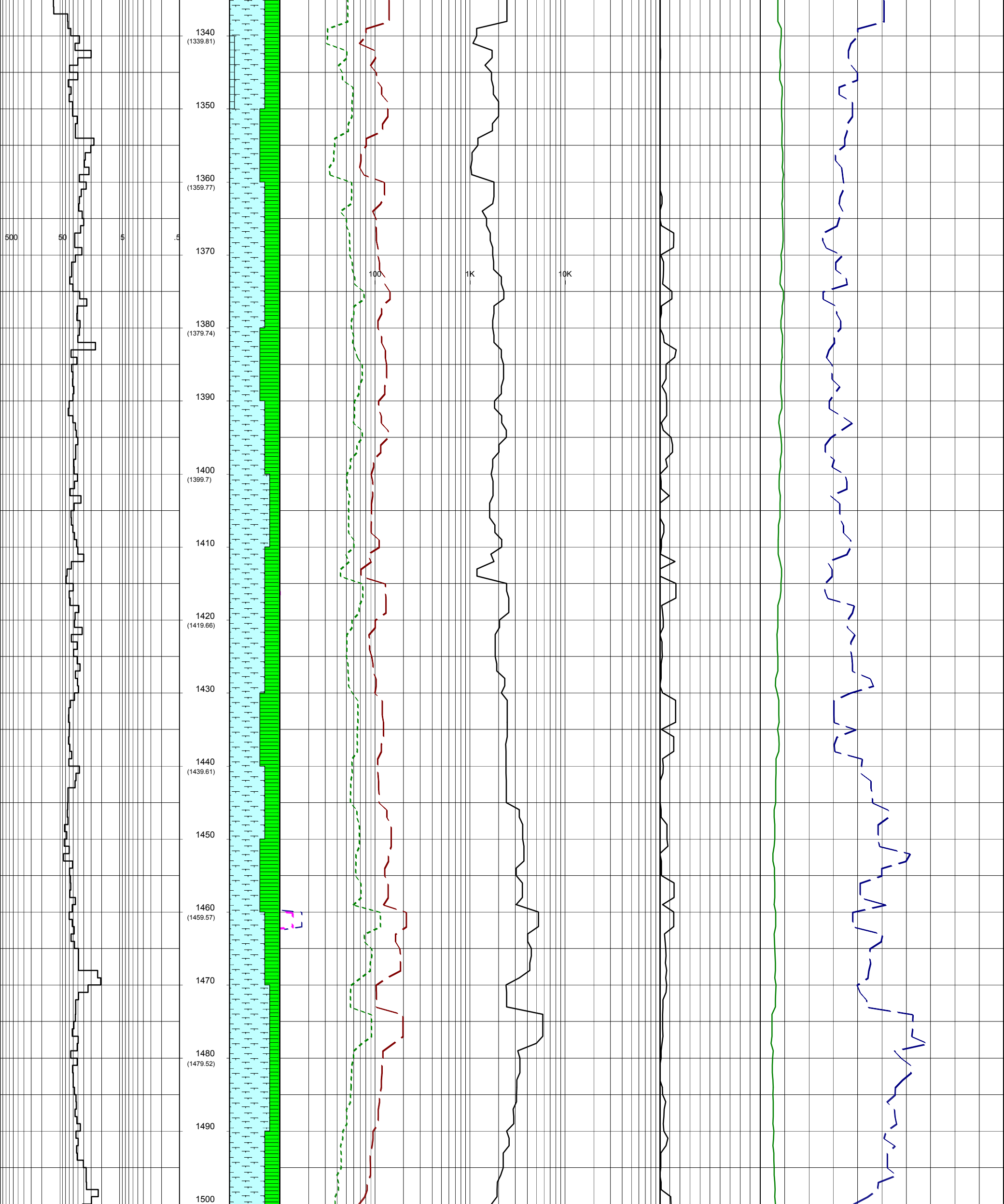


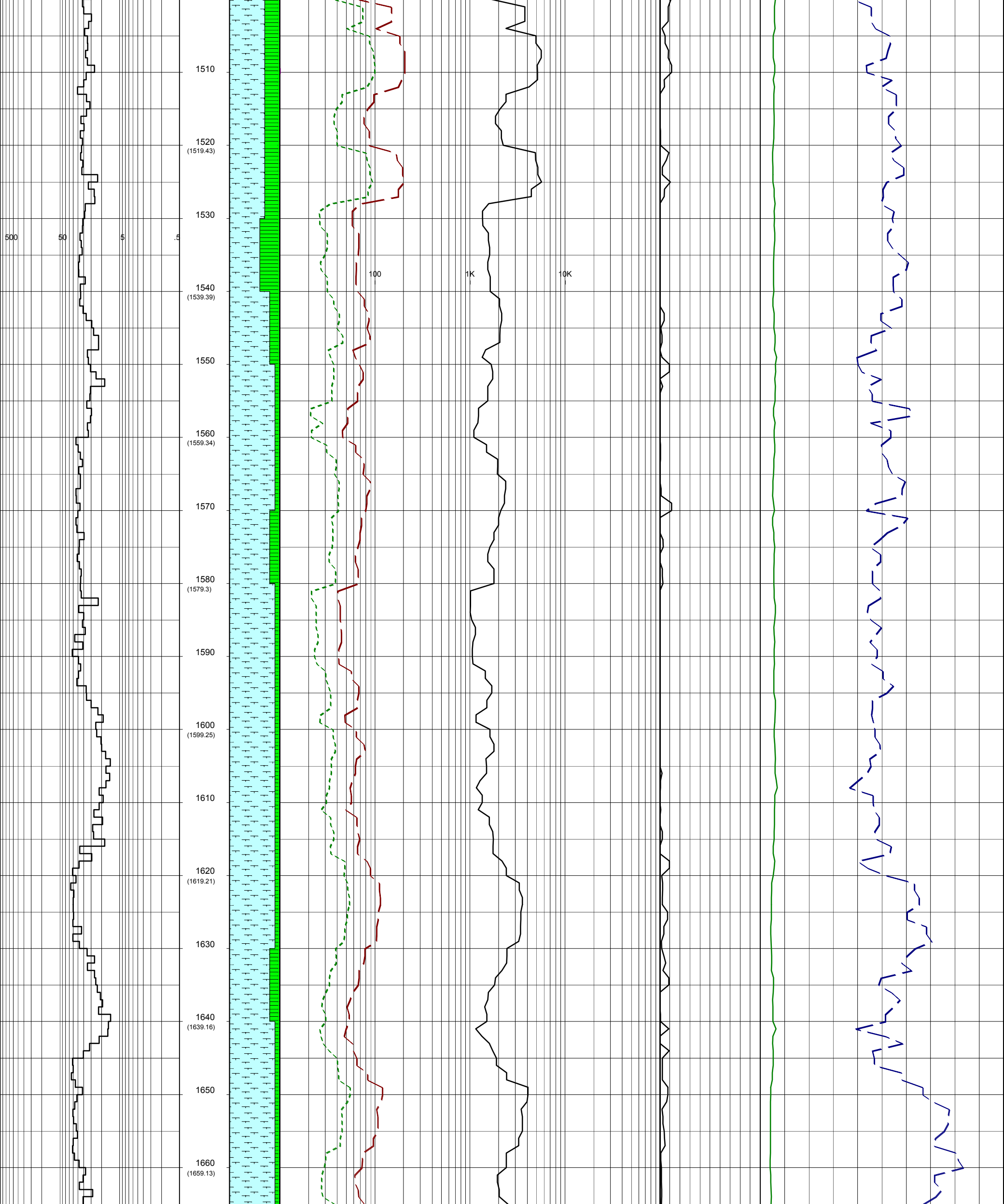


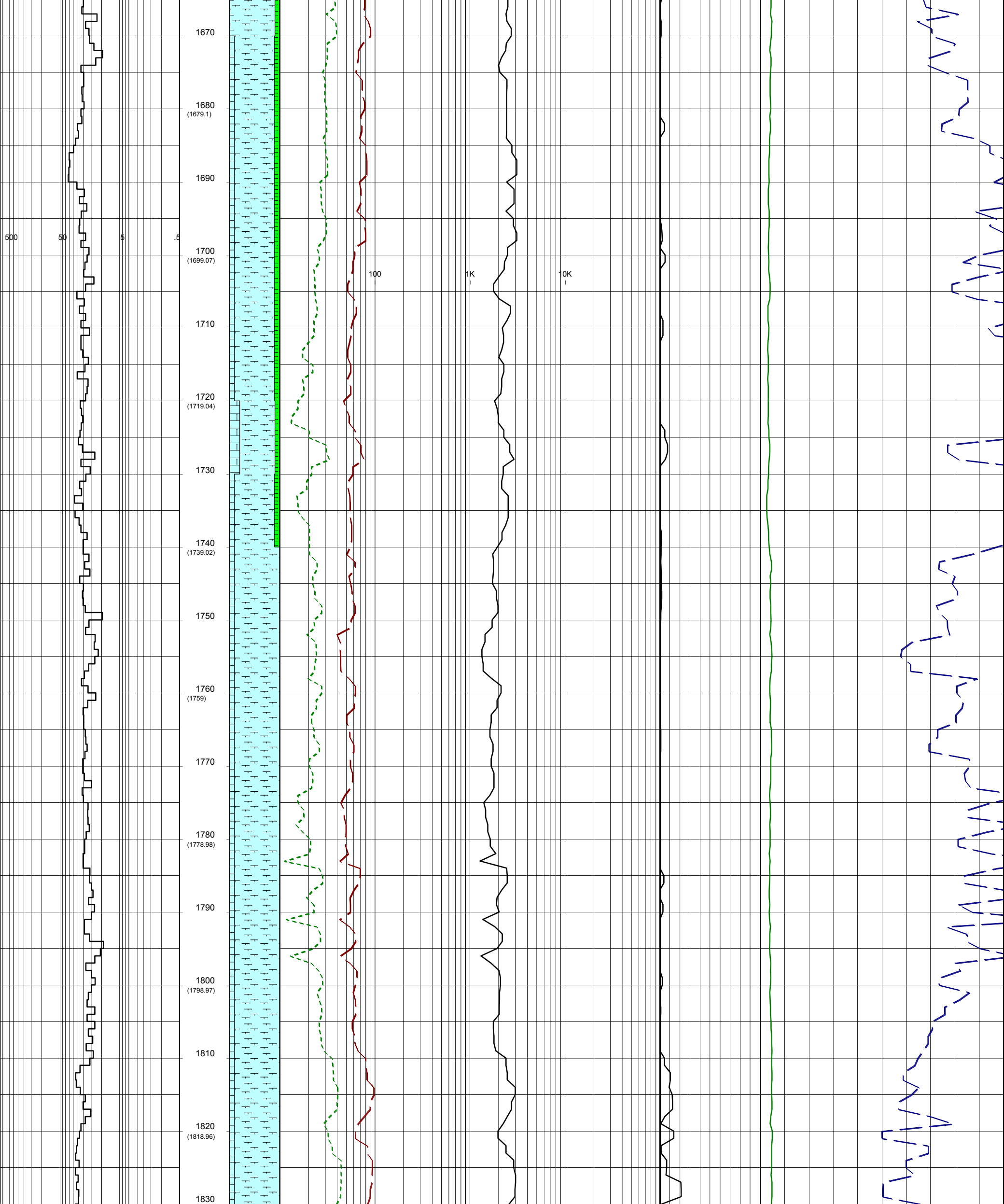


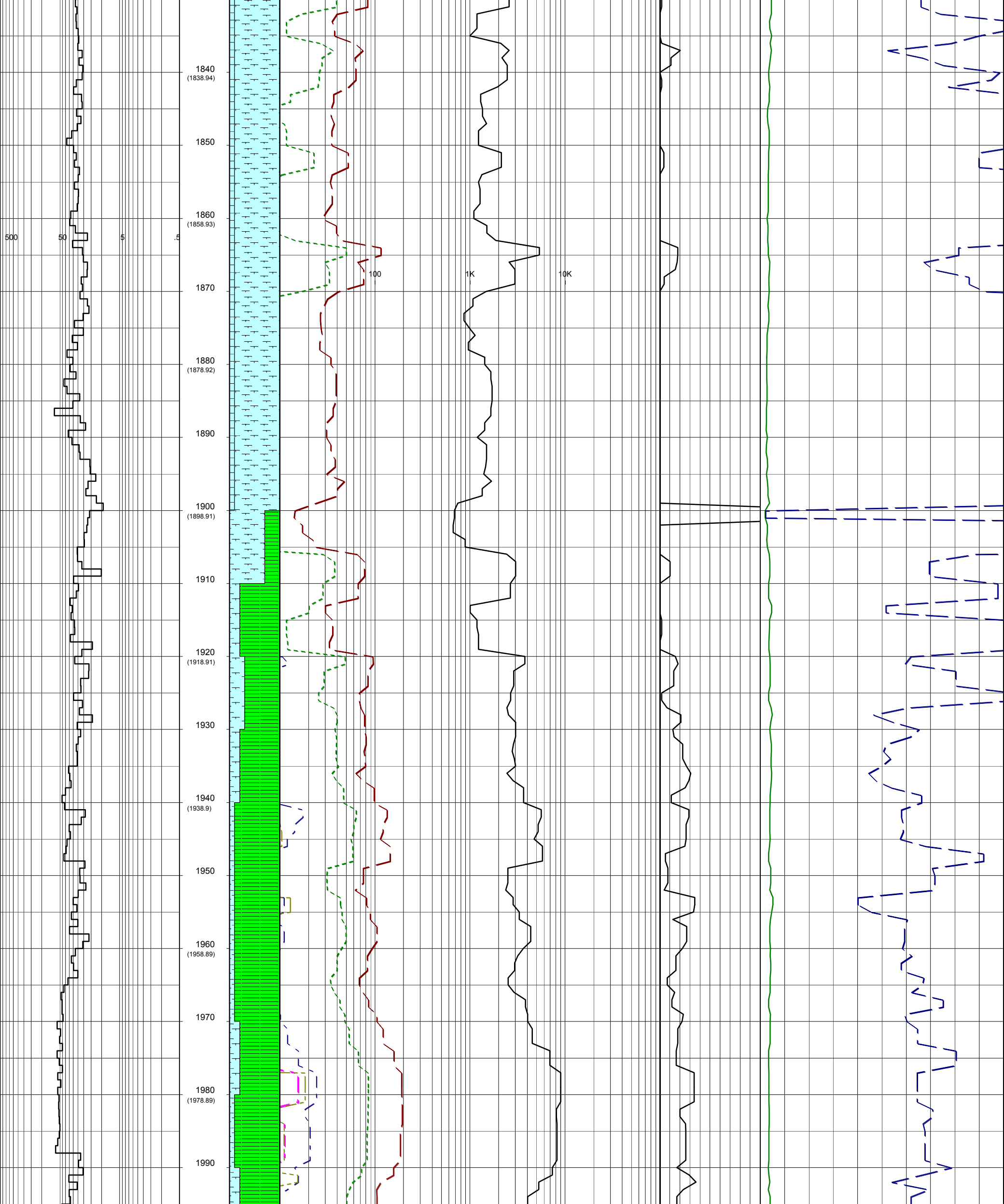


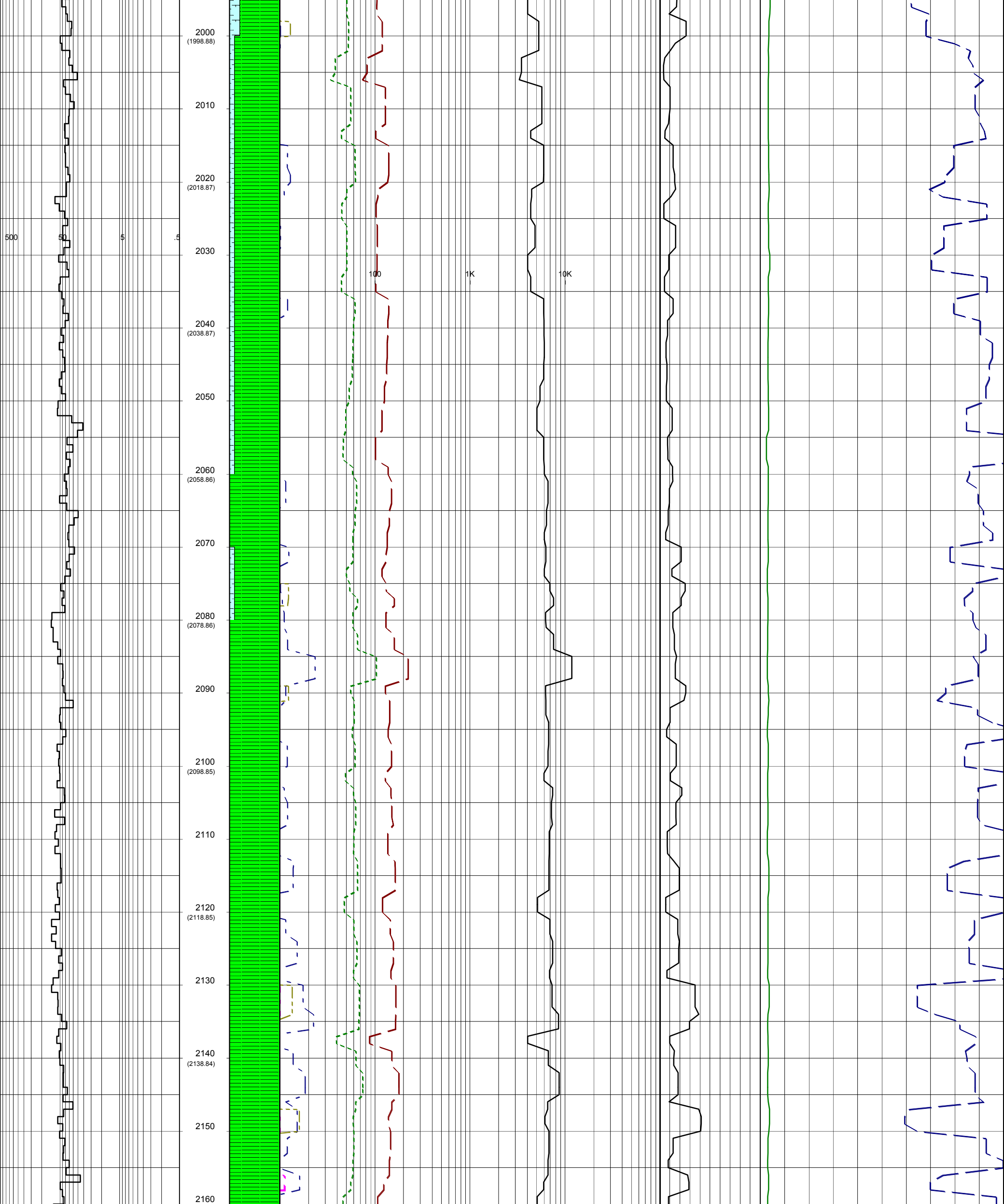


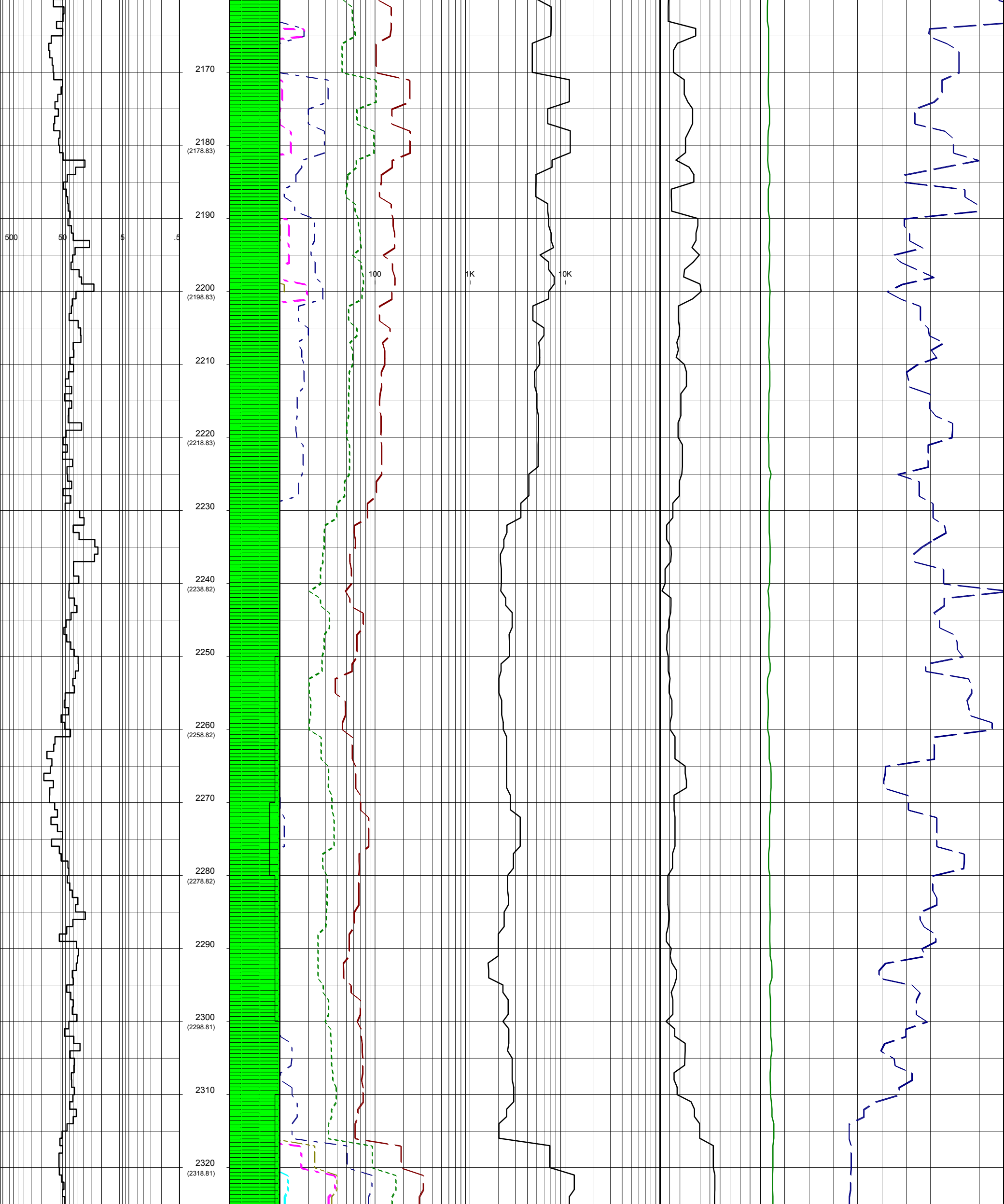


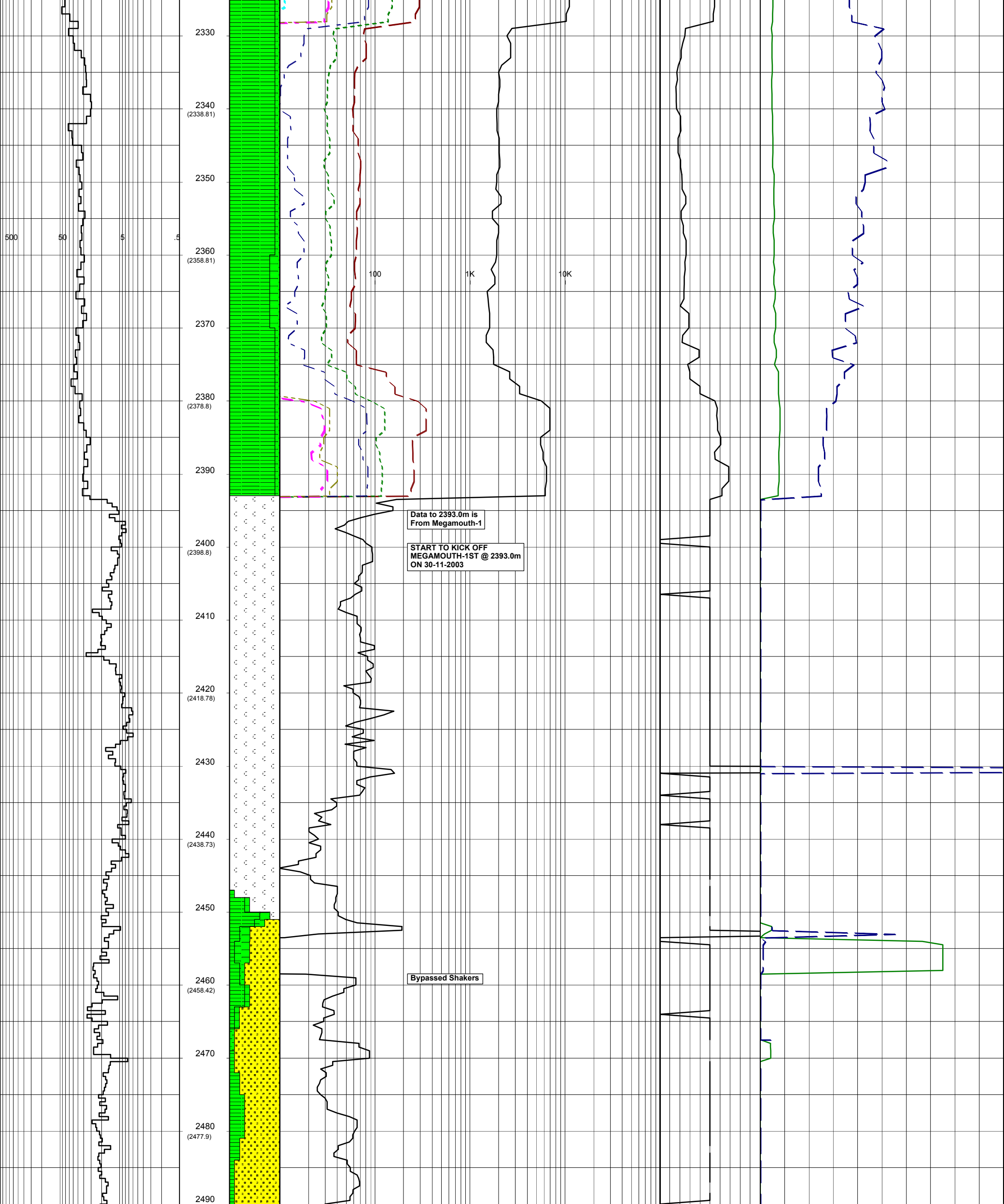


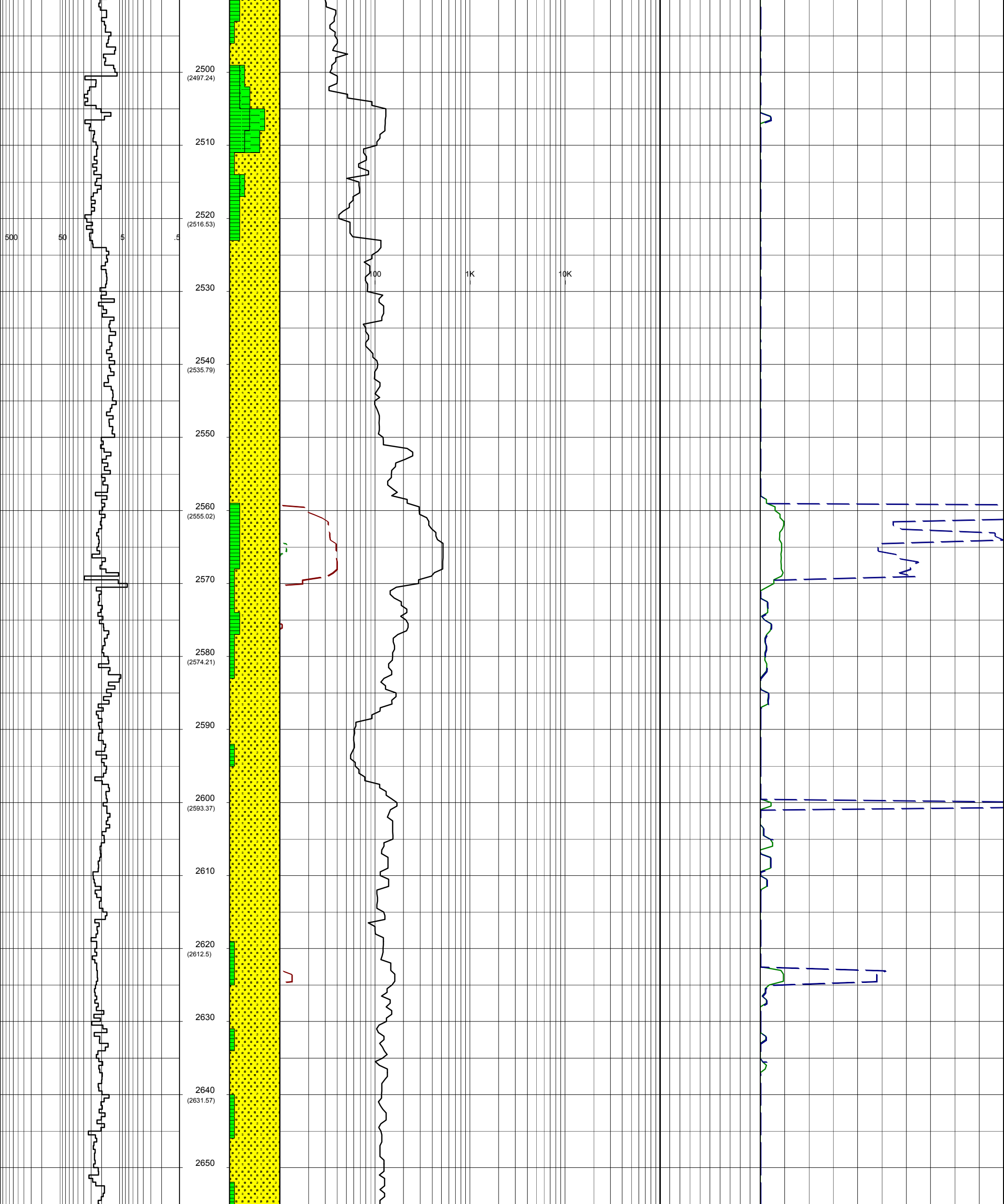


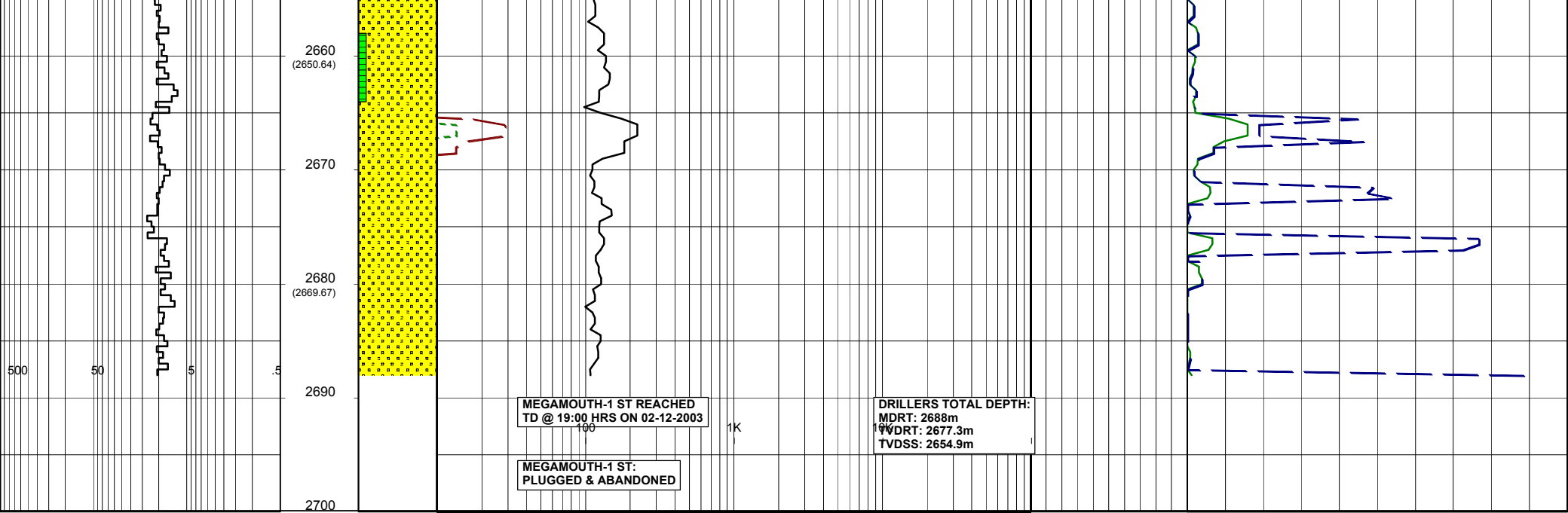














OVERPRESSURE LOG



FROM (m): 50

TO (m): 2750

SCALE : 1/ 2500

Well name : MEGAMOUTH-1ST

Latitude : 38° 35' 44.230" S

Longitude : 148° 16' 31.859" E

Rig Name : Ocean Epoch

Company Name : BHP Billiton

Country : Australia

Rig Type : Semi-Sub

RT-LAT (m): 22.4

Final TD- Drillers (m): 2688.0 m

Spud Date : 17-11-2003

Water Depth (m): 80.2

Final TVD (m): 2677.3 m



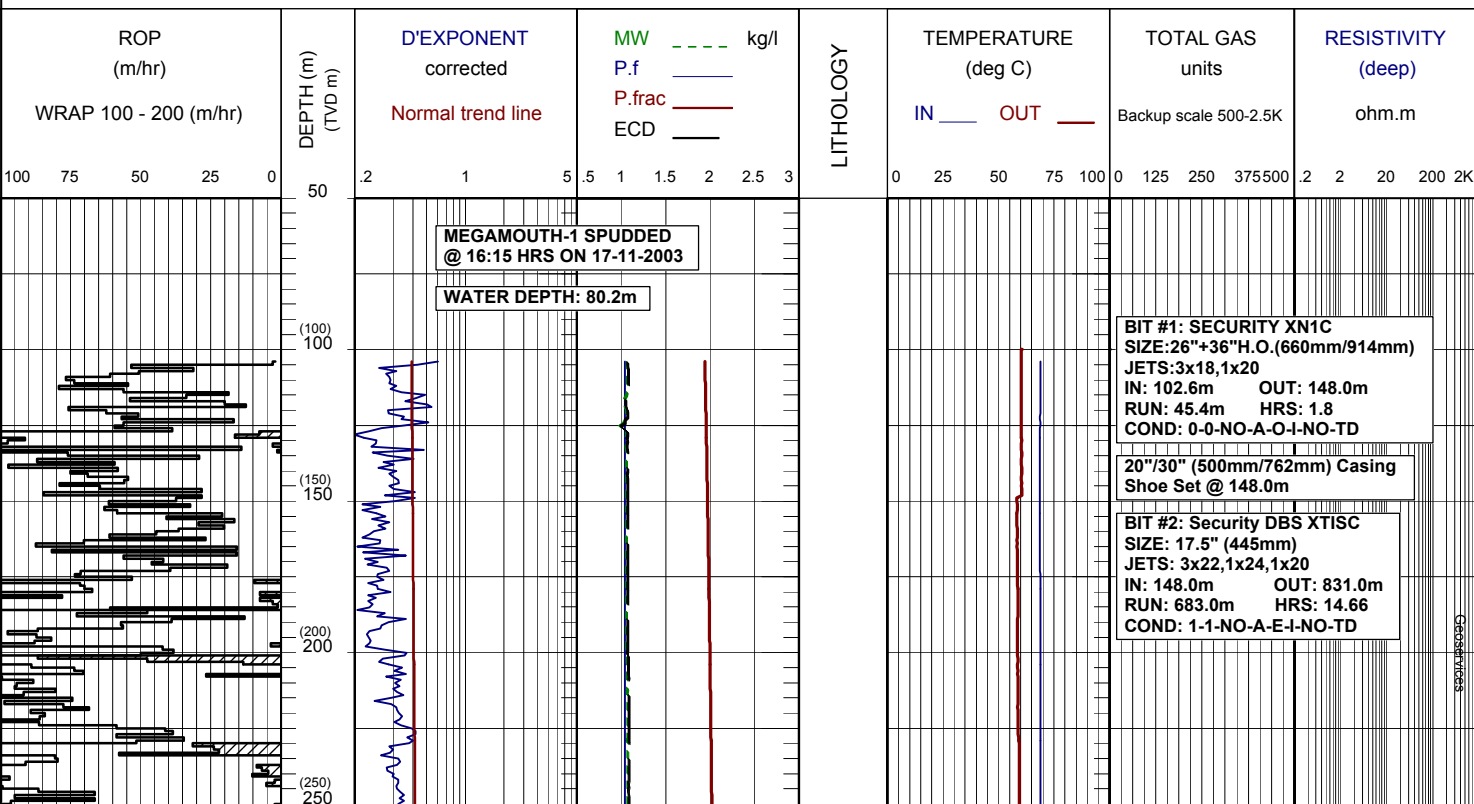
