WELL COMPLETION REPORT

NORTH WIRRAH-1

VOLUME 1
BASIC DATA

GIPPSLAND BASIN
VICTORIA

ESSO AUSTRALIA PTY LTD

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WELL COMPLETION RPEORT
NORTH WIRRAH-1

VOLUME 1:

BASIC DATA

FIGURES

APPENDICIES

WELL COMPLETION RPEORT
NORTH WIRRAH-1

VOLUME 1:

BASIC DATA (cont'd)

ENCLOSURES

1. **MASTER LOG 1:500 scale**
2. **MASTER LOG 1:200 scale**
3. **DRILLING LOG**
4. **GAS RATIO LOG**
5. **PRESSURE LOG**

I. WELL DATA RECORD

WELL NAME:	North Wirrah -1	**CLASSIFICATION:** Wildcat
OPERATOR:	Esso Australia Resources Pty Ltd	

Location:		**Rig Details:**		**Dates:**	
Latitude:	38° 10' 57.094"S	**Rig Name:**	Ensco 102	**On Location:**	02/09/2005
Longitude:	147°50'20.674" E	**Contractor:**	Ensco Australia Pty Ltd	**Spud Date:**	04/09/2005
Eastings:	573,486.30	**Rig Type:**	Jack-up	**TD Date:**	18/09/2005
Northings:	5,773,600.38			**Rig Released:**	25/09/2005
Geodetic Datum:	GDA94(GRS80)			**Total Rig Days:**	23.38
Zone/Meridian:	Zone 55, South			**Drilling AFE:**	L0501F600

		Depths (m)		**Status**
Basin:	Gippsland			Plugged and Abandoned
Field:	Gippsland	**RT to seafloor:**	92.0	Plug 1: 1970-1490m
Permit:	VIC-L2	**RT to Sealevel**	39.2	Plug 2: 914-764m
Permittee And Interest:	BHP Billiton Petroleum (Bass Strait) Pty Ltd 50% and Esso Australia Resources Pty Ltd 50%	**Total Depth:**	2678 (Driller) 2504 MD-HUD (Logger)	Plug 3: 205-105m

Casing/Liner Details		**Mud Details**		**Trajectory:**
Size (mm)	**Depth (m)**	**Mud Type**	**Interval**	
508	1553	S/Wtr-Bentonite	234-888	Deviated hole
244.5	884.0	KCL/PHPA/polymer/glycol	888-2678	

Conventional Coring Details			**Sidewall Coring**		**Cuttings**	
No.	**Interval**	**Recovery**	**Shot**	**Recovered**	**Interval**	**Sample Rate**
					900 - 1480	30m
					1480 - 1580	5 m
					1580 - 1930	10m
					1930 - 1980	5m
N/A			N/A		1980 – 2220	10m
					2220 – 2678	5m

MWD Logging			
Date	**Depth(M)**		**Description**
	From	**To**	
11/09/05-14/09/05	888.0	1498.0	Powerpulse- GVR6-ADN6
11/09/05-18/09/05	1498.0	2668.0	Powerpulse- GVR6-ADN6

Wireline Logging			
Date	**Depth(M)**		**Description**
	From	**To**	
19/09/05	882	2504	HN GS/DSI
19/09/05	762	2500	VSP (Checkshots)

II. OPERATIONS SUMMARY

1. MOVING

North Wirrah-1 well AFE started on the 2nd September 2005 at 01:00hrs when the Ensco 102 jackup rig was 1 nm from Bream B platform under tow to the North Wirrah-1 location.

At 06:30hrs on the 2nd of September, 2005 the Ensco 102 arrived to within one nautical mile of the North Wirrah-1 location. The rig was pinned in 39.2m water on location and preloading was complete. Final leg penetration was starboard 2.9', bow leg 3.3' and port leg 2.9'. The cantilever was skidded out and the rig was prepared for drilling.

The final location of the well as determined from the real time DGPS logging by Fugro Survey Pty. Ltd is:

GDA 94	Latitude : 38° 10' 57.094" S Longitude : 147° 50' 20.674" E
MGA UTM Zone 55	573,486.30m East 5,773,600.38m North
	Rig Heading 135.32 deg True.

2. DRILLING OPERATIONS

26" Hole.

North Wirrah-1 well was spudded at 14:30 hrs on the 4th of September 2005. The section was drilled using a 26" Security roller cone bit to a depth of 160 mMDRT. At TD, 100bbls sweep was pumped which was displaced with sea water, then followed by 280 bbls hi vis mud was spotted. A short trip was then conducted and a 50bbls sweep was pumped which was followed by 280 bbls of Hi-vis mud.

20" Casing

A 20" conductor was run and cemented at 155mMDRT.

12¼" hole

The 12¼" hole was drilled with one bit to a total depth of 888.0mMDRT.

The 12¼" section was drilled with Bit# 1, a Reed DS40HF PDC bit and rotary assembly. The string was run in the hole, tagging cement at 150 mMDRT. The cement and float collar were drilled to 160mMDRT before displacing to new mud at 9.4ppg.

The 12¼" section was then drilled from 160mMDRT to 540mMDRT, simultaneously trouble shooting the SCR problems. From 540m to 775mMDRT, the 12¼" hole was drilled with reduced drilling rate due to limitation on rotary speed of 110 RPM due to the SCR problems. At 775m the TDS started cutting out and being erratic while rotating, which was the cause of a fault in the rig floor TDS system. After rectifiying the fault, the hole was then drilled down to 888m MDRT, the 9 ⅝" casing point.

Prior to pulling out of the hole for running the 9 ⅝" casing, 75bbls sweep was pumped and 3 bottoms up circulated and then a wiper trip was conducted back to the 20" conductor shoe at 155mMDRT. On running back to bottom, a total of 75bbls sweep was pumped and the hole circulated clean. Then 400bbls 8.6+ ppg pre-hydrated gel was spotted in open hole and 30m inside the 20" casing and then the SDI gyro dopped and the bit pulled out of hole, taking surveys at each connection.

The section was drilled in 16.2 on bottom drilling hours, resulting in an average rate of penetration of 44.9 m/hr. Bit #1 was graded 1-1-WT-A-X-IN-NO-TC. The gas levels were low and no geological problems were encountered while drilling the 12 1/4" section.

9 ⅝" Casing

A total of 70 joints of 9 ⅝" casing (L-80, 47 ppf) was run in hole and set at a depth of 884mMDRT and cemented as per program.

8½" PHASE

The 8½" hole was drilled with 2 bit runs, to a total depth of 2678.0mMDRT (2677.93mTVDRT).

The 8½" section was started with Bit# 3, a Reed Hycalog RSX162, along with a PowerDrive Xceed rotary-steerable assembly, and the GVR6 and ADN LWD tools. The cement and float collar and new formation was drilled to 888mMDRT before displacing to a KCl / Polymer / PHPA / Glycol mud system with a weight of 8.9ppg.

Once the mud was balanced in/out 5m of new formation were drilled to 893mMDRT. A pressure integrity test was performed, returning an EMW of 16.9ppg PIT without leak-off.

The 8½" hole was then drilled ahead with the aid of the PowerDrive Xceed rotary-steerable tool to maintain a vertical well profile. At the depth of 1508.0mMDRT the drilling string was pulled out of the hole due to the problems with the top drive.

Bit # 3RR, Reed Hycalog RSX162, was then made up with BHA # 4, a PowerDrive Xceed rotary-steerable assembly, and the GVR6 and ADN6 LWD tools, and run back in hole to drill ahead the 8½" section. The mud weight was progressively increased throughout the section up to a weight 10.15 ppg and then further increased from 10.15 ppg to 10.30 ppg in response to becoming momentarily stuck in hole at 2253mMDRT.

At 2678m the ROP decreased considerably to 1m/hr and it was thought that the bit could not drill anymore, thus North Wirrah-1 well was TD early at 2678m MDRT. The hole was circulated clean at TD.

The bit was then pulled back to the 9 $^{5}/_{8}$" casing shoe and then ran back to bottom for a wiper trip. A 100 bbl Hi-Viscosity sweep was pumped and the hole was circulated with two times bottom's up, to both clean the hole and condition the mud prior the wireline logging program. The drilling assembly was then pulled out of the hole and the wireline equipment was rigged up.

The wireline logging program consisted of two runs:

Run 1: HNGS-DSI-LEHQT

Run 2: VSI 4 -GR (Check-shot)

The well was then plugged and abandoned. The following are the cement abandonment plugs:

Plug 1: 1970-1490m:- Continuous balanced 15.8ppg cement plug set from 1970m to 1490m. Plug set in 3 stages each of 160m. Tagged TOC at 1507m MDRT.

Plug 2: 914-764m:- Balanced 15.8ppg cement plug set from 914m to 764m MDRT. Tagged cement top at 775m MDRT.

Plug 3: 205-105m :- EZSV Bridge Plug set and tagged @ 205m. 15.8ppg cement plug set from 205m to 105m MDRT. Tagged cement top at 106m MDRT.

III. CASING DATA

Type	**Size** (inches)	**Weight** (ppf)	**Grade**	**Thread**	**Depth (**mMDRT)
Conductor	20	202.9	X56 (Note 1)	ALT2 pin x RL4S pin	16.7 - 28.4
Conductor	20	129.3	X56	RL4S	28.4 - 155.3
Surface Casing	9.625	47	L-80	Vam Top	15.2 - 809.9
Surface Casing	9.625	47	L-80	LT&C	809.9 - 884.0

IV. CEMENTING DATA

String Cemented	**Cement Type**	**Dry Cmt Vol** (sx)	**Cement Additives**	**Mix Water**	**Slurry Vol** (bbls)	**Slurry Density** (ppg)	**Cement to/from** (mMDRT)	**Csg Test Pressure** (psi)
20" Conductor	Class G	957	CaCl2 : 1% bwoc NF-6: 0.25 gal/10bbls	5.15 bbls	200.0	15.9	155 to Mudline	N/A
9.625" Lead	Class G	175	Econolite 15 gal/10 bbl NF-6 0.25gal/10bbls	12.53 Gals/ sack	68.75	12.5	884 To 211	2400
9.625" Tail	Class G	290	NF-6 0.25gal/10bbls	5.27 Gals/ sack	60.60	15.8		2400

IV. CEMENTING DATA

ABANDONMENT PLUGS

	Cement Type	**Dry Cmt Vol** (sx)	**Cement Additives**	**Mix Water**	**Slurry Vol** (bbls)	**Slurry Density** (ppg)	**Cement to/from** (mMDRT)	**Csg Test Pressure** (psi)
Plug #1	Class G (HTB)	549	CFR-3L 3 gal/10 bbl Halad-413L 15 gal/10bbls SCR-100 1 gal/10bbls NF-6 0.25 gal/10bbls	4.51 Gals/ Sack	111	15.8	1970 to 1490 TOC tagged at 1507m	Balanced plug
Plug #2	Class G	171	NF-6 0.25 gal/10bbls	5.27 Gals/ Sack	36	15.8	914 to 764 TOC tagged at 775m	Balanced plug
Plug #3	Class G	329	CaCl2 1% BWOC NF-6 0.25 gal/10bbls	5.15 Gals/ Sack	68	15.9	205 to 105 TOC tagged at 106m	Balanced plug set on 9-5/8" EZSV set at 205m, tagged and pressure tested to 2400 psi

V. SAMPLES, SIDEWALL CORES

Cuttings Samples

Sample Type	Number of sets	Quantity per set	Sampling interval	From (mMDRT)	To (mMDRT)
Lightly washed and	**1xSet (A)**	**200 grams**	30m	900	1480
air dried (Palynology)			5m	1480	1580
			10m	1580	1930
			5m	1930	1980
			10m	1980	2220
			5m	2220	2678 (TD)
Washed and dried	**4xSets (B/C/D/G)**	**100 grams**	30m	900	1480
			5m	1480	1580
			10m	1580	1930
			5m	1930	1980
			10m	1980	2220
			5m	2220	2678 (TD)

Conventional Cores

No conventional cores were cut at North Wirrah-1.

Sidewall Cores

No sidewall cores were cut at North Wirrah-1.

VI. WIRELINE LOGS AND SURVEYS

Survey /Log	Company	Top (m MDRT)	Bottom (mMDRT)
Directional Survey	Anadrill	56.6	2644.58
LWD: GVR6/ADN6	Anadrill	888	2678
DSI-HNGS-LEHQT	Schlumberger	882	2504
		GR to Sea Floor	(Tools could not pass 2504m)
VSI 4-GR (Checkshots)	Schlumberger	762	2500
			(Tools could not pass 2504m)

VII. SUMMARY OF FORMATION TEST PROGRAMME

No formation tests were carried out at North Wirrah-1.

VIII. TEMPERATURE RECORD

SUITE 1

LABEL	TYPE OF LOG	FROM	TO	RPT. SECT. / SUMMARY.	Time Since Last Circ / BHT
1	DSI-HNGS-LEHQT	2504 (could not pass 2504m)	882	2400 - 2310	12.25 hrs/103.3ºC@ 2504m
2	VSI 4-GR-LEHQT	2500 (could not pass 2504m)	762	1580 - 1555	21.00hrs/104.4 ºC@2504m

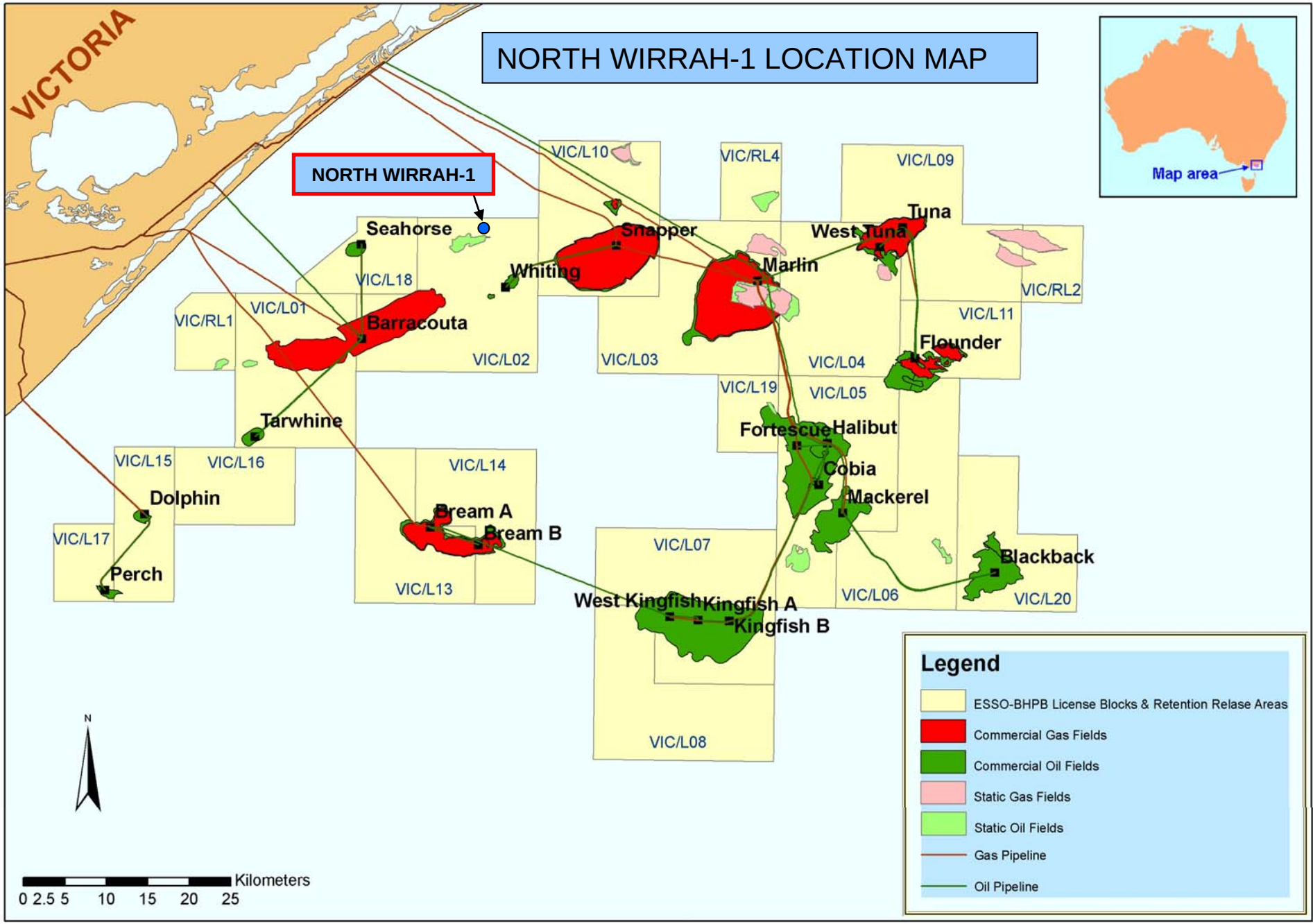

NORTH WIRRAH-1 LOCATION MAP
VICTORIA
NORTH WIRRAH-1
Map area
VIC/L10
VIC/RL4
VIC/L09
Seahorse
Snapper
Tuna
West Tuna
Whiting
Marlin
VIC/L18
VIC/RL2
VIC/L01
VIC/RL1
Barracouta
VIC/L11
Flounder
VIC/L02
VIC/L03
VIC/L04
VIC/L19
VIC/L05
Tarwhine
Fortescue
Halibut
VIC/L15
VIC/L16
VIC/L14
Cobia
Dolphin
Mackerel
Bream A
Bream B
VIC/L17
VIC/L07
Blackback
Perch
VIC/L13
VIC/L06
VIC/L20
West Kingfish
Kingfish A
Kingfish B
VIC/L08
N
Kilometers
0 2.5 5 10 15 20 25
Legend
ESSO-BHPB License Blocks & Retention Relase Areas
Commercial Gas Fields
Commercial Oil Fields
Static Gas Fields
Static Oil Fields
Gas Pipeline
Oil Pipeline

FIGURE 1

North Wirrah-1 Time vs Depth Curve

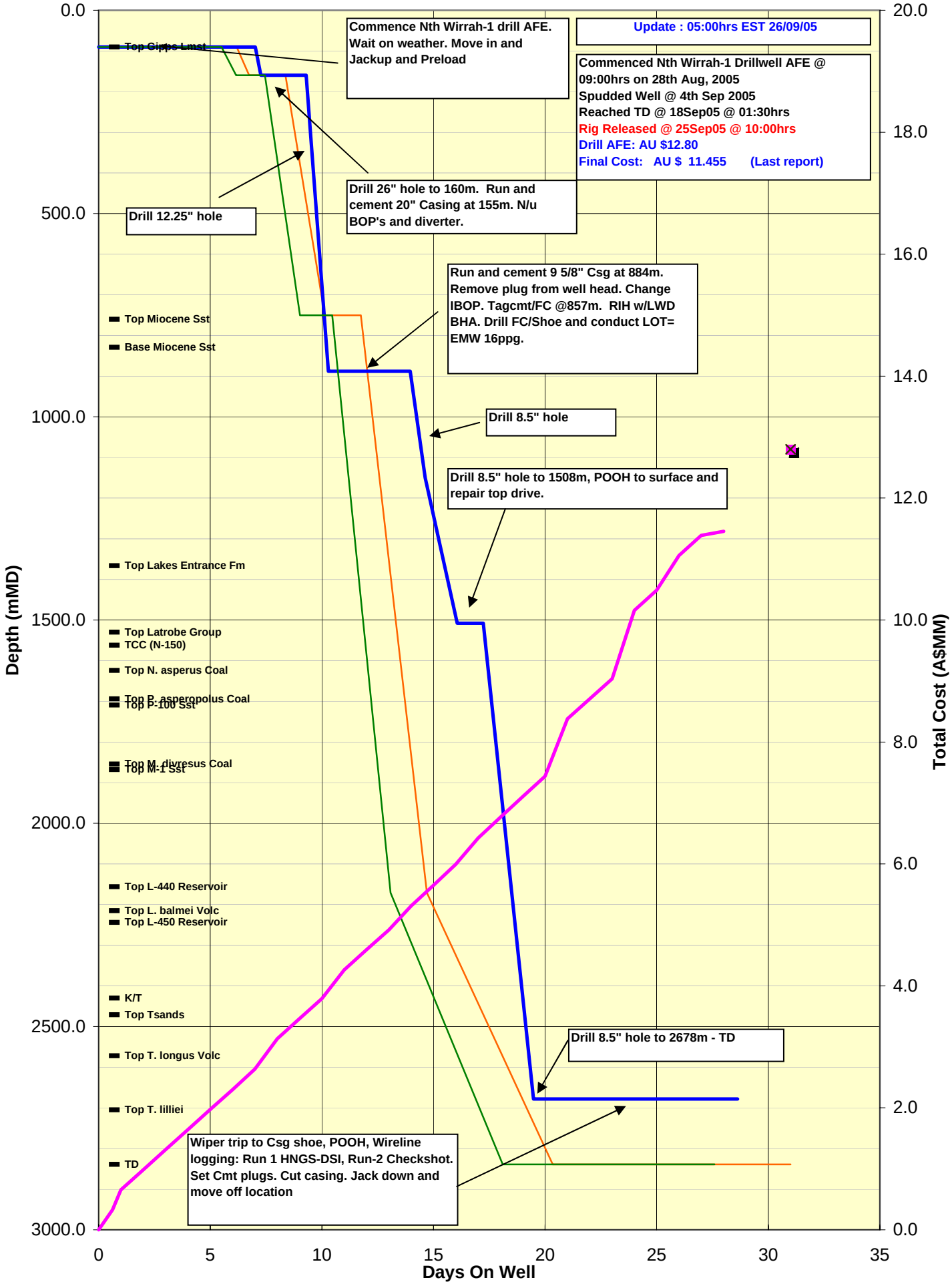


FIGURE 2

EAL Ops Geology (AR): 14/03/2006

North Wirrah-1 - Final Well Report

GENERAL

Platform:	N/A	**Rig:**	ENSCO 102	**Reservoir:**	Lower L.balmei sands
Well:	North Wirrah-1	**Well Slot:**	N/A	**RT-MSL**	39.24m
Drilling Complexity Index	2.8	**Completion Complexity Index**	N/A		

DEPTH		**PERFORMANCE**		**MUD**	
m MDRT	2,678.0	**26" Cond. Hole**	109 m/day	**Max Wt (ppg)**	10.5
m TVDRT	2,677.9	**12-1/4" Surf. Hole**	407 m/day	**Type (Cond. Hole)**	Seawater/Gel sweeps
Vert. Section (m)	2.12	**8-1/2" Prod. Hole**	211 m/day	**Type (Surf. Hole)**	Seawater/Floc. Gel
INCLINATION	Vertical Well			**Type (Prod. Hole)**	KCl/PHPA/Poly/Glycol
Max (deg)	1.34	* time to drill interval, incl's Connections & NPT.			