TD Date : 02-12-2003

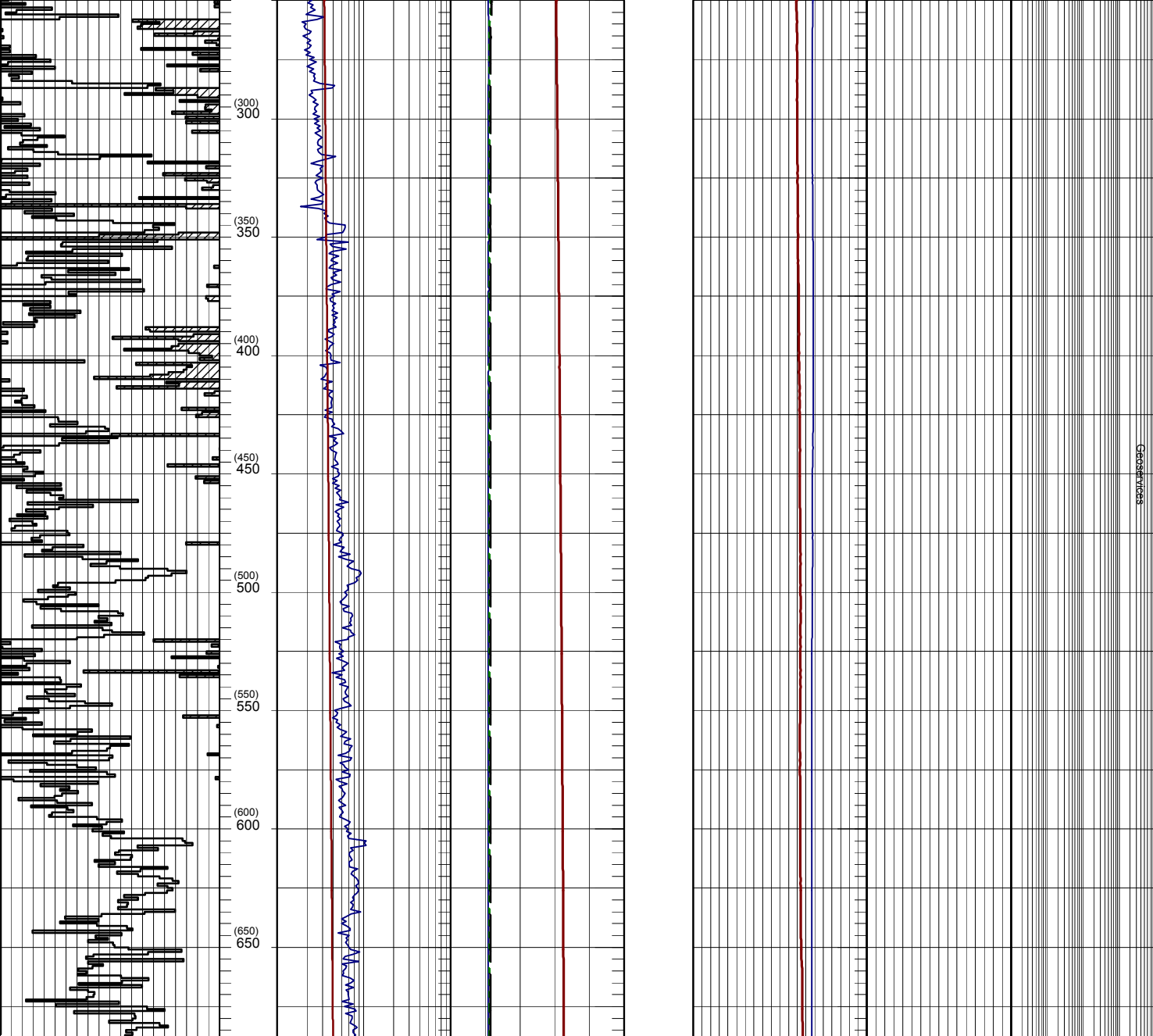
Computed Method: Eaton

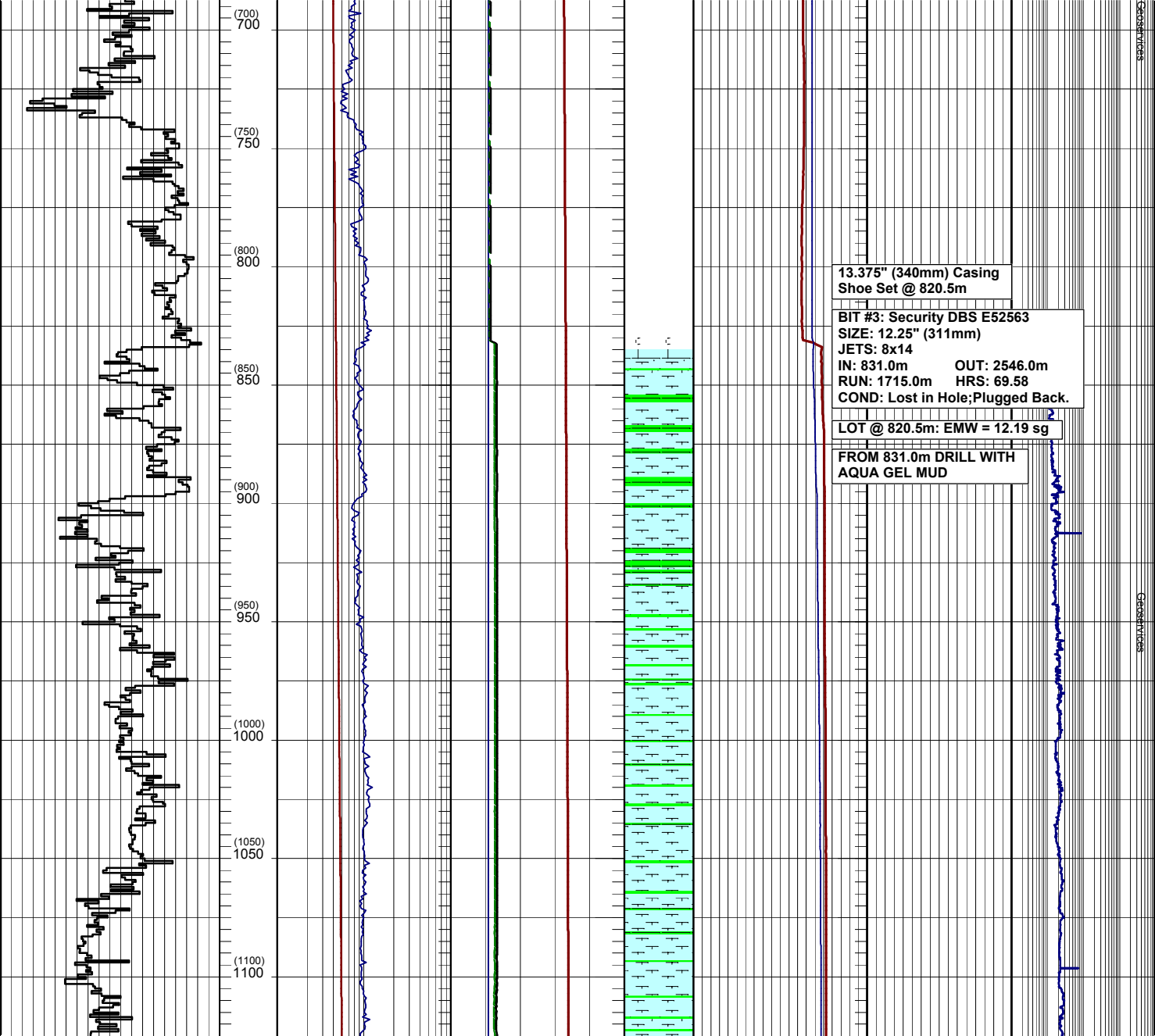
Overburden Law : Soft

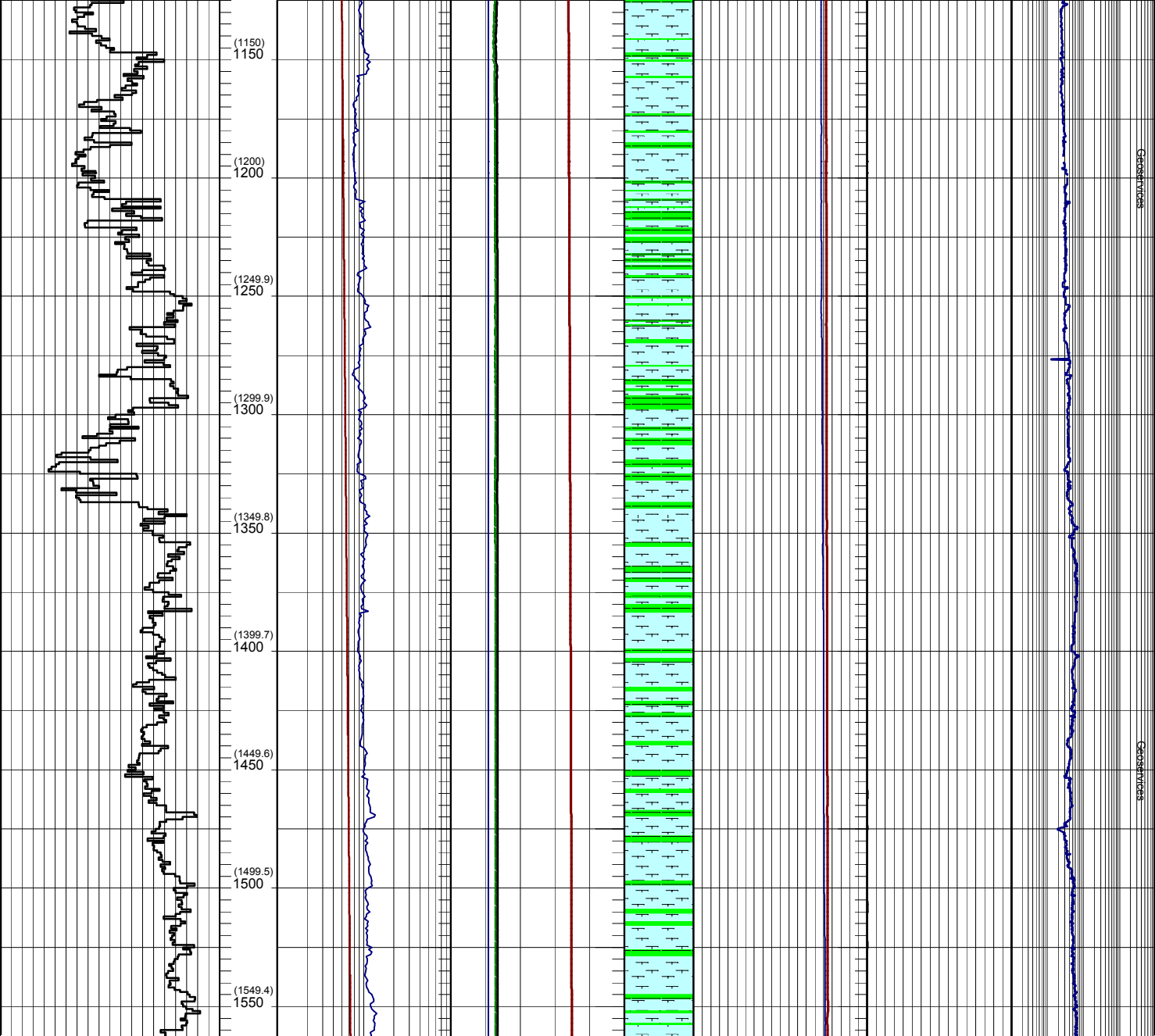
Trend Slopes : a = 0.0001601 b = -0.3586671

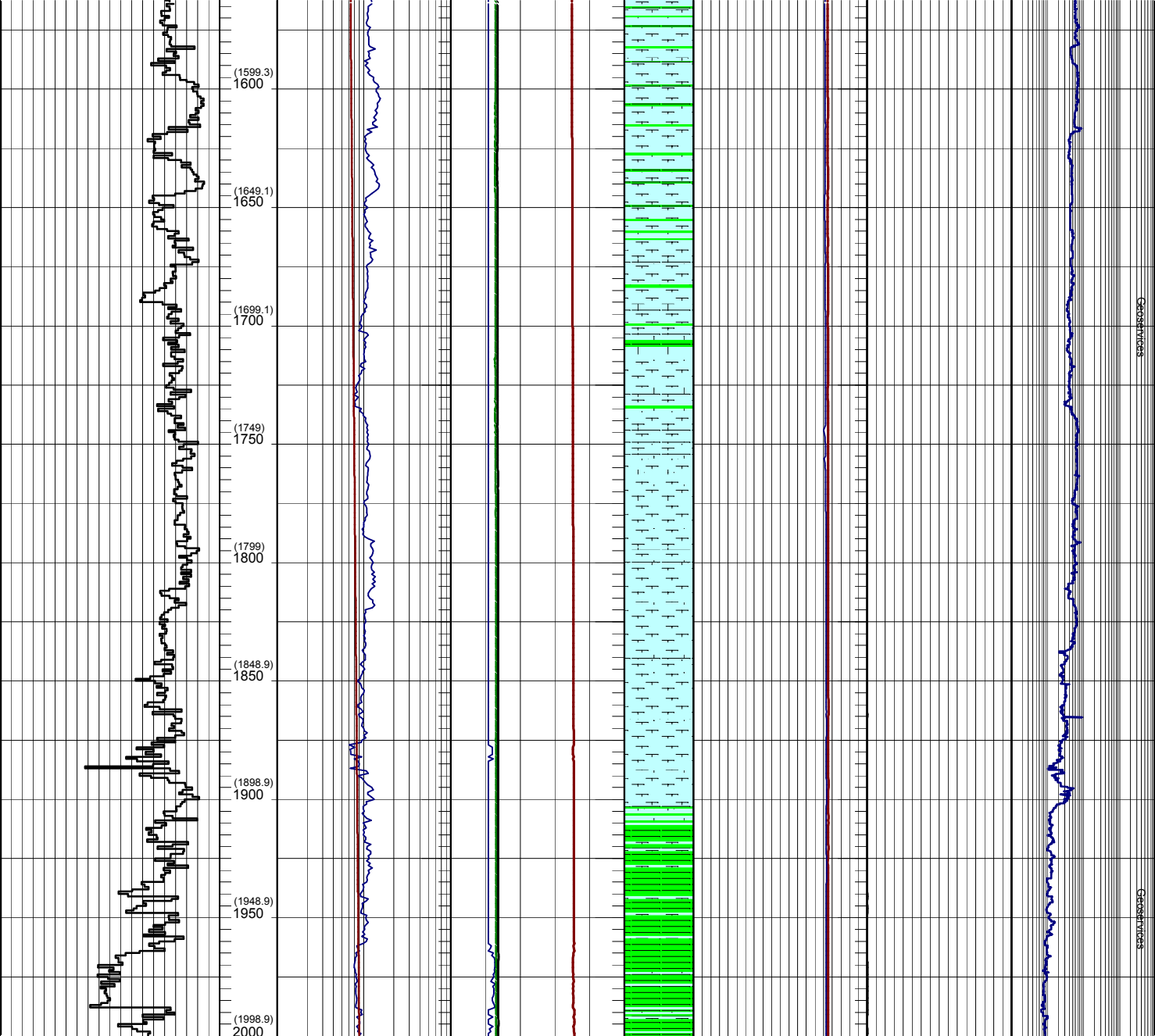
Hydro. Gradient : 1.04 kg/l

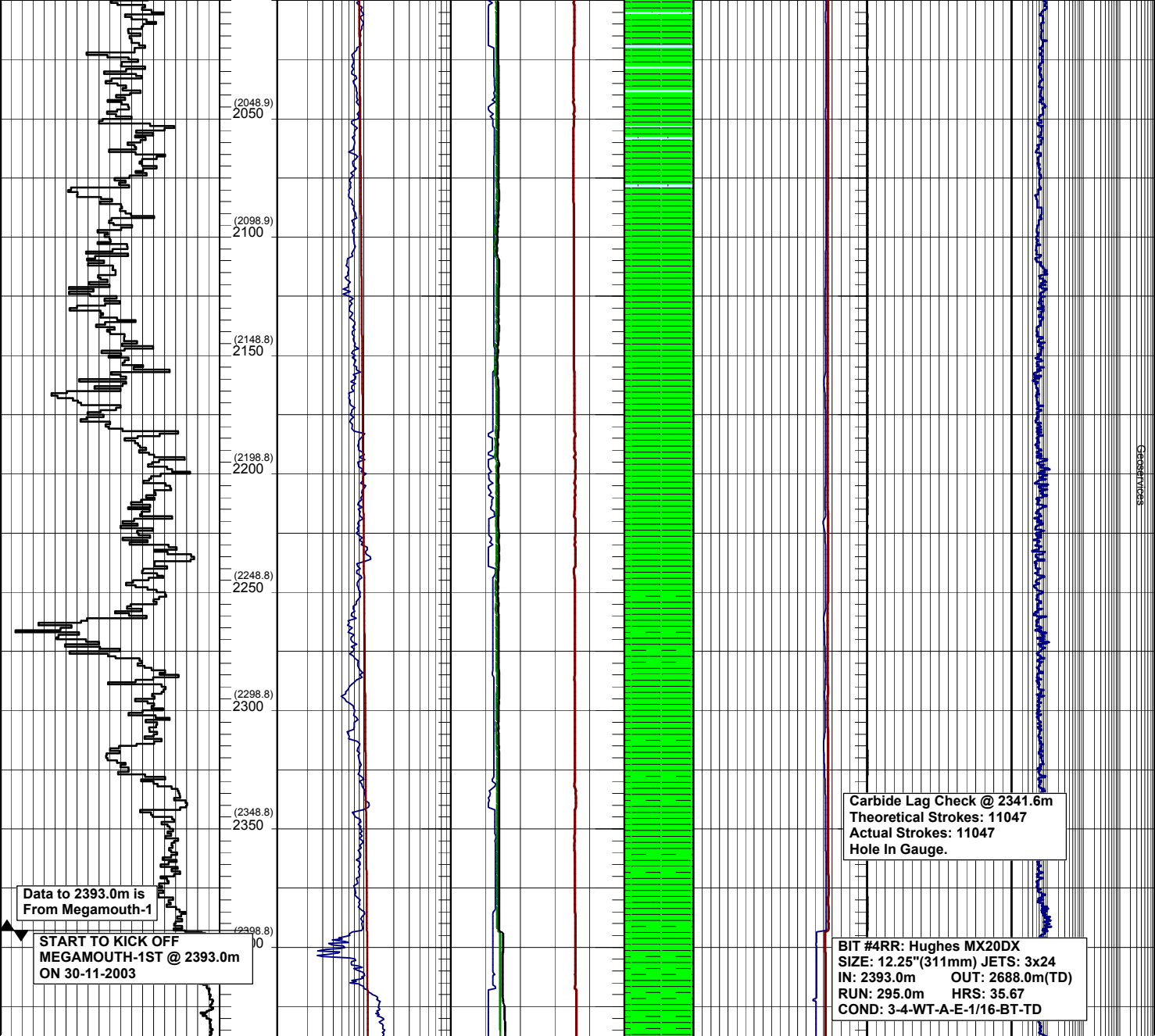
 Limestone Clay Med Sandstone Dolomite Coal Siltstone Marl Carb. Siltstone











(2048.9)
2050

(2098.9)
2100

(2148.8)
2150

(2198.8)
2200

(2248.8)
2250

(2298.8)
2300

(2348.8)
2350

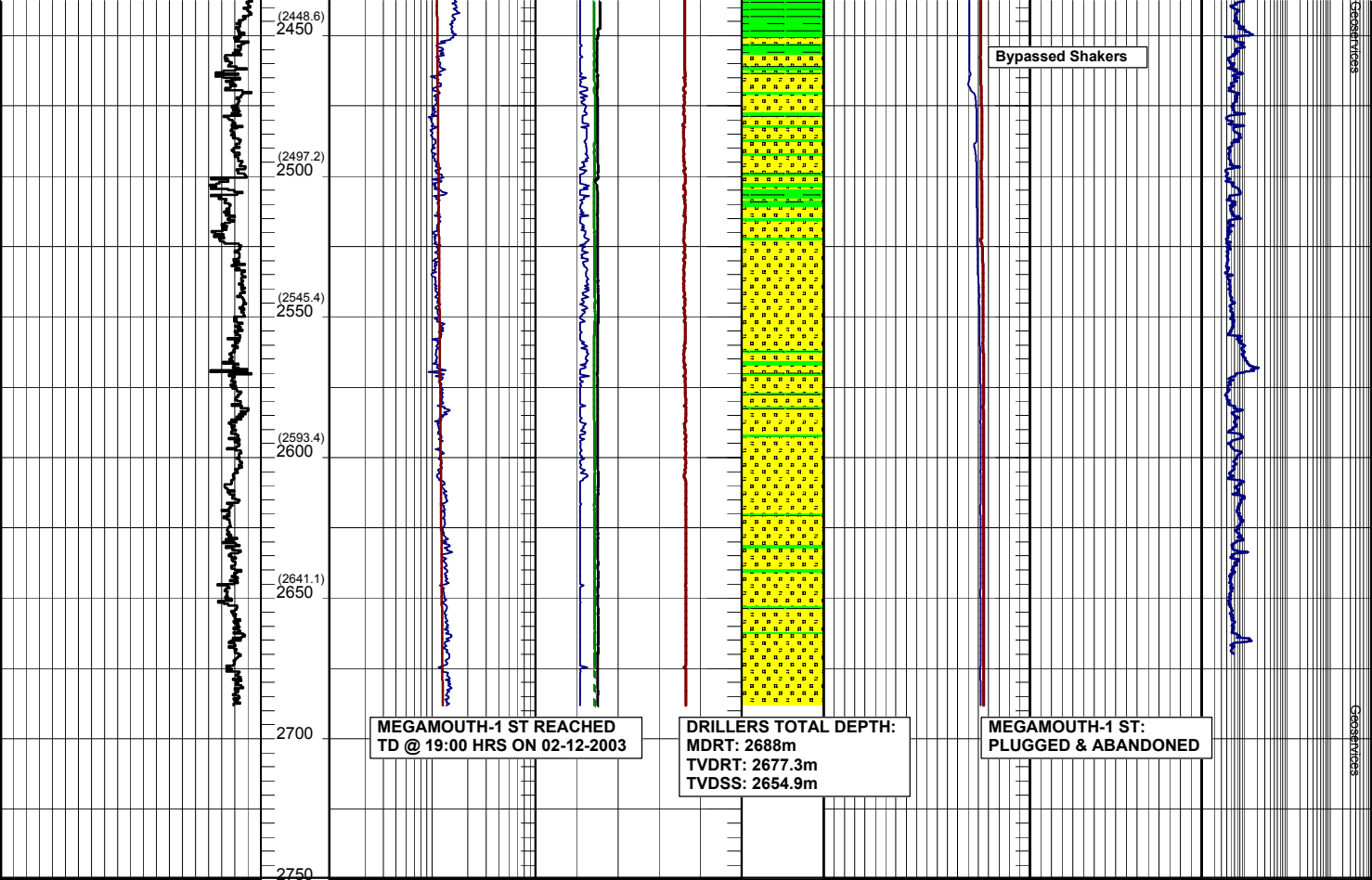
(2398.8)
2400

Data to 2393.0m is
From Megamouth-1

START TO KICK OFF
MEGAMOUTH-1ST @ 2393.0m
ON 30-11-2003

Carbide Lag Check @ 2341.6m
Theoretical Strokes: 11047
Actual Strokes: 11047
Hole In Gauge.

BIT #4RR: Hughes MX20DX
SIZE: 12.25"(311mm) JETS: 3x24
IN: 2393.0m OUT: 2688.0m(TD)
RUN: 295.0m HRS: 35.67
COND: 3-4-WT-A-E-1/16-BT-TD



6.3 APPENDIX 3 Megamouth-1 MWD/LWD End of Well Report

End of Well Report for BHP Billiton

Rig: Ocean Epoch

Well: Megamouth-1

Field: Exploration

Country: Australia

Job No: AU-FE-0002723564

Date: 22-Nov-03

API No:

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1. General Information
2. Operational Overview
3. Summary of MWD Runs
4. Bitrun Summary
5. Directional Survey Data
6. Service Interrupt Report

General Information

Company:	BHP Billiton	
Rig:	Ocean Epoch	
Well:	Megamouth-1	
Field:	Exploration	
Country:	Australia	
API Number:		
Sperry-Sun Job Number:	AU-FE-0002723564	
Job start date:	22-Nov-03	
Job end date:	26-Nov-03	
North reference:	Grid	
Declination:	13.272	deg
Dip angle:	-69.026	deg
Total magnetic field:	60197.660	nT
Date of magnetic data:	17-Nov-03	
Wellhead coordinates N:	38 deg. 35 min 44.230 sec South	
Wellhead coordinates E:	148 deg. 16 min 31.860 sec East	
Vertical section direction:	0.000	deg
MWD Engineers:	F. Besanger	A. Wilson
	T. Osborne	T. Osborne
Company Representatives:	P. Breene	P. Devine
Company Geologist:	G. Wakelin-King	A. Beech
Lease Name:	VIC/P45	
Unit Number:	LT 1087	
State:	Victoria	
County:		

Operational Overview

Sperry-Sun Drilling Services was contracted by BHP Billiton to supply Logging While Drilling (LWD) services on the appraisal well Megamouth-1 in permit VIC-P-45. The well was drilled with the Diamond Offshore MODU Ocean E

445 mm (17 1/2") Hole Section

This section was drilled in one bit run from 148.0 to 831.0 mMDRT. MWD services consisted of a Directional Module (DM) for deviation control.

311 mm (12 1/4") Hole Section

Sperry-Sun's Quad Combo tool suite was utilised during the drilling of this hole section. The Quad Combo tool suit consists of Dual Gamma Ray (DGR), Four Phase Electromagnetic Wave Resistivity (EWR-P4), Stabilised Litho Density (SLD), Compensated Neutron Porosity (CNP), Acoustic Caliper (ACAL), Bimodal Acoustic Tool (BAT) and a Directional Modulal (DM) for deviation control. The hole section was drilled from 831.0 mMDRT to 2546.0 mMDRT in one bit run. The well was plugged back and abandoned fo a sidetrack after the downhole motor parted and an attempt to recover it failed.

0 0

Bitrun Summary

Run Time Data		Drilling Data			Mud Data					
MWD Run :	0100	Start Depth :	148.10	m	Mud Type : Seawater					
Rig Bit No:	2	End Depth :	831.00	m	Weight / Visc : 8.60		sg /	N/A	spl	
Hole Size :	445.00	Footage :	682.90	m	Chlorides :		N/A	ppm		
Run Start :	19-Nov-03 01:00	Avg. Flow Rate :	1090.00	gpm	PV / YP :		N/A	cp /	N/A	lhf2
Run End :	20-Nov-03 06:00	Avg. RPM :	104.00	rpm	Solids/Sand :		N/A	% /	N/A	%
BRT Hrs :	29.00	Avg. WOB :	10.00	klb	%Oil / O:W :		N/A	% /	N/A:100	
Circ. Hrs :	19.00	Avg. ROP :	46.80	m/hr	pH/Fluid Loss: N/A		pH /	N/A	cptm	
Oper. Hrs :	19.00	Avg. SPP :	2400.00	psig	Max. Temp. :		N/A	degC		
MWD Schematics		BHA Schematics								
<div><p>1. DWD 1200 System SN : 4.09 m From Bit</p></div>	(15)				Component	Length	O.D.	I.D.		
	(14)					(m)	(mm)	(mm)		
	(13)									
	(12)	15.	HWDP		132.42	209.550	71.440			
	(11)	14.	Cross Over Sub		0.64	209.550	71.440			
	(10)	13.	HWDP		9.47	200.000	76.000			
	(9)	12.	Cross Over Sub		1.11	209.550	71.440			
	(8)	11.	Drill Collar		18.92	209.550	71.438			
	(7)	10.	Drilling Jars		9.75	209.550	71.440			
	(6)	09.	Drill Collar		55.78	209.550	71.438			
	(5)	08.	Cross Over Sub		1.92	229.000	76.000			
	(4)	07.	Spiral Drill collar		9.09	229.000	76.000			
	(3)	06.	Integral Blade Stabilizer		1.99	444.000	76.000			
	(2)	05.	Spiral Drill collar		9.98	229.000	76.000			
	(1)	04.	Integral Blade Stabilizer		2.04	444.000	76.000			
		03.	MWD		4.72	241.000	76.000			
		02.	Integral Blade Stabilizer		2.37	444.000	76.000			
		01.	Tricone		0.43	444.000	0.000			
Comments					MWD Performance					
Drilled from 148.1 - 831.0 mMDRT in one bit run. POOH to run 340 mm casing.					Tool OD / Type :		241.30	mm/	D/GWD	
					MWD Real-time%:		95.00	% /	95.00	%
					MWD Recorded%:		0.00	% /	0.00	%
					Min. Inc. :		0.13	deg/	684.50	m
					Max. Inc. :		0.62	deg/	166.00	m
					Final Az. :		228.02	deg		
					Max Op. Press. :		830	psig		

Bitrun Summary

Run Time Data		Drilling Data		Mud Data			
MWD Run :	0200	Start Depth :	831.00 m	Mud Type : Aqua-Drill			
Rig Bit No:	3	End Depth :	2546.00 m	Weight / Visc : 1.15 sg / 79.00 spl			
Hole Size :	311.00 mm	Footage :	1715.00 m	Chlorides : 39400 ppm			
Run Start :	22-Nov-03 02:00	Avg. Flow Rate :	880.00 gpm	PV / YP : 21.00 cp / 33.00 lhf2			
Run End :	26-Nov-03 20:00	Avg. RPM :	60.00 rpm	Solids/Sand : 5.5 % / 0.25 %			
BRT Hrs :	114.00	Avg. WOB :	10.00 klb	%Oil / O:W : N/A % / N/A:100			
Circ. Hrs :	82.97	Avg. ROP :	30.00 m/hr	pH/Fluid Loss: 9.25 pH / 5.00 cptm			
Oper. Hrs :	112.09	Avg. SPP :	3300.00 psig	Max. Temp. : 67.0 degC			
MWD Schematics		BHA Schematics					
<div><div><div>(9)</div><div>(8)</div><div>(7)</div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div></div><div><div>9. BAT SN: 180818 49.16 m From Bit</div><div>8. 8" P4M 1200 System SN: 0.00 m From Bit</div><div>7. PM SN: 85267 41.20 m From Bit</div><div>6. HCM SN: 10503669</div><div>5. Sub SN: 0.00 m From Bit</div><div>4. CNP SN: 74044 34.64 m From Bit</div><div>3. EWR-P SN: 144719 31.68 m From Bit</div><div>2. SLD SN: 077162 28.71 m From Bit</div><div>1. DGR SN: 132474 25.30 m From Bit</div></div></div>		<div><div><div>(15)</div><div>(14)</div><div>(13)</div><div>(12)</div><div>(11)</div><div>(10)</div><div>(9)</div><div>(8)</div><div>(7)</div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div></div><div><div>Component</div><div>Length</div><div>O.D.</div><div>I.D.</div></div><div><div></div><div>(m)</div><div>(mm)</div><div>(mm)</div></div><div><div>15. HWDP</div><div>14. Cross Over Sub</div><div>13. HWDP</div><div>12. Cross Over Sub</div><div>11. Drill Collar</div><div>10. Drilling Jars</div><div>09. Drill Collar</div><div>08. Cross Over Sub</div><div>07. MWD</div><div>06. 3-Point String Reamer</div><div>05. Spiral Drill collar</div><div>04. 3-Point String Reamer</div><div>03. Float Sub</div><div>02. 8" Schlumberger PDM</div><div>01. PDC</div></div><div><div>132.42</div><div>0.64</div><div>9.47</div><div>1.11</div><div>18.92</div><div>9.75</div><div>55.78</div><div>1.92</div><div>28.56</div><div>2.74</div><div>9.02</div><div>2.90</div><div>0.77</div><div>8.29</div><div>0.36</div></div><div><div>209.550</div><div>209.550</div><div>200.000</div><div>209.550</div><div>209.550</div><div>209.550</div><div>209.550</div><div>210.000</div><div>213.444</div><div>203.000</div><div>210.000</div><div>203.000</div><div>203.000</div><div>203.200</div><div>311.000</div></div><div><div>71.440</div><div>71.440</div><div>76.000</div><div>71.440</div><div>71.438</div><div>71.440</div><div>71.438</div><div>70.000</div><div>70.000</div><div>70.000</div><div>70.000</div><div>70.000</div><div>70.000</div><div>70.000</div><div>0.000</div></div></div>					
Comments				MWD Performance			
Drilled 12 1/4" (311mm) hole from 831.0 - 2546.0 mMDRT. The well was plugged back and abandoned when the downhole motor parted at 2546.0 mMDRT and an attempt to fish it was unsuccessful.				Tool OD / Type : 203.20 mm/ FEWD			
				MWD Real-time%:90.00 % / 90.00 %			
				MWD Recorded%:90.00 % / 100.00 %			
				Min. Inc. : 0.09 deg/ 845.67 m			
				Max. Inc. : 4.02 deg/ 1458.10 m			
				Final Az. : 350.51 deg			
				Max Op. Press. : 4180 psig			

Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
81.50	0.00	0.00	81.50	0.00 N	0.00 E	0.00	TIE-IN
166.00	0.62	207.17	166.00	0.41 S	0.21 W	-0.40	0.22
195.90	0.61	179.96	195.90	0.71 S	0.28 W	-0.70	0.29
250.50	0.57	192.84	250.49	1.27 S	0.34 W	-1.25	0.07
279.30	0.44	183.73	279.29	1.52 S	0.38 W	-1.50	0.16
367.30	0.37	206.52	367.29	2.11 S	0.53 W	-2.08	0.06
454.00	0.50	187.15	453.99	2.73 S	0.70 W	-2.70	0.07
541.50	0.15	197.89	541.49	3.23 S	0.79 W	-3.19	0.12
628.70	0.26	209.80	628.69	3.51 S	0.92 W	-3.47	0.04
684.50	0.13	189.36	684.49	3.69 S	1.00 W	-3.64	0.08
714.20	0.13	239.71	714.19	3.74 S	1.03 W	-3.69	0.11
821.00	0.19	228.46	820.99	3.92 S	1.27 W	-3.86	0.02
827.40	0.20	228.02	827.39	3.93 S	1.29 W	-3.87	0.02
769.89	0.28	307.01	769.88	3.82 S	1.15 W	-3.76	0.02
845.67	0.09	72.72	845.66	3.95 S	1.30 W	-3.89	0.45
875.61	0.14	47.32	875.59	3.92 S	1.25 W	-3.86	0.07
905.10	0.26	40.22	905.09	3.84 S	1.18 W	-3.79	0.12
933.83	0.28	47.22	933.81	3.75 S	1.09 W	-3.69	0.04
962.40	0.35	27.79	962.39	3.62 S	1.00 W	-3.57	0.13
991.89	0.31	21.75	991.87	3.47 S	0.92 W	-3.42	0.05
1021.90	0.50	21.35	1021.89	3.27 S	0.85 W	-3.23	0.18
1049.70	0.49	8.82	1049.68	3.04 S	0.78 W	-3.00	0.12
1107.70	0.64	8.83	1107.70	2.47 S	0.70 W	-2.44	0.07
1136.80	0.91	4.66	1136.78	2.08 S	0.65 W	-2.05	0.29
1195.40	1.47	359.86	1195.39	0.87 S	0.62 W	-0.84	0.29
1282.00	2.90	3.60	1281.90	2.43 N	0.48 W	2.45	0.50
1312.10	3.07	3.39	1311.90	3.99 N	0.39 W	4.01	0.17
1397.40	3.67	2.54	1397.11	9.00 N	0.13 W	9.00	0.21
1458.10	4.02	1.09	1457.60	13.07 N	0.00 W	13.06	0.18
1484.80	3.92	0.93	1484.31	14.92 N	0.03 E	14.91	0.12
1514.40	3.77	0.58	1513.85	16.91 N	0.06 E	16.89	0.15
1539.60	3.69	1.00	1539.09	18.55 N	0.08 E	18.53	0.10
1570.30	3.85	1.88	1569.64	20.56 N	0.13 E	20.54	0.16
1597.80	3.86	0.11	1597.06	22.41 N	0.16 E	22.38	0.13
1627.80	3.73	359.86	1626.99	24.39 N	0.16 E	24.36	0.13
1654.50	3.53	1.04	1653.64	26.08 N	0.17 E	26.05	0.24
1716.00	2.75	0.13	1715.05	29.45 N	0.21 E	29.41	0.38
1744.20	2.57	359.92	1743.20	30.76 N	0.21 E	30.72	0.19
1773.80	2.29	358.46	1772.80	32.02 N	0.19 E	31.98	0.29
1801.50	2.06	358.97	1800.47	33.06 N	0.17 E	33.02	0.25

Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
1831.71	1.87	355.50	1830.70	34.10 N	0.12 E	34.06	0.23
1861.71	1.82	353.71	1860.69	35.06 N	0.03 E	35.02	0.08
1887.01	1.74	356.67	1885.94	35.84 N	0.03 W	35.80	0.14
1917.60	1.57	355.94	1916.54	36.72 N	0.09 W	36.69	0.17
1949.31	1.51	352.76	1948.21	37.57 N	0.17 W	37.54	0.10
1974.61	1.50	351.45	1973.56	38.23 N	0.27 W	38.20	0.04
2003.11	1.49	349.21	2002.01	38.96 N	0.39 W	38.94	0.06
2032.80	1.37	350.27	2031.67	39.68 N	0.52 W	39.67	0.12
2121.70	1.27	350.42	2120.51	41.70 N	0.87 W	41.70	0.03
2209.50	1.05	346.81	2208.30	43.45 N	1.21 W	43.46	0.08
2297.70	0.88	349.11	2296.51	44.90 N	1.52 W	44.92	0.06
2354.80	0.88	347.07	2353.64	45.76 N	1.70 W	45.79	0.02
2383.01	0.83	351.30	2381.89	46.17 N	1.78 W	46.20	0.09
2466.60	0.69	350.51	2465.40	47.27 N	1.96 W	47.31	0.05
2546.00	0.69	350.51	2544.80	48.21 N	2.11 W	48.21	0.00

Directional Survey Data

CALCULATION BASED ON Minimum Curvature METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT

TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD

VERTICAL SECTION IS COMPUTED ALONG CLOSURE OF 357.49 DEGREES (GRID)

A TOTAL CORRECTION OF 14.07 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 2546.00 METRES

IS 48.25 METRES ALONG 357.49 DEGREES (GRID)

Final Survey projected to TD.

Service Interrupt Report

MWD run number :	0200	Time/Date of Failure :	23-Nov-03 14:00
Rig Bit Number :	3	Depth at time of Failure :	1730.00 m
MWD Run start time/date	22-Nov-03 02:00	Lost Rig Hours :	0.00
MWD Run end time/date	:26-Nov-03 20:00		

Rig Activity

Drilling ahead.

Description of Failure

The response from the CNP sensor became erratic and began to read erroneously high.

Action Taken

Unable to take any action at time of failure

Operation Impact

None. CNP was processed with just the one bank.

Reason for Failure

One of the CNP sensors near detectors failed due to downhole vibration. As the tool has two banks built in for redundancy the CNP data was processed using only one near bank. The high vibration experienced also sheared the screws on one of the DM centralizers resulting in it ending up above the float valve.

Sperry-Sun, A Halliburton Company



6.4 APPENDIX 4 Megamouth-1/ST1 MWD/LWD End of Well Report

End of Well Report for BHP Billiton

Rig: Ocean Epoch
Well: Megamouth-1ST
Field: VIC-P-45
Country: Australia
Job No: AU-FE-0002796094
Date: 27-Nov-03
API No:

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1. General Information
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4. Bitrun Summary
5. Directional Survey Data

General Information

Company:	BHP Billiton	
Rig:	Ocean Epoch	
Well:	Megamouth-1ST	
Field:	VIC-P-45	
Country:	Australia	
API Number:		
Sperry-Sun Job Number:	AU-FE-0002796094	
Job start date:	27-Nov-03	
Job end date:	02-Dec-03	
North reference:	Grid	
Declination:	13.272	deg
Dip angle:	-69.025	deg
Total magnetic field:	60197.031	nT
Date of magnetic data:	27-Nov-03	
Wellhead coordinates N:	38 deg. 35 min 44.230 sec South	
Wellhead coordinates E:	148 deg. 16 min 31.860 sec East	
Vertical section direction:	Closure	deg
MWD Engineers:	F.Besanger	T.Oborne
	A.Wilson	
	T. Oborne	A. Wilson
Company Representatives:	P.Devine	P. Devine
Company Geologist:	G. Wakelin-King	A. Beech
Lease Name:		
Unit Number:	LT 1087	
State:	Victoria	
County:		

Operational Overview

Sperry-Sun Drilling Services was contracted by BHP Billiton to supply Logging While Drilling (LWD) services on the well Megamouth-1 ST in permit VIC-P-45. The well was sidetracked out of the Megamouth-1 well bore after a down hole motor twisted off at 2546.0 mMDRT. The well was drilled with the Diamond Offshore MODU Ocean Epoch.

311mm (12 1/4") Hole Section.

Sperry-Sun's Quad Combo tool suite was used in the drilling of this section and consisted of a Dual Gamma Ray (DGR), Four Phase Electromagnetic Wave Resistivity (EWR-P4), Stabilized Litho Density (SLD), Compensated Neutron Porosity (CNP), Bimodal Acoustic Sonic (BAT) and a Directional Module for deviation control.

A cement plug was set in the Megamouth-1 well bore as a kick off plug and an attempt was made to sidetrack at 2450.0 mMDRT. The first attempt was unsuccessful second cement plug was set. Megamouth-1 ST was successfully kicked off at 2393.0 mMDRT. The hole section was drilled in one bit run toTD at 2688.0 mMDRT. All recorded data was recovered at surface.

TOTALS	====>	328.00	86.28	86.28	53.03	0	0
--------	-------	--------	-------	-------	-------	---	---

Bitrun Summary

Run Time Data		Drilling Data		Mud Data				
MWD Run :	0300	Start Depth :	2450.00 m	Mud Type : Aqua Drill				
Rig Bit No:	4	End Depth :	2483.00 m	Weight / Visc : 1.20 sg / 72.00 spl				
Hole Size :	311.00 mm	Footage :	33.00 m	Chlorides : 39950 ppm				
Run Start :	28-Nov-03 16:22	Avg. Flow Rate :	710.00 gpm	PV / YP : 25.00 cp / 35.00 pa				
Run End :	29-Nov-03 14:09	Avg. RPM :	80.00 rpm	Solids/Sand : 5.5 % / 0.75 %				
BRT Hrs :	21.78	Avg. WOB :	2.00 klb	%Oil / O:W : N/A % / N/A:100				
Circ. Hrs :	8.50	Avg. ROP :	0.00 m/hr	pH/Fluid Loss: 9.50 pH / 1.00 cptm				
Oper. Hrs :	21.78	Avg. SPP :	2900.00 psig	Max. Temp. : 66.00 degC				
MWD Schematics		BHA Schematics						
<div><div>(8)</div><div><div></div><div>8. BAT SN: 180818 113.85 m From Bit</div><div>(7)</div><div>7. 8 DGWD 650 System SN: 0.00 m From Bit</div><div>(6)</div><div>6. PM SN: 103286 26.71 m From Bit</div><div>(5)</div><div>5. HCIM SN: 132882</div><div>(4)</div><div>4. CNP SN: 87644 22.31 m From Bit</div><div>(3)</div><div>3. EWR-P4 SN: 74703 19.36 m From Bit</div><div>(2)</div><div>2. SLD SN: 152522 16.40 m From Bit</div><div>(1)</div><div>1. DGR SN: 89753 12.94 m From Bit</div></div></div>		<div><div>(13)</div><div><div></div><div>13. HWDP 75.65</div><div>(12)</div><div>12. Cross Over Sub 0.64</div><div>(11)</div><div>11. HWDP 9.47</div><div>(10)</div><div>10. Cross Over Sub 1.11</div><div>(9)</div><div>09. Drill Collar 18.92</div><div>(8)</div><div>08. Drilling Jars 9.75</div><div>(7)</div><div>07. Drill Collar 55.78</div><div>(6)</div><div>06. Cross Over Sub 1.92</div><div>(5)</div><div>05. MWD 26.45</div><div>(4)</div><div>04. 3-Point String Reamer 2.32</div><div>(3)</div><div>03. Float Sub 0.77</div><div>(2)</div><div>02. 8" SperryDrill Lobe 8.29</div><div>(1)</div><div>01. PDC 0.35</div></div></div>		Component		Length (m)	O.D. (mm)	I.D. (mm)
				75.65	209.550	71.440		
				0.64	209.550	71.440		
				9.47	200.000	76.000		
				1.11	209.550	71.440		
				18.92	209.550	71.438		
				9.75	209.550	71.440		
				55.78	209.550	71.438		
				1.92	210.000	70.000		
				26.45	213.875	70.000		
				2.32	203.000	70.000		
				0.77	203.000	70.000		
				8.29	203.200	70.000		
				0.35	311.000	0.000		
Comments				MWD Performance				
An attempt to kick off Megamouth-1 ST was unsuccessful. POOH to re-set cement plug.				Tool OD / Type : 203.20 mm/ MPT				
				MWD Real-time%:100.00 % / 99.00 %				
				MWD Recorded%:99.00 % / 100.00 %				
				Min. Inc. : 0.75 deg/ 2442.35 m				
				Max. Inc. : 0.75 deg/ 2442.35 m				
				Final Az. : 355.50 deg				
				Max Op. Press. : 4230 psig				

Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
2383.08	0.83	351.30	2381.89	46.19 N	1.78 W	46.19	TIE-IN
2384.71	0.76	350.33	2383.56	46.21 N	1.78 W	-41.05	1.22
2412.80	0.28	303.92	2411.61	46.43 N	1.87 W	-41.22	0.65
2443.80	7.35	186.91	2442.50	44.51 N	2.17 W	-39.32	7.23
2469.50	14.35	185.33	2467.75	39.70 N	2.67 W	-34.78	8.18
2499.70	15.12	185.79	2497.02	32.04 N	3.41 W	-27.54	0.78
2528.50	15.52	186.75	2524.70	24.49 N	4.24 W	-20.35	0.49
2553.50	16.08	187.06	2548.79	17.73 N	5.06 W	-13.89	0.68
2585.90	16.57	187.42	2579.88	8.70 N	6.21 W	-5.22	0.47
2614.71	17.07	187.73	2607.50	0.42 N	7.31 W	2.73	0.53
2656.60	17.94	187.31	2647.41	12.06 S	8.96 W	14.73	0.63
2688.00	17.94	187.31	2677.28	21.65 S	10.19 W	23.93	0.00

Directional Survey Data

CALCULATION BASED ON Minimum Curvature METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT

TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD

VERTICAL SECTION IS COMPUTED ALONG CLOSURE OF 205.21 DEGREES (GRID)

A TOTAL CORRECTION OF 14.07 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 2688.00 METRES

IS 23.93 METRES ALONG 205.21 DEGREES (GRID)

Final Survey Projected to TD.