Comments: Water depth was 51.1m. The well was spudded on 4-Sept-2005 at 1430 hrs and reached TD on 18-Sept-2005 at 0130hr. 2,586m of new hole was drilled from 92m to 2,678m.

TIME ANALYSIS

Start Date:	2-Sept-2005, 0100hrs	**Finish Date:**	25-Sept-2005, 1000hrs		
Target Days (P10):	27.60	**Total Days:**	23.38	**% Under Target:**	15.3%
AFE Days (P50):	31.00	**NPT Days:**	1.90	**% of Total Days:**	8.2%
Supplementary AFE Days (P50):	N/A				

COSTS

AFE No.:	L.0501F600	**Revisions:**	--	**$ per m**	A $3.73 k / metre (new hole)
$ per day:	A$ 412.8 k/day	**$ per day (excl. T + L)** * Equipment, LWD & Logging	A$ 380.2 k/day		A$ 3.60 k / metre* * based on TD **not** new hole

	Equipment	**Materials**	**Contracts**	**Allocations**	**Contingency**	**Total**
AFE (Original)	375,000	1,506,492	10,178,956	739,552	0	A$12,800,000
AFE (Supplement)	-	-	-	-	-	-
Estimated Total	189,189	1,311,907	7,691,274	458,695	0	A$9,651,065

CASING *(all depths herein are based on ENSCO 102 elevations: RT-MSL=39.24m)*

	Size / Weight / Grade / Thread	**m MDRT**	**m TVDRT**	**PIT (ppg)**
Conductor Casing *	20", 0.625" wall, X56, RL4S	155	155	N/A
Surface Casing *	9-5/8", 47ppf, L80, Vam Top	884	884	16.93 (Jug)

Comments: Refer to P&A diagram for casing remaining after well was plugged and abandoned.

COMPLETION *(No completion run. well was plugged and abandoned)*

	Size / Weight / Grade / Thread	**MMDRT**	**MTVDRT**	**Type**
Completion	-	-	-	-

	Upper Interval [m MDRT]	**Upper Interval [m TVDRT]**	**Lower Interval [mMDRT]**	**Lower Interval [mTVDRT]**	**Gun Type**
Perforation Interval:	-	-	-	-	-

ADDITIONAL

MWD LWD Run	**Logs**	**Upper Interval [m MDRT]**	**Lower Interval [m MDRT]**	**Remarks**
1	Powerpulse-D&I-GVR6-ADN6	888.0	1508.0	POOH due to TDS problem.
2	Powerpulse-D&I-GVR6-ADN6	1508.0	2678.0	
Wireline Suite/Run	**Logs Run**	**Upper Interval [m MDRT]**	**Lower Interval [m MDRT]**	
1/1	HNGD-DSI	882	2504	Logging tool unable to pass 2504mMD
1/2	VSP	762	2504	Logging tool unable to pass 2504mMD

Comments:

1. Refer to the North Wirrah-1 P&A Schematic for details of the well after abandonment.

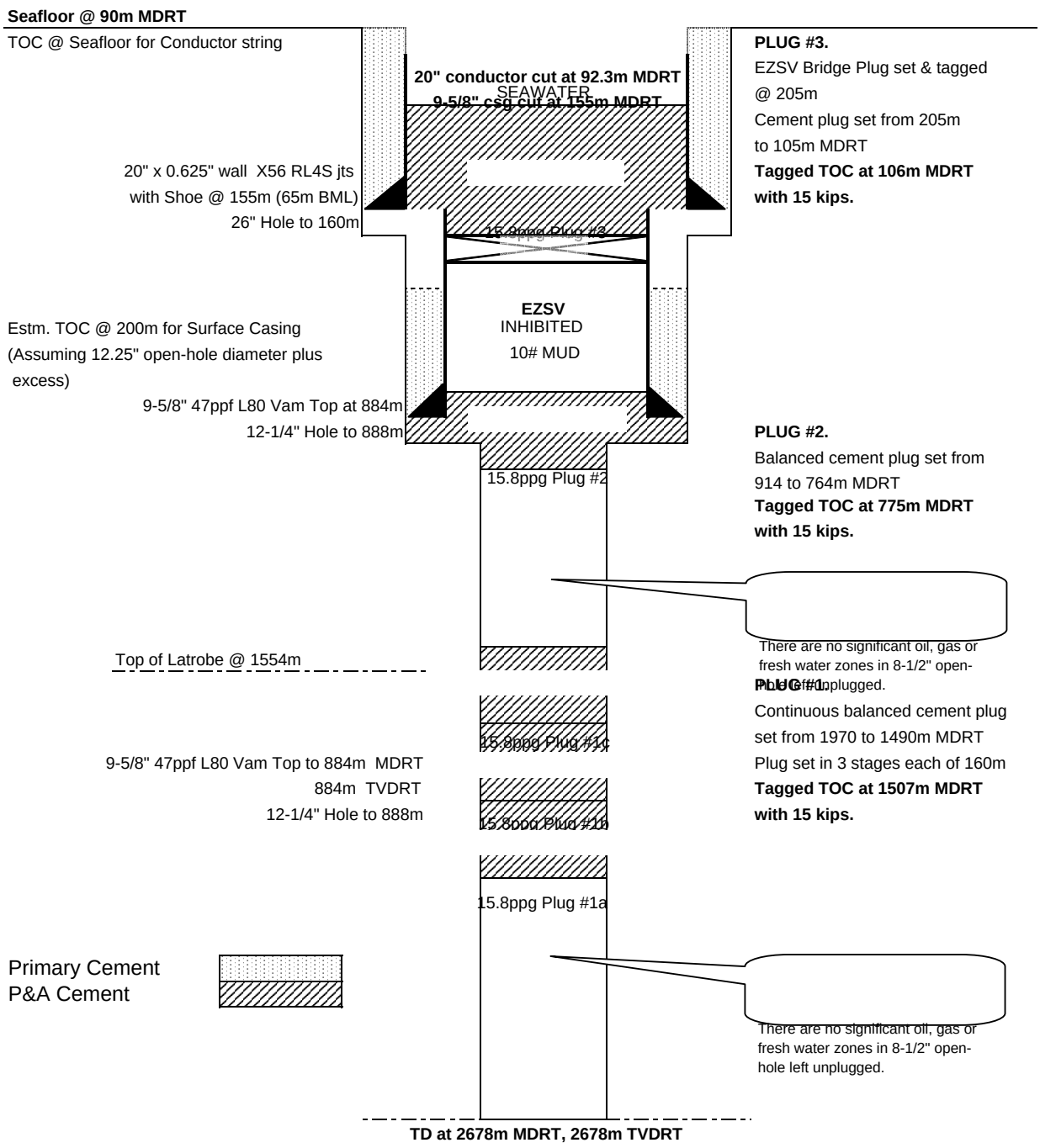
ACTUAL PLUG AND ABANDONMENT WELLBORE SKETCH
NORTH WIRRAH-1
Drilled by the Jack-up ENSCO 102

LOCATION: GDA94. Latitude 38° 10' 57.094" S. Longitude 147° 50' 20.674" E.
MGA Zone 55 Easting 573,486.30m, Northing 5,773,600.38m
Rig on Location 1020 hours 02-Sep-2005. Rig released 25-Sep-2005

MSL @ 39m RT

ALL DEPTHS ARE METRES FROM ROTARY TABLE.

WATER DEPTH = 51m



PLUG #3.
EZSV Bridge Plug set & tagged @ 205m
Cement plug set from 205m to 105m MDRT
Tagged TOC at 106m MDRT with 15 kips.

PLUG #2.
Balanced cement plug set from 914 to 764m MDRT
Tagged TOC at 775m MDRT with 15 kips.

There are no significant oil, gas or fresh water zones in 8-1/2" open-hole left unplugged.

PLUG #1.
Continuous balanced cement plug set from 1970 to 1490m MDRT
Plug set in 3 stages each of 160m
Tagged TOC at 1507m MDRT with 15 kips.

There are no significant oil, gas or fresh water zones in 8-1/2" open-hole left unplugged.

Revision 1 (24-Feb-2006). Correction of the actual well location by 0.64m from the previously advised location of MGA Easting 573,486.52m and Northing 5,773,600.98m.

FIGURE 4

APPENDIX 1

LITHOLOGICAL DESCRIPTIONS

Interval mMDRT From	To	%	Lithology / Show Description
			Spot samples collected every 20m to 30m through the 12.25" hole from 160 mMDRT to 888 mMDRT.
760	780	100	**CALCARENITE:** mottled brown/grey to medium and sometimes darker shades of grey, fine to medium grained, moderate sorting, subangular to subrounded grains, moderate calcareous cement/matrix, minor to common lithic flecks, occasional macrofossil fragments, sometimes with increased argillaceous matrix, rare to trace glauconite in places, friable to firm, mostly nil to poor visual porosity.
780	800	20	**CALCARENITE**: mottled brown/grey to medium and sometimes darker shades of grey, fine to medium grained, moderate sorting, subangular to subrounded grains, moderate calcareous cement/matrix, minor to common lithic flecks, occasional macrofossil fragments, rare to trace glauconite in places, friable to firm, mostly nil to poor visual porosity.
		70	**SANDSTONE:** quartzose, white to very light grey, medium to dominantly coarse & very coarse grained, moderately well sorted, subangular to subrounded, loose grains to occasionally calcareous cemented aggregates, trace glauconite, poor to fair inferred porosity. NO SHOWS.
		10	**SILTY CLAYSTONE**: light brown grey, silty, calcareous in part, soft to firm, subblocky.
800	820	30	**CALCARENITE:** as above.
		60	**SANDSTONE:** as above
		10	**SILTY CLAYSTONE**: as above
820	888	100	**CALCARENITE:** as above.
Drilled to 12 1/4" hole section to TD 888m MDRT at 2110 hrs 7th September. POOH and ran 9 5/8" casing to 882m MDRT. Cemented same and picked up 8 1/2" rotary steerable assembly. Commenced drilling 8 1/2" hole section at 1500hrs on the 9th September.			
888	**890**		Spot sample below the shoe.
		90	**CALCARENITE:** as above.
		10	**CEMENT**
890	**900**	100	**CALCARENITE:** mottled grey & white, very fine to silty grained, well sorted, subrounded, moderate calcareous cement/matrix, abundant grey argillaceous matrix in parts, common micro glauconite, friable to firm, nil to poor visual porosity, no shows.
900	**930**	100	**CALCARENITE:** as above.
930	**960**	100	**CALCARENITE:** as above, with minor macrofossil fragments.
		Trc	**LIMESTONE:** pale brown, microcrystalline, subblocky to blocky, hard.
960	**990**	100	**CALCARENITE:** as above.
		Trc	**LIMESTONE:** as above.
990	**1020**	100	**CALCARENITE:** mottled grey & white, lesser medium to darker grey, very fine to silty grained, well sorted, subrounded, weak to moderate calcareous cement/matrix, abundant grey argillaceous matrix in parts, common micro glauconite, minor macrofossil fragments, friable to firm, nil to poor visual porosity, no shows. Minor tending to
		TR	**HIGHLY CALC CLAYSTONE**: medium dark to dark grey, firm to moderately hard, sub-blocky,
1020	**1050**	100	**CALCARENITE:** as above.

Interval mMDRT From	To	%	Lithology / Show Description
1050	**1080**	100	**CALCARENITE:** mostly slightly mottled grey and white or light olive grey and light yellowish brown, with lesser medium to darker grey, very fine to medium grained texture, occ more crystalline texture, generally well sorted, subrounded, weak to moderate calcareous cement/matrix, sometimes abundant grey argillaceous matrix in parts, common micro to fine grained glauconite and glauconite clusters in places, rare micas and rare fine to medium quartz grains, minor macrofossil fragments, few to moderate planktonic and calcareous benthonic foraminifera, varying soft to very hard but mostly firm to tending moderately hard, mostly nil to occ poor visual porosity, NO SHOWS. Minor tending to
		TR	**HIGHLY CALC CLAYSTONE**: medium dark to dark grey, firm to moderately hard, sub-blocky, occurrence as stringers.
1080	**1110**	100	**CALCARENITE**: as above, but less of the harder more crystalline texture associated with the calcarenite.
		Gd	**HIGHLY CALC CLAYSTONE**: as above.
		TR	
1110	**1140**	100	**CALCARENITE**: as above, but less of the harder more crystalline texture associated with the calcarenite.
		Gd	**HIGHLY CALC CLAYSTONE**: as above.
		TR	
1140	**1170**	100	**CALCARENITE:** more even darker coloured overall, becoming more olive grey to medium dark grey, very fine to medium grained texture, dominantly very fine to fine grained texture, generally well sorted, subrounded, weak to moderate calcareous cement/matrix, sometimes abundant grey argillaceous matrix in parts, minor to common micro to fine grained glauconite, minor macrofossil fragments, few to moderate planktonic and calcareous benthonic foraminifera, varying soft to very hard but mostly firm to tending moderately hard, mostly nil to occ poor visual porosity, NO SHOWS. Minor tending to
		Gd	**HIGHLY CALC CLAYSTONE**: medium dark to dark grey, firm to moderately
		TR	hard, sub-blocky, occurrence as stringers.
1170	**1200**	100	**CALCARENITE**: as above.
		Gd	**HIGHLY CALC CLAYSTONE**: as above.
		TR	
1200	**1230**	100	**CALCARENITE**: as above.
		Gd	**HIGHLY CALC CLAYSTONE**: as above.
		TR	
1230	**1260**	100	**CALCARENITE**: as above. Minor gradational to calcilutite and traces MARL.
		Gd	**HIGHLY CALC CLAYSTONE**: as above.
		TR	
	1265	80	**CALCARENITE**: as above. Minor gradational to calcilutite.
	(spot)	20	**MARL:** light medium grey to medium grey, increased argillaceous content, distinctly less 'grainy' texture compared to previous calcarenite type described above, mostly soft to firm sub-blocky cuttings, slightly sticky.
		Gd	**HIGHLY CALC CLAYSTONE**: as above.
		TR	
	1270	100	**CALCARENITE**: more even darker coloured overall, becoming more olive grey to
	(spot)		medium dark grey, very fine to fine grained texture, generally well sorted, subrounded, weak to moderate calcareous cement/matrix, sometimes abundant grey argillaceous matrix in parts, minor to common micro to fine grained glauconite, minor macrofossil fragments, few to moderate planktonic and calcareous benthonic foraminifera, varying soft to very hard but mostly firm to tending moderately hard, mostly nil to occ poor visual porosity, NO SHOWS.
		TR	**MARL:** as above..
		TR	**HIGHLY CALC CLAYSTONE**: as above.

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
1270	**1290**	80	**CALCARENITE**: as above. Minor gradational to calcilutite.
		20	**MARL:** light medium grey to medium grey, increased argillaceous content, distinctly less 'grainy' texture compared to previous calcarenite type described above, mostly soft to firm sub-blocky cuttings, slightly sticky.
		Gd TR	**HIGHLY CALC CLAYSTONE**: as above.
1290	**1320**	100	**CALCARENITE:** pale grey, mottled grey & white, silty to very fine grained, well sorted, subrounded, weak to moderate calcareous cement/matrix, common argillaceous, common micro glauconite flecks, firm to friable, tight visual porosity, no shows.
1320	**1350**	100	**CALCARENITE:** as above.
1350	**1380**	60	**CALCARENITE:** as above.
		40	**CALCISILTITE:** varying light grey to medium grey and occ medium dark grey, silty texture, minor to sometimes moderate argillaceous content (grading to marl), also very fine grained in part (grading to calcarenite), mostly firm and subblocky, trace black disseminated flecks but no other accessories discernible, no visible porosity.
		Tr	**MARL:** as above.
1380	**1410**	20	**CALCARENITE:** as per 1290 to 1320m.
		40	**CALCISILTITE:** as above but with silty texture only, grading to .
		40	**MARL:** pale grey and whitish grey, minor mottled with calcisiltite, trace micro glauconite, trace pyrite nodules, varying soft to firm and mostly sub-blocky, trace black disseminated flecks but no other accessories discernible.
1410	**1430**	10	**CALCARENITE:** as per 1290 to 1320m.
		50	**CALCISILTITE:** as above.
		40	**MARL:** pale grey & white, mottled with calcareous siltstone, trace micro glauconite, trace pyrite nodules, subblocky, firm.
1430	**1440**	60	**CALCISILTITE:** as above, gradational to
		40	**MARL:** pale grey and white, mottled with calcareous siltstone, trace micro glauconite, trace pyrite nodules, subblocky, firm.
1440	**1450**	20	**CALCARENITE:** very fine to fine grained texture, trace to good trace glauconite grains, otherwise as above.
		40	**CALCISILTITE:** generally as above with trace to occ good trace glauconite grains in places.
		40	**MARL:** light grey to medium grey, minor medium dark grey, minor mottled with calcisiltite, trace micro glauconite, trace pyrite nodules, varying soft to firm and mostly sub-blocky, trace black disseminated flecks and glauconite grains but no other accessories discernible.
1450	**1460**	40	**CALCISILTITE:** as above, gradational to
		60	**MARL:** increasing argillaceous content, light grey to medium grey with minor medium dark grey, massive and homogeneous appearance, trace micro glauconite, trace pyrite nodules, mostly firm and sub-blocky. *Samples becoming more conspicuously contaminated with baracarb 'fines".*

Interval mMDRT From	To	%	Lithology / Show Description
1460	**1470**	60	**MARL:** increasing argillaceous content, light grey to medium grey with minor medium dark grey, massive and homogeneous appearance, trace micro glauconite, trace pyrite nodules, varying soft to firm, mostly tending firm and sub-blocky.
		40	**CALCISILTITE:** varying light grey to medium grey and occ medium dark grey, silty texture, minor to sometimes moderate argillaceous content (grading to marl), also very fine grained in part (grading to calcarenite), mostly firm and subblocky, trace black disseminated flecks but no other accessories discernible, no visible porosity.
		TR	**CALCARENITE:** as above, very fine to occ fine grained. *Samples becoming more conspicuously contaminated with baracarb 'fines".*
1470	**1480**	100	**CALCISILTITE:** as above.

At 1480m change sampling interval to every 5m

1480	**1485**	100	**CALCISILTITE:** light grey & white, argillaceous in part grading to marl, also very fine grained in part grading to calcarenite, common very fine grained glauconite, firm, subblocky.
1485	**1490**	80	**CALCISILTITE:** as above.
		20	**MARL:** very pale grey, common glauconite flecks, firm, subblocky to subfissile.
1490	**1495**	70	**CALCISILTITE:** light grey, argillaceous in part grading to marl, also grading to calcarenite in part, abundant glauconite specks & laminations, firm, subblocky.
		30	**MARL:** light grey, common glauconite flecks, firm, subblocky.
1495	**1500**	50	**CALCISILTITE:** as above.
		50	**MARL:** as above.
1500	**1505**	40	**CALCISILTITE:** as above.
		60	**MARL:** as above.

Ongoing problems with top drive and slow ROP's because of this - decision made to POOH and service top drive when at 1508m. Bit blade recovery from 1508m MDRT indicated medium grey to medium dark grey MARL lithotype - massive/homogeneous appearance.

1505	**1510**	50	**CALCISILTITE:** light grey, argillaceous in part grading to marl, also grading to calcarenite in part, abundant glauconite specks & laminations, firm, subblocky.
		50	**MARL:** light grey, common glauconite flecks, firm, subblocky.
1510	**1515**	50	**CALCISILTITE:** white to light grey, arenaceous grading to very fine grained calcarenite in part, argillaceous in part, common glauconite grains, minor pyrite
		50	nodules, commonly laminated with marl, trace micro & macro fossil fragments, firm, subblocky. **MARL:** white to light grey, common glauconite grains, laminated with calcisiltite, firm & dispersive, subblocky.
1515	**1520**	50	**CALCISILTITE:** as above.
		50	**MARL:** as above.
1520	**1525**	50	**CALCISILTITE:** as above.
		50	**MARL:** as above.
1525	**1530**	80	**CALCISILTITE:** as above.
		20	**MARL:** as above.

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
1530	**1535**	70	**CALCISILTITE:** as above.
		30	**MARL:** as above.
1535	**1540**	80	**CLAYSTONE:** pale to medium brown to olive grey, distinctly increasing glauconite grains, varying common to abundant glauconite grains, sometimes appearing silty, soft to firm and sub-blocky, partly dispersive, slightly to non calcareous.
		20	**SILTSTONE:** pale to medium brown, glauconitic, argillaceous, laminated with greensand, common pyrite, firm, subblocky.
			.
1540	**1545**	70	**GLAUCONITIC CLAYSTONE:** pale to medium brown to olive grey sometimes greenish brown, common to abundant (20-40% very fine to medium grained glauconite) glauconite grains, sometimes appearing silty, soft to firm and sub-blocky, partly dispersive
		20	**SILTSTONE:** pale to medium brown, glauconitic, argillaceous, laminated with greensand, common pyrite, firm, subblocky.
		5	**SANDSTONE:** loose very fine to fine with occasional medium grained quartz grains, dominantly very fine grained, well sorted and dominantly subangular. Possibly as stringers within the glauconitic claystone lithotype.
1545	1550	90	**GREENSAND / GLAUCONITIC "SANDSTONE":** medium green coloured, 50-60% quartz grains and 40-50% glauconite grains, fine to very coarse grained, poorly to moderately well sorted, subangular to subrounded, traces of pyrite, varying loose to calcareous and? dolomitic cemented aggregates, inferred poor to minor fair porosity. NO SHOWS.
		10	**GLAUCONITIC CLAYSTONE:** as above.
1550	1555	40	**GLAUCONITIC SANDSTONE:** medium green coloured, quartz grains and 40-50% glauconite grains, fine to very coarse grained, poorly to moderately well sorted, subangular to subrounded, traces of pyrite, varying loose to calcareous and ?dolomitic cemented aggregates, inferred poor to minor fair porosity. NO SHOWS.
		50	**SANDSTONE:** light grey, quartz, medium to granular, dominantly medium to coarse grained, moderately well sorted, conspicuous pyrite cementation, also with some glauconitic cementation in places, varying loose grains to cemented aggregates, inferred poor to fair intergranular porosity (depending on cementation) . NO SHOWS.
		10	**GLAUCONITIC CLAYSTONE:** as above.
1555	1560	90	**SANDSTONE** : quartz, medium to granular, dominantly coarse to very coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, loose and disaggregated, no aggregates noted, inferred good intergranular porosity. NO OIL SHOWS.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE**: cavings, as above
1560	1565	90	**SANDSTONE** : quartz, as above except dominantly medium grained.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE**: cavings, as above
1565	1570	90	**SANDSTONE** : quartz, as above except dominantly fine to medium grained, with increasing argillaceous matrix. No SHOWS
		10	**CLAYSTONE**: medium light grey to medium grey, non calcareous, very soft to soft.
1570	1575	95	**SANDSTONE** : quartz, as above except dominantly medium grained, with increasing argillaceous matrix. NO SHOWS.
		5	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE**: cavings, as above

Interval mMDRT From	To	%	Lithology / Show Description
1575	1580	70	**SANDSTONE** : quartz, as above except dominantly fine to medium grained, with increasing argillaceous matrix. NO SHOWS discernible form cutting samples.
		30	**CLAYSTONE**: medium light grey to medium grey, non calcareous, mostly very soft to soft and tending dispersive, washes away easily, micromicaceous in places. Sample heavily contaminated with "BARABLOK" (mud additive for coal seams)
1580	1585	90	**SANDSTONE** : quartz, medium to granular, dominantly medium to lower coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, inferred good intergranular porosity. NO OIL SHOWS.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1585	1590	90	**SANDSTONE** : as above. NO OIL SHOWS ***No UV sample fluorescence from washed sample or solvent cut from same - however, raw unwashed cutting sample which are heavily contaminated with 'Barablok' (hydrocarbon resin/asphaltite) have subdued bluish white sample fluorescence on surface, and same gives instantaneous whitish blue solvent cut = ??? this SHOW Barablok derived???.***
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
Varying sampling interval 5-10m due to sustained Rop's well above 50m/hr			
1590	1600	90	**SANDSTONE** : quartz, very fine to fine grained, tending well sorted, subangular to subrounded, dominantly subangular, appears clean apart from 10-20% quartz silt matrix and very minor clay minerals and trace micromicaceous, no other discernible accessories, varying disaggregated grains to soft and friable aggregates, inferred fair to good intergranular porosity. NO OIL SHOWS.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1600	1610	90	**SANDSTONE** : quartz, very fine to fine grained, tending well sorted, subangular to subrounded, dominantly subangular, appears clean apart from 10-20% quartz silt matrix and very minor clay minerals and trace micromicas, no other discernible accessories, varying disaggregated grains to soft and friable aggregates, inferred fair to good intergranular porosity. NO OIL SHOWS.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1610	1620	20	**SANDSTONE** : quartz, very fine to fine grained, tending well sorted, subangular to subround, dominantly subangular, appears clean apart from 10-20% quartz silt matrix and very minor clay minerals and trace micromicas, no other discernible accessories, varying disaggregated grains to soft and friable aggregates, inferred fair to good intergranular porosity. NO OIL SHOWS.
		70	**ARGILLACEOUS SANDSTONE**: olive grey to medium brownish grey, very fine to fine grained, dominantly very fine grained, very well sorted, dominantly subangular, 30-50% silt and clay minerals, non calcareous, varying soft to occasionally firm aggregates, partly gradational to sandy siltstone. Visually tight, nil to very poor visual porosity from aggregates. NO OIL SHOWS.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
1620	1630	25	**SANDSTONE** : quartz, very fine to medium grained, tending moderately well sorted, subangular to subrounded, dominantly subangular, appears clean apart from 10-20% quartz silt matrix and very minor clay minerals and trace micromicas, no other discernible accessories, varying disaggregated grains to soft and friable aggregates, inferred fair to good intergranular porosity. NO OIL SHOWS.
		45	**ARGILLACEOUS SANDSTONE/SILTSTONE**: as above, partly gradational to sandy siltstone and arenaceous claystone.
		20	**COAL/HIGHLY CARBONACEOUS CLAYSTONE:** black and moderately hard to hard, brittle, sub-bituminous. Partly grading to highly carbonaceous claystone.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1630	1640	90	**SANDSTONE** : quartz, medium to granular, dominantly medium to lower coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, inferred good intergranular porosity. NO OIL SHOWS.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1640	1650	80	**SANDSTONE** : quartz, medium to granular, dominantly medium to lower coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, inferred good intergranular porosity. NO OIL SHOWS.
		10	**COAL/HIGHLY CARBONACEOUS CLAYSTONE:** black and moderately hard to hard, brittle, sub-bituminous. Partly grading to highly carbonaceous claystone.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1650	1660	80	**SANDSTONE** : as above.
		10	**COAL/HIGHLY CARBONACEOUS CLAYSTONE:** as above.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1660	1670	90	**SANDSTONE** : quartz, medium to granular, dominantly medium to lower coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, inferred good intergranular porosity. NO OIL SHOWS.
		10	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1670	1680	55	**SANDSTONE** : quartz, medium to granular, dominantly medium to lower coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, inferred good intergranular porosity. NO OIL SHOWS.
		40	**COAL/lesser HIGHLY CARBONACEOUS CLAYSTONE:** black and moderately hard to hard, brittle, sub-bituminous. Partly grading to highly carbonaceous claystone.
		5	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1680	1690	60	**SANDSTONE** : quartz, medium to granular, dominantly medium to lower coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, inferred good intergranular porosity. NO OIL SHOWS.
		10	**COAL/HIGHLY CARBONACEOUS CLAYSTONE:** black and moderately hard to hard, brittle, sub-bituminous. Partly grading to highly carbonaceous claystone.
		30	**CARBONACEOUS CLAYSTONE:** mostly medium brown to minor dark brown and traces blackish brown, moderate to common carbonaceous material, mostly soft to occ firm, non calcareous, minor gradational to carbonaceous siltstone.
		5	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above

Interval mMDRT			Lithology / Show Description
From	To	%	
1690	1700	80	**SANDSTONE** : quartz, medium to granular, dominantly medium to lower coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, inferred good intergranular porosity. NO OIL SHOWS.
		TR	**COAL/HIGHLY CARBONACEOUS CLAYSTONE:** black and moderately hard to hard, brittle, sub-bituminous. Partly grading to highly carbonaceous claystone.
		15	**CARBONACEOUS CLAYSTONE:** mostly medium brown to minor dark brown and traces blackish brown, moderate to common carbonaceous material, mostly soft to occ firm, non calcareous, minor gradational to carbonaceous siltstone.
		5	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1700	1710	50	**COAL/lesser HIGHLY CARBONACEOUS CLAYSTONE:** black and moderately hard to hard, brittle, sub-bituminous. Partly grading to highly carbonaceous claystone.
		10	**CARBONACEOUS CLAYSTONE:** mostly medium brown to minor dark brown and traces blackish brown, moderate to common carbonaceous material, mostly soft to occ firm, non calcareous, minor gradational to carbonaceous siltstone.
		35	**SANDSTONE** : quartz, medium to granular, dominantly medium to lower coarse grained, appears clean, no discernible accessories, moderately well sorted, subangular to subrounded, inferred good intergranular porosity. NO OIL SHOWS.
		5	**GLAUCONITIC SANDSTONE/GLAUCONITIC CLAYSTONE/MARL**: cavings, as above
1710	1720	60	**COAL:** black and moderately hard to hard, brittle, sub-bituminous tending bituminous, semibright tending bright, appears clean. Partly grading to highly carbonaceous claystone.
		20	**VARIABLY CARBONACEOUS/HIGLY CARB> CLAYSTONE:** mostly medium to darker yellowish brown to medium and darker shades of brown with minor blackish brown, moderate to common carbonaceous material, mostly soft to occ firm, partly dispersive, mostly sub-blocky, non calcareous, minor gradational to carbonaceous siltstone.
		20	**SANDSTONE** : quartz, fine to coarse grained, dominantly fine to medium grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, inferred good intergranular porosity. NO OIL SHOWS.
1720	1730	60	**SANDSTONE** : quartz, fine to coarse grained, dominantly medium grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good intergranular porosity. NO OIL SHOWS.
		10	**COAL:** as above.
		20	**VARIABLY CARBONACEOUS/HIGLY CARB> CLAYSTONE:** as above.
1730	1740	70	**SANDSTONE/CEMENTED SANDSTONE** : quartz, fine to coarse grained, dominantly medium grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, varying loose and disaggregated grains to distinctly quartz cemented aggregates (relates to slower ROP around this depth), increased rock flour associated with this sample, inferred very poor to good intergranular porosity. NO OIL SHOWS.
		10	**COAL:** as above.
		20	**VARIABLY CARBONACEOUS/HIGLY CARB> CLAYSTONE:** as above.
1740	1750	80	**SANDSTONE** : quartz, fine to coarse grained, dominantly medium grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good intergranular porosity. NO OIL SHOWS.
		5	**COAL:** as above.
		15	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above.

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
1750	1760	40	**SANDSTONE** : quartz, fine to coarse grained, dominantly medium grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good intergranular porosity. NO OIL SHOWS.
		45	**SILTY CLAYSTONE:** mostly medium shades of brownish grey and greyish brown, mostly with distinctly silty matrix, minor to occ common carbonaceous matrix, very soft to firm and sub-blocky, mostly soft and sub-blocky, non calcareous. Minor gradational to siltstone and claystone.
		TR	**COAL:** as above.
		5	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above.
1760	1770	30	**SANDSTONE** : quartz, fine to coarse grained, dominantly medium grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good intergranular porosity. NO OIL SHOWS.
		30	**SILTY CLAYSTONE:** mostly medium shades of brownish grey and greyish brown, mostly with distinctly silty matrix, minor to occ common carbonaceous matrix, very soft to firm and sub-blocky, mostly soft and sub-blocky, non calcareous. Minor gradational to siltstone and claystone.
		30	**COAL:** as above.
		10	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above.
1770	1780	60	**SANDSTONE** : quartz, fine to coarse grained, dominantly medium grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good intergranular porosity. NO OIL SHOWS.
		30	**SILTY CLAYSTONE:** mostly medium shades of brownish grey and greyish brown, mostly with distinctly silty matrix, minor to occ common carbonaceous matrix, very soft to firm and sub-blocky, mostly soft and sub-blocky, non calcareous. Minor gradational to siltstone and claystone.
		5	**COAL:** as above.
		5	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above.
1780	1790	80	**SANDSTONE** : quartz, fine to fine pebbly, dominantly medium to coarse grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good intergranular porosity. NO OIL SHOWS.
		10	**SILTY CLAYSTONE:** mostly medium shades of brownish grey and greyish brown, mostly with distinctly silty matrix, minor to occ common carbonaceous matrix, very soft to firm and sub-blocky, mostly soft and sub-blocky, non calcareous. Minor gradational to siltstone and claystone.
		5	**COAL:** as above.
		5	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above.
1790	1800	50	**SANDSTONE** : quartz, fine grained to granular, dominantly medium to coarse grained, moderately well sorted, subangular to subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good intergranular porosity. NO OIL SHOWS.
		45	**SILTY CLAYSTONE/SILTSTONE:** mostly medium shades of brownish grey and greyish brown, mostly with distinctly silty matrix, minor to occ common carbonaceous matrix, very soft to firm and sub-blocky, mostly soft and sub-blocky, non calcareous. Minor gradational to very fine grained argillaceous sandstone.
		5	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above, cavings.

Interval mMDRT From	To	%	Lithology / Show Description
1800	1810	80	**SANDSTONE** : quartz, fine grained to granular, dominantly very coarse grained to granular, subangular to subrounded, dominantly subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good to very good intergranular porosity. NO OIL SHOWS.
		20	**SILTY CLAYSTONE/SILTSTONE:** mostly medium shades of brownish grey and greyish brown, mostly with distinctly silty matrix, minor to occ common carbonaceous matrix, very soft to firm and sub-blocky, mostly soft and sub-blocky, non calcareous. Minor gradational to very fine grained argillaceous sandstone.
		5	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above, cavings.
1810	1820	70	**SANDSTONE** : quartz, as above. NO OIL SHOWS.
		30	**SILTY CLAYSTONE/SILTSTONE:** as above.
		TR	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above, cavings.
1820	1830	90	**SANDSTONE** : quartz, as above. NO OIL SHOWS.
		10	**SILTY CLAYSTONE/SILTSTONE:** as above.
		TR	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above, cavings.
1830	1840	80	**SANDSTONE** : quartz, as above. NO OIL SHOWS.
		10	**SILTY CLAYSTONE/SILTSTONE:** as above.
		10	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above, cavings.
1840	1850	90	**SANDSTONE** : quartz, dominantly granular, as above. NO OIL SHOWS.
		10	**SILTY CLAYSTONE/SILTSTONE:** as above.
		TR	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above, cavings.
1850	1860	80	**SANDSTONE** : quartz, dominantly granular, as above. NO OIL SHOWS.
		20	**CLAYSTONE:** light brownish grey to light whitish brown, to tan, very soft to soft and dispersive, mostly sub-blocky, minor black flecks, non calcareous.
		TR	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above, cavings.
1860	1870	90	**SANDSTONE** : quartz, dominantly granular, as above. NO OIL SHOWS.
		10	**SILTY CLAYSTONE/SILTSTONE:** as above.
		TR	**VARIABLY CARBONACEOUS/HIGLY CARB. CLAYSTONE:** as above, cavings.
1870	1880	80	**COAL:** black and moderately hard to hard, brittle, sub-bituminous tending bituminous, semibright tending bright, appears clean. Partly grading to highly carbonaceous claystone.
		20	**SANDSTONE:** as above.
1880	1890	90	**CLAYSTONE:** very light olive grey to whitish grey, very soft to tending firm and sub-blocky, mostly soft, no accessories discernible, non calcareous.
		10	**SANDSTONE and Minor COAL**: as above, cavings.
1890	1900	80	**SANDSTONE:** quartz, fine grained to granular, dominantly very coarse grained to granular, subangular to subrounded, dominantly subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good to very good intergranular porosity. NO OIL SHOWS.
		15	**CLAYSTONE:** very light olive grey to whitish grey, very soft to tending firm and sub-blocky, mostly soft, no accessories discernible, non calcareous.
		5	**COAL:** as above.

Interval mMDRT			Lithology / Show Description
From	To	%	
1900	1910	70	**SANDSTONE:** quartz, fine grained to granular, dominantly very coarse grained to granular, subangular to subrounded, dominantly subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good to very good intergranular porosity. NO OIL SHOWS.
		5	**CLAYSTONE:** very light olive grey to whitish grey, very soft to tending firm and sub-blocky, mostly soft, no accessories discernible, non calcareous.
		25	**COAL:** black and moderately hard to hard, brittle, sub-bituminous tending bituminous, semibright tending bright, appears clean. Partly grading to highly carbonaceous claystones above.
1910	1920	70	**COAL:** black and moderately hard to hard, brittle, sub-bituminous tending bituminous, semibright tending bright, appears clean. Continues to slow desprb gas from cuttings at surface.
		23	**SANDSTONE:** as above.
1920	1930	40	**SANDSTONE:** quartz, fine grained to medium , dominantly medium to lower coarse grained, subangular to subrounded, dominantly subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good to very good intergranular porosity. NO OIL SHOWS.
		40	**SILTSTONE / ARGILLACEOUS VF GD SANDSTONE:** mostly light grey to medium shades of brownish grey and greyish brown, mostly with distinctly silty matrix and sometimes very fine sandy matrix, minor to occ common carbonaceous matrix, minor to common clay matrix, varying soft to moderately hard sub-blocky ctgs, mostly firm to moderately hard, non calcareous. Minor gradational to very fine grained argillaceous sandstone. Nil visual porosity. NO SHOWS.
		20	**CLAYSTONE:** very light olive grey to whitish grey, very soft to tending firm and sub-blocky, mostly soft, no accessories discernible, non calcareous.
		TR	**COAL:** black and moderately hard to hard, brittle, sub-bituminous tending bituminous, semibright tending bright, appears clean. Partly grading to highly carbonaceous claystones above.
1930	1935	80	**CLAYSTONE:** mostly very light olive grey to whitish grey, minor light shades of brownish grey and greyish brown, very soft to tending firm and sub-blocky, mostly very soft to soft, no accessories discernible, non calcareous.
		10	**SILTSTONE / ARGILLACEOUS VF GD SANDSTONE:** as above.
		10	**SANDSTONE:** as above, probable cavings.
1935	1940	70	**SANDSTONE:** translucent to white, fine to coarse grained, predominantly medium grained, moderate sorting, subangular, weak siliceous cement, abundant quartz overgrowths, common white silty/kaolinite matrix, common pyrite, friable, good inferred porosity, poor where matrix, no shows.
		20	**CARBONACEOUS SILTSTONE:** dark brown/black, argillaceous, abundant carbonaceous laminations, moderately hard, subblocky.
		10	**COAL:** black, dull to subvitreous, silty, uneven to subconchoidal fracture, brittle, blocky.
1940	1945	100	**SANDSTONE:** colourless to white, very fine to coarse grained, predominantly medium grained, moderate sorting, subangular to subrounded, weak siliceous cement, abundant quartz overgrowths, generally clean also with common white silty/kaolinite matrix, occasional pyrite nodules, friable, good inferred porosity, poor where matrix, no shows.
1945	1950	100	**SANDSTONE:** as above.
1950	1955	50	**SANDSTONE:** as above.
		50	**SILTSTONE:** mottled brown & white, arenaceous grading to very fine grained sandstone, common carbonaceous flecks, minor pyrite nodules, firm, subblocky.
1955	1960	70	**SANDSTONE:** as above.
		30	**SILTSTONE:** as above.
		Trc	**COAL:** as above.