Sperry-Sun, A Halliburton Company



6.5 APPENDIX 5 Rig Positioning Report



Megamouth-1 Positioning Report of the Ocean Epoch

**Prepared for
BHP Billiton Petroleum Pty Ltd**

Report No: 3634A3

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Prepared for



BHP BILLITON PETROLEUM PTY LTD

DOCUMENT TITLE	:	MEGAMOUTH-1 POSITIONING REPORT OF THE OCEAN EPOCH
CLIENT	:	BHP BILLITON PETROLEUM PTY LTD
LOCATION	:	BASS STRAIT
PERMIT	:	VIC-P-45
REPORT REF.	:	3634A3
REPORT REV NO.	:	0
REPORT ISSUE DATE	:	2 DECEMBER 2003
SURVEY DATE	:	10 – 18 NOVEMBER 2003

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- K - DAILY REPORT SHEETS

LOCATION DIAGRAM



ABSTRACT

This report details the positioning services provided by Thales GeoSolutions (Australasia) Limited (Thales), prior to and during the positioning of the semi-submersible drilling rig Ocean Epoch at the Megamouth-1 location for BHP Billiton Petroleum Pty Ltd (BHPBP).

Positioning of the Ocean Epoch during the approach to and at the Megamouth-1 location was provided by Thales' SkyFix/SkyFix Spot Differential GPS (Differential GPS) interfaced to Thales' MultiFix 3 multiple reference station positioning software and Thales' GNS2 navigation software. The two anchor handling vessels (AHVs), Lady Dawn and Pacific Challenger were positioned using Thales' Tracs/Tug Display Vessel Tracking System (VTS). The Ocean Epoch was positioned at the Megamouth-1 location at 2108 on 15 November 2003.

Intended Megamouth-1 Location

The coordinates of the intended Megamouth-1 location were provided by BHPBP as follows:

Datum: GDA94

Latitude : 38° 35' 44.230" South
Longitude : 148° 16' 31.870" East

Projection: MGA Zone 55, CM 147° East

Easting : 611 077.45m
Northing : 5 727 325.04m

Rig Positioning Tolerance : ± 10m

Intended Rig Heading : 240.0° (T)

Final Differential GPS Drillstem Position at the Megamouth-1 Location

The final Differential GPS Position of the Ocean Epoch drillstem at the Megamouth-1 location was computed from data observed between 1226 and 1326 on 17 November 2003. The final position is as follows:

Datum: GDA94

Latitude : 38° 35' 44.230" South
Longitude : 148° 16' 31.859" East

Projection: MGA Zone 55, CM 147° East

Easting : 611 077.19m
Northing : 5 727 325.06m

The final Differential GPS drillstem position is 0.26m on a bearing of 273.0° (T) from the intended Megamouth-1 location.

Final Rig Heading : 238.2° (T)

All times quoted in this report are Eastern Standard Time (UTC + 11.0 hours).

1. RESULTS

1.1 FINAL DIFFERENTIAL GPS POSITION OF THE OCEAN EPOCH DRILLSTEM AT THE MEGAMOUTH-1 LOCATION

The Ocean Epoch was positioned at the Megamouth-1 location at 2108 on 15 November 2003.

The final Differential GPS position of the Ocean Epoch drillstem at the Megamouth-1 location, was determined using Thales' MultiFix 3 positioning software interfaced to a BD112 GPS card, with differential corrections being provided by Thales' SkyFix Spot Differential GPS services.

The final fix routine, within Thales' GNS2 navigation software version 2.48, was used to compute the final Differential GPS position of the drillstem at the Megamouth-1 location. A total of 720 position fixes were recorded at 5 second intervals between 1226 and 1326 on 17 November 2003.

Refer to Appendix A for the GNS2 final Differential GPS position printouts at the Megamouth-1 location. Associated graphs are located in Appendix B.

Differential corrections from the SkyFix Spot reference stations in Adelaide, Melbourne and Sydney were used in the MultiFix 3 software computations to derive the final Differential GPS position.

The final surface coordinates of the Ocean Epoch drillstem at the Megamouth-1 location, determined from Differential GPS observations are as follows:

Total number of samples used = 720.

The computed antenna position is as follows:

GPS Antenna Position

Datum: WGS84

Latitude	:	38° 35' 44.825" South	(S.D. 0.31m)
Longitude	:	148° 16' 30.208" East	(S.D. 0.26m)
Ellipsoidal Height	:	22.76m	(S.D. 0.29m)

Transforming the above WGS84 coordinates to GDA94 coordinates using the parameters in section 6, gives the following antenna coordinates:

GPS Antenna Position

Datum: GDA94

Latitude	:	38° 35' 44.825" South
Longitude	:	148° 16' 30.208" East
Ellipsoidal Height	:	22.76m

By applying a distance of 43.97m on a bearing of 65.3° (T) from the antenna position, the following drillstem coordinates are calculated:

Final Differential GPS Position of the Drillstem at the Megamouth-1 Location

Datum: GDA94

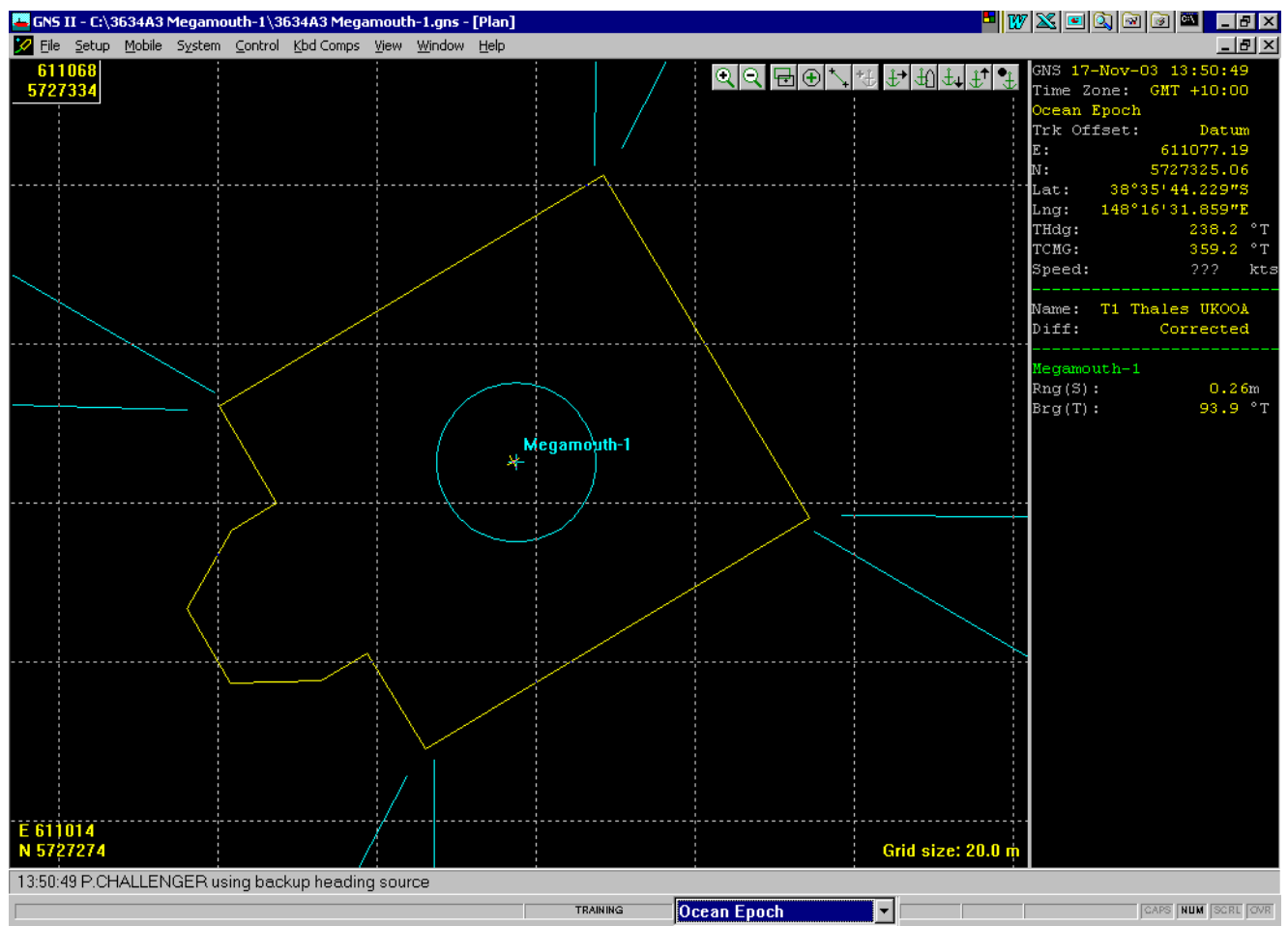
Latitude : 38° 35' 44.230" South
Longitude : 148° 16' 31.859" East

Projection: MGA Zone 55, CM 147° East

Easting : 611 077.19m
Northing : 5 727 325.06m

This final Differential GPS position of the drillstem is 0.26m on a bearing of 273.0° (T) from the intended Megamouth-1 location.

Final Rig Heading : 238.2° (T)



SkyFix Spot Differential GPS Position and Intended Position at the Megamouth-1 Location

1.2 OCEAN EPOCH ANCHOR POSITIONS

Deployed anchor positions were derived from the computed anchor function within the GNS2 software. The function takes into account the length of anchor chain out, water depth, anchor tension and the wet weight of anchor chain to compute the deployed anchor positions. The final anchor positions are tabulated below:

Datum: GDA94 Projection: MGA Zone 55, CM 147° East

Anchor	Intended Anchor Position		Final Anchor Position	
	Easting (m)	Northing (m)	Easting (m)	Northing (m)
Anchor 1	611 051.00	5 726 199.00	611 066.00	5 726 239.00
Anchor 2	610 505.00	5 726 350.00	610 581.00	5 726 373.00
Anchor 3	609 947.00	5 727 348.00	610 080.00	5 727 356.00
Anchor 4	610 104.00	5 727 893.00	610 161.00	5 727 847.00
Anchor 5	611 104.00	5 728 451.00	611 100.00	5 728 379.00
Anchor 6	611 650.00	5 728 300.00	611 650.00	5 728 437.00
Anchor 7	612 207.00	5 727 302.00	612 227.00	5 727 310.00
Anchor 8	612 050.00	5 726 758.00	612 041.00	5 726 774.00

Difference of final anchor positions from the intended anchor positions.

Anchor	Dropped by	Easting (m)	Northing (m)
Anchor 1	Pacific Challenger	-15	-40
Anchor 2	Lady Dawn	-75	-23
Anchor 3	Lady Dawn	-132	-8
Anchor 4	Lady Dawn	-56	+45
Anchor 5	Lady Dawn	+4	+72
Anchor 6	Ocean Epoch	-1	-137
Anchor 7	Lady Dawn	-20	-8
Anchor 8	Pacific Challenger	+10	-16

Horizontal distance and bearing from the Ocean Epoch fairleads to the final anchor positions.

Anchor	Bearing (T)	Horizontal Distance (ft)
Anchor 1	179.3°	3443
Anchor 2	207.1°	3388
Anchor 3	270.7°	3140
Anchor 4	299.5°	3340
Anchor 5	359.9°	3337
Anchor 6	26.8°	3970
Anchor 7	89.6°	3639
Anchor 8	119.6°	3523

Ocean Epoch anchor details are located in Appendices C, D and E of this report.

2. SAFETY

A pre-rig move meeting was held at Thales' Perth offices on 9 November 2003. Thales personnel M. Elmslie and B. O'Brien were present. During the meeting safety procedures were discussed including correct operation and handling of equipment. It was also confirmed that personnel had been issued with the appropriate safety equipment.

On arrival at the Ocean Epoch C. Groenewoud attended a rig induction.

Should an incident occur, Thales' procedures require the incident to be recorded on the appropriate forms and Thales' QA & Safety Manager to be notified immediately. The QA & Safety Manager will initiate a full and thorough investigation with corrective action being introduced to prevent further incidents.

There were no incidents involving Thales personnel during this project. Thales personnel carried out their duties at all times in accordance with Company and Statutory Regulations and Guidelines.

When demobilising the Ocean Epoch, all equipment was packed securely in the designated area where it would not cause obstructions. All heavy or fragile boxes were clearly labelled to avoid accidents during handling.

A project debrief was also held at Thales' Perth offices on 18 November 2003. During the meeting the safety procedures that had been undertaken were discussed and reviewed. It was noted that all personnel had taken due care and as a result there had been no incidents.

3. SUMMARY

3.1 REQUIREMENTS

Thales GeoSolutions (Australasia) Limited were contracted by BHP Billiton Petroleum Pty Ltd to provide personnel and positioning equipment consisting of Thales' SkyFix/SkyFix Spot Differential GPS for the rig move of the Ocean Epoch to the Megamouth-1 location.

The project requirements were as follows:

- (a) Real-time positioning of the Ocean Epoch, Lady Dawn and Pacific Challenger during anchor recovery operations at the Casino-3 location.
- (b) Provide real-time positioning of the semi-submersible drilling rig Ocean Epoch and the anchor handling vessels Lady Dawn and Pacific Challenger, during transit to the Megamouth-1 location.
- (c) Differential GPS Positioning of the Ocean Epoch at the Megamouth-1 location.
- (d) Real-time positioning (including GNS2 fixing/logging/streaming) of the Ocean Epoch, Lady Dawn and Pacific Challenger during anchor deployment operations at the Megamouth-1 location.
- (e) Determine the final Differential GPS position of the Ocean Epoch drillstem at the Megamouth-1 location using a Multiple Reference Station Differential GPS solution.
- (f) The provision of a comprehensive positioning report containing the final Differential GPS position of the Ocean Epoch drillstem and anchors at the Megamouth-1 location.

The positioning requirements were as follows:

- (a) Intended Megamouth-1 location:

Datum: GDA94

Latitude : 38° 35' 44.230" South
Longitude : 148° 16' 31.870" East

Projection: MGA Zone 55, CM 147° East

Easting : 611 077.45m
Northing : 5 727 325.04m

- (b) Positioning tolerance : $\pm 10\text{m}$
- (c) Intended rig heading : 240.0° (T)

3.2 SUMMARY OF EVENTS

All times quoted are in Western Standard Time (UTC + 8.0 hours).

10 November 2003

1020 ME departs Perth (UTC+8.00).
1655 Arrive Melbourne.
1800 Check into Holiday Inn.

11 November 2003

0600 CG departs Perth (UTC +8.00).
1300 CG arrives Melbourne.
1330 CG checks in at Bristows, Essedon airport.
1345 ME checks in at Bristow's, Essedon airport.
1500 Depart Essedon airport for Ocean Epoch.
1600 Arrive Ocean Epoch.
1630 CG commences rig induction.
1700 CG completes rig induction.
1800 Commence mobilisation.
2000 Stop mobilisation, waiting on crane lift.

12 November 2003

0700 Recommence mobilisation.
0830 Mobilisation complete, GNS2 and Multifix operational.
0911 Commence checkfix.
0921 Checkfix complete, rig 1.74m on a bearing of 22.7° from published location.
1400 Tracs operational.
1912 Commence solar obs for gyro cal.
1939 Complete solar obs, C-O of -87.0 entered into GNS2. Hack joint failed to release, cannot release casing from seabed.

13 November 2003

0500 Casing released from seabed.
0600 AHV's preparing to recover anchors (PC experiencing problems with heading).
0619 #5 assigned to LD.
0628 #1 assigned to PC.
0634 #1 PCC passed to PC.
0635 #5 PCC passed to LD.
0648 PC lifting #1.
0706 #1 off bottom.
0715 Heaving in #1.
0725 #5 off bottom.

13 November 2003 (continued)

0729 Heaving in #5.
0815 Rig having difficulties winding in #1.
0818 #5 racked.
0820 #4 assigned to LD.
0835 #4 PCC passed to LD.
0857 LD lifting #4.
0904 #4 off bottom.
0905 Heaving in #4.
1000 #4 racked.
1020 #1 racked.
1042 #8 assigned to LD.
1045 #8 PCC passed to LD.
1116 #8 off bottom.
1117 Heaving in #8.
1214 PC connected to tow bridle.
1218 #8 racked.
1249 #2 assigned to LD.
1324 #2 off bottom.
1412 #2 racked.
1433 #6 assigned to LD.
1445 #6 PCC passed to LD.
1518 #6 off bottom.
1519 Heaving in #6.
1600 Collar on #6 chaser broken, delaying racking.
1634 #6 PCC passed back to fig.
1637 #3 assigned to LD.
1654 #3 PCC passed to LD.
1900 Rig handed over from Santos to BHPBP.
1719 #3 off bottom.
1720 Heaving in #3.
1758 #3 racked.
1759 #7 assigned to Ocean Epoch.
1800 Commence pulling in on #7.
1930 #7 off bottom.
2030 GNS2 system changed from zone 54 to zone 55 projection.
2030 LD connected to tow bridle.
2145 Structures updated from zone 54 to zone 55 onboard PC.
2230 Structures updated from zone 54 to zone 55 onboard PC.
2300 Tow route update sent to AHV's.

14 November 2003

0000 Rig position 39°00.5' S 143°01.3' E Hdg 130°, Dist to go 289nm.
0600 Rig position 39°16.7' S 143°43.5' E Hdg 094°, Dist to go 261.5nm.
1440 GNS2 computer crash, MultiFix config file corrupted.
1510 MultiFix operational.
1800 Rig position 39°21.3' S 145°26.8' E Hdg 094°, Dist to go 172.5nm.
1900 Notified by BHPBP company man that starboard crane and topdrive have both broken down.
Will only be able to use port crane to deploy anchors.
1948 Commence solar obs for gyro cal.
2001 Complete solar obs, C-O of -86.79° calc'd, client rep agrees to leave C-O of -87° in GNS2 software.

15 November 2003

0000 Rig position 39°25.5' S 146°15.3' E Hdg 095°, Dist to go 121.5nm.
0600 Rig position 39°22' S 147°06.8' E Hdg 017°, Dist to go 93.7nm.
1030 Notified by BHPBP survey rep that run in anchor has been changed to anchor #6. New waypt cal'd.
1210 PC running on one engine due to cracked fuel line, speed reduced to 4.5-5kts.
1239 PC's engine repaired, running on 2 engines.
1600 ME attends anchor prelay meeting.
1840 Tow vessels taking evasive action to avoid collision with tanker.
1800 Rig back on line, Rig position 38°39.5' S 148°26.6' E Hdg 311°, dist to go 11.7nm.
1830 Tow vessels shortening tow wire.
1940 Ballasting rig to 30'.
1952 Rig at WP 6.
1955 #6 assigned to Ocean Epoch.
2105 Dropping #6.
2108 #6 on bottom.
2110 Ocean Epoch paying out 500' of chain to allow AHV's to pull rig around.
2137 Stop paying out.
2140 Stop ballasting at 30' draft.
2159 Wind gusting up to 40kts, AHV's having trouble bringing rig onto line.
2205 Resume paying out chain, AHV's still having trouble.
2303 Ocean Epoch over Megamouth-1 location.
2330 #3 assigned to Ocean Epoch. Attempt to drop #3 unsuccessful, PCC wrapped around anchor.

16 November 2003

0008 #3 free, dropping anchor.
0011 #3 on bottom.
0013 Start paying out chain on #3.
0024 Rig over intended location.
0345 LD disconnected from tow bridle.
0358 #2 assigned to LD.
0407 LD waiting on weather, winds gusting up to 40kts.
0530 #2 PCC passed to LD.
0557 LD running out #2.
0631 #2 on bottom.
0715 #2 PCC passed back to rig.
0821 #7 PCC passed to LD.
0823 #7 assigned to LD.
0824 LD running out #7.
0925 #7 on bottom, chaser broken off pennant wire.
0930 Start preparations to rerun #3.
1034 PC released from tow bridle.
1256 #3 assigned to LD.
1315 LD attempting hook #3 chain.
1345 #3 chain hooked by LD.
1400 #3 off bottom.
1403 LD running out #3.
1425 #3 on bottom.
1429 #3 tension tested ok.
1445 LD unhooked from #3.
1500 Rig moving over to drop #4.
1550 #4 on bottom.
1555 Rig moving away from #4 dropped location.
1615 Rig stopped moving.
1627 #4 assigned to LD.
1636 LD moving in to hook #4 chain.
1815 #8 assigned to PC.
1840 #8 PCC passed to PC.
1738 LD hooked onto #4 chain.
1750 #4 off bottom.
1901 PC running out #8.
1920 #8 on bottom.
2010 Rig moving to drop #5 on bottom.
2039 #5 on bottom.
2045 Moving rig away from #5 dropped location.
2140 LD attempting to hook #5 chain.

16 November 2003 (continued)

2210 LD hooked onto #5 chain.
2225 Commence ballasting to 55'.
2227 #5 off bottom.
2235 LD running out #5, #1 PCC passed to PC.
2253 PC running out #1.
2258 #5 on bottom.
2321 #1 on bottom.
2325 Rig moving to intended location.
2340 LD unhooked from #5.
2345 #1 PCC passed back to rig.

17 November 2003

0015 Commence pretensioning.
0105 Optus signal producing no sync, no diffs from Optus Spot beam.
0116 Optus signal returns, diffs back.
0120 Tensioning complete, rig continuing to move to location.
0145 Rig on location.
0154 Commence preliminary fix.
0202 Call made to SkyFix Singapore concerning Optus dropout. Problem was uplink modem lockup, modem was reset and signal returned.
1045 Evening tensions on all anchors.
1226 Commence final fix.
1326 Complete final fix, rig 0.26m on a bearing of 273.0°(T) from intended location.
1615 Spudded in.
1800 Thales personnel waiting on 30" casing to be stabbed in.

18 November 2003

0000 Thales personnel waiting for 30" to be stabbed in.
0645 30" casing stabbed in and cemented.
0730 Commence demobilisation.
0800 Demobilisation complete.
0830 Thales personnel depart Ocean Epoch.
1000 Arrive Essendon airport.
1355 Depart Melbourne.
1450 Arrive Perth (UTC+8.00).

4. EQUIPMENT ANALYSIS

4.1 EQUIPMENT PERFORMANCE

During the positioning of the semi-submersible drilling rig Ocean Epoch to the Megamouth-1 location, no significant problems were encountered with Thales' equipment or software.

A problem arose with the Optus spot signal, the system lost synchronisation and therefore a differential solution was not able to be calculated. After approximately 10 minutes the signal returned to normal and a differential solution was available.

Thales personnel contacted SkyFix Singapore concerning the problem and were informed that the outage was caused by an uplink modem lock-up and that the system had been reset and was functioning correctly.

5. EQUIPMENT CHECKS AND CALIBRATIONS

5.1 GYROCOMPASS CALIBRATION

The S.G. Brown 1000S TSS Gyrocompass installed onboard the Ocean Epoch was calibrated on 12 November 2003 using a marine sextant. A series of measurements of the horizontal angle between the centreline of the rig and the sun was observed while accurately recording local time at the instant of each observation. The gyrocompass heading was simultaneously recorded within GNS2 data files.

Thales' Solar Observation software was used to determine the azimuth of the sun for each observation. The observed horizontal angle was applied to the sun's azimuth to determine the true heading of the rig. Each Computed (C) true heading was then compared with the Observed (O) gyrocompass heading to determine the Computed minus Observed (C-O) value for the gyrocompass. The C-O value in GNS2 was set to zero prior to conducting the gyrocompass calibration.

Observation Date : 12 November 2003

Average Local Time (HMS)	Average Horizontal Angle (DMS)	Azimuth Sun (DMS)	Azimuth RO (DMS)	Calculated (C) True Heading (D.D)	Observed (O) True Heading (D.D)	C-O (D.D)
19:11:55	016° 18' 24"	256° 16' 47"	239° 58' 23"	239.97°	327.20°	-87.23°
19:18:28	014° 52' 24"	255° 18' 41"	240° 26' 17"	240.44°	327.20°	-86.76°
19:33:01	012° 57' 24"	253° 08' 48"	240° 11' 24"	240.19°	327.30°	-87.11°
19:36:07	012° 41' 24"	252° 40' 57"	239° 59' 33"	239.99°	327.00°	-87.01°
19:37:31	012° 30' 12"	252° 28' 20"	239° 58' 08"	239.97°	327.20°	-87.23°
19:39:13	011° 51' 00"	252° 13' 01"	240° 22' 01"	240.37°	327.00°	-86.63°

Mean C-O = -87.00°

The mean C-O of -87.00° was input into the GNS2 navigation software and used during the final fix routine at the Megamouth-1 location. See Appendix F for the gyrocompass calibration results.

5.2 DIFFERENTIAL GPS CHECK FIX

A Differential GPS check fix of the drillstem position of the Ocean Epoch at the Casino-3 location was computed using SkyFix Spot Differential GPS. 120 fixes were taken. Appendix G contains the results of the check fix of the Ocean Epoch drillstem position at the Casino-3 location.

The published Differential GPS coordinates of the Ocean Epoch drillstem position at the Casino-3 location are as follows:

Datum : GDA94

Latitude : 38° 46' 34.558" South
Longitude : 142° 44' 05.437" East

Projection : MGA Zone 54, CM 141° East

Easting : 650 700.11m
Northing : 5 706 621.82m

The computed Differential GPS check fix coordinates of the Ocean Epoch drillstem position are as follows:

Datum : GDA94

Latitude : 38° 46' 34.506" South
Longitude : 142° 44' 05.465" East

Projection : MGA Zone 54, CM 141° East

Easting : 650 700.81m
Northing : 5 706 623.41m

The Differential GPS check fix of the drillstem of the Ocean Epoch is 1.74m on a bearing of 22.7° (T) from the published Casino-3 location.

6. GEODETIC PARAMETERS

The datum for coordinates determined by Thales' SkyFix and SkyFix Spot Differential GPS are referenced to International Terrestrial Reference Frame 2000 (ITRF2000). The datum for coordinates listed in this report are referenced to the Geocentric Datum of Australia 1994 (GDA94).

6.1 ITRF2000 DATUM AND PROJECTION

Datum	:	ITRF2000 (Epoch 1997.0)
Ellipsoid/Spheroid	:	Geodetic Reference System 1980 (GRS80)
Semi-major Axis (a)	:	6 378 137.000m
Semi-minor Axis (b)	:	6 356 752.314m
Eccentricity Squared (e^2)	:	0.006 694 380
Flattening ($1/f$)	:	298.257 222 101
Projection Name	:	Universal Transverse Mercator (UTM)
Projection Type	:	Universal Transverse Mercator (UTM)
UTM Zone	:	55 South
Central Meridian (CM)	:	147° East
Scale factor on the CM	:	0.9996
False Easting	:	500 000m
False Northing	:	10 000 000m
Latitude of Origin	:	0° (Equator)
Unit of Measure	:	International Metre

Note: The WGS84 datum and the ITRF2000 datum are consistent in the order of a few centimetres and are considered to be the same.

6.2 GDA94 DATUM AND PROJECTION

Datum	:	Geocentric Datum of Australia 1994 (GDA94)
Ellipsoid/Spheroid	:	Geodetic Reference System 1980 (GRS80)
Semi-major Axis (a)	:	6 378 137.000m
Semi-minor Axis (b)	:	6 356 752.314m
Eccentricity Squared (e^2)	:	0.006 694 380
Flattening ($1/f$)	:	298.257 222 101
Projection Name	:	Map Grid of Australia (MGA)
Projection Type	:	Universal Transverse Mercator (UTM)
MGA Zone	:	55
Central Meridian (CM)	:	147° East
Scale factor on the CM	:	0.9996
False Easting	:	500 000m
False Northing	:	10 000 000m
Latitude of Origin	:	0° (Equator)
Unit of Measure	:	International Metre

Note: Where an accuracy of a metre or greater is required, the WGS84 datum and the GDA94 datum are considered to be the same.

6.3 DATUM TRANSFORMATION - ITRF2000 TO GDA94

From the Geocentric Datum of Australia Technical Manual (Version 2.2) produced by the Inter-governmental Committee on Surveying & Mapping (ICSM), the ITRF2000 datum and the WGS84 datum are consistent at a level in the order of a few centimetres and are considered to be the same. Similarly, where an accuracy of a metre or greater is required, the GDA94 datum and the WGS84 datum are considered to be the same. In January 1994 the GDA94 datum and the ITRF datum were coincident, however the GDA94 datum is moving with the Australian tectonic plate in a North northeastly direction at a rate of approximately 7 centimetres per year.