Interval mMDRT From	To	%	Lithology / Show Description
1960	1965	100	**SANDSTONE:** colourless to white, very fine to rarely coarse grained, predominantly medium grained, moderate sorting, subangular to subrounded, unconsolidated, abundant quartz overgrowths, generally clean also with minor white silty/kaolinite matrix, occasional pyrite nodules, friable, good to excellent inferred porosity, poor where matrix, no shows.
1965	1970	90	**SANDSTONE:** as above.
		10	**SILTSTONE:** as per 1955 mMDRT.
1970	1975	80	**SANDSTONE:** as above.
		10	**SILTSTONE:** mottled brown & black, argillaceous, carbonaceous, firm, subblocky.
		10	**COAL:** black, dull to subvitreous, silty, uneven fracture, brittle, subblocky.
1975	1980	100	**SANDSTONE:** colourless to white, very fine to rarely coarse grained, predominantly medium grained, moderate sorting, subangular to subrounded, unconsolidated, abundant quartz overgrowths, clean, trace pyrite, friable, good to excellent inferred porosity, no shows.
1980	1990	100	**SANDSTONE:** as above.
1990	2000	100	**SANDSTONE:** as above.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
	2003		Spot sample Silty COAL.
2000	2010	100	**SANDSTONE:** translucent to white/pale grey, very fine to rarely coarse grained, predominantly medium grained, moderately well sorted, subangular (quartz overgrowths) to subrounded (where very fine), generally unconsolidated, abundant quartz overgrowths, common white silty/kaolinite matrix, trace pyrite, friable, good to inferred porosity where clean, poor visual porosity with matrix, no shows.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2010	2020	90	**SANDSTONE:** as above.
		10	**SILTSTONE:** pale grey & brown, arenaceous, abundant carbonaceous flecks, firm, subblocky.
		Trc	**COAL:** black, dull to subvitreous, silty, uneven to subconchoidal fracture, brittle, blocky.
2020	2030	100	**SANDSTONE:** as above.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2030	2040	100	**SANDSTONE:** as above.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2040	2050	100	**SANDSTONE:** as above, with few aggregates containing white silty matrix.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.

Interval mMDRT From	To	%	Lithology / Show Description
2050	2060	80	**SANDSTONE:** translucent to white, fine to rarely coarse grained, predominantly medium grained, moderately well sorted, subangular (quartz overgrowths) to subrounded (where fine), unconsolidated, abundant quartz overgrowths, generally clean, minor white silty/kaolinite matrix, trace pyrite, friable, good to excellent inferred porosity, no shows.
		10	**SILTSTONE:** mottled grey/brown/black, arenaceous in part, arenaceous in part, abundant carbonaceous material, firm, subblocky.
		10	**COAL:** as above.
2060	2070	100	**SANDSTONE:** as above.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2070	2080	100	**SANDSTONE:** as above.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2080	2090	90	**SANDSTONE:** translucent to white, fine to rarely coarse grained, predominantly medium grained, moderately well sorted, subangular, unconsolidated in part, carbonate cement in part, abundant quartz overgrowths, variable (clean to abundant) white silty/kaolinite matrix, trace pyrite, friable, good inferred porosity where clean, decreasing to tight visual porosity with increasing matrix, no shows.
		Trc	**SILTSTONE:** mottled grey/brown/black, arenaceous in part, arenaceous in part, abundant carbonaceous material, firm, subblocky.
		Trc	**COAL:** black, dull to subvitreous, silty, uneven to subconchoidal fracture, brittle, blocky.
		10	**Calcareous SILSTONE:** light green/grey, argillaceous, hard, subfissile.
2090	2100	100	**SANDSTONE:** translucent to white, fine to rarely coarse grained, predominantly medium grained, moderately well sorted, subangular, unconsolidated, abundant quartz overgrowths, variable (clean to abundant) white silty/kaolinite matrix, trace pyrite, friable, good inferred porosity where clean, decreasing to tight visual porosity with increasing matrix, no shows.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
		Trc	**Calcareous SILSTONE:** as above.
2100	2110	100	**SANDSTONE:** as above.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2110	2120	90	**SANDSTONE:** as above.
		5	**SILTSTONE:** pale brown & black, argillaceous, arenaceous in part, common carbonaceous material, firm to moderately hard, subblocky.
		Trc	**COAL:** black, subvitreous, silty, uneven to subconchoidal fracture, brittle, blocky.
		5	**Calcareous SILSTONE:** light green/grey, argillaceous, hard, subfissile.
2120	2130	100	**SANDSTONE:** translucent to white, fine to rarely coarse grained, predominantly medium grained, well sorted, subangular to subrounded, unconsolidated, abundant quartz overgrowths, trace white silty/kaolinite matrix, trace pyrite, friable, good inferred porosity, no shows.
		Trc	**SILTSTONE:** as above.
2130	2140	100	**SANDSTONE:** as above.
		Trc	**SILTSTONE:** as above.
2140	2150	95	**SANDSTONE:** as above.
		5	**SILTSTONE:** brown/grey & black, argillaceous, arenaceous in part, common carbonaceous material, moderately hard, subblocky.

Interval mMDRT From	To	%	Lithology / Show Description
2150	2160	95	**SANDSTONE:** as above, with increasing silty matrix & decreasing porosity.
		5	**SILTSTONE:** as above.
2160	2170	95	**SANDSTONE:** as above.
		5	**SILTSTONE:** as above.
		5	**Siliceous SILTSTONE:** white & pale grey, sucrosic texture, moderately hard, subblocky.
2170	2180	80	**Silty SANDSTONE:** white, very fine to medium grained, predominantly fine grained, well sorted, subrounded to subangular where medium, weakly cemented, abundant white silty/kaolinite matrix, grain supporting in part, friable, nil to tight visual porosity, no shows.
		15	**Siliceous SILTSTONE:** as above.
		5	**SILTSTONE:** brown, arenaceous, common carbonaceous material, moderately hard, subblocky.
2180	2190	80	**SANDSTONE:** as above.
		10	**SILTSTONE:** as above.
		10	**Siliceous SILTSTONE:** as above.
2190	2200	90	**SANDSTONE:** as above, with increasing pyrite.
		5	**SILTSTONE:** as above.
		5	**Siliceous SILTSTONE:** as above.
2200	2210	95	**SANDSTONE:** translucent to white, fine to rarely coarse grained, predominantly fine to medium grained, moderately well sorted, subangular, unconsolidated in part, some highly siliceous cemented aggregates with abundant quartz overgrowths, variable (clean to abundant) white silty/kaolinite matrix, trace pyrite, friable, good inferred porosity where clean, decreasing to tight visual porosity with increasing matrix**. WEAK SHOW 2200 to 2210 mMDRT 5%, solid, dull to moderately bright yellow fluorescence, crush cut, trace residue.**
		5	**SILTSTONE:** as above.
2210	2215	90	**SANDSTONE:** as above. NO SHOW**.**
		10	**SILTSTONE:** as above.
2215	2220	80	**???Degraded VOLCANICS:** overall "claystone" to slightly silty texture, colour varying light yellowish white to very light yellowish grey, mostly very soft to soft and sub-blocky cuttings. Visually very tight. NO SHOWS.
		20	**SANDSTONE:** as above
2220	2225	80	**Degraded VOLCANICS:** "claystone" texture varying light whitish green to sometimes whitish medium green, minor maroon colours, trace tan, occasional less weathered clasts with remnant crystal texture, mostly very soft to soft and less altered clasts hard to very hard. Visually very tight. NO SHOWS.
		20	**SANDSTONE:** as above

Slight overall colour change to 2220m MDRT sample tray suggesting proximity to significant lithology change - light yellowish and greenish tinge*. = top of the degraded Lower Balmei Volcanics*

Very distinct overall colour change to sample tray consistent with penetration of the Lower Balmei Volcanics - distinct greenish colourations

Interval mMDRT From	To	%	Lithology / Show Description
2225	2230	80	**Degraded VOLCANICS:** varying "claystone" to "silty" texture varying light whitish green to sometimes whitish medium green and medium to dark reddish brown (maroon) colours, sometimes mottled, trace tan, occasional less weathered clasts with remnant aphanatic crystal texture, mostly very soft to soft and sub-blocky, and less altered clasts hard to very hard. Visually very tight. NO SHOWS.
		20	**SANDSTONE:** as above, unclear if cavings, or quartz veining "grinds" derived from volcanics, or sandstone beds associated with volcanics.
2230	2235	80	**Variably Degraded VOLCANICS:** varying "claystone" to "silty" texture varying light whitish green to sometimes whitish medium green and medium to dark reddish brown (maroon) colours, sometimes mottled, trace tan, occasional less distinctly less altered clasts with remnant aphanatic crystal texture, mostly very soft to soft and sub-blocky, and less altered clasts hard to very hard. Visually very tight. NO SHOWS.
		20	**SANDSTONE:** as above, ?cavings.
2235	2240	80	**Degraded VOLCANICS / VOLCANICS:** mostly medium dark grey to dark grey with lesser reddish grey and greenish grey, varying 'claystone" to finely crystalline texture, mostly varying moderately weathered to much more fresh appearance, grey groundmass with very fine to fine greenish crystals, trace chert fragments and quartz veining, varying soft to very hard cuttings, to moderately hard and sub-blocky. NO SHOWS.
		20	**SANDSTONE:** as above, ?cavings.
2240	2245	80	**Degraded VOLCANICS / VOLCANICS:** varying whitish grey to greenish and maroon colourations, sometimes mottled colours, otherwise as above.
		20	**SANDSTONE**: as above.
2245	2250	80	**VOLCANICS:** as above with less of the degraded type.
		20	**SANDSTONE**: as above, unclear if some or all cavings, or quartz veining "grinds" from volcanics , or sandstone beds associated with volcanics.
2250	2255	80	**VOLCANICS:** distinctly less weathered/degraded appearance compared to the type mentioned above, mottled very light grey to medium/dark grey to greyish black, mostly hard to very hard blocky 'cuttings', , returned as angular to subangular and blocky aggregates and fine to medium loose grains, common quartz associated dark mafics and phenocrysts, dominantly very fine to finely crystalline texture, common feldspars and black lithics, trace mica and nodular pyrite, trace chert.
		20	SANDSTONE: as above.
2255	2260	90	**HIGHLY DEGRADED /DEGRADED VOLCANICS:** very light whitish grey to whitish grey, minor medium grey and medium dark grey, sometimes with a greenish tinge, quartz rich with patches of greenish degraded crystals in a varying 'claylike to silty' matrix, , very fine to fine grained, varying soft to moderately hard , varying firm sub-blocky aggregates to residual quartz on bottom of sample trays.
		10	VOLCANICS: as above., cavings.
2260	2270	100	**HIGHLY DEGRADED VOLCANICS: as above**
2265	2270	90	**HIGHLY DEGRADED / DEGRADED VOLCANICS**: mostly moderate red to dusky red, lesser medium to dark greenish shades with greenish tinge, 'claylike' to silty/very fine grained matrix with quartz phenocrysts, varying soft to hard sub-blocky to blocky ctgs, common quartz 'grinds' on bottom of sample tray.
		10	**VOLCANICS:** as above:

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
2270	2275	80	**VOLCANICS:** mostly distinctly less weathered/degraded appearance compared to the type mentioned above, mottled to even medium/dark grey to greyish black, mostly hard to very hard blocky 'cuttings', returned as angular to subangular and blocky aggregates and fine to medium loose grains, common quartz with associated dark mafics and phenocrysts, dominantly very fine to finely crystalline texture, minor black lithics, trace mica and nodular pyrite, trace chert.
		20	**DEGRADED VOLCANICS**: as above.
2275	2280	80	**HIGHLY DEGRADED /DEGRADED VOLCANICS:** very light whitish grey to whitish grey, minor medium grey and medium dark grey, sometimes with a greenish tinge, quartz rich with patches of greenish degraded crystals in a varying 'claylike to silty' matrix, very fine to fine grained, varying soft to moderately hard , conspicuous disseminated micropyrite in places, varying very soft to firm sub-blocky aggregates to residual quartz on bottom of sample trays. NO OIL SHOWS, but trace mineral fluorescence from scattered crystals.
		20	**VOLCANICS:** as above, fresh appearance , probable cavings.
2280	2285		**??DEGRADED VOLCANICS / QUARTZ SEDIMENTS:** very light whitish grey to whitish grey, minor medium grey and medium dark grey, sometimes with a greenish tinge, quartz rich with patches of greenish degraded crystals in a varying 'claylike to silty' matrix, very fine to fine grained, varying soft to moderately hard , varying very soft to soft sub-blocky ctgs - matrix washes away leaving angular quartz grains residue. NO OIL SHOWS, but trace mineral fluorescence from scattered crystals.
2285	2290	90	**???? QUARTZ SANDSTONE, *or alternatively highly degraded very quartz rich volcanics,* :** white to very whitish grey, quartoze, sample comprises very fine to medium quartz grains embedded in a quartz silt matrix (latter = ?rock flour), no other accessories discernible except trace pyrite, does not look volcanic overall compared with samples immediately above, abundant angular quartz grains (?PDC bit) in washed sample. NO OIL SHOWS.
		10	**DEGRADED VOLCANICS:** as above
2290	2295	90	**???? QUARTZ SANDSTONE, *or alternatively highly degraded very quartz rich volcanics,* :** as above. NO OIL SHOWS.
		10	**DEGRADED VOLCANICS:** as above
2295	2300	90	**???? QUARTZ SANDSTONE, *or alternatively highly degraded very quartz rich volcanics,* :** generally as above but sometimes with greenish tinge degraded indication) , overall unclear if this lithology highly degraded quartz rich volcanic or quartz sandstone.
		10	**DEGRADED VOLCANICS:** as above
2300	2305	80	**VOLCANICS (DOLERITE):** medium/dark greenish grey to mostly greenish black to blackish, dominantly medium grained crystalline texture, hard to very hard angular 'cuttings', returned as angular to subangular and fragments with common pyroxene and subordinate quartz crystals with associated dark mafics and phenocrysts, traces of nodular pyrite and micro-siliceous veining.
		20	**DEGRADED VOLCANICS:** as above.
2305	2310	80	**VOLCANICS (DOLERITE):** as above.
		20	**DEGRADED/ALTERED VOLCANICS:** as above.

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
2310	2315	90	**QUARTZ SANDSTONE:** white to very whitish grey, quartoze, sample comprises very fine to medium quartz grains embedded in a quartz silt matrix (latter = ?rock flour), traces of carbonaceous laminae and microlaminae, trace pyrite, very soft to soft sub-blocky 'aggregates' = quartz grains embedded in 'rock flour' matrix, inferred fair to good porosity . **WEAK tending FAIR SHOW**: 100% even but dull whitish blue UV sample fluorescence, slow diffusing weak bluish solvent cut which continues to intensify over several minutes to moderate bluish solvent cut,
		10	thick ring to thin film blue-white residue. **DEGRADED VOLCANICS / DOLERITE:** as above
2315	2320	90	**QUARTZ SANDSTONE:** white to very whitish grey, quartoze, sample comprises varying very fine to medium quartz grains embedded in a quartz silt matrix (latter = ?rock flour) to fine to medium quartz 'grinds" on bottom of sample tray, traces of carbonaceous laminae and microlaminae, trace pyrite, very soft to soft sub-blocky 'aggregates' = quartz grains embedded in 'rock flour' matrix, inferred fair to good porosity . **WEAK tending FAIR SHOW**: 100% even but dull whitish blue UV sample fluorescence, slow diffusing weak bluish solvent cut which continues to intensify over several minutes to moderate bluish solvent cut, thick ring to thin film blue-white residue.
		10	**DEGRADED VOLCANICS / DOLERITE:** as above
2320	2325	90	**SANDSTONE:** white, fine to occasionally coarse grained, predominantly medium grained, moderate sorting, angular to subangular (quartz overgrowths), weak to moderate siliceous cement, unconsolidated in part, abundant quartz overgrowths, variable (clean to abundant) white silty/kaolinite matrix, common pyrite, friable, tight to poor visual porosity with decreasing matrix**. WEAK SHOW - fluorescence associated with 'silty' aggregates 20%, moderately bright, patchy yellow/white fluorescence, crush cut, patchy yellow/white residue.**
		10	**VOLCANICS:** as above.
2325	2330	90	**SANDSTONE:** as above, with 20% fluorescence as above.
		10	**VOLCANICS:** as above.
2330	2335	90	**SANDSTONE:** as above, becoming fine to coarse grained, increasing silty matrix,
		10	with **Fluorescence associated with silty aggregates 30%, moderately bright, patchy to solid, yellow/white fluorescence, very slow streaming cut, patchy yellow/white residue.** **VOLCANICS:** as above.
2335	2340	90	**SANDSTONE:** white, very fine to rarely coarse grained, predominantly fine to medium grained, poor sorting, subangular (quartz overgrowths) to subrounded, weak siliceous cement, unconsolidated in part, abundant quartz overgrowths, variable (minor to abundant) white silty/kaolinite matrix, common pyrite & chlorite, friable, tight to fair visual porosity with decreasing matrix**.**
		10	**VOLCANICS:** as above.
2340	2345	95	**SANDSTONE:** as above, no shows.
		Trc	**VOLCANICS:** mottled green, grey & black.
		5	**SILTSTONE:** mottled brown/grey, arenaceous, common carbonaceous laminations, moderately hard, subblocky.
2345	2350	95	**SANDSTONE:** as above,
		Trc	**VOLCANICS:** mottled green, grey & black.
		5	**SILTSTONE:** as above.
		Trc	**COAL:** black, subvitreous, silty, uneven subconchoidal fracture, brittle, blocky, grades to carbonaceous siltstone.

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
2350	2355	100	**SANDSTONE:** clear to translucent, white to very light whitish grey, very fine to coarse grained, poorly sorted, subangular, weak siliceous cement, unconsolidated, abundant quartz overgrowths, variable (minor to abundant) white silty/kaolinite matrix, common pyrite & chlorite, friable, tight to good visual porosity with decreasing matrix, no shows**.**
		Trc	**VOLCANICS:** as above.
		Trc	**SILTSTONE:** as above.
2355	2360	100	**SANDSTONE:** as above.
		Trc	**VOLCANICS:** as above.
2360	2365	100	**SANDSTONE:** as above.
		Trc	**VOLCANICS:** as above.
		Trc	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2365	2370	90	**SANDSTONE:** as above.
		Trc	**VOLCANICS:** as above.
		10	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2370	2375	100	**WEATHERED VOLCANICS:** white argillaceous matrix / fine grain supporting, chlorite & pyrite nodules, dark green/black mafic rock fragments, feldspar fragments.
2375	2380	100	**WEATHERED VOLCANICS:** as above.
2380	2385	100	**WEATHERED VOLCANICS:** as above.
2385	2390	100	**WEATHERED VOLCANICS:** as above.
2390	2400	50	**WEATHERED VOLCANICS:** as above.
		50	**SANDSTONE:** white argillaceous matrix / fine grain supporting, chlorite & pyrite nodules, dark green/black mafic rock fragments, feldspar fragments.white, very fine to rarely coarse grained, moderate sorting, subangular, weak siliceous cement, abundant quartz overgrowths, variable (trace to abundant) white silty/argillaceous matrix, common pyrite & chlorite, friable, tight to good visual porosity with decreasing matrix, no shows**.**
2400	2405	60	**SANDSTONE:** as above.
		30	**SILTSTONE:** mottled brown/grey, argillaceous, arenaceous in part, carbonaceous flecks, moderately hard, subblocky, also with very fine sandstone laminations.
		10	**VOLCANICS:** as above.
2405	2410	60	**SANDSTONE:** as above, abundant matrix, tight visual porosity.
		40	**SILTSTONE:** as above.
2410	2415	50	**SANDSTONE:** as above.
		50	**SILTSTONE:** as above.
2415	2420	60	**SILTSTONE:** mottled brown/grey, light grey, argillaceous, arenaceous in part,
		10	carbonaceous flecks, moderately hard, subblocky, also with very fine sandstone
		30	laminations.
			CLAYSTONE/rock flour?: white, silty, dispersive, subblocky, abundant sand grains.

Interval mMDRT From	To	%	Lithology / Show Description
2420	2425	20	**SANDSTONE:** as above.
		40	**SILTSTONE:** mottled brown/grey, light grey, argillaceous, arenaceous in part, carbonaceous flecks, moderately hard, subblocky, also with very fine sandstone laminations.
		40	**CLAYSTONE/rock flour?:** white, silty, dispersive, subblocky.
		Trc	**COAL:** as above.
2425	2430	40	**SANDSTONE:** white to translucent, fine to coarse grained, poor sorting, subangular to subrounded, weak siliceous cement, abundant quartz overgrowths where coarse, variable (trace to abundant) white silty/argillaceous matrix, common chlorite, trace pyrite, friable, tight to good visual porosity with decreasing matrix, no shows**.**
		20	**SILTSTONE:** as above.
		40	**CLAYSTONE:** as above.
2430	2435	100	**SANDSTONE:** as above, abundant argillaceous matrix, tight visual porosity.
2435	2440	20	**SANDSTONE:** as above.
		80	**SILTSTONE:** mottled & laminated brown/grey, argillaceous, abundant carbonaceous material, moderately hard, subblocky.
2440	2445	100	**SILTSTONE:** as above.
2445	2450	10	**SANDSTONE:** as above.
		80	**SILTSTONE:** as above.
		10	**CLAYSTONE:** mottled white/grey/black, silty, dispersive, subblocky.
2450	2455	100	**SANDSTONE:** white to translucent, fine to coarse grained, moderately well sorted, subangular to subrounded, weak to moderate siliceous cement, abundant quartz overgrowths where coarse, variable (trace to abundant) white silty/argillaceous matrix, friable, tight to fair visual porosity with decreasing matrix, no shows**.**
2455	2460	80	**SANDSTONE:** as above. NO SHOWS.
		20	**SILTSTONE:** as above.
		Trc	**COAL:** as above.
2460	2465	30	**SANDSTONE:** as above. NO SHOWS.
		50	**SILTSTONE:** as above.
		20	**CLAYSTONE:** as above.
2465	2470	90	**Variable CARBOANCEOUS CLAYSTONES**: mostly medium to dark brown, minor greyish black, moderate to common carbonaceous debris, mostly firm to moderately hard and sub-blocky to subfissile.
		10	**COAL:** brownish black to black, moderately hard, semibright to bright, tending high ash coal.
2470	2475	80	**SANDSTONE:** white, silty to very fine grained matrix, grades to arenaceous siltstone, abundant grain supporting white argillaceous matrix (possibly PDC induced, no visual porosity, inferred poor to fair porosity. **TRACE SHOW - 2470 - 2475 mMDRT Trace, dull, patchy yellow/white fluorescence.**
		20	**Variable CARBOANCEOUS CLAYSTONES**: as above.

Interval mMDRT From	To	%	Lithology / Show Description
2475	2480	80	**SANDSTONE:** white to translucent, fine to coarse grained, moderately well sorted, subangular to subrounded, weak to moderate siliceous cement, abundant quartz overgrowths where coarse, variable (trace to abundant) white silty/argillaceous matrix, friable, tight to fair visual porosity with decreasing matrix. NO SHOWS.
		20	**CARBOANCEOUS CLAYSTONE:** as above.
2480	2485	70	**SANDSTONE:** white to translucent, fine to coarse grained, moderately well sorted, subangular to subrounded, weak to moderate siliceous cement, abundant quartz overgrowths where coarse, variable (trace to abundant) white silty/argillaceous matrix, friable, tight to fair visual porosity with decreasing matrix. NO SHOWS.
		30	**CLAYSTONE / CARBOANCEOUS CLAYSTONE:** as above.
2485	2490	90	**SANDSTONE:** white to very light whitish grey, fine to coarse grained, dominantly medium grained, moderately well sorted, angular to subangular to subrounded, dom subangular weak to moderate siliceous cement, nil to abundant quartz overgrowths where coarse, variable cementation ranging nil where loose/disaggregated to hard very hard siliceous cemented aggregates, grains often shattered/fractured from PDC bit action, moderate to common white silty/argillaceous matrix (= 'rock flour' from PDC bit) , inferred poor to good inferred porosity (depending on degree of cementation). NO SHOWS.
		10	**CLAYSTONE / CARBOANCEOUS CLAYSTONE and VOLCANICS and LAKES ENTRANCE :** as above , inferred cavings. .
2490	2495	90	**SANDSTONE:** as above with conspicuous hard to very hard siliceous cemented aggregates in the coarse fraction recovery from the shakers. NO SHOWS.
		10	**CLAYSTONE / CARBOANCEOUS CLAYSTONE and VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings..
2495	2500	90	**SANDSTONE:** as above. NO SHOWS.
		10	**CLAYSTONE / CARBONACEOUS CLAYSTONE and VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings..
2500	2505	60	**SANDSTONE:** as above. NO SHOWS.
		30	**CARBONACEOUS CLAYSTONE;** as above
		10	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2505	2510	75	**SANDSTONE:** as above with conspicuous hard to very hard siliceous cemented aggregates in the coarse fraction recovery from the shakers. NO SHOWS.
		20	**CARBONACEOUS CLAYSTONE;** as above
		5	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2510	2515	85	**SANDSTONE:** as above with conspicuous hard to very hard mostly siliceous cemented but some calcareous cemented aggregates in the coarse fraction recovery from the shakers. NO SHOWS except some dull yellowish fluorescence from some of the hard to very hard siliceous cemented aggregates - no crush cut, assumed mineral fluorescence. Also some solvent cut from 'rock flour' with barablok embedded.
		10	**CARBONACEOUS CLAYSTONE;** as above
		5	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2515	2520	85	**SANDSTONE:** as above. ?NO 'real' SHOWS - trace mineral fluorescence, and samples giving bluish solvent cut from increased amounts of barablok.
		10	**CARBONACEOUS CLAYSTONE;** as above
		5	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.

Interval mMDRT			Lithology / Show Description
From	To	%	
2520	2525	85	**SANDSTONE:** as above
		10	**CARBONACEOUS CLAYSTONE;** as above
		5	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2525	2530	50	**SANDSTONE:** as above. NO SHOWS, barablok giving bluish solvent cut.
		40	**CARBONACEOUS CLAYSTONE:** mostly medium to dark brown with some medium to darker grey also, minor greyish black, moderate to common carbonaceous debris, varying soft and dispersive to firm/ moderately hard and sub-blocky to subfissile.
		10	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2530	2535	60	**SANDSTONE:** as above, comprising highly fractured PDC bit quartz 'grinds' in sample tray together with strongly cemented aggregates and fragments. NO SHOWS, barablok giving bluish solvent cut.
		30	**CARBONACEOUS CLAYSTONE:** mostly medium to dark brown with some medium to darker grey also, minor greyish black, moderate to common carbonaceous debris, varying soft and dispersive to firm/ moderately hard and sub-blocky to subfissile.
		10	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2535	2540	40	**SANDSTONE:** as above. NO OIL SHOWS.
		50	**CARBONACEOUS CLAYSTONE /:** as above.
		10	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2540	2545	85	**SANDSTONE:** as above with conspicuous strongly cemented (siliceous and calcareous) aggregates in sample tray. NO SHOWS.
		10	**CARBONACEOUS CLAYSTONE;** as above
		5	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2545	2555	90	**SANDSTONE:** as above with conspicuous strongly cemented (siliceous and calcareous) aggregates and PDC fractured quartz grains in sample tray, dom medium to ?lower coarse grained. NO SHOWS.
		5	**CARBONACEOUS CLAYSTONE;** as above
		5	**VOLCANICS and LAKES ENTRANCE MARL :** as above , cavings.
2555	2560	90	**SILTY CARBONACEOUS CLAYSTONE**: mostly medium to dark brown shades with some medium to darker grey also, minor greyish black, moderate to common carbonaceous debris, varying silty matrix with silty and very fine sandy microlaminations in places, varying soft and dispersive to firm/ moderately hard and sub-blocky to subfissile, mostly soft to firm. Minor amounts gradational to argillaceous, carbonaceous very fine grained sandstone.
		TR	**COAL:** as above
		10	**SANDSTONE**:as above, cavings.
2560	2565	80	**SANDSTONE:** white to pale brown, fine to coarse grained, poor sorting, subangular, moderate siliceous cement, common white argillaceous/kaolinite matrix, moderately hard, tight visual porosity, no shows.
		20	**SILTSTONE**: brown/black, argillaceous, carbonaceous, moderately hard, sub-blocky.
2565	2570	50	**SANDSTONE:** as above.
		50	**SILTSTONE**: as above.
2570	2575	20	**SANDSTONE:** as above.
		80	**SILTSTONE**: as above.

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
2575	2580	40	**SANDSTONE:** as above.
		60	**SILTSTONE**: as above.
2580	2585	40	**SANDSTONE:** as above.
		60	**SILTSTONE**: medium grey, grey/brown/black, argillaceous, arenaceous in part, carbonaceous, micromicaceous, moderately hard, subblocky to subfissile..
2585	2590	30	**SANDSTONE:** white to pale brown, fine to coarse grained, poor sorting,
		70	subangular, moderate siliceous cement, common white argillaceous/kaolinite matrix, moderately hard, tight visual porosity, no shows. **SILTSTONE**: as above.
2590	2595	40	**SANDSTONE:** as above.
		60	**SILTSTONE**: as above.
2595	2600	10	**SANDSTONE:** pale brown, fine to medium grained, moderate sorting, subangular
		90	to subrounded, moderate siliceous cement, common white silty matrix, moderately hard, tight visual porosity, no shows. **SILTSTONE**: as above.
2600	2605	10	**SANDSTONE:** as above.
		90	**SILTSTONE**: pale grey to dark grey/brown/black, argillaceous, carbonaceous, common chlorite mineralisation, moderately hard, subblocky to subfissile.
		Trc	**COAL:** black, silty, uneven fracture, brittle.
2605	2610	50	**SANDSTONE:** white, fine to coarse grained, poor sorting, subangular, well cemented with silica, abundant quartz overgrowths, common white silty matrix, common chlorite, moderately hard, tight visual porosity, no shows.
		50	**SILTSTONE**: as above.
		Trc	**COAL:** as above.
2610	2615	50	**SANDSTONE:** as above.
		50	**SILTSTONE**: as above.
2615	2620	50	**SANDSTONE:** as above.
		50	**SILTSTONE**: as above.
2620	2625	50	**SANDSTONE:** as above.
		50	**SILTSTONE**: as above.
2625	2630	90	**SANDSTONE:** white, very fine to medium grained, moderately well sorted, subangular to subrounded, weak to moderate siliceous cement, common quartz overgrowths, variable (common to abundant) white silty matrix, common chlorite,
		10	friable to moderately hard, tight to good porosity with decreasing matrix, no shows. **SILTSTONE**: as above.
2630	2635	50	**SANDSTONE:** as above.
		50	**SILTSTONE**: as above.
2635	2640	40	**SANDSTONE:** as above.
		60	**SILTSTONE**: as above.

Interval mMDRT			Lithology / Show Description
From	**To**	**%**	
2640	2645	70	**SANDSTONE:** white, fine to medium grained, occasionally coarse, poorly sorted, subangular to angular, strong siliceous cement, common quartz overgrowths, variable (common to abundant) white silty matrix, common chlorite, moderately hard, tight visual porosity, no shows.
		30	**SILTSTONE**: pale grey to dark grey/brown/black, argillaceous, trace carbonaceous material, occasional pyrite nodules, moderately hard, subblocky to subfissile.
		Trc	**VOLCANICS:** dark green & grey crystalline rock fragments, quartz veins, hard.
2645	2650	90	**SANDSTONE:** as above.
		10	**SILTSTONE**: as above.
2650	2655	90	**SANDSTONE:** as above.
		10	**SILTSTONE**: as above.
2655	2660	70	**SANDSTONE:** as above.
		10	**SILTSTONE/SILTY CLAYSTONE** : as above.
		20	**ARGILLACEOUS SANDSTONE**: light to medium shades of olive grey and greyish brown to brown, very fine to medium grained, dom fine to lower medium grained, moderately well sorted, dom subangular with 10-20% silt and clay minerals as matrix, minor to moderate disseminated carbonaceous debris, mostly soft to moderately hard variably cemented aggregates, poor visual porosity from aggregates.
2660	2665	80	**SANDSTONE:** clear, white, frosted, fine to very coarse grained, dom medium to lower coarse grained, moderately well sorted, subangular to angular, strong siliceous cement in places , minor to common quartz overgrowths, variable common to abundant white silty matrix (mostly PDC bit rock flour") , pyrite nodules, moderately hard, varying poor to occ fair inferred porosity from ctgs, LWD resistivity and density. NO SHOWS.
		20	**ARGILLACEOUS SANDSTONE**: light to medium shades of olive grey and greyish brown to brown, very fine to medium grained, dom fine to lower medium grained, moderately well sorted, dom subangular with 10-20% silt and clay minerals as matrix, minor to moderate disseminated carbonaceous debris, mostly soft to moderately hard variably cemented aggregates, poor visual porosity from aggregates.
		TR	**SILTSTONE**: as above.
		TR	**VOLCANICS:** dark green & grey crystalline rock fragments, quartz veins, hard.
2665	2670	80	**SANDSTONE: as above.**
		20	**ARGILLACEOUS SANDSTONE**: as above. **SILTSTONE**: as above.
		TR	**VOLCANICS:** dark green & grey crystalline rock fragments, quartz veins, hard.
2670	2675	90	**SANDSTONE:** as above, fine to very coarse grained, poorly to moderately well sorted, varying fractured PDC grains and strongly cemented aggregates. NO SHOWS.
		10	**CAVINGS:** mixed lithtypes as described above.
2675 slow ROP's	2676 (spot)	90	**SANDSTONE:** as above, fine to very coarse grained, poorly to moderately well sorted, varying fractured PDC grains and strongly cemented aggregates. NO SHOWS.
		10	**CAVINGS:** mixed lithtypes as described above.
2676	2678	90	**SANDSTONE:** as above, fine to very coarse grained, poorly to moderately well sorted, varying fractured PDC grains and strongly cemented aggregates. NO SHOWS.
		10	**CAVINGS:** mixed lithtypes as described above.

Well TD'd at 0210 hrs 18th September after bit gave indications of low torque and increasing SPP.

APPENDIX 2

MUDLOGGING REPORT

NORTH WIRRAH - 1

FINAL WELL REPORT

Prepared by
Overseas Oilfield Services S.A.
Engineers: D. van der Aa, T. Platt, M. Boyd, B. Beranek.

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CONTENTS

SECTION 1 -- GENERAL WELL SUMMARY

SECTION 2 -- GEOLOGICAL SUMMARY

SECTION 3 -- GEOSERVICES WELL LOGS

Section 1
General Well Summary

WELL DATA

Operator	: Esso Australia Ltd	
Well name	: North Wirrah-1	
Country	: Australia	
Location	: Bass Strait	
Field	: North Wirrah	
Permit	: VIC / L2	
Location MGA94 co-ordinates	: 573,486.30 mE	5,773,600.38 mN
Location local co-ordinates	: Lat: 38° 10' 57.094" S	Long: 147° 50' 20.674" E
Profile	: Vertical	
Reference depth	: Rotary Table	
RT to Seabed	: 90.0 metres	
RT above M.S.L.	: 39.2 metres	
Seawater depth	: 51.0 metres	
Proposed total depth	: 2839.0 mMDRT	
Actual total depth	: 2678.0 mMDRT	
True vertical depth	: 2677.9 mTVDRT	
Spud Date	: 04th September 2005	
Total depth reached on	: 18th September 2005	
Drilling Contractor	: Ensco Australia	
Rig name	: Ensco 102	
Rig type	: Jackup	

Drilling Phases

Diameter (inch)	From (mMDRT)	To (mMDRT)	Mud Type
22/26"	90.0	160.0	Sea Water/Pre-Hydrated Bentonite Sweeps
12¼"	160.0	888.0	Seawater / KCl / PHPA / Polymer
8½"	888.0	2678.0	KCl / Polymer / PHPA / Glycol

Cased Hole

Casing Diameter (inch)	Casing Type	Shoe Depth (mMDRT)
20”	Conductor	155.0
$9^5/_8$"	Surface	884.0

MUD LOGGING

Logging Unit Number: 171

Engineers: D. van der Aa, T. Platt, M. Boyd, B. Beranek.
Mud Loggers : N. Elliot, F. Makhad.

Sampling Intervals

Sample Type	Number of sets	Quantity per set	Sampling interval	From (mMDRT)	To (mMDRT)
Lightly washed and air dried (Palynology)	**1xSet (A)**	**200 grams**	30m	900	1480
			5m	1480	1580
			10m	1580	1930
			5m	1930	1980
			10m	1980	2220
			5m	2220	2678 (TD)
Washed and dried	**4xSets (B/C/D/G)**	**100 grams**	30m	900	1480
			5m	1480	1580
			10m	1580	1930
			5m	1930	1980
			10m	1980	2220
			5m	2220	2678 (TD)

Cuttings Distribution

Company	SETS
EAPL	A / B
BHPB	C
DPI	D
Geoscience Australia	G

WELL SUMMARY

North Wirrah-1 well will test a fault dependent structural trap NE of the Wirrah field. North Wirrah will test the primary target L-450 below volcanics which are *L.balmei* in age. North Wirrah-1 is also planned to continue drilling to test a secondary target, which is the *T. longus* reservoirs, which host the most significant oil accumulation in the Wirrah Field. Other secondary objectives are possible throughout the section with structural closure from the *P. asperopolus* level through *M. diversus* and upper and lower *L. balmei* intervals.

The 20" conductor was set at 155mMDRT.
The 12¼" hole section was drilled from 160mMDRT to 888mMDRT.
$9^5/_8$" casing was run and set at 884mMDRT.
The 8½" section was drilled from 888.0mMDRT to 2678.0mMDRT with a final well angle of 0.06°.
2 wireline logging runs were then performed.
The well was then plugged back and abandoned.

26" PHASE

North Wirrah-1 well was spudded at 14:45 hrs on the 04th of September 2005. The section was drilled using a 26" Security roller cone bit in to a depth of 160 mMDRT. A 20" conductor was run and cemented at 155mMDRT.

12¼" PHASE

The 12¼" hole was drilled with one bit to a total depth of 888.0mMDRT.

The 12¼" section was drilled with Bit# 1, a Reed DS40HF PDC bit and rotary assembly. The string was run in the hole, tagging cement at 150 mMDRT. The cement and float collar were drilled to 160mMDRT before displacing to new mud at 9.4ppg.

The section was drilled in 16.2 on bottom drilling hours, resulting in an average rate of penetration of 44.9 m/hr. The gas levels were low and no problems were encountered while drilling the 12 1/4" section.

Prior to pulling out of the hole for running a 9 5/8" casing, a wiper trip was conducted back to the 20" conductor shoe at 155mMDRT.