The following 7-parameter datum transformation was used by Thales' GNS2 software to convert ITRF2000 coordinates to GDA94 coordinates:

Dx	=	0.000m
Dy	=	0.000m
Dz	=	0.000m
Rx	=	0.000"
Ry	=	0.000"
Rz	=	0.000"
Scale	=	0.000 p.p.m.

The sign convention used in Thales' GNS2 software is that used by the US Department of Defence, where a positive rotation about the Z axis is an anti-clockwise movement of the X and Y axes (when viewed from the North Pole looking towards the centre of the Earth).

7. EQUIPMENT DESCRIPTIONS

7.1 GNS2

GNS2 (General Navigation System) is Thales' third generation of On-line Navigation Survey Control software. It has been written by Thales' Software Support Group in C++ for operation under Windows® 95 or Windows® 98 or Windows® NT. GNS2 adheres to the operation and dialogue conventions of the Microsoft Windows® environment. Attention has been paid to preserving a consistent operator interface, while at the same time modifying individual dialogue boxes to reflect specific logical circumstances. It has been designed for operation with a pointing device such as a mouse or a tracker ball but control can still be effected in case of the absence or failure of such a device.

The program has the ability to accommodate a large number and variety of mobiles, including surface vessels/ships, anchor handling vessels, tugs, barges, ROVs, towfish, aircraft, vehicles and submersibles etc. The only limiting factors on the number of mobiles that can be tracked in GNS2 are the number of input/output serial communication ports available on the computer and the computer's memory.

For the input/output (I/O) of navigation and sensor data, GNS2 employs intelligent multi-channel serial communications boards to expand a computer's serial input/output facility. Currently GNS2 can support up to 26 communication (Comm) ports, which would consist of the computer's two internal Comm ports and three 8 channel serial communications boards fitted in the computer's internal expansion slots.

If Least Squares Computations (LSCs) are employed for positional calculations, whether two-dimensional (2D), three-dimensional (3D) or altitude aided, GNS2 uses standard iteration routines for the minimisation of residuals using 'variation of coordinate' algorithms. The number of positioning systems/computations that GNS2 can handle, is only limited by the number of I/O serial communication ports available on the computer and the computer's memory.

All input observables are accepted on interrupt. Screen updates and other internal triggers are paced to once per second but time critical activities occur at discrete moments as required.

The GNS2 application workspace can extend beyond the display area, which is normally restricted to a single monitor connected to the computer. By using one or more multiple VGA cards, an enlarged display area can spread across multiple monitors.

Currently GNS2 can display 14 different types of view windows. Several copies of the same type of view window can be invoked at any one time. This may be required when several mobiles are being tracked and a Plan, Helmsman's or Bullseye display are required for each one or when the data on several Comm ports are to be viewed simultaneously. Each window can be individually sized to optimise use of the available display area.

GNS2 can be operated in 2 modes; GNS2 Master or GNS2 Remote. GNS2 Master has the full functionality of GNS2. GNS2 Remote is run on a separate computer and allows independent configuration of the graphics display and its associated numeric information. GNS2 Remote is operated on Anchor Handling Vessels or anywhere where positional information is required. (eg. Vessel Masters, ROV Pilots, Winch Control Stations). The link between GNS2 Master and GNS2 Remote can be via a telemetry link or hard wired cable.

7.2 GLOBAL POSITIONING SYSTEM (GPS)

System Description

The NAVSTAR GPS (Navigational Satellite Timing and Ranging Global Positioning System) is a USA Military all-weather, space-based positioning system that transmits signals from a constellation of satellites orbiting the Earth. It is capable of providing suitably equipped users worldwide with accurate three-dimensional positions on, or near, the Earth's surface. The accuracy of these determined positions can vary from a few millimetres to several 10's of metres depending on the GPS receiver and on the method of data acquisition and processing. System design consists of three integrated parts: the Ground Control Segment, the Space Segment and the User Segment.

The operational space segment consists of 24 production satellites and 3 active spares; the term Space Vehicle (SV) is used as a synonym for satellite. The satellites are in high orbits, at approximately 20,200km, having an orbit period of 12 hours. They are arranged in 6 orbital planes, inclined at 55 degrees with near circular orbits. The configuration provides complete 4-satellite (3D) coverage worldwide.

GPS Observations

There are two important types of GPS observations (observables): Pseudo-range and Carrier Phase. Carrier phase is sometimes also referred to as carrier beat phase. Pseudo-range techniques are generally used for navigation. In high-precision baseline surveying the carrier phase is used. Although the (undifferenced) phase can be used directly, it has become common practice, at least in surveying applications, to process certain linear combinations of the original carrier phase observations (double differences and triple differences).

Pseudo-ranges

The pseudo-range is a measure of the distance between the satellite and the receiver at the epochs of transmission and reception of the signals. The transit time of the signals is measured by comparing (correlating) identical pseudo-random noise (PRN) codes generated by the satellite and by the receiver. A code-tracking loop within the receiver shifts the internal replica of the PRN code in time until maximum correlation occurs. The codes generated at the receiver are derived from the receiver's own clock, and the codes of the satellite transmissions are generated by the satellite system of clocks. It follows that unavoidable timing errors in both the satellite and the receiver clock will cause the measured quantity (pseudo-range) to differ from the geometric distance.

Where instantaneous positions are required, pseudo-range is the preferred observable. Given the satellite ephemeris (i.e. the position of the satellite at the epoch of transmission), there are seven unknowns: two clock errors, three receiver coordinates and the ionospheric and tropospheric delays. The effect of the satellite clock error is negligible for the typical navigation solution, particularly considering that the time errors are indistinguishable from the ionospheric and tropospheric delays. The satellite clocks are constantly monitored and synchronised with GPS time as maintained by the control centre. Actual offsets of the satellite clocks are approximated by polynomials in time and transmitted as part of the navigation message to the user for the correction of the measured pseudo-ranges. The ionospheric and tropospheric delays can be computed on the basis of ionospheric and tropospheric models, thus there are four unknowns left X, Y, Z and receiver clock error. These can be determined from four pseudo-ranges measured simultaneously to four GPS satellites.

Carrier Phase

The phase observable is the difference between the phase of the carrier signal of the satellite, measured at the receiver, and the phase of the local oscillator within the receiver at the epoch of measurement. This can be regarded as a biased range measurement of the satellite-receiver distance with the integer number of carrier waves being unknown. The wavelength of the L1 carrier is about 19cm. Because of the fraction of the carrier phase is measured, the term "interferometry" is often used to describe carrier phase techniques.

7.3 SkyFix/SkyFix Spot Differential GPS (DGPS)

Differential GPS (DGPS)

GPS is primarily a USA Defence space-based positioning system capable of operating worldwide and in all weather conditions. The USA Military can degrade the accuracy of GPS with the use of Selective Availability (SA) to control the accuracy of Pseudo-range measurements. Essentially, the user is given a false Pseudo-range for each satellite so that the resulting measurement is in error by a controlled amount. On the 1 May 2000 SA was discontinued conditionally and coincided with the successful demonstration of the ability to selectively deny GPS signals on a regional basis. SA has been set to zero and can be reinstated during periods of heightened global tension.

GPS signals are affected by several sources of positional bias, the largest of which was SA. The remaining biases of the ionosphere, the troposphere, time, satellite ephemeris and inherent receiver noise also give rise to substantial bias of position.

Differential GPS is a means by which the civil user can improve the accuracy and quality of GPS to the 1-3 metre level. It requires a receiver be located at a precisely known point from which pseudo-range corrections for each satellite can be determined and monitored. These pseudo-range corrections are then communicated by means of a telecommunications link to users at unknown locations. In the relative mode, most of the important systematic errors common to the known station and at the unknown location cancel out to improve the accuracy of the computed position.

SkyFix/SkyFix Spot Differential

SkyFix

Thales GeoSolutions (Australasia) Limited introduced its SkyFix Differential GPS System in Australia in February 1991, using the Inmarsat Pacific and Indian Ocean marine communications satellites as the differential data broadcast link. Extensive performance trials and projects undertaken to date have shown SkyFix to meet the best industry expectations in terms of quality of service and accuracy.

Satellite communications systems, particularly at the Inmarsat L-band frequencies of 1.5 GHz are reliable and free of the interference associated with the crowded MF/HF bands. This high data integrity gives users confidence that the corrections will be continuously received without interference.

The SkyFix Australian network comprises of reference stations at Dampier, Broome, Perth, Adelaide, Melbourne, Sydney, Cairns and Darwin.

SkyFix Spot

The SkyFix Spot Differential GPS System was launched in Australia in December 1994, using the OPTUS high powered focused communications satellite as the differential data broadcast link. Projects undertaken to date have shown SkyFix Spot to meet the industry expectations in terms of quality of service and accuracy.

The SkyFix Spot system has a link capacity of 1200 bits per second, similar to the SkyFix system but because it is only transmitting corrections from the Australian network an update rate of better than five seconds is achieved.

The OPTUS satellite uses the L-band frequencies of 1.5586 GHz and are very reliable and free of interference avoiding data loss associated with the crowded MF/HF bands.

The SkyFix Spot network comprises of reference stations at Dampier, Broome, Perth, Adelaide, Melbourne, Sydney, Cairns, Darwin, Alice Springs and also Ujung Pandang and Jakarta in Indonesia and Wellington, New Zealand.

The differential corrections generated at each reference station are brought via landline links to the data hub and control centre in Singapore, where the system is monitored for performance and quality. From there, a composite message containing full RTCM 104 version 2 formatted data from all reference stations are sent via dual redundant links to Satellite Earth Stations at Sentosa Island, Singapore, O.T.C. Perth, Western Australia and OPTUS, Perth, Western Australia, for uplink and broadcast over the Inmarsat Pacific and Indian Ocean Region satellites and the OPTUS Satellite.

The SkyFix/SkyFix Spot system includes a 24 hour monitoring facility to ensure the validity of data received at the control centre from the Differential GPS reference stations, and that the same data are received over the SkyFix/SkyFix Spot satellite data link.

7.4 TRIMBLE BD112 GPS CARD

Standard Features

Sub-meter accuracy
Real-time positioning
12 Channel GPS receiver 1, 5 or 10 Hz update rate
Two RS-232 serial ports
RTCM SC-104 input
NMEA-0183 output
TSIP interface protocol
Carrier phase
1 PPS output

Physical Characteristics

Size	115mm L x 80mm W x 22 mm D
Weight	68.1 g (.15 lbs)
Operating temperature	-40°C to +70°C (-40°F to +158°F)
Storage temperature	-40°C to +85°C (-40°F to +185°F)

Compact Dome Antenna

Diameter	5.68" D (14.6cm)
Height	3.38" (8.6cm)
Weight	294g
Power	35–40 mA @ +5 VDC @ 25°C

Technical Specifications

General	12 parallel channels track up to 12 satellites, L1 C/A code with carrier filtering
Update rate	1, 5 or 10Hz. Default is 5 Hz
Accuracy	Typically less than one meter RMS; Assumes at least 5 satellites, PDOP less than 4, and RTCM SC-104 standard format broadcast from a Trimble 4000RS™, BD112 reference station or equivalent reference station
Time to first fix	< 30 seconds, typical
NMEA messages	ALM, GCA, GLL, GSA, GSV, VTG, ZDA
Power consumption	500 mA @ +5 V (Includes compact dome antenna power, typical at 25°C)

7.5 MultiFix 3

7.5.1 System Overview

MultiFix 3 is Thales GeoSolutions third generation *multiple reference station* differential GPS (DGPS) real time position computation and quality control program. It is an integral part of the Thales SkyFix Premier service but can also be used with the standard SkyFix service. MultiFix 3 has more advanced features than its predecessor, MultiFix 2, including being able to use dual frequency receivers and form real time 'Iono-Free DGPS position solutions'.

MultiFix 3 is one of a series of programs available under the group name Zero, which includes other tools and utilities with a similar user interface and layout structure, like static and dynamic position comparison programs, a correction monitor program, a terminal program and a replay utility.

MultiFix 3 takes in Almanac, Ephemeris and Raw Code and Carrier measurements from a single or dual frequency GPS receiver (or, for replay, from logged files). It takes in RTCM SC104 Version 2 differential correction messages from one or more RTCM correction delivery systems. It also takes in RTCM Type 15 or Thales Proprietary RTCM Type 55 Ionospheric range corrections generated at selected SkyFix Premier reference stations and broadcast via the Thales global network of high (SkyFix Spot-Optus) and low (SkyFix-Inmarsat) power satellite based L-Band beams.

Key features of the program are:

- No limit on the number of RTCM correction delivery systems (data links)
- No limit on the number of RTCM differential reference stations
- No limit on the number of computations (solutions)
- Each computation can employ corrections from any combination of reference stations available
- Computations are weighted least squares with statistical evaluation based upon the UKOOA recommendations
- No limit on the number of outputs
- No limit on the number of view windows
- View windows can be customised
- Extra NMEA outputs can be defined
- TCP/IP communication via sockets for GPS, RTCM and position data transfer between networked computers

MultiFix 3 has been designed in a modular fashion such that data is passed between modules as if over a computer network. The core module MultiFix 3 performs the computation of position. Additional modules are available and more will be made available in the future. While a single computer can be used, the various modules will equally be able to be run on different computers, provided there is a network interconnection.

MultiFix 3 uses the EGM96 geoid/spheroid separation model.

The RTCM corrections that are generated at reference stations are contaminated by a variety of error components, one of which is Ionospheric delay. The Ionospheric delay is currently more variable because of greater sun spot activity. MultiFix 2 and MultiFix 3's standard computation uses the Klobuchar Ionospheric delay model. This model is updated periodically but is not responsive to the current short-term variability. MultiFix 3 has an additional calculation option when working with dual frequency receivers and in receipt of Type 15 or 55 RTCM messages. With dual frequency receivers, estimates can be made of the Ionospheric delay by examining the differences between the measurements from the two frequencies. If the same procedure for estimation of Ionospheric delay is performed at the reference stations and on the mobile, both the RTCM corrections and the pseudo-ranges can have the Ionospheric delay removed, effectively providing an Iono-Free DGPS position solution.

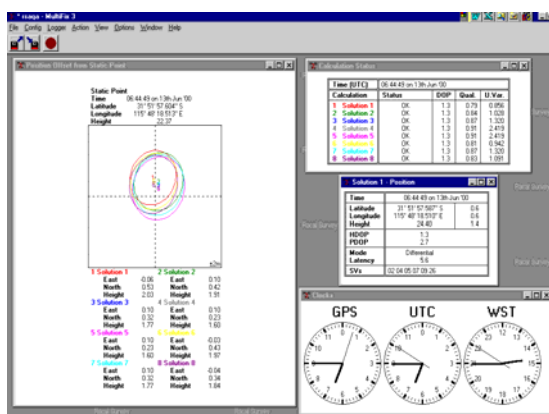
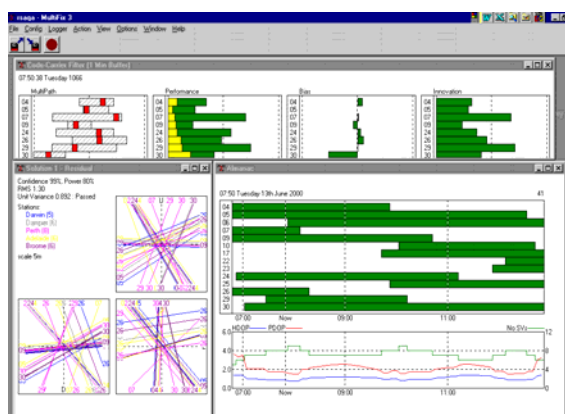
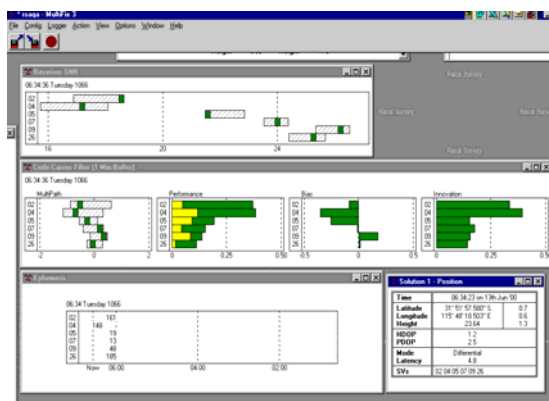
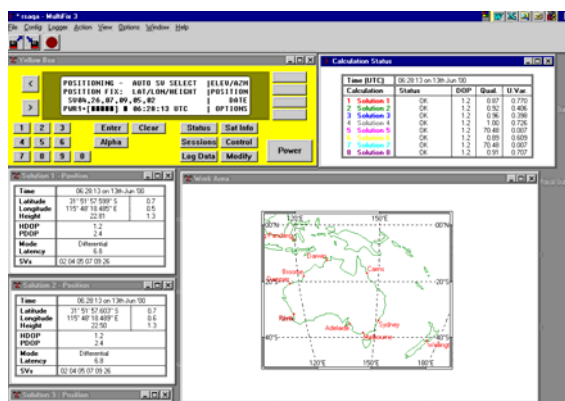
7.5.2 Hardware Requirements

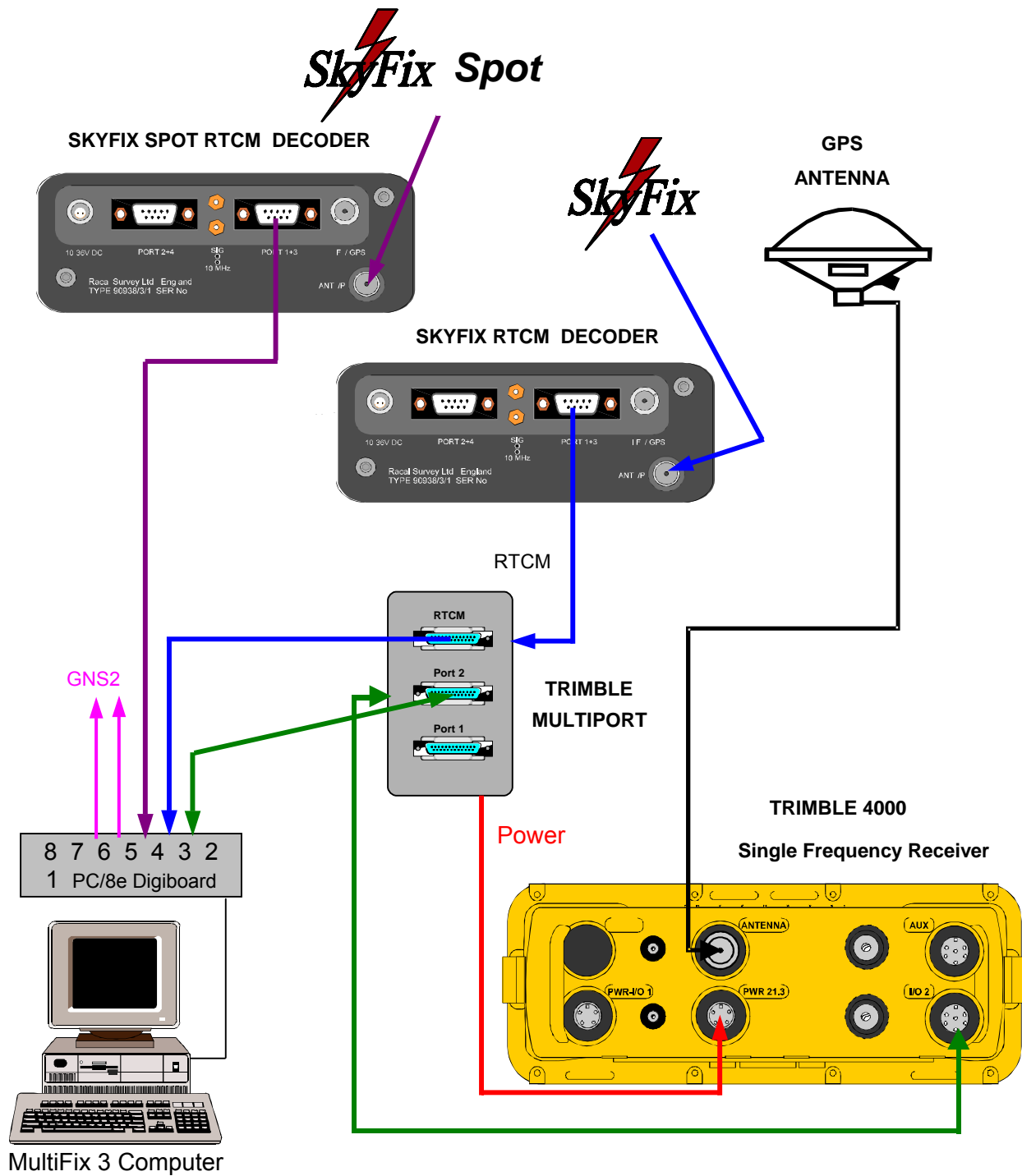
Optimum requirements for MultiFix 3 are:

- 350 MHz Pentium II computer
- 32 Mb RAM
- Windows 95, 98 or NT operating system
- Graphics resolution of at least 800 x 600 pixels
- Intelligent multi-port serial I/O board

7.5.3 Positioning and Quality Control Displays

MultiFix 3 has a large number of features to accommodate the user requirements of highly accurate positions with quality control (QC) information and outputs in different formats. MultiFix 3 runs in a Windows environment, which allows the user to design a preferred screen layout by opening, sizing and placing the numerous displays that are available. Examples of the various displays can be found below.





Typical MultiFix 3 Interconnection With Trimble 4000 GPS Receiver

7.6 TRACS TDMA

Tracs TDMA (Time Division Multiple Access) is a high speed, intelligent network radio datalink which can operate in the VHF or UHF bands to provide an addressable network with integrated position reporting from an integrated/internal GPS receiver. The standard Tracs units are fitted with a Trimble SK8 GPS receiver, or a Trimble DSM GPS receiver.

Each unit in the network is assigned a unique address (1 to 255) enabling messages can be specifically addressed to that unit. A broadcast address (0) is provided to allow multiple units to receive a message, for example RTCM corrections. The system manages the data bandwidth by dividing it into timeslots synchronised by means of GPS 1PPS (pulse per second) timing pulse from an internal GPS receiver.

The standard Tracs system has a frequency band of 455.0MHz to 465.0MHz (frequency module 53R). The channel frequencies can be selected in 25kHz steps and the units are equipped with the facility to pre-store 10 selected frequencies within the 10MHz band. Units for use in Australia are fitted with 471MHz radios.

There are four types of messages that can be transmitted in a Tracs network.

- Position Reports automatically generated from the SK8 or DSM GPS receiver as a NMEA type or Raw Pseudo Range information.
- Transparent messages used to send unformatted data across the network eg. RTCM corrections.
- Open messages used to provide a general-purpose data link between units. This format is used by GNS to transfer information.
- Configuration messages used for remote configuration of units using the Destination ID to identify which unit is being configured.

7.7 S.G. BROWN 1000S GYROCOMPASS

The S.G. Brown 1000S Gyrocompass is a compact, simple-to-operate master heading reference instrument employing the effect of gravity and the earth's rotation to produce a True North reference. This reference may be read off the compass card or from a digital display and can be interfaced to the GNS2 navigation system.

The normal starting cycle of the instrument is fully automatic and is initiated when the system power supply is switched on. A fail safe control circuit is incorporated which ensures that the compass is not damaged after a power failure when power is restored; the compass will restart automatically and carry out its normal settling program.

8. PERSONNEL AND EQUIPMENT

8.1 PERSONNEL

The following personnel were employed on this project:

For : Thales GeoSolutions (Australasia) Limited

M. Elmslie	:	Surveyor/Team Leader
C. Groenewoud	:	Engineer

For : BHP Billiton Petroleum Pty Ltd

A. Sellers	:	Client Representative
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8.2 EQUIPMENT

The following equipment was provided for this project:

Ocean Epoch

- 2 x Compaq Computer, inc monitor, keyboard (for GNS2 / MultiFix 3)
- 1 x Thales SkyFix Mini Rig Portable
- 3 x SkyFix/SkyFix Spot MK II Receivers
- 1 x Compaq Computer, inc. monitor, keyboard (for GNS2 Remote)
- 1 x S.G. Brown 1000S Gyrocompass
- 1 x Uninterruptable Power Supply (UPS)
- 1 x Canon BJC-1000 Printer
- 1 x Epson LX300 Printer
- 2 x SkyFix Spot Antenna 90962/3/1
- 2 x BD112 GPS Receivers
- 2 x Tracs Bricks
- 2 x Tracs Multiplexer
- 2 x UHF Antennae
- 1 x Marine Sextant
- 1 x Laptop Computer

Lady Dawn And Pacific Challenger (Each)

- 1 x Tracs Geopod
- 1 x Fluxgate compasses
- 1 x Tracs Box and Interface Box
- 1 x Compaq computer, inc. monitor, keyboard (GNS2 Tug Display)
- 1 x Uninterruptable Power Supply (UPS)

plus all associated software (GNS 2 version 2.48, MultiFix 3 version 1.32) c/w cables, consumables, software dongles etc.

Spare

- 1 x Tracs Geopod
- 1 x Fluxgate Compass
- 1 x Tracs Box and Interface Box

9. DISTRIBUTION

Copies of this report have been distributed as follows:

BHP Billiton Petroleum Pty Ltd : 1 electronic copy
Attn: Mr Brian Teggart

Thales GeoSolutions (Australasia) Limited : 1 copy


Michael Elmslie
Surveyor


Anthony Kerr
Survey Manager

APPENDIX A

FINAL DIFFERENTIAL GPS DRILLSTEM POSITION AT MEGAMOUTH-1

FINAL POSITION FIX – DIFFERENTIAL GPS

Job Description: Rig Move Megamouth-1
Job Number: 3634A3
Thales Surveyor: M.Elmslie
Client: BHPBP
Client Representative: A.Sellers

Sampling started: 17 Nov 2003 12:25:47
Sampling end: 17 Nov 2003 13:25:40

Ocean Epoch

Intended datum location

Datum: GDA94 (GRS80)
Latitude: 38°35'44.230"S **Longitude:** 148°16'31.870"E
Projection: MGA94 Zone 55
Easting: 611077.45 m **Northing:** 5727325.04 m

Final Antenna Position (T1 Thales UKOOA):

Sample size: 720 fixes used out of a total of 720.

Antenna offset

X: 5.45m **Y:** 43.63m **Z:** 0.00m
Range: 43.97m **Rel Brg from datum to antenna:** 7.1°

Datum: WGS 84
Latitude: 38°35'44.825"S **Longitude:** 148°16'30.208"E **Spheroidal Ht:** 22.76m
Datum: GDA94 (GRS80)
Latitude: 38°35'44.825"S **Longitude:** 148°16'30.208"E **Spheroidal Ht:** 22.76m
Projection: MGA94 Zone 55
Easting: 611036.99 **Northing:** 5727307.25 **Spheroidal Ht:** 22.76m

Standard deviations

Long or E: 0.26m
Lat or N: 0.31m
Height: 0.29m
Position: 0.40m

Final Datum Position

Datum: GDA94 (GRS80)
Latitude: 38°35'44.230"S **Longitude:** 148°16'31.859"E
Projection: MGA94 Zone 55
Easting: 611077.19 m **Northing:** 5727325.06 m

Mean corrected heading: 238.2°T
SD heading: 0.2°T
Intended heading: 240.0°T
Difference from intended: -1.8°
Gyro C-O: -87.0°
Convergence: -0.80°

Final Datum Position is 0.26m on a bearing of 273.0°T (273.8°G) from the intended location.