The $9^5/_8$" casing was run in hole and set at a depth of 884mMDRT and cemented as per program.

8½" PHASE

The 8½" hole was drilled with 2 bit runs, to a total depth of 2678.0mMDRT (2677.9mTVDRT).

The 8½" section was started with Bit# 3, a Reed Hycalog RSX162, along with a PowerDrive Xceed rotary-steerable assembly. The cement and float collar and new formation was drilled to 888mMDRT before displacing to a KCl / Polymer / PHPA / Glycol mud system with a weight of 8.9ppg.

Once the mud was balanced in/out 5m of new formation were drilled to 893mMDRT. A pressure integrity test was performed, returning an EMW of 16.0ppg.

The 8½" hole was then drilled ahead with the aid of the PowerDrive Xceed rotary-steerable tool to maintain angle and direction. At the depth of 1508.0mMDRT the drilling string was pulled out of the hole due to the problems with the top drive.

Bit # 3RR was then made up with BHA # 4, a PowerDrive Xceed rotary-steerable assembly, and run back in hole to drill ahead the 8½" section. The mud weight was progressively increased throughout the section up to a weight 10.15 ppg and then further increased from 10.15 ppg to 10.30 ppg in response to becoming momentarily stuck in hole at 2253mMDRT.

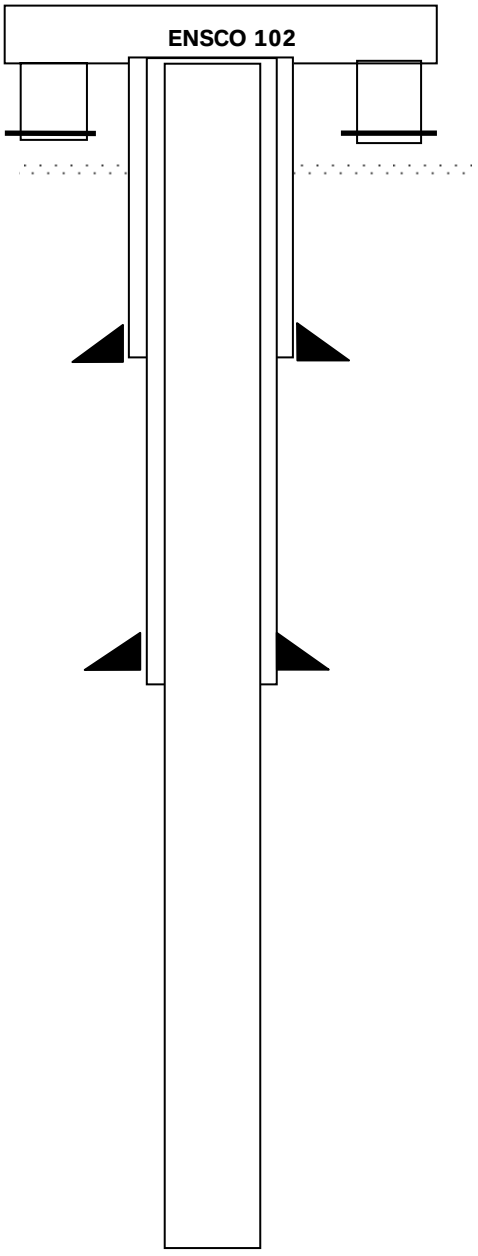
The well reached TD at a depth of 2678mMDRT. The hole was circulated clean at TD.

The bit was then pulled back to the 9 $^{5}/_{8}$" casing shoe and then ran back to bottom for a wiper trip. A 100 bbl Hi-Viscosity sweep was pumped and the hole was circulated with two times bottom's up, to both clean the hole and condition the mud prior the wireline logging program. The drilling assembly was then pulled out of the hole and the wireline equipment was rigged up.

The wireline logging program consisted of two runs:
Run 1: HNGS-DSI
Run 2: VSI (Check-shot)

The well was then plugged and abandoned.

WELL PROFILE
NORTH WIRRAH-1



Rotary Table to MSL 39.2 m

Water Depth 51.0 m
RT to Sea Bed 90.2 m

Spud North Wirrah-1
from 92.0 mMDRT
on 04th of September 2005

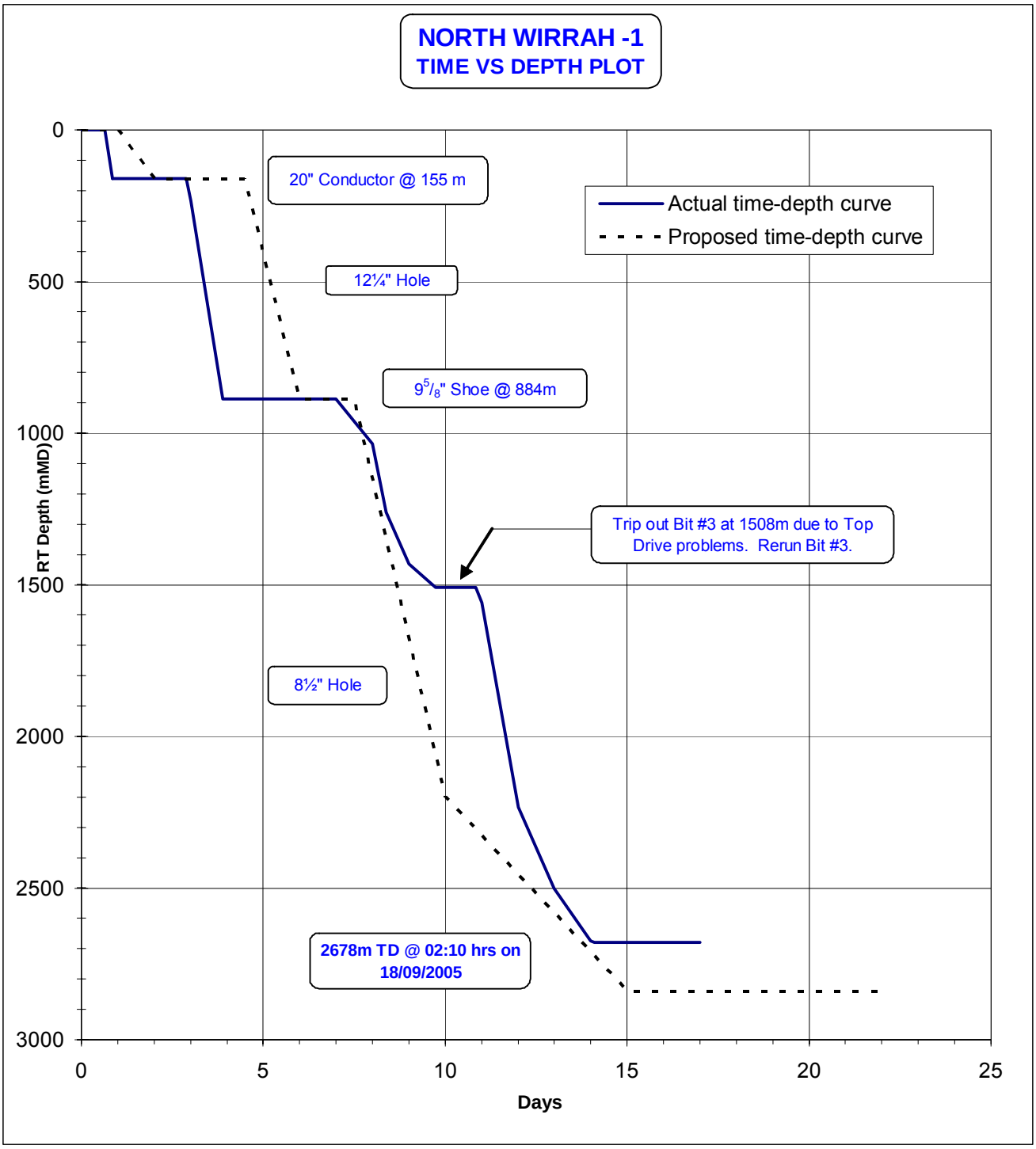
20" Conductor Set at 155.0 mMDRT

12¼" Hole
160.0 m - 888.0 mMDRT
Mud Weight 8.8 ppg

9 5/8" Casing Set at
884.0 mMDRT

8½" Hole
888m – 2678.0 mMDRT
Mud Weight 8.9+ - 10.3+ppg

TD North Wirrah -1 at
2678.0mMDRT
on 18th of September 2005


NORTH WIRRAH -1
TIME VS DEPTH PLOT
20" Conductor @ 155 m
12¼" Hole
9⅝" Shoe @ 884m
8½" Hole
Trip out Bit #3 at 1508m due to Top Drive problems. Rerun Bit #3.
2678m TD @ 02:10 hrs on 18/09/2005
Actual time-depth curve
Proposed time-depth curve
RT Depth (mMD)
Days
0
500
1000
1500
2000
2500
3000
0
5
10
15
20
25

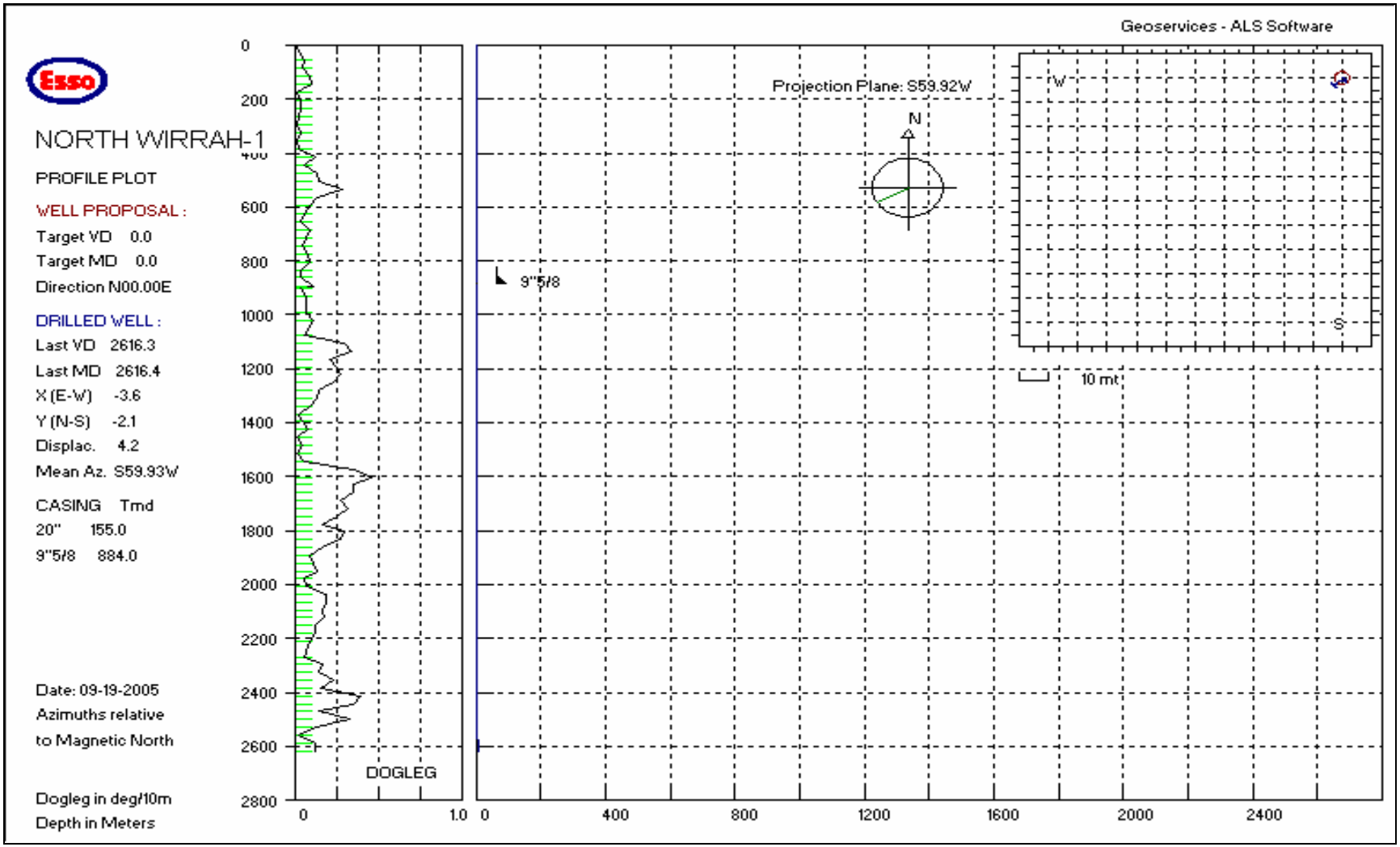
CASING DATA

Type	**Size** (Inches)	**Weight** (lb/ft)	**Grade**	**Thread**	**Depth** (mMDRT)
Surface Conductor	20"	68.0	X56	ALT2/RL4S	16-30
Surface Conductor	20"	68.0	X56	RL4S	30-155
Intermediate 12¼" Hole	9⅝"	47	L80	VamTop	884.0

BIT SUMMARY
NORTH WIRRAH-1

Bit	BHA	Bit Type	Serial No.	Jets	Size	Depth In	Depth Out	Bit Time	Run	ROP	Formation	Bit Grading	Comments
#	#			(/32)	Inch	(m)	(m)	(Hrs)	(m)	m/hr		(I-O-D-L-B-G-O-R)	
1	1	ROLLER CONE BIT	751339	4x28	26"	90	160	4.9	70	14.2	GIPPSLAND LIMESTONE	1-1-WT-A-E-I-NO-TD	North Wirrah-1 Spudded @ 14:45 on the 04th September 2005.
2	3	REED HYCALOG DS40HF	200363	4 x 16	12¼"	160	888	16.2	728	44.9	GIPPSLAND LIMESTONE	1-1-WT-A-E-X-I-TC	
3	4	REED HYCALOG RSX 162	210539	6 x18	8½"	888	1508	37.7	620	16.4	LAKES ENTRANCE/ LATROBE GROUP	1-1-PN-N-X-1-NO-RIG	POOH to repair the Top Drive
3RR	5	REED HYCALOG RSX 162	210539	6 x13	8½"	1508	2678	52.4	1170	22.3	LATROBE GROUP	5-8-RO-S-X-1/16-LT-TD	TD North Wirrah-1 @ 02:10 hrs on 18th September 2005.

WELL DIRECTIONAL PROFILE: NORTH WIRRAH-1



NORTH WIRRAH-1 WELL DIARY

04th September 2005 Made up BHA and ran in hole. Drill from 92m to 160m with sea water. Pump hi vis sweep at TD. POOH to just below mudline, RIH back to TD, POOH, lay down BHA, R/U and run 20" conductor R/U riser tensioning frame.

05th September 2005 R/U and run 20" conductor. R/U cement lines, Perform 20" cement job as per program, set conductor at 155m, wait on cement, nipple up diverter.

06th September 2005 Continue nippling up diverter. Make up 12 ¼" BHA and run in hole. Drill out cement and 20" conductor shoe and displace to new mud. Drill ahead 12 ¼" section to 234m.

07th September 2005 Drill from 234m to 888m, section TD. Pull out of the hole for wiper trip.

08th September 2005 Run back to the bottom and circulate hole clean. Displace hole to 9.4 ppg mud for the next section. Pull out of the hole and prepare for running 9 ⅝" casing. Rig up to run 9 ⅝" casing. Run 9 ⅝" casing as per program, pump and displace cement. Rig down lines and casing handling equipment while waiting on cement.

09th September 2005 Wait on cement. Try to run in and test BOP. No go. Lift BOP and remove top plug. Reinstall BOP. Pressure test BOP, choke / kill line, connections. Upper BOP would not test. Breakout IBOP and change. Pressure test casing – test ok. Re-install IBOP.

10th September 2005 Continue to install IBOP. Slip & cut drill line. Make up bit and run in hole for a clean up run. Run in hole picking up drill pipe. Tag at 855m. Wash down to 857m. Circulate hole volume. Pull out of hole to surface to make up BHA. Make up Bit #3 and BHA #3. Run in hole. Shallow hole test LWD tools. Run in hole picking up single joints of drill pipe.

11th September 2005 Run in hole Bit #3, picking up single joints of drill pipe, to the float collar at 857m. Drill from 857m to 888m. Displace the well to KCl / PHPA / Glycol mud. Drill ahead 5m of new formation to 893m. Repair the top drive. Pull to inside the casing shoe and circulate x 1.5 bottom's up. Complete PIT to 16ppg EMW. Drill ahead from 893m to 1036m, conducting MWD surveys and Torque and Drag readings as per requirements.

12th September 2005 Drill ahead in 8½" hole from 1036m to 1430m, conducting MWD surveys and Torque and Drag readings as per requirements.

13th September 2005 Drill ahead from 1430m to 1508m. Work on Top Drive – Unable to fix. Flow check and POOH into casing shoe. Flow check, pump slug and pull of out hole.

14th September 2005 Download MWD tools. Continue to troubleshoot Top Drive. Make up Bit#3RR and BHA#4 and run in hole to 1508m. Drill ahead 8½" section from 1508m to 1560m.

15th September 2005 Drill ahead 8½" section from 1560m to 2227m.

16th September 2005 Drill ahead 8½" section from 2227m to 2500m.

17th September 2005 Drill ahead 8½" section from 2500m to 2675m.

18th September 2005 Call TD at 2678m, circulate hole clean, flow check, POOH to 9 ⅝" shoe, Service top drive, RIH for wiper trip, Wash last stands to bottom, Pump Hi Vis sweep pill, Circulate bottoms up – Trip gas recorded as 15 units, Flow check, POOH, R/U Wireline equipment, RIH wireline, wireline tools hung up at 2504m, Call town, continue attempts to work wireline tools through HUP, Commence Logging run #1 from 2504m.

19th September 2005 Complete wireline logging runs, R/D wireline equipment, M/U 3 ½" Stinger BHA, RIH stinger on 5" DP, Spot Hi Vis pill on bottom, pull back 3 stands, Circulate hole clean- Trip gas recorded at 44 units, R/U cement head, Pressure test lines, pump cement @1970m (plug #1a), Pull stinger assembly back to 1810m, circulate hole clean of cement, R/U cement head, pump cement (plug #1b)

.

20th September 2005 Pull stinger assembly back, circulate hole clean of cement, R/U cement head, pump cement (plug #1c), Pull stinger assembly back, circulate hole clean of cement , wait on cement, lay down drill pipe, tag TOC. Pull stinger assembly back to the 9 ⅝" shoe, R/U cement head, pump cement across 9 ⅝" shoe, Pull stinger assembly back, circulate hole clean of cement , wait on cement, lay down drill pipe, tag TOC at 775m. Geoservice's unit released and commence rig down.

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Section 2
Geological Summary

NORTH WIRRAH-1

Interval (m)			ROP (avg)	Lithology Description LIMESTONE with SANDSTONE & CLAYSTONE						
160	-	888	44.9	**CALCARENITE**: light grey, light green grey in part, abundant fossil fragments, friable occasionally grading to Calcilutite, good intergranular porosity, no fluorescence. **SANDSTONE:** quartz, clear to milky, medium grained, predominantly coarse to very coarse, moderately well sorted, subangular to subrounded, traces of glauconite, loose grains to weakly to moderately cemented aggregates, poor to fair inferred porosity. **CLAYSTONE:** light brown to light grey, silty, soft to firm, blocky to subblocky, calcareous.						
Gas average			**(units) :**	1	**Composition (ppm)**	C1 10	C2 2	C3 2	C4 2	C5 2	-
Show Details			No Hydrocarbon Shows.								

Interval (m)			ROP (avg)	Lithology Description Massive CALCARENITE with stringers and thin interbeds of MARL and HIGHLY CALCAREOUS CLAYSTONE.						
888	-	1360	26.1	**CALCARENITE 100%:** mottled grey / white to lesser medium and dark grey, very fine to medium grained texture, dominantly fine grained, minor to moderate fine grained glauconite, rare micas, trace macro-fossil debris, few to moderate forams, very soft to very hard, mostly firm and sub-blocky, nil to very poor visible porosity.						
Gas average			**(units) :**	2	**Composition (ppm)**	C1 248	C2 11	C3 5	C4 1	C5 1	-
Show Details			No Hydrocarbon Shows.								