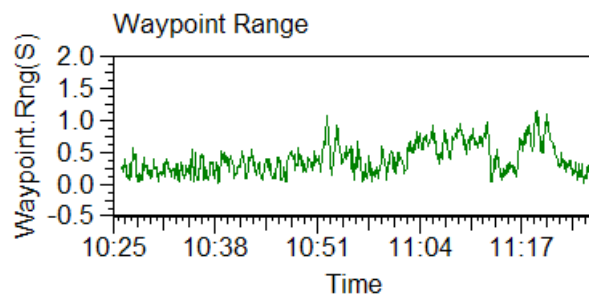
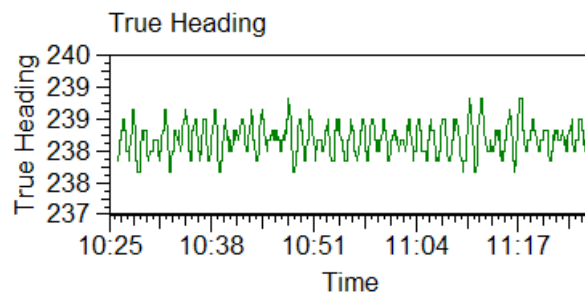
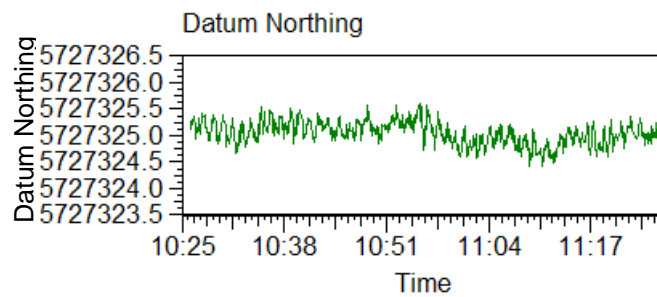
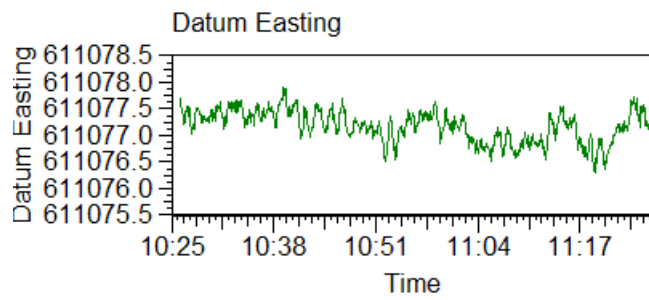
APPENDIX B

GNS2 STATIC DIFFERENTIAL GPS FIX GRAPHS

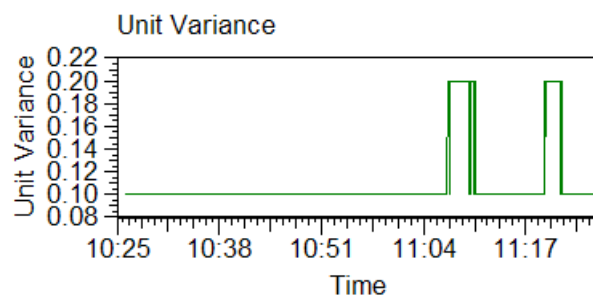
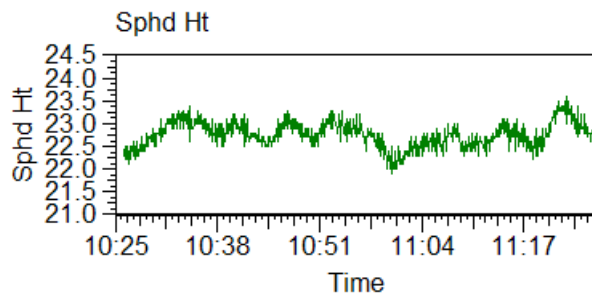
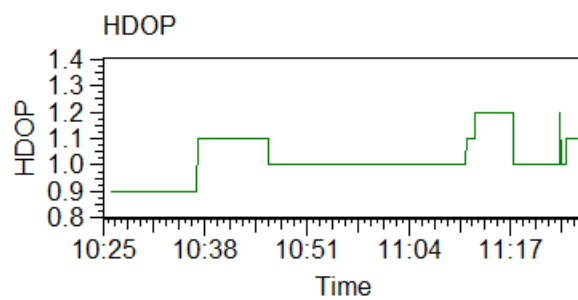
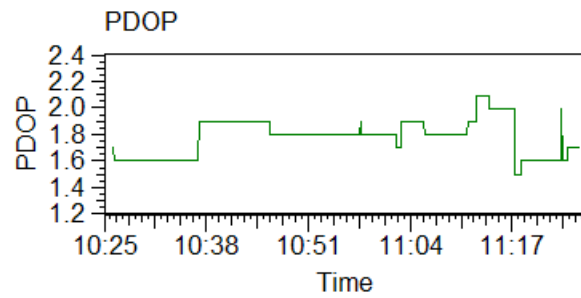
THALES Thales GeoSolutions (Australasia) Limited

Project: Positioning Report of the Ocean Epoch

Client: BHPBP Australia



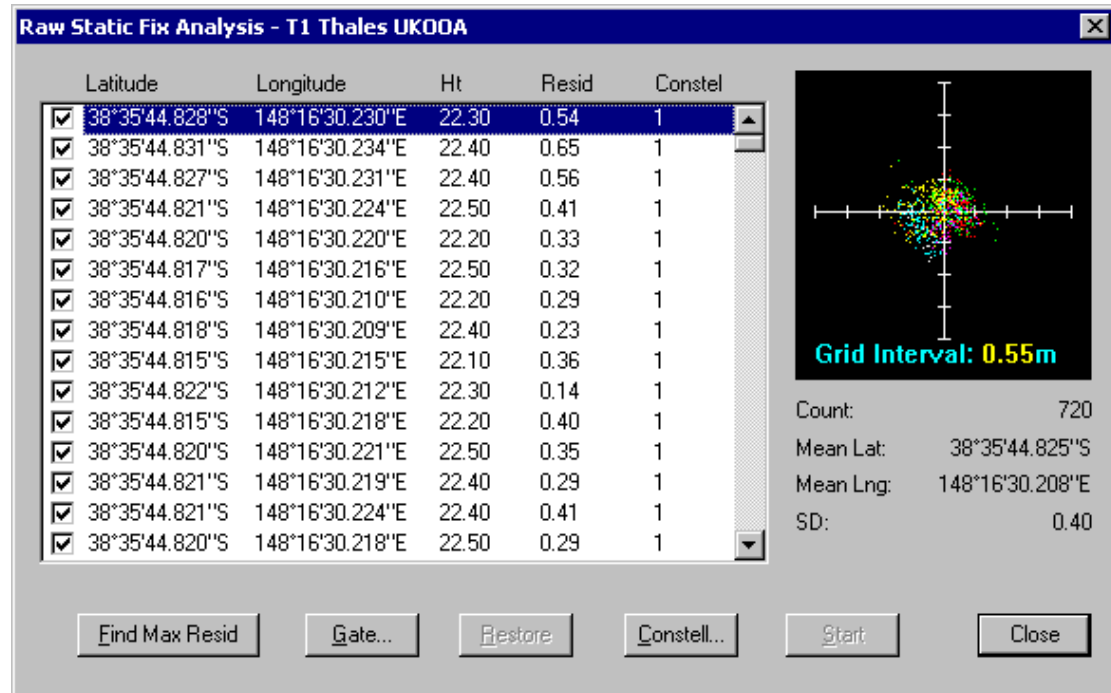
Project: Positioning Report of the Ocean Epoch
Client: BHPBP Australia



THALES Thales GeoSolutions (Australasia) Limited

Project: Positioning Report of the Ocean Epoch

Client: BHPBP Australia



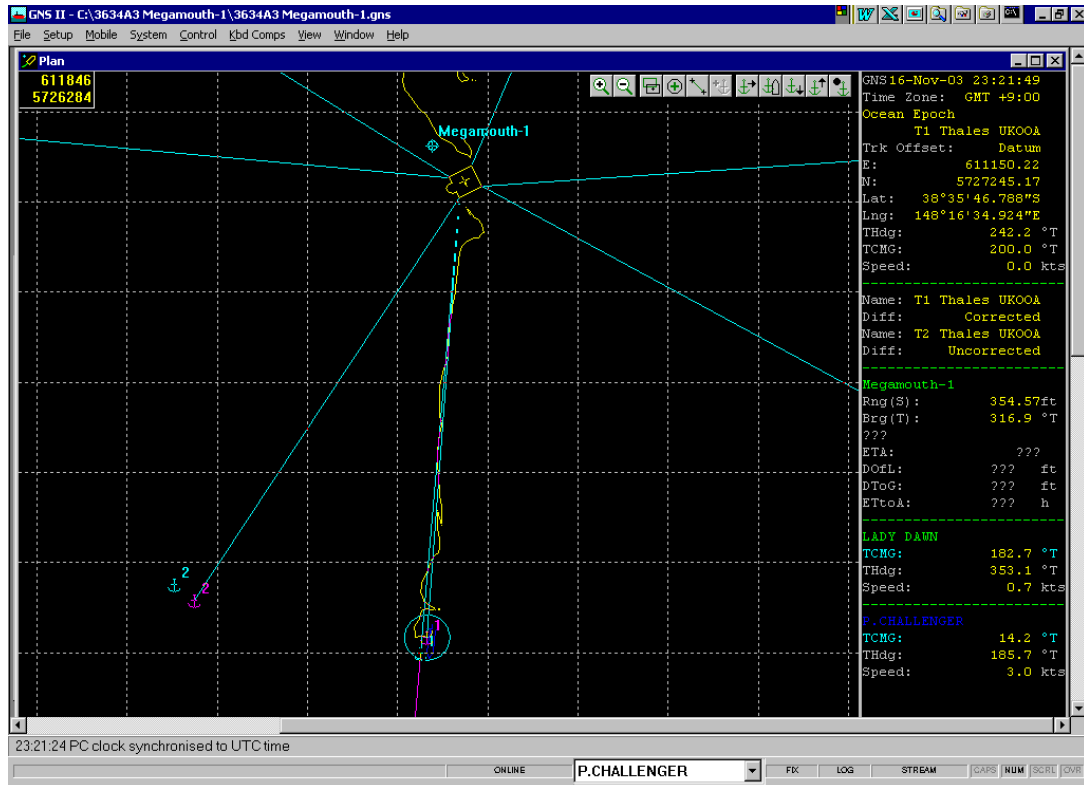
APPENDIX C

ANCHOR DEPLOYMENT GRAPHICS

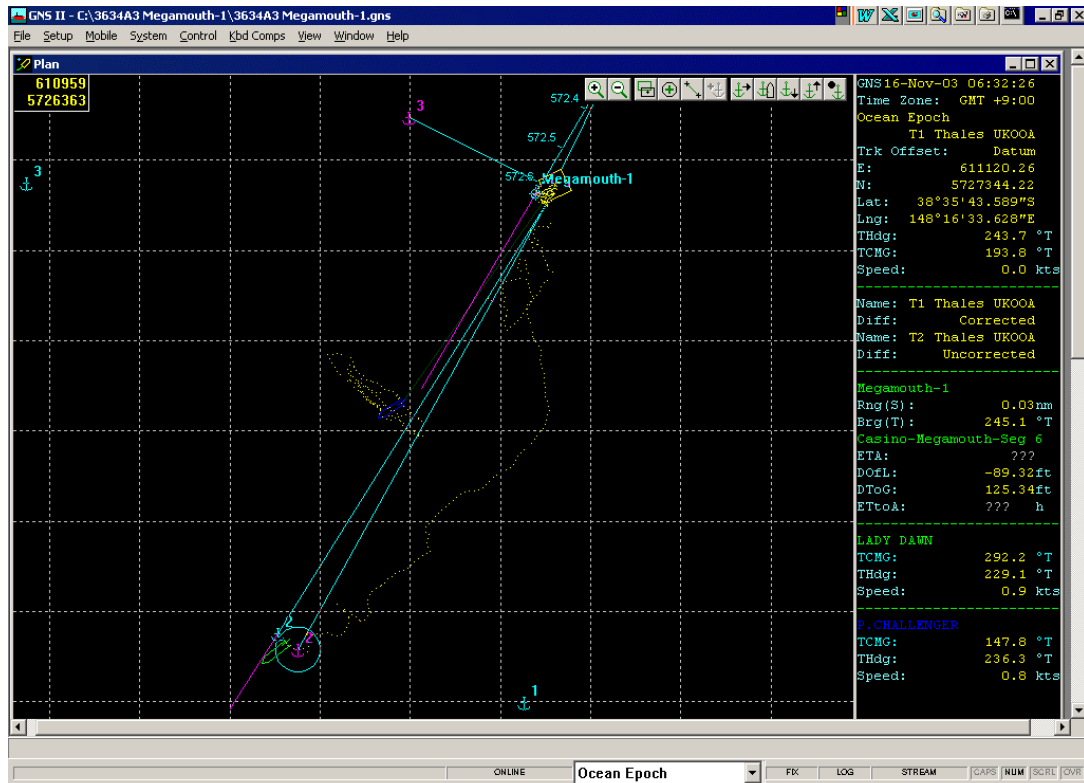
THALES Thales GeoSolutions (Australasia) Limited

Project: Megamouth-1 Positioning Report of the Ocean Epoch
Client: BHPBP Australia

Anchor 1 – P.Challenger



Anchor 2 – L.Dawn

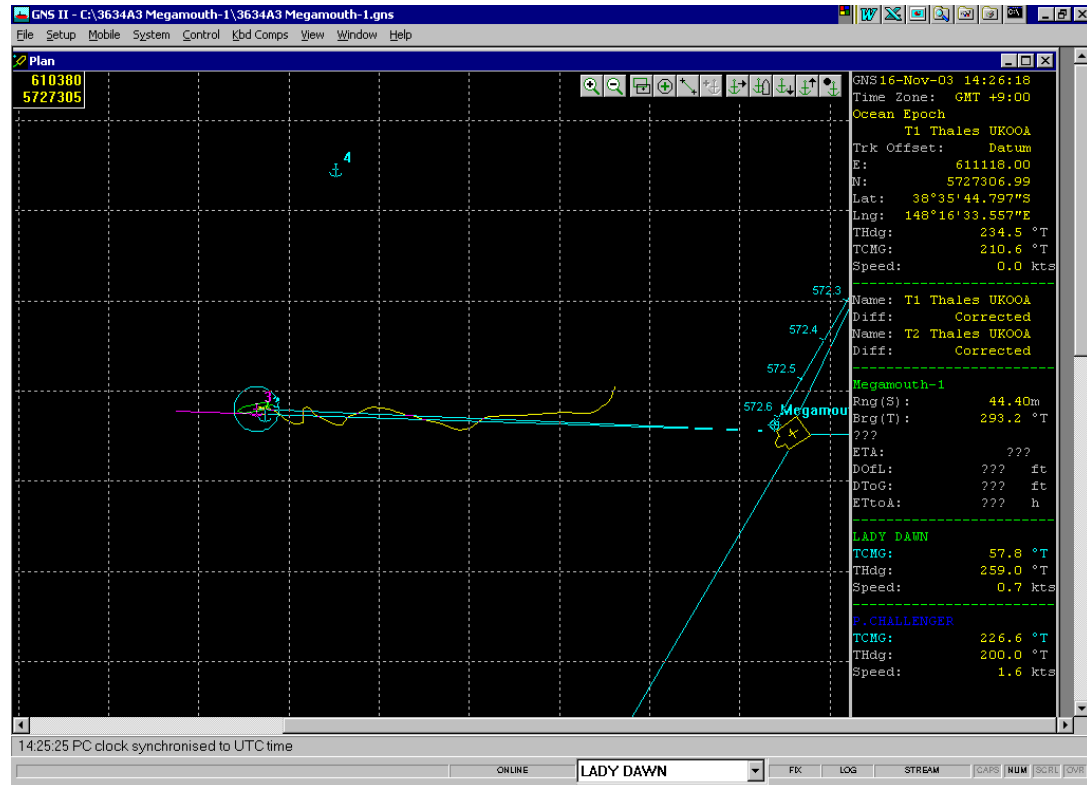


THALES Thales GeoSolutions (Australasia) Limited

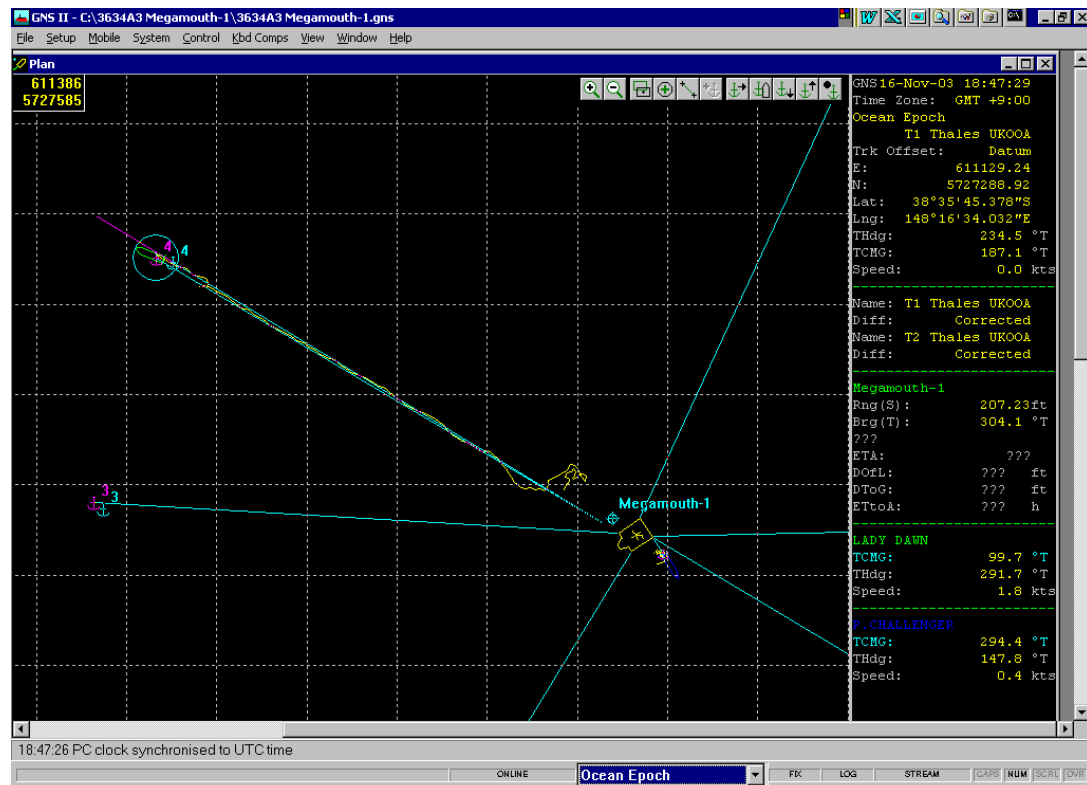
Project: Megamouth-1 Positioning Report of the Ocean Epoch

Client: BHPBP Australia

Anchor 3 – P.Frontier

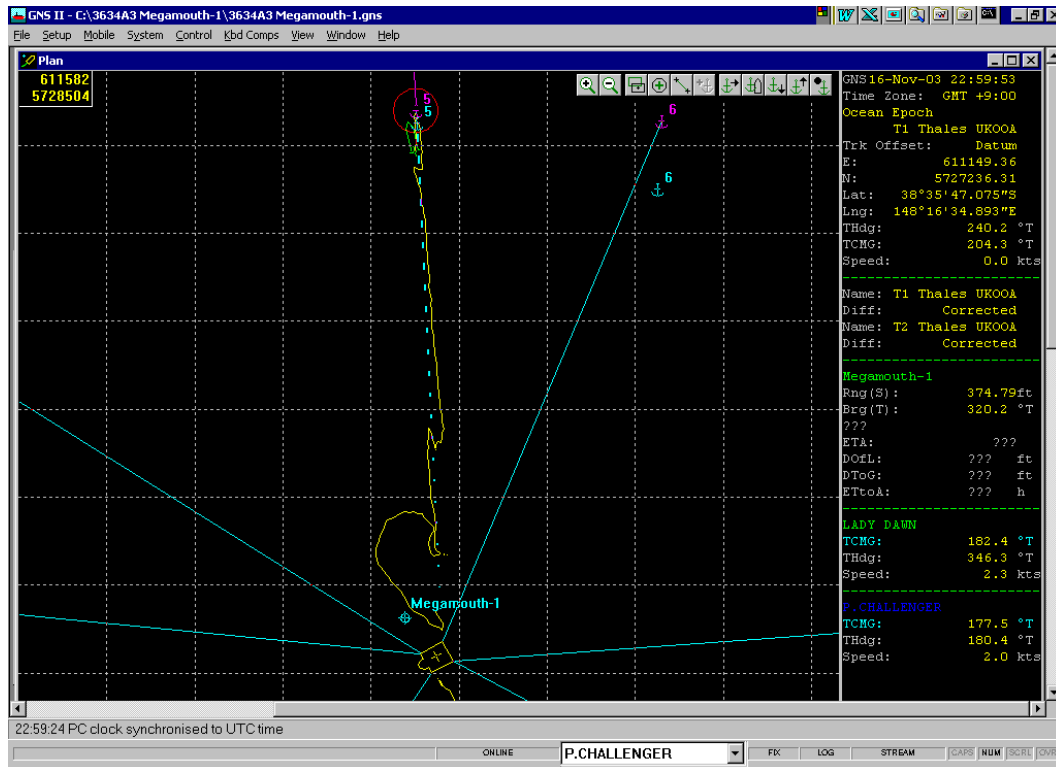


Anchor 4 – P.Frontier

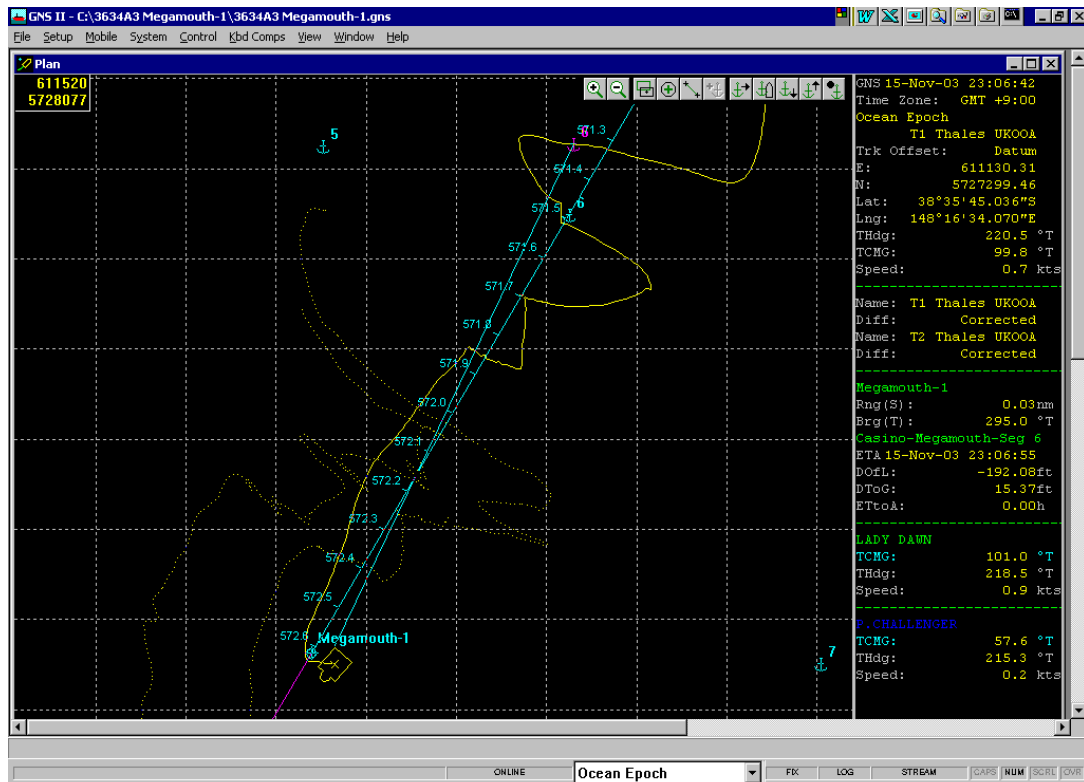


Project: Minerva Megamouth-1 Positioning Report of the Ocean Epoch
Client: BHPBP Australia

Anchor 5 – L.Dawn



Anchor 6 – Ocean Epoch

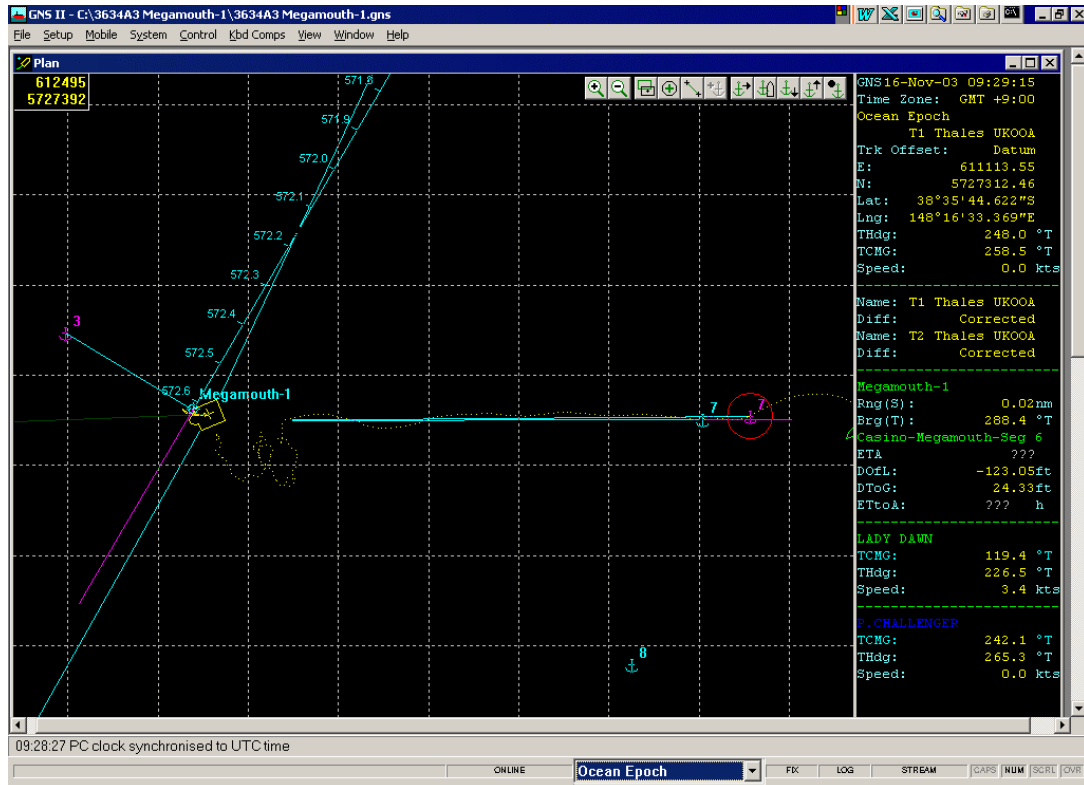


THALES Thales GeoSolutions (Australasia) Limited

Project: Minerva 4 Positioning Report of the Sedco 702

Client: BHPBP Australia

Anchor 7 – L.Dawn



Anchor 8 – P.Challenger



APPENDIX D

OCEAN EPOCH ANCHOR PATTERN DETAILS AT MEGAMOUTH-1

OCEAN EPOCH ANCHOR POSITIONS

17 Nov 2003 14:32

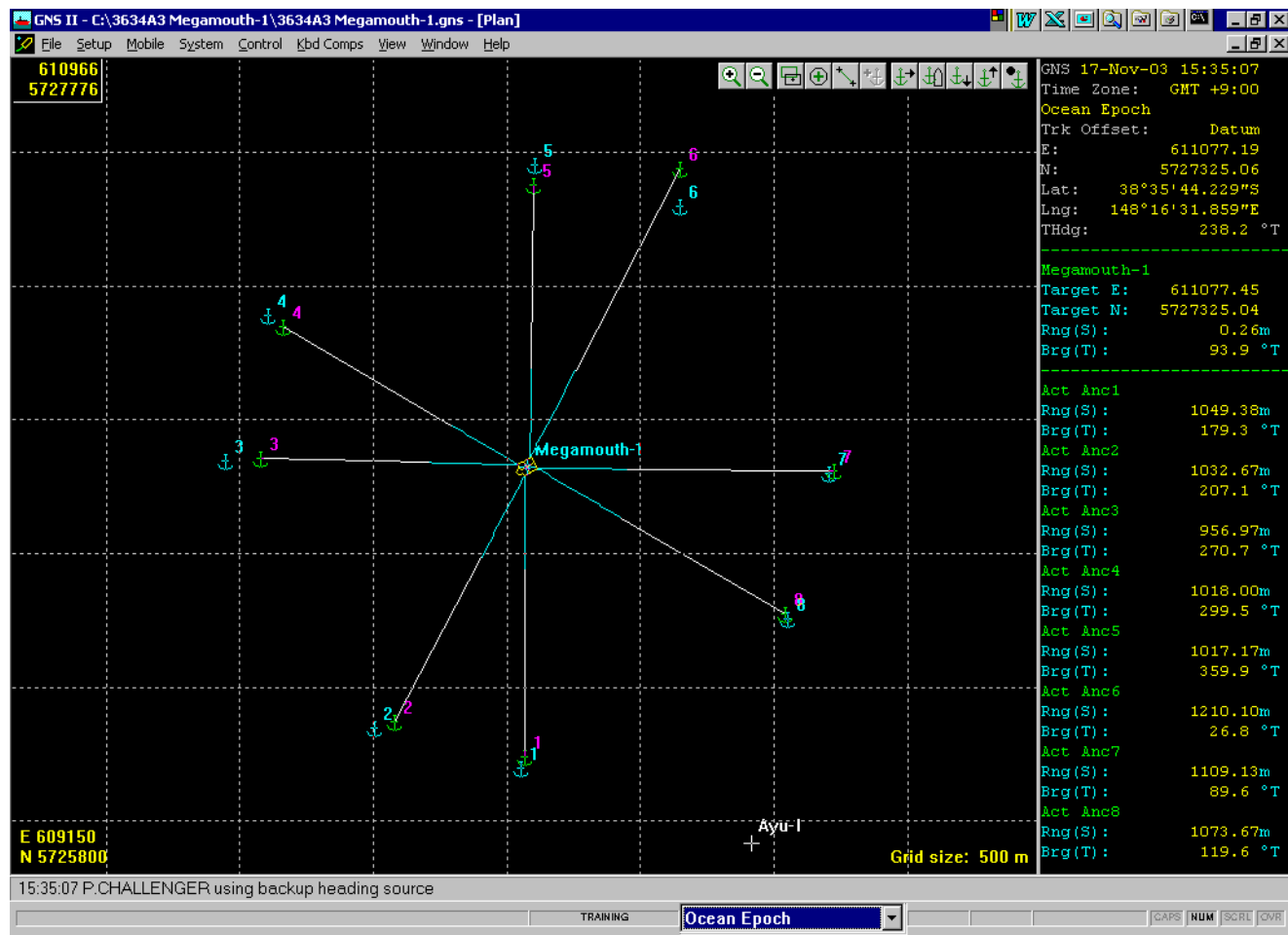
Main Anchors

Name	Intended E	Intended N	Dropped E	Dropped N
Anchor 1	611051.11	5726198.90	611065.61	5726238.50
Anchor 2	610505.13	5726350.42	610580.60	5726373.15
Anchor 3	609947.45	5727348.10	610079.57	5727356.23
Anchor 4	610104.40	5727892.54	610160.68	5727847.23
Anchor 5	611103.78	5728451.17	611099.97	5728379.34
Anchor 6	611649.76	5728299.66	611650.35	5728437.12
Anchor 7	612207.45	5727301.97	612227.22	5727310.34
Anchor 8	612050.49	5726757.53	612040.99	5726773.51