Interval (m)			ROP (avg)	Lithology Description **MASSIVE CALCISILTITE**							
1360	-	1441	8.0	**CALCISILTITE:** light to medium grey, silty texture, mostly firm and sub-blocky, trace disseminated black flecks, 20-30% clay minerals, homogenous appearance.							
Gas average			**(units) :**	2	**Composition (ppm)**	C1 489	C2 17	C3 8	C4 3	C5 2	-
Show Details			No Hydrocarbon Shows.								

Interval (m)			ROP (avg)	Lithology Description **Interbedded CALCISILTITE and MARL.**							
1441	-	1508	7.0	**CALCISILTITE:** light medium grey to medium, grey, silty to occasional very fine grained texture, soft to firm and sub-blocky, trace glauconite and disseminated black specks, gradational to MARL. **MARL:** olive grey to medium dark grey, firm and sub-blocky, trace disseminated black specks, rare glauconite grains, massive / homogenous appearance.							
Gas average			**(units) :**	4	**Composition (ppm)**	C1 672	C2 27	C3 7	C4 2	C5 2	-
Show Details			No Hydrocarbon Shows.								

Interval (m)			ROP (avg)	Lithology Description **Interbedded CALCISILTITE and MARL.**							
1508	-	1555	14.2	**CALCISILTITE:** light grey, arenaceous, laminated, grading to Calcarenite, argillaceous in part grading to Marl, abundant glauconite specks and occasional laminations, firm, sub-blocky. **MARL**: white and light grey, common glauconite grains, laminations, firm and dispersive, sub-blocky.							
Gas average			**(units) :**	9	**Composition (ppm)**	C1 1369	C2 75	C3 17	C4 9	C5 5	-
Show Details			No Hydrocarbon Shows.								

Interval (m)	ROP (avg)	Lithology Description **Massive graded SANDSTONE beds with minor CLAYSTONE**

				and COAL							
1555	-	1735	65.9	**SANDSTONE:** clear to translucent, coarse to very coarse, grading medium to fine with depth, poorly sorted, sub-angular to angular, loose, clean, good visible porosity, no fluorescence. **CLAYSTONE:** white to pale grey, medium grey brown, silty in part, common lithics, soft, dispersive, amorphous to sub-blocky. **COAL:** black to dark brown, dull to sub-vitreous, brittle, sub-blocky, uneven, silty in part.							
Gas average			**(units) :**	57	**Composition (ppm)**	C1 9606	C2 831	C3 119	C4 65	C5 21	-
Show Details			No Hydrocarbon shows.								

Interval (m)			ROP (avg)	Lithology Description **10-20m thick, mostly coarser grained quartz SANDSTONE beds, separated by CLAYSTONES, variably CARBONACEOUS CLAYSTONES, SILTSTONES, and variably thick COAL.**
1735	-	1890	60.5	**SANDSTONE (20-90%)** : quartz, fine grained to granular, dominantly very coarse grained to granular, subangular to subrounded, dominantly subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good to very good intergranular porosity. No oil shows. **SANDSTONE (0-50%)** : quartz, very fine to fine grained, tending well sorted, subangular to subrounded, dominantly subangular, appears clean apart from 10-20% quartz silt matrix and very minor clay minerals and trace micromicas, no other discernible accessories, varying disaggregated grains to soft and friable aggregates, inferred fair to good intergranular porosity. No oil shows from washed cuttings. **ARGILLACEOUS SANDSTONE (0-50%)**: olive grey to medium brownish grey, very fine to fine grained, dominantly very fine grained, very well sorted, dominantly subangular, 30-50% silt and clay minerals, non calcareous, varying soft to occasionally firm aggregates, partly gradational to sandy siltstone. Visually tight, nil to poor visual porosity. No shows. **SILTY CLAYSTONE/SILTSTONE:** brownish grey to greyish brown, silty matrix, minor to occasional common carbonaceous matrix, very soft to firm and sub-blocky, mostly soft and sub-blocky, non calcareous. Minor gradational to very fine grained argillaceous sandstone. **CLAYSTONE (0-30%)** : very light olive grey to whitish grey, very soft to tending firm and sub-blocky, mostly soft, no accessories discernable, non calcareous. **COAL (0-100%):** black, moderately hard to hard, brittle, sub-bituminous tending bituminous, semi-bright tending bright, appears clean. Sometimes partly gradational to Highly carbonaceous claystone, other times well defined clean coal seam.

Gas average	**(units) :**	25	**Composition (ppm)**	C1	C2	C3	C4	C5	-
				2829	495	240	112	45	
Show Details	No Hydrocarbon shows.								

Interval (m)			ROP (avg)	Lithology Description **SANDSTONE with minor interbedded CLAYSTONE**						
1890	-	1908	48.6	**M1 SANDSTONE (70% to 90%):** quartz, fine grained to granular, dominantly very coarse grained to granular, subangular to subrounded, dominantly subrounded, mostly appears clean, no discernible accessories, loose and disaggregated grains only, inferred good to very good intergranular porosity. No oil shows. **CLAYSTONE (10% to 30%):** very light olive grey to whitish grey, very soft to tending firm and sub-blocky, mostly soft, no accessories discernable, non calcareous.						
Gas average			**(units) :**	22	**Composition (ppm)**	C1 1931	C2 435	C3 261	C4 98	C5 49	-
Show Details			No Hydrocarbon shows.								

Interval (m)			ROP (avg)	Lithology Description **Interbedded SANDSTONE, SILSTONE & COAL.**						
1908	-	2086	36.2	**SANDSTONE (10% to 100%):** colourless to white, very fine to rarely coarse grained, predominantly medium grained, moderate sorting, subangular to subrounded, unconsolidated, abundant quartz overgrowths, generally clean also with minor white silty/kaolinite matrix, occasional pyrite nodules, friable, good to excellent inferred porosity, poor where matrix, no shows. **SILTSTONE (Tr to 60%):** mottled brown & white, arenaceous grading to very fine grained sandstone, common carbonaceous flecks, minor pyrite nodules, firm, subblocky. **COAL (Tr to 70%):** black, dull to subvitreous, silty, uneven to subconchoidal fracture, brittle, blocky.						
Gas average			**(units) :**	47	**Composition (ppm)**	C1 7089	C2 642	C3 237	C4 85	C5 35	-
Show Details			No Hydrocarbon shows.								

Interval (m)			ROP (avg)	Lithology Description **Mostly Massive quartz SANDSTONE with CLAYSTONE/SILTSTONE interbeds in places.**						
2086	-	2220	30.2	**SANDSTONE:** translucent to opaque quartz, fine to coarse grained, dominantly medium grained, moderately well sorted, dominantly sub-angular, varying loose / unconsolidated to occasional siliceous cemented, trace pyrite, varying poor to very good inferred intergranular porosity, mostly inferred very good to good, mostly no oil shows, except WEAK SHOW 2200 – 2210m. **SILTSTONE / SILTY SANDSTONE**: varying shades of light to medium brown to blackish brown, common carbonaceous debris in places, frim to moderately hard, sub-blocky.						
Gas average			**(units) :**	37	**Composition (ppm)**	C1 6097	C2 387	C3 145	C4 57	C5 25	-
Show Details			Fluorescence: 2200 – 2210m. Trace to 5%: solid dull to moderately bright yellow, crush cut, trace residue.							

Interval (m)			ROP (avg)	Lithology Description **VOLCANICS with minor SANDSTONE interbeds**						
2220	-	2280	9.2	**VOLCANICS** 80-100%: Varying fresh to highly degraded, varying greenish black to maroon- light whitish grey, very soft to very hard, sub blocky to blocky, fine- medium crystalline texture in part. **SANDSTONE** 10-20%: Quartz, very fine to coarse, moderately well sorted, loose, disaggregated, inferred cavings.						
Gas average			**(units) :**	8	**Composition (ppm)**	C1 1280	C2 72	C3 27	C4 12	C5 7	-
Show Details			No Hydrocarbon Shows							

Interval (m)			ROP (avg)	Lithology Description **SANDSTONE with minor VOLCANICS**						
2280	-	2300	25.6	**QUARTZ SANDSTONE** 90-100%: White- light whitish grey, very fine- medium quartz grains in white quartz silt/'claylike' matrix, very soft to firm, poor to occasional fair visual porosity, no shows. **VOLCANICS** 0-10%: Varying fresh to highly degraded, varying greenish black to maroon- light whitish grey, very soft to very hard, sub blocky to blocky, fine- medium crystalline texture in part.						
Gas average			**(units) :**	33	**Composition (ppm)**	C1 5355	C2 253	C3 80	C4 29	C5 13	-
Show Details			No Hydrocarbon Shows							

Interval (m)			ROP (avg)	Lithology Description **DOLERITE**						
2300	-	2310	7.2	**DOLERITE** 100%: Dark greenish grey to greenish black , medium graded crystalline texture, hard to very hard, angular- sub angular, trace pyrite and quartz micro-veining.						
Gas average			**(units) :**	5	**Composition (ppm)**	C1 780	C2 36	C3 16	C4 10	C5 6	-
Show Details			No Hydrocarbon Shows.								

Interval (m)			ROP (avg)	Lithology Description **Mostly QUARTZ SANDTONES with interbeds of CARBONACEOUS CLAYSTONES, SILTSTONES and very thin COAL SEAMS.**						
2310	-	2525	15.3	**SANDSTONE 60-90%:** Light white grey, very light grey, very fine-very coarse, dominantly medium, moderately well sorted, angular to sub round, dominantly sub angular, loose grains to variably siliceous and calcareous cemented aggregates, rock flour in part. **CARBONACEOUS CLAYSTONE/SILTSTONE 0-40%:** Medium to dark brown and brown-black, common carbonaceous specks, firm to hard, dominantly firm- moderately hard, sub blocky-sub fissile. **COAL 0-10%:** Thin seams, brown-black to black, firm to moderately hard, brittle, semi bright- bright, moderately clean.						
Gas average			**(units) :**	41	**Composition (ppm)**	C1 5908	C2 533	C3 243	C4 110	C5 50	-
Show Details			Fluorescence: 2315 – 2320m: 100%: dull even whitish blue fluorescence, slow diffusive weak to moderate blue cut, thick ring to thin filmy bluish white residue. Fluorescence: 2320 – 2340m: (Associated with Silty Sandstone aggregates) 30% decreasing to 5%: moderately bright, patchy yellowish white, slow crush cut, patchy yellowish white residue. Fluorescence: 2345 – 2350m: trace fluorescence in silty aggregates: moderately bright patchy yellowish white fluorescence, slow crush cut, patchy yellowish white residue. Fluorescence: 2470 – 2475m: trace fluorescence in Silty aggregates: dull patchy yellowish white fluorescence, slow crush cut, patchy yellowish white residue.							

Interval (m)			ROP (avg)	Lithology Description **Mostly QUARTZ SANDTONES with interbeds of CARBONACEOUS CLAYSTONES and SILTSTONES.**						
2525	-	2678 TD	8.4	**SANDSTONE** 60-90%: Light white grey, very light grey, very fine-very coarse, dominantly medium, moderately well sorted, angular to sub round, dominantly sub angular, loose grains to variably siliceous and calcareous cemented aggregates, rock flour in part. **CARBONACEOUS CLAYSTONE/SILTSTONE** 0-40%: Medium to dark brown and brown-black, common carbonaceous specks, firm to hard, dominantly firm- moderately hard, sub blocky-sub fissile.						
Gas average			**(units) :**	36	**Composition (ppm)**	C1 5078	C2 490	C3 211	C4 90	C5 45	-
Show Details			No Hydrocarbon Shows.								

GAS REPORT
NORTH WIRRAH-1

12¼" section

The 12¼" hole section was drilled from 160mMDRT to 888mMDRT. Background gas levels were very low, averaging 2 units. A maximum gas peak of 6 units (0.12%) was recorded at 862mMDRT.

No hydrocarbon shows were seen in the cuttings in this section.
The mud weight was 8.85ppg for this section.
No H_2S or significant CO2 (<1%) levels were recorded while drilling the 12¼" hole section.

8$^1/_2$" section

In the 8½" hole section from 888mMDRT to 1540mMDRT, the top of the Latrobe Group, background gas levels averaged 5 units. A maximum gas peak of 13 units (0.86%) was recorded at 1538mMDRT.

From the top of the Latrobe Group at 1540mMDRT to the section TD at 2678mMDRT, the background gas was higher, averaging between 10 and 40 units. A maximum gas peak of 482 units (9.64%) was recorded at 1914.5mMDRT, which was associated with a coal. No fluorescence was seen in the sample from this depth.

Hydrocarbon shows were seen in several intervals of samples in this section. These intervals were:

- 2200m – 2210mMDRT
- 2315m – 2340mMDRT
- 2345m – 2350mMDRT
- 2470m – 2475mMDRT

The hydrocarbon shows listed varied in character and a full description can be obtained in the Geological Summary.

The mud weight was in the range from 8.9ppg to 10.35ppg.
No H_2S or significant CO2 (<1%) levels were recorded while drilling the 8 1/2" hole section.

The Gas Peaks listed below are as detected by the Reserval gas equipment. An FCP-FGP (FID) backup gas system was also operating for North Wirrah -1. The gas ratio plots show the same trends with variation in the gas recorded. (1% = 50 units = 10000 ppm). The Reserval is more accurate than the auxillary FID system and therefore provides a higher quality of data for analytical purposes. The Reserval picks up more background heavy gas and the Reserval's mud degasser (GZG) has a constant flow of mud through its sample chamber. It is therefore not affected by varying flow rates from its position in the flow line, which is situated as close to the bell nipple as possible. Calibrations on both detector systems were checked regularly before and during the drilling phases and these dates were recorded in accordance with the ESSO weekly maintenance requirements.

12¼" section

No significant gas peaks were recorded in the 12¼" section.

8½" section

Depth Metres	**Total Gas** Peak units	**C_1 ppm**	**C_2 ppm**	**C_3 ppm**	**iC_4 ppm**	**nC_4 ppm**	**iC_5 ppm**	**nC_5 ppm**
1562	45	7306	312	15	6	6	4	3
1567.5	35	5571	228	12	4	3	3	1
1593	49	8489	364	14	5	3	3	2
1627	124	21382	1684	242	92	131	33	30
1649	110	18608	1788	203	89	108	30	23
1672	189	31065	2913	137	94	73	32	20
1682	134	23392	2187	105	71	54	26	17
1701	178	30528	2819	363	80	92	29	21
1708	264	43947	4013	919	87	140	24	18
1714	242	39680	3670	895	114	182	34	31
1750	48	5731	1017	497	88	149	41	38
1762	54	6227	1020	625	120	200	56	48
1873	151	20886	3343	1248	130	211	56	40
1877	147	20869	3322	1025	88	132	38	23
1914.5	482	67755	5795	1208	140	131	50	24
1925	63	9065	917	279	37	46	23	13
1933.5	64	9607	924	288	41	51	23	13
1949.5	67	9708	1030	398	55	87	30	22
1958.5	41	6004	622	266	40	55	23	16
1964	37	5508	579	250	38	51	21	14
1985	33	5483	392	169	28	40	19	13
2000.5	129	21181	1873	741	109	192	53	48
2051.5	51	7853	739	348	49	78	25	21
2055	57	8763	842	361	54	85	25	21
2077	59	9290	803	319	50	68	25	23
2132	67	11407	826	296	36	75	22	22
2136	81	14415	912	301	36	75	22	24
2143	80	12446	846	286	32	68	20	20
2258	56	8771	518	151	17	24	6	5
2280	59	7807	725	321	50	80	28	33
2289.5	62	10030	381	92	8	16	5	4

2316	104	13522	1214	526	71	131	36	33
2324	109	14061	1272	602	92	171	53	52
2334	132	16104	1630	800	136	250	84	80
2336	148	17537	1808	925	164	292	102	96
2340	97	11337	1184	647	120	215	77	71
2346	203	23365	2616	1584	369	560	222	179
2390	99	15434	1512	715	134	215	89	65
2408	68	11905	797	250	29	76	46	16
2423	66	11584	704	264	30	72	26	19
2440	119	18112	1928	820	74	265	40	43
2442	137	22210	1849	750	84	221	58	46
2444.5	139	22728	1836	720	74	206	51	43
2452	67	10236	710	247	21	65	18	15
2471.5	103	15653	1538	701	64	227	43	44
2474.5	119	16827	1785	956	132	307	93	82
2560	106	18263	1351	457	33	113	25	32
2580	107	17329	1319	516	53	157	46	50
2594	221	36088	2382	733	86	234	104	99
2596.5	120	7770	1521	599	62	225	78	78
2605	71	9431	938	428	44	156	55	58
2608.5	140	21478	1695	704	72	222	71	76
2618	78	11014	989	458	49	154	49	53
2621	77	11193	910	406	38	129	37	42
2636.5	52	7209	772	345	26	108	25	28
2645.5	49	6378	850	329	15	99	18	20
2648.5	54	6939	748	384	41	122	39	41
2656.5	78	11332	820	343	35	101	29	29
2662.5	32	4073	438	193	15	58	14	17

Gas Ratio Interpretation - Introduction

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 available to 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 know as the gas ratios method) and the Wetness/Balance/Character plots.

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 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:

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.

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:

$$W_h = \frac{(C2 + C3 + C4 + C5)}{(C1+C2+C3+C4+C5)} \times 100\ (\%)$$

$$B_h = \frac{(C1 + C2)}{(C3 + C4 + C5)}$$

$$C_h = \frac{(C4 + C5)}{C3}$$

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.
$W_h > 40.0$	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:

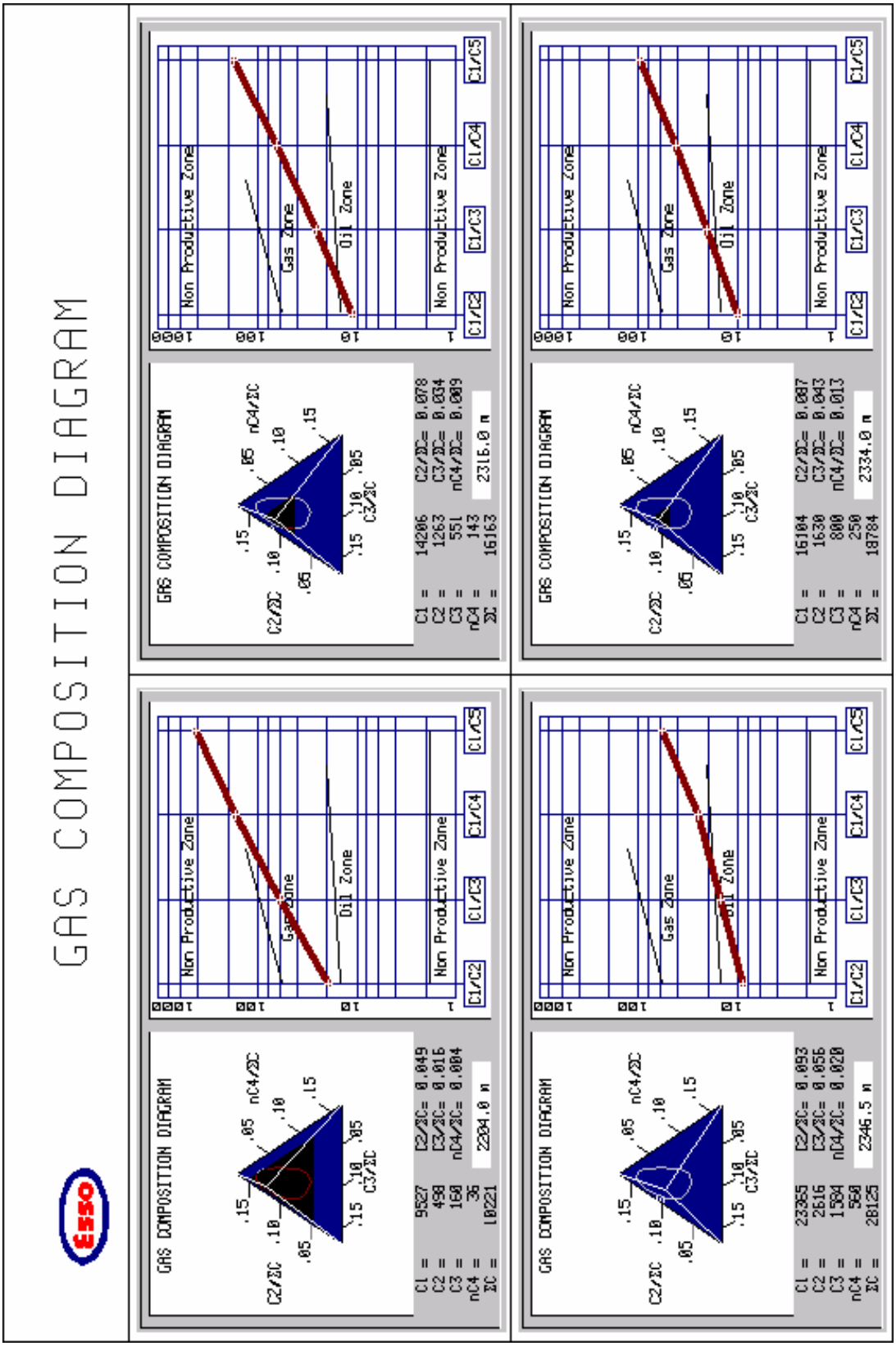
$W_h < 0.5$ and $B_h > 100$	Very light, dry gas that is almost certainly non-productive.
$0.5 < W_h < 17.5$ and $W_h < B_h < 100$	Productive gas with gas increasing in wetness and density as the two curves converge.
$0.5 < W_h < 17.5$ and $B_h < W_h$	Productive gas condensate or a high gravity gas/oil ratio.
$17.5 < W_h < 40$ and $B_h < W_h$	Productive oil with oil gravity decreasing - density increasing as the curves diverge.
$17.5 < W_h < 40$ and $B_h > W_h$	Non-productive residual oil.