THALES Thales GeoSolutions (Australasia) Limited

Project: Megamouth-1 Positioning Report of the Ocean Epoch

Client: BHPBP



APPENDIX E

OCEAN EPOCH ANCHOR CATENARY CALCULATIONS

THALES Thales GeoSolutions (Australasia) Limited

Project: Positioning Report of the Ocean Epoch
Client: BHPBP Australia

Ocean Epoch Catenary Control

Anchors
Anchor 1 DEPLOYED

Fairlead Cable
Out
Winch Counter Reading
☒ Manual: 3482 ft
☐ Counter: Not Available

Corr to Fairlead... 0.00 ft
Total (corrected): 3482.00 ft
On Seabed: 2296.07 ft
Suspended: 1185.93 ft

Tension
☒ Manual: 191 kips
☐ Tensionometer: Not Available
Current Value: 191.00 kips

Cable Components

	Length	Wt (Wt/L)
Fairlead		
F'lead Seg 1	3482.00	68.00
Anchor		0.00
AHV to Anc	0.00	0.00

Add... Edit... Delete Last

Anchor Handling Vessel Cable
Weight/Length... Out: 0 ft
Depth(MSL)... 80.00 m View Section...
☒ Enable Comp Update Catenary

Anchor
Computed Actual
E: 611065.61 611065.61
N: 5726238.50 5726238.50
Depth(MSL): 262.64 ft 262.64 ft
Horizontal Range From Fairlead
Comp: 3442.84 ft Act: 3442.84 ft
Computed Minus Actual: 0.00 ft
Brg From Fairlead
Comp: 179.3 °T Act: 179.3 °T
☐ Use Intended (Planning Only)
Transfer Comp -> Actual

Touchdown Points
Point: 1 Down Total: 1
E: 611066.64 N: 5726938.17
Horiz Rng From F'lead: 1146.77 ft
Units... Close

Ocean Epoch Catenary Control

Anchors
Anchor 2 DEPLOYED

Fairlead Cable
Out
Winch Counter Reading
☒ Manual: 3428 ft
☐ Counter: Not Available

Corr to Fairlead... 0.00 ft
Total (corrected): 3428.00 ft
On Seabed: 2269.44 ft
Suspended: 1158.56 ft

Tension
☒ Manual: 183 kips
☐ Tensionometer: Not Available
Current Value: 183.00 kips

Cable Components

	Length	Wt (Wt/L)
Fairlead		
F'lead Seg 1	3428.00	68.00
Anchor		0.00
AHV to Anc	0.00	0.00

Add... Edit... Delete Last

Anchor Handling Vessel Cable
Weight/Length... Out: 0 ft
Depth(MSL)... 80.00 m View Section...
☒ Enable Comp Update Catenary

Anchor
Computed Actual
E: 610580.60 610580.60
N: 5726373.15 5726373.15
Depth(MSL): 262.15 ft 262.15 ft
Horizontal Range From Fairlead
Comp: 3388.04 ft Act: 3388.04 ft
Computed Minus Actual: 0.00 ft
Brg From Fairlead
Comp: 207.1 °T Act: 207.1 °T
☐ Use Intended (Planning Only)
Transfer Comp -> Actual

Touchdown Points
Point: 1 Down Total: 1
E: 610904.21 N: 5726984.32
Horiz Rng From F'lead: 1118.60 ft
Units... Close

Ocean Epoch Catenary Control

Anchors
Anchor 3 DEPLOYED

Fairlead Cable
Out
Winch Counter Reading
☒ Manual: 3181 ft
☐ Counter: Not Available

Corr to Fairlead... 0.00 ft
Total (corrected): 3181.00 ft
On Seabed: 2055.03 ft
Suspended: 1125.97 ft

Tension
☒ Manual: 173 kips
☐ Tensionometer: Not Available
Current Value: 173.00 kips

Cable Components

	Length	Wt (Wt/L)
Fairlead		
F'lead Seg 1	3181.00	68.00
Anchor		0.00
AHV to Anc	0.00	0.00

Add... Edit... Delete Last

Anchor Handling Vessel Cable
Weight/Length... Out: 0 ft
Depth(MSL)... 80.00 m View Section...
☒ Enable Comp Update Catenary

Anchor
Computed Actual
E: 610079.57 610079.57
N: 5727356.23 5727356.23
Depth(MSL): 262.73 ft 262.73 ft
Horizontal Range From Fairlead
Comp: 3139.67 ft Act: 3139.67 ft
Computed Minus Actual: 0.00 ft
Brg From Fairlead
Comp: 270.7 °T Act: 270.7 °T
☐ Use Intended (Planning Only)
Transfer Comp -> Actual

Touchdown Points
Point: 1 Down Total: 1
E: 610705.58 N: 5727340.18
Horiz Rng From F'lead: 1084.65 ft
Units... Close

THALES Thales GeoSolutions (Australasia) Limited

Project: Positioning Report of the Ocean Epoch
Client: BHPBP Australia

Ocean Epoch Catenary Control

Anchors
Anchor 4 DEPLOYED

Fairlead Cable
Out
Winch Counter Reading
☒ Manual: 3387 ft
☐ Counter: Not Available

Corr to Fairlead... 0.00 ft
Total (corrected): 3387.00 ft
On Seabed: 2396.16 ft
Suspended: 990.84 ft

Tension
☒ Manual: 136 kips
☐ Tensionometer: Not Available
Current Value: 136.00 kips

Cable Components

	Length	Wt (wt/L)
Fairlead		
F'lead Seg 1	3387.00	68.00
Anchor		0.00
AHV to Anc	0.00	0.00

Add... Edit... Delete Last

Anchor Handling Vessel Cable
Weight/Length... Out: 0 ft
Depth(MSL)... 80.00 m View Section...
☒ Enable Comp Update Catenary

Anchor
Computed Actual
E: 610160.68 610160.68
N: 5727847.23 5727847.23
Depth(MSL): 262.69 ft 262.69 ft
Horizontal Range From Fairlead
Comp: 3339.90 ft Act: 3339.90 ft
Computed Minus Actual: 0.00 ft
Brg From Fairlead
Comp: 299.5 °T Act: 299.5 °T
☐ Use Intended (Planning Only)
Transfer Comp --> Actual

Touchdown Points
Point: 1 Down Total: 1
E: 610791.12 N: 5727478.85
Horiz Rng From F'lead: 943.73 ft
Units... Close

Ocean Epoch Catenary Control

Anchors
Anchor 5 DEPLOYED

Fairlead Cable
Out
Winch Counter Reading
☒ Manual: 3378 ft
☐ Counter: Not Available

Corr to Fairlead... 0.00 ft
Total (corrected): 3378.00 ft
On Seabed: 2242.80 ft
Suspended: 1135.20 ft

Tension
☒ Manual: 176 kips
☐ Tensionometer: Not Available
Current Value: 176.00 kips

Cable Components

	Length	Wt (wt/L)
Fairlead		
F'lead Seg 1	3378.00	68.00
Anchor		0.00
AHV to Anc	0.00	0.00

Add... Edit... Delete Last

Anchor Handling Vessel Cable
Weight/Length... Out: 0 ft
Depth(MSL)... 80.00 m View Section...
☒ Enable Comp Update Catenary

Anchor
Computed Actual
E: 611099.97 611099.97
N: 5728379.34 5728379.34
Depth(MSL): 262.23 ft 262.23 ft
Horizontal Range From Fairlead
Comp: 3337.17 ft Act: 3337.17 ft
Computed Minus Actual: 0.00 ft
Brg From Fairlead
Comp: 359.9 °T Act: 359.9 °T
☐ Use Intended (Planning Only)
Transfer Comp --> Actual

Touchdown Points
Point: 1 Down Total: 1
E: 611091.41 N: 5727695.96
Horiz Rng From F'lead: 1094.37 ft
Units... Close

Ocean Epoch Catenary Control

Anchors
Anchor 6 DEPLOYED

Fairlead Cable
Out
Winch Counter Reading
☒ Manual: 4008 ft
☐ Counter: Not Available

Corr to Fairlead... 0.00 ft
Total (corrected): 4008.00 ft
On Seabed: 2784.19 ft
Suspended: 1223.81 ft

Tension
☒ Manual: 203 kips
☐ Tensionometer: Not Available
Current Value: 203.00 kips

Cable Components

	Length	Wt (wt/L)
Fairlead		
F'lead Seg 1	4008.00	68.00
Anchor		0.00
AHV to Anc	0.00	0.00

Add... Edit... Delete Last

Anchor Handling Vessel Cable
Weight/Length... Out: 0 ft
Depth(MSL)... 80.00 m View Section...
☒ Enable Comp Update Catenary

Anchor
Computed Actual
E: 611650.35 611650.35
N: 5728437.12 5728437.12
Depth(MSL): 262.38 ft 262.38 ft
Horizontal Range From Fairlead
Comp: 3970.15 ft Act: 3970.15 ft
Computed Minus Actual: 0.00 ft
Brg From Fairlead
Comp: 26.8 °T Act: 26.8 °T
☐ Use Intended (Planning Only)
Transfer Comp --> Actual

Touchdown Points
Point: 1 Down Total: 1
E: 611257.85 N: 5727684.95
Horiz Rng From F'lead: 1185.95 ft
Units... Close

THALES Thales GeoSolutions (Australasia) Limited

Project: Positioning Report of the Ocean Epoch
Client: BHPBP Australia

Ocean Epoch Catenary Control

Anchors
Anchor 7 DEPLOYED

Fairlead Cable
Out
Winch Counter Reading
☒ Manual: 3680 ft
☐ Counter: Not Available

Corr to Fairlead... 0.00 ft
Total (corrected): 3680.00 ft
On Seabed: 2551.33 ft
Suspended: 1128.67 ft

Tension
☒ Manual: 174 kips
☐ Tensionometer: Not Available
Current Value: 174.00 kips

Cable Components

	Length	Wt (wt/L)
Fairlead		
F'lead Seg 1	3680.00	68.00
Anchor		0.00
AHV to Anc	0.00	0.00

Add... Edit... Delete Last

Anchor Handling Vessel Cable
Weight/Length... Out: 0 ft

Depth(MSL)... 80.00 m View Section...

☒ Enable Comp Update Catenary

Anchor
Computed Actual
E: 612227.22 612227.22
N: 5727310.34 5727310.34
Depth(MSL): 262.38 ft 262.38 ft
Horizontal Range From Fairlead
Comp: 3638.89 ft Act: 3638.89 ft
Computed Minus Actual: 0.00 ft

Brig From Fairlead
Comp: 89.6 °T Act: 89.6 °T
☐ Use Intended (Planning Only)

Transfer Comp --> Actual

Touchdown Points
Point: 1 Down Total: 1
E: 611449.79 N: 5727316.00
Horiz Rng From F'lead: 1087.56 ft

Units... Close

Ocean Epoch Catenary Control

Anchors
Anchor 7 DEPLOYED

Fairlead Cable
Out
Winch Counter Reading
☒ Manual: 3680 ft
☐ Counter: Not Available

Corr to Fairlead... 0.00 ft
Total (corrected): 3680.00 ft
On Seabed: 2551.33 ft
Suspended: 1128.67 ft

Tension
☒ Manual: 174 kips
☐ Tensionometer: Not Available
Current Value: 174.00 kips

Cable Components

	Length	Wt (wt/L)
Fairlead		
F'lead Seg 1	3680.00	68.00
Anchor		0.00
AHV to Anc	0.00	0.00

Add... Edit... Delete Last

Anchor Handling Vessel Cable
Weight/Length... Out: 0 ft

Depth(MSL)... 80.00 m View Section...

☒ Enable Comp Update Catenary

Anchor
Computed Actual
E: 612227.22 612227.22
N: 5727310.34 5727310.34
Depth(MSL): 262.38 ft 262.38 ft
Horizontal Range From Fairlead
Comp: 3638.89 ft Act: 3638.89 ft
Computed Minus Actual: 0.00 ft

Brig From Fairlead
Comp: 89.6 °T Act: 89.6 °T
☐ Use Intended (Planning Only)

Transfer Comp --> Actual

Touchdown Points
Point: 1 Down Total: 1
E: 611449.79 N: 5727316.00
Horiz Rng From F'lead: 1087.56 ft

Units... Close

APPENDIX F

GYROCOMPASS CALIBRATION REPORT



Thales GeoSolutions (Australasia) Limited

ABN 82 000 601 909

Solar Observation for Azimuth (Hour Angle) 2003

Thales Job Number: 3634A3
Job Description: Megamouth-1 Ocean Epoch Rig Move
Client: BHPBP
Party Chief: M.Elmslie
Surveyor: M.Elmslie
Rig Name: Ocean Epoch
Date: 12 November 2003

Control Point Co-ordinates

Datum: GDA94 Projection: UTM Zone 54S CM 141° East

Latitude (DMS): -038 46 35
Longitude (DMS): 142 44 05
UTC Correction (HMS): 11.00

Total Station Observations:

Face	Local Time (HMS)			Observed Direction to R.O. (DMS)			Observed Direction to Sun (DMS)			Observed (O) True Heading (D.D)
Left	19	11	55	000	00	00	016	18	24	327.20
Right	19	11	55	180	00	00	196	18	24	
Left	19	18	28	000	00	00	014	52	24	327.20
Right	19	18	28	180	00	00	194	52	24	
Left	19	33	01	000	00	00	012	57	24	327.30
Right	19	33	01	180	00	00	192	57	24	
Left	19	36	07	000	00	00	012	41	24	327.00
Right	19	36	07	180	00	00	192	41	24	
Left	19	37	31	000	00	00	012	30	12	327.20
Right	19	37	31	180	00	00	192	30	12	
Left	19	39	13	000	00	00	011	51	00	327.00
Right	19	39	13	180	00	00	191	51	00	
Left										
Right										
Left										
Right										
Left										
Right										
Left										
Right										
Left										
Right										
Left										
Right										

Signature

SURVEYOR/PARTY CHIEF

CLIENT SURVEY REPRESENTATIVE



Thales GeoSolutions (Australasia) Limited

ABN 82 000 601 909

Solar Observation for Azimuth (Hour Angle) 2003

Thales Job Number: 3634A3
Job Description: Megamouth-1 Ocean Epoch Rig Move
Client: BHPBP
Party Chief: M.Elmslie
Surveyor: M.Elmslie
Rig Name: Ocean Epoch
Date: 12 November 2003

Datum: GDA94 **Projection:** UTM Zone 54S CM 141° East

Average Local Time (HMS)			Average Horizontal Angle (DMS)			Azimuth Sun (DMS)			Azimuth RO (DMS)			Calculated (C) True Heading (D.D)	Observed (O) True Heading (D.D)	C-O (D.D)
19	11	55.0	016	18	24	256	16	47	239	58	23	239.97	327.20	-87.23
19	18	28.0	014	52	24	255	18	41	240	26	17	240.44	327.20	-86.76
19	33	01.0	012	57	24	253	08	48	240	11	24	240.19	327.30	-87.11
19	36	07.0	012	41	24	252	40	57	239	59	33	239.99	327.00	-87.01
19	37	31.0	012	30	12	252	28	20	239	58	08	239.97	327.20	-87.23
19	39	13.0	011	51	00	252	13	01	240	22	01	240.37	327.00	-86.63

Mean C-O -87.00

Signature

SURVEYOR/PARTY CHIEF

CLIENT SURVEY REPRESENTATIVE

APPENDIX G

DIFFERENTIAL GPS CHECK FIX

CHECK POSITION FIX – DIFFERENTIAL GPS

Job Description: Rig Move
Job Number: 3634A3
Thales Surveyor: M.Elmslie
Client: BHPBP
Client Representative: A.Sellers

Sampling started: 12 Nov 2003 09:10:08
Sampling end: 12 Nov 2003 09:20:05

Ocean Epoch

Published datum location

Datum: GDA94 (GRS80)
Latitude: 38°46'34.558"S **Longitude:** 142°44'05.437"E
Projection: UTM Zone 54 (S)
Easting: 650700.11 m **Northing:** 5706621.82 m

Final Antenna Position (T1 Thales UKOOA):

Sample size: 120 fixes used out of a total of 120.

Antenna offset

X: 5.45m **Y:** 43.63m **Z:** 0.00m
Range: 43.97m **Rel Brg from datum to antenna:** 7.1°

Datum: WGS 84
Latitude: 38°46'35.082"S **Longitude:** 142°44'03.798"E **Spheroidal Ht:** 16.36m
Datum: GDA94 (GRS80)
Latitude: 38°46'35.082"S **Longitude:** 142°44'03.798"E **Spheroidal Ht:** 16.35m
Projection: UTM Zone 54 (S)
Easting: 650660.25 **Northing:** 5706606.43 **Spheroidal Ht:** 16.35m

Standard deviations

Long or E: 0.24m
Lat or N: 0.22m
Height: 0.42m
Position: 0.33m

Final Datum Position

Datum: GDA94 (GRS80)
Latitude: 38°46'34.506"S **Longitude:** 142°44'05.465"E

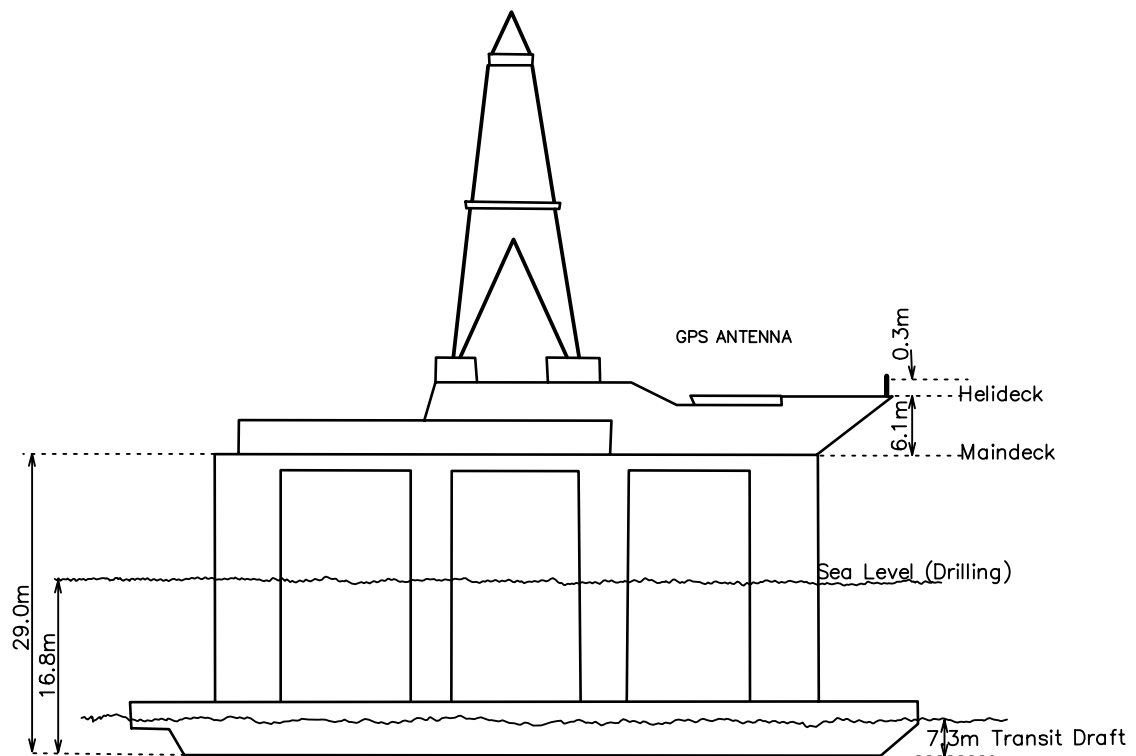
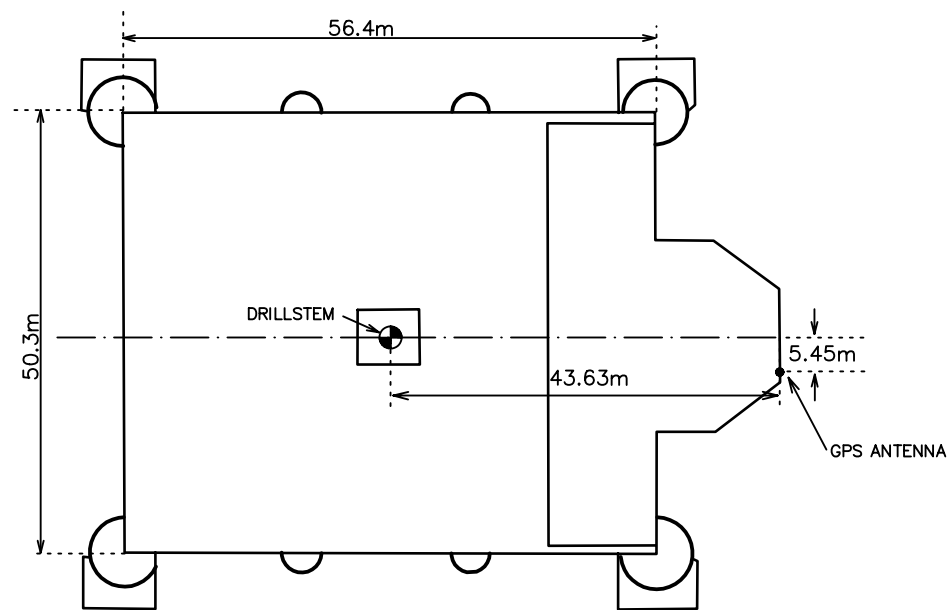
Projection: UTM Zone 54 (S)
Easting: 650700.81 m **Northing:** 5706623.41 m

Mean corrected heading: 239.1°T
SD heading: 0.1°T
Intended heading: 238.9°T
Difference from intended: 0.2°
Gyro C-O: -88.2°
Convergence: -1.09°

Final Datum Position is 1.74m on a bearing of 22.7°T (23.8°G) from the published location.

APPENDIX H

OCEAN EPOCH OFFSET DIAGRAM



OCEAN EPOCH

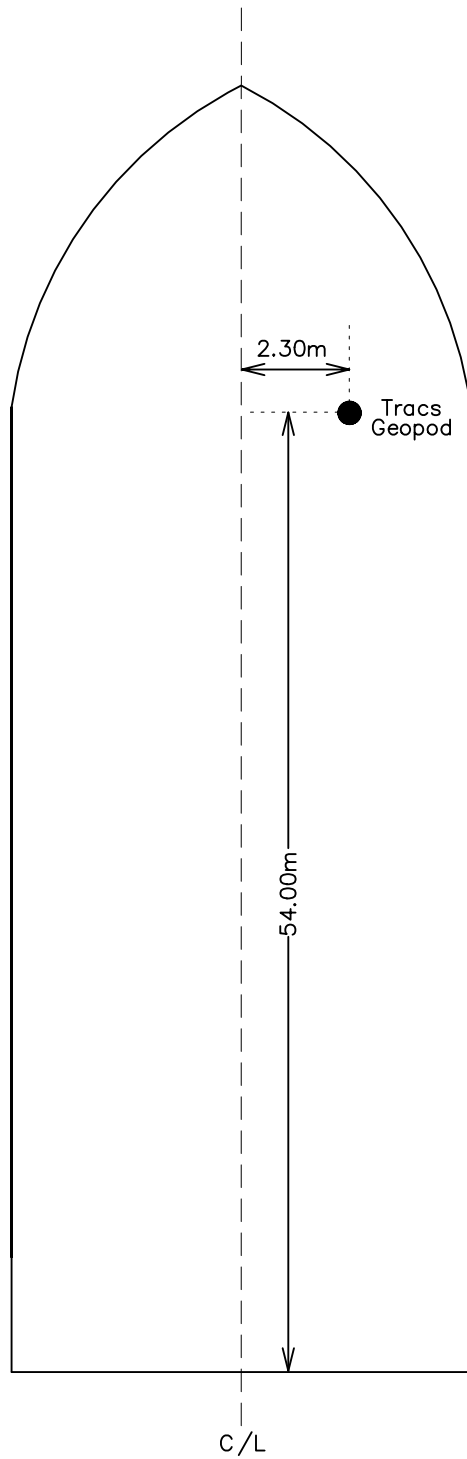
(Not To Scale)

APPENDIX I

LADY DAWN AND PACIFIC CHALLENGER OFFSET DIAGRAMS

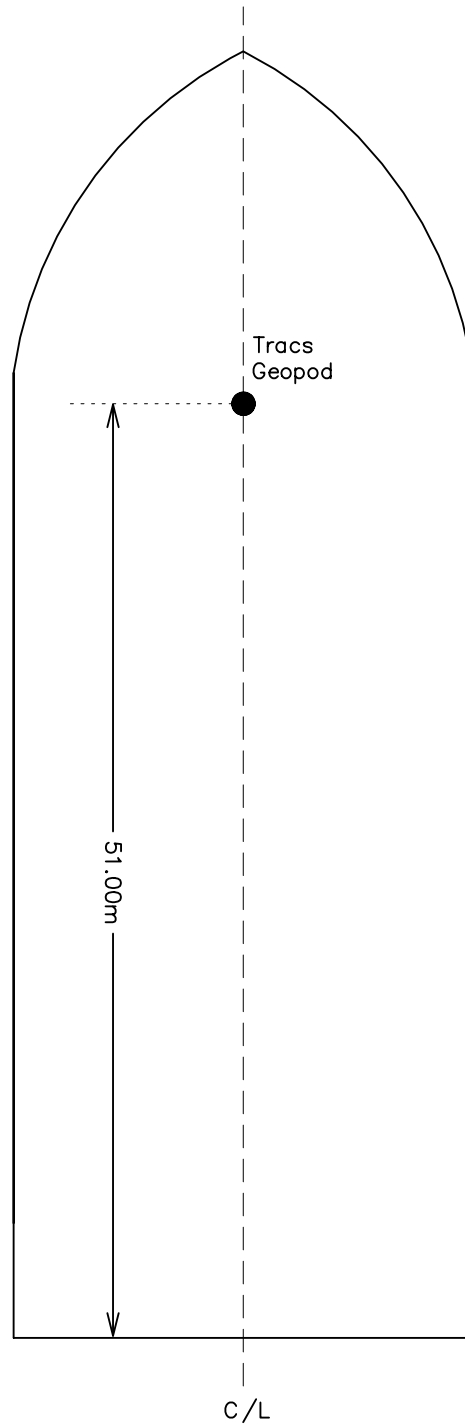
PACIFIC CHALLENGER

(NOT TO SCALE)



LADY DAWN

(NOT TO SCALE)



APPENDIX J

GNS2 CONFIGURATION FILE PRINTOUT

GNS II CONFIGURATION FILE W:\Project Data\3634A3 BHPBP Megamouth-1 Ocean Ep

JOB DETAILS

Job Number : 3634A3
Job Description : Rig Move
Company : Thales GeoSolutions Group Ltd
Client : BHPBP
Time Zone : GMT +10:00
11:00

WORKING SPHEROID

GDA94 (GRS80)
Semi-major : 6378137.000 m
e Squared : 0.006694380023

WORKING PROJECTION

MGA94 Zone 55
Lat of Origin : 00°00'00.000"N
Long of Origin : 147°00'00.000"E
False Easting : 500000.00
False Northing : 10000000.00
Scale Factor : 0.999600
Units : Metres

GPS TRANSFORMATION

From : WGS 84
Semi-major : 6378137.000 m
e Squared : 0.006694380067
To : GDA94 (GRS80)
Dx : 0.000 m
Dy : 0.000 m
Dz : 0.000 m
Rot x : 0.0000 secs
Rot y : 0.0000 secs
Rot z : 0.0000 secs
Scale : 0.0000 ppm

WAYPOINTS

Casino-3	E: 129441.41 N: 5699409.38 Ht: 0.00 m Horz Tol1: 5.00 m
WP2	E: 182135.07 N: 5649010.65 Ht: 0.00 m
WP3	E: 456964.22 N: 5635939.73 Ht: 0.00 m
WP6	E: 613887.90 N: 5732116.22 Ht: 0.00 m
WP4	E: 500000.00 N: 5636058.99 Ht: 0.00 m
WP5	E: 630458.81 N: 5716740.88 Ht: 0.00 m
Megamouth-1	E: 611077.45 N: 5727325.04 Ht: 0.00 m Horz Tol1: 10.00 m
Anemone	E: 615680.38 N: 5708678.30 Ht: 0.00 m
Archer-1	E: 613941.01 N: 5708250.19 Ht: 0.00 m
Ayu-1	E: 611914.99 N: 5725917.64 Ht: 0.00 m
Helios-1	E: 611109.23 N: 5716525.39 Ht: 0.00 m
Hermes-1	E: 613157.77 N: 5725699.74 Ht: 0.00 m
Moray-1	E: 591706.20 N: 5698012.62 Ht: 0.00 m
Mudskipper-1	E: 598307.86 N: 5692923.45 Ht: 0.00 m

TRACK GUIDANCE

None defined

MOBILES

Ocean Epoch (semi-sub rig)
Shape Definition: Ocean Epoch
Line:-
X: -5.40 m Y: 44.80 m

Verified by: (sign)_____ (print)_____

GNS II CONFIGURATION FILE W:\Project Data\3634A3 BHPBP Megamouth-1 Ocean Ep

X: -11.00 m Y: 34.90 m
X: -11.00 m Y: 28.20 m
X: -25.20 m Y: 28.20 m
X: -25.20 m Y: -28.20 m
X: 25.20 m Y: -28.20 m
X: 25.20 m Y: 28.20 m
X: 11.00 m Y: 28.20 m
X: 11.00 m Y: 34.90 m
X: 5.40 m Y: 44.80 m
X: -5.40 m Y: 44.80 m

Tracking Point : Datum
Pitch and Roll Centre: Datum

Selected Sources:-

Primary Position : T6 Thales UKOOA (Using Antenna Offset : Gps_ae)
Backup Position : T2 Thales UKOOA (Using Antenna Offset : Gps_ae)
Primary Heading : S1 SGB 1000S
Primary Height : Datum Displacement
Pitch and Roll : Manual
Soundings : Manual
Speed : Position Filter
Course Made Good : Posn Filter CMG

Equipment:-

T6 Thales UKOOA

Status: ON Interface: Sock3
Antenna Offset Selected: Gps_ae
X: 5.45 m Y: 43.63 m Z: 0.00 m Rng: 43.97 m Brg: 7.1°
Apply Pitch Roll: Off Stale Time: 5.0 s Posn SD: 3.0 m Ht SD: 1.0 m
Update posn only when diff corrected
Filter: Off Time Constant:60.0 s Sample Dwell: 0.5 s
Gate: Off Gate Width: 9.0 xSD Minimum Gate: 0.0 m

T1 Thales UKOOA

Status: ON Interface: Sock1
Antenna Offset Selected: Gps_ae
X: 5.45 m Y: 43.63 m Z: 0.00 m Rng: 43.97 m Brg: 7.1°
Apply Pitch Roll: Off Stale Time: 5.0 s Posn SD: 3.0 m Ht SD: 1.0 m
Update posn only when diff corrected
Filter: Off Time Constant:60.0 s Sample Dwell: 0.5 s
Gate: Off Gate Width: 9.0 xSD Minimum Gate: 0.0 m

T2 Thales UKOOA

Status: ON Interface: Sock2
Antenna Offset Selected: Gps_ae
X: 5.45 m Y: 43.63 m Z: 0.00 m Rng: 43.97 m Brg: 7.1°
Apply Pitch Roll: Off Stale Time: 5.0 s Posn SD: 3.0 m Ht SD: 1.0 m
Update posn regardless of whether diff corrected
Filter: Off Time Constant:60.0 s Sample Dwell: 0.5 s
Gate: Off Gate Width: 9.0 xSD Minimum Gate: 0.0 m

T3 Tracs TDMA Master

Status: OFF Interface: COM7
Antenna Offset Selected: Gps_ae
X: 5.45 m Y: 43.63 m Z: 0.00 m Rng: 43.97 m Brg: 7.1°

S1 SGB 1000S

Status: ON Interface: COM6
C-O: -87.0 degs Stale Time: 5.0 s SD: 0.1 degs

Verified by: (sign)_____ (print)_____

GNS II CONFIGURATION FILE W:\Project Data\3634A3 BHPBP Megamouth-1 Ocean Ep

Filter: Off Gate: Off Time Constant: 5.0 s Sample Dwell: 0.5 s

Defined Offsets:-

Datum

X: 0.00 m Y: 0.00 m Z: 0.00 m Rng: 0.00 m Brg: 0.0°

Gps_ae

X: 5.45 m Y: 43.63 m Z: 0.00 m Rng: 43.97 m Brg: 7.1°

Fairlead 7

X: -26.93 m Y: -31.90 m Z: 0.00 m Rng: 41.75 m Brg: 220.2°

Fairlead 1

X: -26.93 m Y: 27.90 m Z: 0.00 m Rng: 38.78 m Brg: 316.0°

Fairlead 6

X: 26.93 m Y: -31.90 m Z: 0.00 m Rng: 41.75 m Brg: 139.8°

LADY DAWN (ship)

Shape Definition: Lady Dawn

Line:-

X: 0.00 m Y: 0.00 m

X: 7.50 m Y: 0.00 m

X: 7.50 m Y: 56.00 m

X: 0.00 m Y: 69.00 m

X: -7.50 m Y: 56.00 m

X: -7.50 m Y: 0.00 m

X: 0.00 m Y: 0.00 m

Tracking Point : Datum

Pitch and Roll Centre: Datum

Selected Sources:-

Primary Position : T5 Tracs TDMA Remote (Using Antenna Offset : POD)

Primary Heading : T5 Tracs TDMA Remote

Primary Height : Datum Displacement

Pitch and Roll : Manual

Soundings : Manual

Speed : Position Filter

Course Made Good : Posn Filter CMG

Equipment:-

T5 Tracs TDMA Remote

Status: ON Interface: Not defined

Antenna Offset Selected: POD

X: 0.00 m Y: 51.00 m Z: 0.00 m Rng: 51.00 m Brg: 0.0°

Defined Offsets:-

Datum

X: 0.00 m Y: 0.00 m Z: 0.00 m Rng: 0.00 m Brg: 0.0°

POD

X: 0.00 m Y: 51.00 m Z: 0.00 m Rng: 51.00 m Brg: 0.0°

P.CHALLENGER (ship)

Shape Definition: P_Challenger

Line:-

X: -6.50 m Y: 0.00 m

X: -6.50 m Y: 50.00 m

X: 0.00 m Y: 63.00 m

X: 6.50 m Y: 50.00 m

X: 6.50 m Y: 0.00 m

X: -6.50 m Y: 0.00 m

Tracking Point : Datum

Verified by: (sign) _____ (print) _____

Pitch and Roll Centre: Datum

Selected Sources:-

Primary Position : T4 Tracs TDMA Remote (Using Antenna Offset : POD)
 Primary Heading : T4 Tracs TDMA Remote
 Primary Height : Datum Displacement
 Pitch and Roll : Manual
 Soundings : Manual
 Speed : Position Filter
 Course Made Good : Posn Filter CMG

Equipment:-

T4 Tracs TDMA Remote

Status: ON Interface: Not defined

Antenna Offset Selected: POD

X: -2.30 m Y: 54.00 m Z: 0.00 m Rng: 54.05 m Brg:357.6°

Defined Offsets:-

Datum

X: 0.00 m Y: 0.00 m Z: 0.00 m Rng: 0.00 m Brg: 0.0°

POD

X: -2.30 m Y: 54.00 m Z: 0.00 m Rng: 54.05 m Brg:357.6°

ANCHORS

Ocean Epoch

Fairleads:-

Name	X	Y	Z	Rng	Brg
Fairlead 1	-26.93 m	27.90 m	0.00 m	38.78 m	316.0°
Fairlead 2	-26.93 m	31.90 m	0.00 m	41.75 m	319.8°
Fairlead 3	26.93 m	31.90 m	0.00 m	41.75 m	40.2°
Fairlead 4	26.93 m	27.90 m	0.00 m	38.78 m	44.0°
Fairlead 5	26.93 m	-27.90 m	0.00 m	38.78 m	136.0°
Fairlead 6	26.93 m	-31.90 m	0.00 m	41.75 m	139.8°
Fairlead 7	-26.93 m	-31.90 m	0.00 m	41.75 m	220.2°
Fairlead 8	-26.93 m	-27.90 m	0.00 m	38.78 m	224.0°

Main Intended Positions:-

Name	Easting	Northing	Depth	Tolerance
Anchor 1	611051.11	5726198.90	0.00 m	50.00 m
Anchor 2	610505.13	5726350.42	0.00 m	50.00 m
Anchor 3	609947.45	5727348.10	0.00 m	50.00 m
Anchor 4	610104.40	5727892.54	0.00 m	50.00 m
Anchor 5	611103.78	5728451.17	0.00 m	50.00 m
Anchor 6	611649.76	5728299.66	0.00 m	50.00 m
Anchor 7	612207.45	5727301.97	0.00 m	50.00 m
Anchor 8	612050.49	5726757.53	0.00 m	50.00 m

Main Actual Positions:-

Name	Easting	Northing	Depth	Tolerance
Anchor 1	611065.61	5726238.50	80.05 m	50.00 m
Anchor 2	610580.60	5726373.15	79.90 m	50.00 m
Anchor 3	610079.57	5727356.23	80.08 m	50.00 m
Anchor 4	610160.68	5727847.23	80.07 m	50.00 m
Anchor 5	611099.97	5728379.34	79.93 m	50.00 m
Anchor 6	611650.35	5728437.12	79.97 m	50.00 m
Anchor 7	612227.22	5727310.34	79.97 m	50.00 m
Anchor 8	612040.99	5726773.51	79.96 m	50.00 m

Verified by: (sign)_____ (print)_____

APPENDIX K

DAILY REPORT SHEETS



Equipment	Op	
Ocean Epoch		
SkyFix		
SkyFix Spot		
Gyro		
GNS 2		
MultiFix 3		
GRREP		
Tracs		

[illegible]

Thales
Personnel
M.Elmslie(ME)
Client Personnel
G.Howard
(Santos)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

PAGE 1 OF 13

[illegible]

WHITE	: Accounts Department
BLUE	: Operations Department
YELLOW	: Clients Representative

Signature _____
CLIENT REPRESENTATIVE



Equipment	Op		Equipment	Op		Thales Personnel	WX	Sea State	Swell	Wind Dir.
Ocean Epoch			AHV's			M.Elmslie(ME)	0000			
SkyFix			TRACS			C.Groenewoud (CG)	0600			
SkyFix Spot			Fluxgate				1200			
Gyro							1800			
GNS 2										
MultiFix 3										
GRREP										
Tracs						Client Personnel				
						G.Howard				
						(Santos)				

PAGE 2 OF 13

[illegible]

Signature _____
CLIENT REPRESENTATIVE



Date:12-11-03	Client:Santos	Job No.:3634A3	Vessel:Ocean Epoch	Location:Megamouth-1
---------------	---------------	----------------	--------------------	----------------------

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

[illegible]

Signature _____
CLIENT REPRESENTATIVE



THALES GEOSOLUTIONS (AUSTRALASIA) LIMITED

DAILY RECORD SHEET

Date:13-11-03 Client:Santos/BHPBP Job No.:3634A3 Vessel:Ocean Epoch Location:Megamouth-1

Equipment	Op	
Ocean Epoch		
SkyFix	✓	
SkyFix Spot	✓	2
Gyro	✓	
GNS 2	✓	
MultiFix 3	✓	
GRREP	✓	
Tracs	✓	

Equipment	Op	
AHV's		
TRACS	✓	2
Fluxgate	✓	2

Thales Personnel
M.Elmslie(ME)
C.Groenewoud (CG)
Client Personnel
G.Howard
(Santos)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

DIARY OF OPERATIONS

PAGE 4 OF 13

TIME	Time Zone=UTC+11.00 Thursday, 13 November 2003
0500	Casing released from seabed.
0600	AHV's preparing to recover anchors(PC experiencing problems with heading).
0619	#5 assigned to LD.
0628	#1 assigned to PC.
0634	#1 PCC passed to PC.
0635	#5 PCC passed to LD.
0648	PC lifting #1.
0706	#1 off bottom.
0715	Heaving in #1.
0725	#5 off bottom.
0729	Heaving in #5
0815	Rig having difficulties winding in #1.
0818	#5 racked.
0820	#4 assigned to LD.
0835	#4 PCC passed to LD.
0857	LD lifting #4.
0904	#4 off bottom.
0905	Heaving in #4
1000	#4 racked.
1020	#1 racked.
1042	#8 assigned to LD.
1045	#8 PCC passed to LD.
1116	#8 off bottom.

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Signature _____
SURVEYOR/ENGINEER

WHITE : Accounts Department
BLUE : Operations Department
YELLOW : Clients Representative

Signature _____
CLIENT REPRESENTATIVE



THALES GEOSOLUTIONS (AUSTRALASIA) LIMITED

DAILY RECORD SHEET

Date:13-11-03 Client:Santos/BHPBP Job No.:3634A3 Vessel:Ocean Epoch Location:Megamouth-1

Equipment	Op	
Ocean Epoch		
SkyFix	✓	
SkyFix Spot	✓	2
Gyro	✓	
GNS 2	✓	
MultiFix 3	✓	
GRREP	✓	
Tracs	✓	

Equipment	Op	
AHV's		
TRACS	✓	2
Fluxgate	✓	2

Thales Personnel
M.Elmslie(ME)
C.Groenewoud (CG)
Client Personnel
G.Howard
(Santos)
P.Breene
(BHPBP)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

DIARY OF OPERATIONS

PAGE 5 OF 13

TIME	Time Zone=UTC+11.00 Thursday, 13 November 2003
1117	Heaving in #8.
1214	PC connected to tow bridle.
1218	#8 racked.
1249	#2 assigned to LD.
1324	#2 off bottom.
1412	#2 racked.
1433	#6 assigned to LD.
1445	#6 PCC passed to LD.
1518	#6 off bottom.
1519	Heaving in #6.
1600	Collar on #6 chaser broken, delaying racking.
1634	#6 PCC passed back to fig.
1637	#3 assigned to LD.
1654	#3 PCC passed to LD.
1900	Rig handed over from Santos to BHPBP.
1719	#3 off bottom.
1720	Heaving in #3
1758	#3 racked.
1759	#7 assigned to Ocean Epoch.
1800	Commence pulling in on #7.
1930	#7 off bottom.
2030	GNS2 system changed from zone 54 to zone 55 projection.
2030	LD connected to tow bridle.

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Signature _____
SURVEYOR/ENGINEER

WHITE : Accounts Department
BLUE : Operations Department
YELLOW : Clients Representative

Signature _____
CLIENT REPRESENTATIVE



Equipment	Op	
Ocean Epoch		
SkyFix	✓	
SkyFix Spot	✓	2
Gyro	✓	
GNS 2	✓	
MultiFix 3	✓	
GRREP	✓	
Tracs	✓	

[illegible]

Thales
Personnel
M.EImslie(ME)
C.Groenewoud
(CG)
Client Personnel
G.Howard
(Santos)
P.Breene
(BHPBP)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

PAGE 6 OF 13

[illegible]

Signature _____
SURVEYOR/ENGINEER

Signature _____
CLIENT REPRESENTATIVE



Equipment	Op	
Ocean Epoch		
SkyFix	✓	
SkyFix Spot	✓	2
Gyro	✓	
GNS 2	✓	
MultiFix 3	✓	
GRREP	✓	
Tracs	✓	

[illegible]

Thales
Personnel
M.Elmslie(ME)
C.Groenewoud
(CG)
Client Personnel
P.Breene
(BHPBP)
A.Sellers
(EDR)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

PAGE 7 OF 13

[illegible]

Signature _____
SURVEYOR/ENGINEER

Signature _____
CLIENT REPRESENTATIVE



THALES GEOSOLUTIONS (AUSTRALASIA) LIMITED

DAILY RECORD SHEET

Date:15-11-03 Client:BHPBP Job No.:3634A3 Vessel:Ocean Epoch Location:Megamouth-1

Equipment	Op	
Ocean Epoch		
SkyFix	✓	
SkyFix Spot	✓	2
Gyro	✓	
GNS 2	✓	
MultiFix 3	✓	
GRREP	✓	
Tracs	✓	

Equipment	Op	
AHV's		
TRACS	✓	2
Fluxgate	✓	2

Thales Personnel
M.Elmslie(ME)
C.Groenewoud (CG)
Client Personnel
P.Breene
(BHPBP)
A.Sellers
(EDR)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

DIARY OF OPERATIONS

PAGE 8 OF 13

TIME	Time Zone=UTC+11.00 Saturday, 15 November 2003
0000	Rig position 39°25.5' S 146°15.3' E Hdg 095°, Dist to go 121.5nm.
0600	Rig position 39°22' S 147°06.8' E Hdg 017°, Dist to go 93.7nm.
1030	Notified by BHPBP survey rep that run in anchor has been changed to anchor #6. New waypt cal'd.
1210	PC running on one engine due to cracked fuel line, speed reduced to 4.5-5kts.
1239	PC's engine repaired, running on 2 engines.
1600	ME attends anchor prelay meeting.
1840	Tow vessels taking evasive action to avoid collision with tanker.
1800	Rig back on line, Rig position 38°39.5' S 148°26.6' E Hdg 311°, dist to go 11.7nm.
1830	Tow vessels shortening tow wire.
1940	Ballasting rig to 30'.
1952	Rig at WP 6.
1955	#6 assigned to Ocean Epoch.
2105	Dropping #6.
2108	#6 on bottom.
2110	Ocean Epoch paying out 500' of chain to allow AHV's to pull rig around.
2137	Stop paying out.
2140	Stop ballasting at 30' draft.
2159	Wind gusting up to 40kts, AHV's having trouble bringing rig onto line.
2205	Resume paying out chain, AHV's still having trouble.
2303	Ocean Epoch over Megamouth-1 location.
2330	#3 assigned to Ocean Epoch. Attempt to drop #3 unsuccessful, PCC wrapped around anchor.

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Signature _____
SURVEYOR/ENGINEER

WHITE : Accounts Department
BLUE : Operations Department
YELLOW : Clients Representative

Signature _____
CLIENT REPRESENTATIVE



THALES GEOSOLUTIONS (AUSTRALASIA) LIMITED

DAILY RECORD SHEET

Date:16-11-03 Client:BHPBP Job No.:3634A3 Vessel:Ocean Epoch Location:Megamouth-1

Equipment	Op	
Ocean Epoch		
SkyFix	✓	
SkyFix Spot	✓	2
Gyro	✓	
GNS 2	✓	
MultiFix 3	✓	
GRREP	✓	
Tracs	✓	

Equipment	Op	
AHV's		
TRACS	✓	2
Fluxgate	✓	2

Thales Personnel
M.Elmslie(ME)
C.Groenewoud (CG)
Client Personnel
P.Breene
(BHPBP)
A.Sellers
(EDR)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

DIARY OF OPERATIONS

PAGE 9 OF 13

TIME	Time Zone=UTC+11.00 Sunday, 16 November 2003
0008	#3 free, dropping anchor.
0011	#3 on bottom.
0013	Start paying out chain on #3.
0024	Rig over intended location.
0345	LD disconnected from tow bridle.
0358	#2 assigned to LD.
0407	LD waiting on weather, winds gusting up to 40kts.
0530	#2 PCC passed to LD.
0557	LD running out #2.
0631	#2 on bottom.
0715	#2 PCC passed back to rig.
0821	#7 PCC passed to LD.
0823	#7 assigned to LD.
0824	LD running out #7.
0925	#7 on bottom, chaser broken off pennant wire.
0930	Start preparations to rerun #3.
1034	PC released from tow bridle.
1256	#3 assigned to LD.
1315	LD attempting hook #3 chain.
1345	#3 chain hooked by LD.
1400	#3 off bottom.
1403	LD running out #3.
1425	#3 on bottom.

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Signature _____
SURVEYOR/ENGINEER

WHITE : Accounts Department
BLUE : Operations Department
YELLOW : Clients Representative

Signature _____
CLIENT REPRESENTATIVE



THALES GEOSOLUTIONS (AUSTRALASIA) LIMITED DAILY RECORD SHEET

Date:16-11-03 Client:BHPBP Job No.:3634A3 Vessel:Ocean Epoch Location:Megamouth-1

Equipment	Op		Equipment	Op		Thales Personnel	WX	Sea State	Swell	Wind Dir.
Ocean Epoch			AHV's			M.Elmslie(ME)	0000			
SkyFix	✓		TRACS	✓	2	C.Groenewoud (CG)	0600			
SkyFix Spot	✓	2	Fluxgate	✓	2		1200			
Gyro	✓						1800			
GNS 2	✓									
MultiFix 3	✓					Client Personnel				
GRREP	✓					P.Breene				
Tracs	✓					(BHPBP)				
						A.Sellers				
						(EDR)				

DIARY OF OPERATIONS

PAGE 10 OF 13

TIME	Time Zone=UTC+11.00	Sunday, 16 November 2003
1429	#3 tension tested ok.	
1445	LD unhooked from #3.	
1500	Rig moving over to drop #4.	
1550	#4 on bottom.	
1555	Rig moving away from #4 dropped location.	
1615	Rig stopped moving.	
1627	#4 assigned to LD.	
1636	LD moving in to hook #4 chain.	
1815	#8 assigned to PC.	
1840	#8 PCC passed to PC.	
1738	LD hooked onto #4 chain.	
1750	#4 off bottom.	
1901	PC running out #8.	
1920	#8 on bottom.	
2010	Rig moving to drop #5 on bottom.	
2039	#5 on bottom.	
2045	Moving rig away from #5 dropped location.	
2140	LD attempting to hook #5 chain.	
2210	LD hooked onto #5 chain.	
2225	Commence ballasting to 55'.	
2227	#5 off bottom.	
2235	LD running out #5, #1 PCC passed to PC.	
2253	PC running out #1.	

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Signature _____
SURVEYOR/ENGINEER

WHITE : Accounts Department
BLUE : Operations Department
YELLOW : Clients Representative

Signature _____
CLIENT REPRESENTATIVE



Equipment	Op	
Ocean Epoch		
SkyFix	✓	
SkyFix Spot	✓	2
Gyro	✓	
GNS 2	✓	
MultiFix 3	✓	
GRREP	✓	
Tracs	✓	

[illegible]

Thales
Personnel
M.Elmslie(ME)
C.Groenewoud
(CG)
Client Personnel
P.Breene
(BHPBP)
A.Sellers
(EDR)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

PAGE 11 OF 13

[illegible]

Signature _____
SURVEYOR/ENGINEER

Signature _____
CLIENT REPRESENTATIVE

THALES GEOSOLUTIONS (AUSTRALASIA) LIMITED

DAILY RECORD SHEET

Date:17-11-03	Client:BHPBP	Job No.:3634A3	Vessel:Ocean Epoch	Location:Megamouth-1
---------------	--------------	----------------	--------------------	----------------------

Equipment	Op		Equipment	Op		Thales Personnel	WX	Sea State	Swell	Wind Dir.
Ocean Epoch			AHV's			M.Elmslie(ME)	0000			
SkyFix	✓		TRACS	✓	2	C.Greenewoud (CG)	0600			
SkyFix Spot	✓	2	Fluxgate	✓	2		1200			
Gyro	✓						1800			
GNS 2	✓									
MultiFix 3	✓					Client Personnel				
GRREP	✓					P.Breene				
Tracs	✓					(BHPBP)				
						A.Sellers				
						(EDR)				

DIARY OF OPERATIONS

PAGE 12 OF 13

[illegible]

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Signature _____
SURVEYOR/ENGINEER

WHITE : Accounts Department
BLUE : Operations Department
YELLOW : Clients Representative

Signature _____
CLIENT REPRESENTATIVE



THALES GEOSOLUTIONS (AUSTRALASIA) LIMITED

DAILY RECORD SHEET

Date:18-11-03 Client:BHPBP Job No.:3634A3 Vessel:Ocean Epoch Location:Megamouth-1

Equipment	Op	
Ocean Epoch		
SkyFix	✓	
SkyFix Spot	✓	2
Gyro	✓	
GNS 2	✓	
MultiFix 3	✓	
GRREP	✓	
Tracs	✓	

Equipment	Op	
AHV's		
TRACS	✓	2
Fluxgate	✓	2

Thales Personnel
M.Elmslie(ME)
C.Groenewoud (CG)
Client Personnel
P.Breene
(BHPBP)
A.Sellers
(EDR)

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

DIARY OF OPERATIONS

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TIME	Time Zone=UTC+11.00 Tuesday, 18 November 2003
0000	Thales personnel waiting for 30" to be stabbed in.
0645	30" casing stabbed in and cemented.
0730	Commence demobilisation.
0800	Demobilisation complete.
0830	Thales personnel depart Ocean Epoch.
1000	Arrive Essedon airport.
1355	Depart Melbourne.
1450	Arrive Perth (UTC+8.00)

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Signature _____
SURVEYOR/ENGINEER

WHITE : Accounts Department
BLUE : Operations Department
YELLOW : Clients Representative

Signature _____
CLIENT REPRESENTATIVE