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

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

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.


GAS COMPOSITION DIAGRAM
ESSO
GAS COMPOSITION DIAGRAM
Non Productive Zone
Gas Zone
Oil Zone
C1/C2
C1/C3
C1/C4
C1/C5
C1 = 9527
C2 = 498
C3 = 168
nC4 = 36
ΣC = 10221
C2/ΣC= 0.049
C3/ΣC= 0.016
nC4/ΣC= 0.004
2204.0 m
C1 = 23365
C2 = 2616
C3 = 1594
nC4 = 560
ΣC = 28135
C2/ΣC= 0.093
C3/ΣC= 0.056
nC4/ΣC= 0.020
2346.5 m
C1 = 14206
C2 = 1263
C3 = 551
nC4 = 143
ΣC = 16163
C2/ΣC= 0.078
C3/ΣC= 0.034
nC4/ΣC= 0.009
2316.0 m
C1 = 16104
C2 = 1630
C3 = 800
nC4 = 250
ΣC = 18784
C2/ΣC= 0.087
C3/ΣC= 0.043
nC4/ΣC= 0.013
2334.0 m

APPENDIX 3

BASIC PALYNOLOGY REPORT

Well Name : North Wirrah-1

Operator :

Interval : 1460m - 2698m

Scale : 1:5000

Chart date: 09 March 2006

Palynological Data Chart : BASIC DATA

% Abundance histogram : Highest occurrence

Roger Morgan

North Wirrah-1

Morgan Palaeo Associates
Maitland, South Australia

Enclosure 1

APPENDIX 4

CHECKSHOT DATA

Stack number	Well depth[m]	TVD from SRD[m]	TT[ms]	TT(TVD Corrected)[ms]	TWT(TVD Corrected)[ms]	Interval] Velocity[m/s	Average Velocity[m/s]	RMS Velocity[m/s]
1	762.9	723.7	307.1	311.7	623.3	16.8	2322	2322
16	762.9	723.7	308.7	313.3	626.7	2809.7	2309.8	2315.8
15	830	790.8	332.5	337.2	674.4	2920.5	2345.1	2354.2
14	880.9	841.7	349.9	354.6	709.3	3106.1	2373.4	2385.2
13	1364	1324.7	505.2	510.1	1020.3	2776.2	2596.8	2626
12	1540	1500.7	568.6	573.5	1147.1	2922.3	2616.6	2643
2	1555	1515.7	573.7	578.7	1157.3	100.5	2619.3	2645.6
11	1555	1515.7	573.9	578.9	1157.8	3308.9	2618.4	2645.2
10	1701	1661.7	618	623	1246	3177.1	2667.3	2697.5
9	1871	1831.8	671.5	676.5	1353	3553.5	2707.7	2738.5
8	2217	2177.7	768.8	773.9	1547.7	4138.3	2814.1	2853.9
7	2311	2271.7	791.5	796.6	1593.2	-305.1	2851.8	2898.4
3	2311	2271.7	791.3	796.4	1592.8	4221.4	2852.4	2898.7
6	2374	2334.7	806.3	811.3	1622.7	3969.4	2877.6	2928.4
5	2442	2402.7	823.4	828.5	1656.9	4228.1	2900.2	2953.6
4	2500	2460.7	837.1	842.2	1684.4		2921.8	2978.8

Well depth[m]	Time	Shot Type	Shot#	Stack#	Source	Remarks
762.9	10:35:54	ENLO 1				
762.9	10:36:18	ENHI 2				
762.9	10:36:27	ETHD 3				
762.9	10:36:41	DRNG 4				
762.9	10:36:55	GA02 5				
762.9	10:37:04	GA04 6				
762.9	10:37:14	GA08 7				
762.9	10:37:24	GA16 8				
762.9	10:37:34	GA32 9				
762.9	10:37:48	XTLK 10				
762.9	10:38:07	XTLK 11				
762.9	10:38:25	XTLK 12				
762.9	10:38:43	EIMP 13				
762.9	10:41:05	BKGD 14				
762.9	10:42:46	SHOT 16		1	A	
762.9	10:44:44	SHOT 17		1	A	
762.9	10:44:54	SHOT 18		1	A	
762.9	10:46:47	SHOT 19		1	A	
1555.0	11:23:33	SHOT 20		2	A	
1555.0	11:23:51	SHOT 21		2	A	
1555.0	11:25:21	SHOT 22		2	A	
1555.0	11:26:37	SHOT 23		2	A	
1555.0	11:27:04	SHOT 24		2	A	
1555.0	11:27:14	SHOT 25		2	A	
1555.0	11:27:24	SHOT 26		2	A	
1555.0	11:27:34	SHOT 27		2	A	
1555.0	11:27:44	SHOT 28		2	A	
1555.0	11:27:54	SHOT 29		2	A	
1555.0	11:28:04	SHOT 30		2	A	
1555.0	11:28:14	SHOT 31		2	A	
2311.0	11:50:58	SHOT 33		3	A	
2311.0	11:51:30	SHOT 34		3	A	
2311.0	11:52:05	SHAK 35				
2311.0	11:52:40	SHOT 36		3	A	
2311.0	11:53:58	SHOT 37		3	A	
2311.0	11:55:01	SHOT 38		3	A	
2500.0	12:11:44	SHOT 39		4	A	
2500.0	12:12:31	SHOT 40		4	A	
2500.0	12:13:13	SHOT 41		4	A	
2500.0	12:13:28	SHOT 42		4	A	
2500.0	12:13:46	SHOT 43		4	A	
2442.0	12:20:31	SHOT 44		5	A	
2442.0	12:20:56	SHOT 45		5	A	
2442.0	12:21:27	SHOT 46		5	A	
2374.0	12:27:01	SHOT 47		6	A	
2374.0	12:27:24	SHOT 48		6	A	
2374.0	12:27:53	SHOT 49		6	A	
2311.0	12:32:27	SHOT 50		7	A	
2311.0	12:32:52	SHOT 51		7	A	
2311.0	12:33:19	SHOT 52		7	A	
2217.0	12:39:21	SHOT 53		8	A	
2217.0	12:39:57	SHOT 54		8	A	
2217.0	12:40:35	SHOT 55		8	A	
2217.0	12:41:00	SHOT 56		8	A	
2217.0	12:41:21	SHOT 57		8	A	
2217.0	12:42:03	SHOT 58		8	A	

2217.0	12:42:44	SHOT	59	8	A
2217.0	12:43:05	SHOT	60	8	A
1871.0	12:58:23	SHOT	61	9	A
1871.0	12:58:48	SHOT	62	9	A
1871.0	12:59:09	SHOT	63	9	A
1701.0	13:08:50	SHOT	64	10	A
1701.0	13:09:13	SHOT	65	10	A
1701.0	13:10:08	SHOT	66	10	A
1555.0	13:18:02	SHOT	67	11	A
1555.0	13:18:41	SHOT	68	11	A
1555.0	13:19:13	SHOT	69	11	A
1540.0	13:23:18	SHOT	70	12	A
1540.0	13:23:41	SHOT	71	12	A
1540.0	13:24:03	SHOT	72	12	A
1364.0	13:33:04	SHOT	73	13	A
1364.0	13:33:26	SHOT	74	13	A
1364.0	13:33:48	SHOT	75	13	A
880.9	13:53:20	SHOT	76	14	A
880.9	13:54:05	SHOT	77	14	A
880.9	13:54:28	SHOT	78	14	A
830.0	13:59:27	SHOT	79	15	A
830.0	14:00:07	SHOT	80	15	A
830.0	14:00:18	SHOT	81	15	A
830.0	14:00:32	SHOT	82	15	A
762.9	14:05:24	SHOT	83	16	A
762.9	14:06:02	SHOT	84	16	A
762.9	14:06:20	SHOT	85	16	A
762.9	14:06:55	SHOT	86	16	A

APPENDIX 5

SURVEY DATA

North Wirrah 1 Final Geodetic Survey

Report Date:	September 27, 2005	Survey / DLS Computation Method:	Minimum Curvature / Lubinski
Client:	Esso Australia Pty Ltd	Vertical Section Azimuth:	0.000°
Field:	North Wirrah	Vertical Section Origin:	N 0.000 m, E 0.000 m
Structure / Slot:	North Wirrah / 1	TVD Reference Datum:	RKB
Well:	North Wirrah 1	TVD Reference Elevation:	39.2 m relative to MSL
Borehole:	North Wirrah 1	Sea Bed / Ground Level Elevation:	90.200 m relative to MSL
UWI/API#:		Magnetic Declination:	13.006°
Survey Name / Date:	North Wirrah 1 Final / September 9, 2005	Total Field Strength:	59979.379 nT
Tort / AHD / DDI / ERD ratio:	34.447° / 15.71 m / 3.249 / 0.006	Magnetic Dip:	-68.743°
Grid Coordinate System:	GDA94/MGA94 Zone 55	Declination Date:	September 09, 2005
Location Lat/Long:	S 38 10 57.074, E 147 50 20.683	Magnetic Declination Model:	BGGM 2004
Location Grid N/E Y/X:	N 5773600.980 m, E 573486.520 m	North Reference:	Grid North
Grid Convergence Angle:	-0.51871524°	Total Corr Mag North -> Grid North:	+13.525°
Grid Scale Factor:	0.99966651	Local Coordinates Referenced To:	Well Head

Comments	Measured Depth (m)	Inclination (deg)	Azimuth (deg)	TVD (m)	Vertical Section (m)	NS (m)	EW (m)	DLS (deg/30 m)	Northing (m)	Easting (m)	Latitude	Longitude
Tie-In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5773600.98	573486.52	S 38 10 57.074	E 147 50 20.683
	56.60	0.32	42.40	56.60	0.12	0.12	0.11	0.17	5773601.10	573486.63	S 38 10 57.070	E 147 50 20.687
	86.00	0.40	58.77	86.00	0.23	0.23	0.25	0.13	5773601.21	573486.77	S 38 10 57.067	E 147 50 20.693
	116.00	0.16	49.65	116.00	0.31	0.31	0.37	0.24	5773601.29	573486.89	S 38 10 57.064	E 147 50 20.698
	146.00	0.22	140.89	146.00	0.29	0.29	0.44	0.27	5773601.27	573486.96	S 38 10 57.064	E 147 50 20.701
	176.00	0.20	143.80	176.00	0.21	0.21	0.51	0.02	5773601.19	573487.03	S 38 10 57.067	E 147 50 20.704
	206.00	0.29	131.05	206.00	0.12	0.12	0.59	0.10	5773601.10	573487.11	S 38 10 57.070	E 147 50 20.707
	236.00	0.20	133.86	236.00	0.03	0.03	0.69	0.09	5773601.01	573487.21	S 38 10 57.073	E 147 50 20.711
	266.00	0.16	125.76	266.00	-0.03	-0.03	0.76	0.05	5773600.95	573487.28	S 38 10 57.075	E 147 50 20.714
	296.00	0.18	137.36	296.00	-0.09	-0.09	0.83	0.04	5773600.89	573487.35	S 38 10 57.077	E 147 50 20.717
	326.00	0.23	161.17	326.00	-0.18	-0.18	0.88	0.10	5773600.80	573487.40	S 38 10 57.080	E 147 50 20.719
	356.00	0.19	163.93	356.00	-0.29	-0.29	0.91	0.04	5773600.69	573487.43	S 38 10 57.083	E 147 50 20.720
	386.00	0.25	157.87	386.00	-0.40	-0.40	0.95	0.06	5773600.58	573487.47	S 38 10 57.087	E 147 50 20.722
	416.00	0.57	139.71	416.00	-0.57	-0.57	1.07	0.34	5773600.41	573487.59	S 38 10 57.092	E 147 50 20.727
	446.00	0.74	141.47	445.99	-0.84	-0.84	1.29	0.17	5773600.14	573487.81	S 38 10 57.101	E 147 50 20.736
	476.00	0.74	172.45	475.99	-1.18	-1.18	1.43	0.40	5773599.80	573487.95	S 38 10 57.112	E 147 50 20.742
	506.00	0.56	207.56	505.99	-1.50	-1.50	1.39	0.43	5773599.48	573487.91	S 38 10 57.122	E 147 50 20.741
	536.00	0.65	297.54	535.99	-1.55	-1.55	1.17	0.86	5773599.43	573487.69	S 38 10 57.124	E 147 50 20.732
	566.00	1.02	289.46	565.99	-1.38	-1.38	0.77	0.39	5773599.60	573487.29	S 38 10 57.119	E 147 50 20.715
	596.00	0.83	277.69	595.98	-1.27	-1.27	0.30	0.27	5773599.71	573486.82	S 38 10 57.115	E 147 50 20.696
	626.00	0.67	273.30	625.98	-1.23	-1.23	-0.09	0.17	5773599.75	573486.43	S 38 10 57.114	E 147 50 20.680
	656.00	0.60	266.84	655.98	-1.23	-1.23	-0.42	0.10	5773599.75	573486.10	S 38 10 57.114	E 147 50 20.666
	686.00	0.61	241.78	685.98	-1.31	-1.31	-0.72	0.26	5773599.67	573485.80	S 38 10 57.117	E 147 50 20.654
	716.00	0.45	250.69	715.97	-1.42	-1.42	-0.97	0.18	5773599.56	573485.55	S 38 10 57.121	E 147 50 20.644
	746.00	0.57	256.13	745.97	-1.50	-1.50	-1.22	0.13	5773599.48	573485.30	S 38 10 57.123	E 147 50 20.633
	776.00	0.48	231.83	775.97	-1.61	-1.61	-1.47	0.24	5773599.37	573485.05	S 38 10 57.127	E 147 50 20.623
	806.00	0.45	200.43	805.97	-1.80	-1.80	-1.61	0.25	5773599.18	573484.91	S 38 10 57.133	E 147 50 20.617
	836.00	0.54	203.88	835.97	-2.04	-2.04	-1.71	0.09	5773598.94	573484.81	S 38 10 57.141	E 147 50 20.613
	862.00	0.48	210.12	861.97	-2.25	-2.25	-1.81	0.09	5773598.73	573484.71	S 38 10 57.148	E 147 50 20.609
	893.68	0.54	245.83	893.65	-2.42	-2.42	-2.01	0.30	5773598.56	573484.51	S 38 10 57.153	E 147 50 20.601
	903.56	0.58	248.38	903.53	-2.46	-2.46	-2.10	0.14	5773598.52	573484.42	S 38 10 57.155	E 147 50 20.597
	932.70	0.44	234.88	932.67	-2.58	-2.58	-2.33	0.19	5773598.40	573484.19	S 38 10 57.158	E 147 50 20.588
	990.76	0.26	175.81	990.73	-2.84	-2.84	-2.50	0.20	5773598.14	573484.02	S 38 10 57.167	E 147 50 20.581
	1019.54	0.54	193.35	1019.50	-3.04	-3.04	-2.53	0.32	5773597.95	573483.99	S 38 10 57.173	E 147 50 20.580
	1077.81	0.29	221.48	1077.77	-3.41	-3.41	-2.69	0.16	5773597.57	573483.83	S 38 10 57.186	E 147 50 20.574
	1106.72	0.64	350.02	1106.68	-3.31	-3.31	-2.77	0.88	5773597.67	573483.75	S 38 10 57.182	E 147 50 20.570
	1135.67	0.46	115.12	1135.63	-3.20	-3.20	-2.69	1.02	5773597.78	573483.83	S 38 10 57.179	E 147 50 20.573
	1164.40	0.42	197.79	1164.36	-3.35	-3.35	-2.62	0.61	5773597.63	573483.90	S 38 10 57.183	E 147 50 20.577
	1193.40	0.56	294.34	1193.36	-3.39	-3.39	-2.78	0.76	5773597.59	573483.74	S 38 10 57.185	E 147 50 20.570
	1222.23	0.52	28.54	1222.19	-3.22	-3.22	-2.85	0.82	5773597.76	573483.68	S 38 10 57.179	E 147 50 20.567
	1251.36	0.39	119.27	1251.32	-3.15	-3.15	-2.70	0.67	5773597.83	573483.83	S 38 10 57.177	E 147 50 20.573
	1280.30	0.08	24.79	1280.26	-3.18	-3.18	-2.60	0.42	5773597.80	573483.92	S 38 10 57.178	E 147 50 20.577
	1309.52	0.33	150.56	1309.48	-3.24	-3.24	-2.55	0.39	5773597.75	573483.97	S 38 10 57.180	E 147 50 20.579
	1338.44	0.08	121.48	1338.40	-3.32	-3.32	-2.49	0.27	5773597.66	573484.03	S 38 10 57.182	E 147 50 20.582
	1367.65	0.04	86.18	1367.61	-3.33	-3.33	-2.47	0.05	5773597.65	573484.06	S 38 10 57.183	E 147 50 20.583
	1396.59	0.14	13.59	1396.55	-3.29	-3.29	-2.45	0.14	5773597.69	573484.07	S 38 10 57.182	E 147 50 20.583
	1425.61	0.09	247.14	1425.57	-3.27	-3.27	-2.46	0.21	5773597.71	573484.06	S 38 10 57.181	E 147 50 20.583
	1454.63	0.09	239.09	1454.59	-3.29	-3.29	-2.50	0.01	5773597.69	573484.02	S 38 10 57.181	E 147 50 20.581

	1483.60	0.09	326.47	1483.56	-3.28	-3.28	-2.53	0.13	5773597.70	573483.99	S 38 10 57.181	E 147 50 20.580
	1514.78	0.10	321.13	1514.74	-3.24	-3.24	-2.56	0.01	5773597.74	573483.96	S 38 10 57.180	E 147 50 20.579
	1543.88	0.18	23.57	1543.84	-3.18	-3.18	-2.56	0.17	5773597.80	573483.96	S 38 10 57.178	E 147 50 20.579
	1572.78	0.82	223.85	1572.74	-3.29	-3.29	-2.69	1.03	5773597.70	573483.84	S 38 10 57.181	E 147 50 20.574
	1601.76	0.56	79.58	1601.72	-3.41	-3.41	-2.69	1.36	5773597.57	573483.83	S 38 10 57.185	E 147 50 20.574
	1630.85	0.60	199.29	1630.81	-3.53	-3.53	-2.60	1.03	5773597.45	573483.92	S 38 10 57.189	E 147 50 20.577
	1659.81	0.43	51.27	1659.77	-3.60	-3.60	-2.57	1.03	5773597.38	573483.95	S 38 10 57.192	E 147 50 20.579
	1688.90	0.44	182.95	1688.85	-3.65	-3.65	-2.49	0.82	5773597.34	573484.03	S 38 10 57.193	E 147 50 20.582
	1717.84	0.53	41.23	1717.79	-3.66	-3.66	-2.40	0.95	5773597.33	573484.12	S 38 10 57.193	E 147 50 20.585
	1747.00	0.28	169.79	1746.95	-3.62	-3.62	-2.30	0.76	5773597.36	573484.22	S 38 10 57.192	E 147 50 20.590
	1775.86	0.35	77.10	1775.81	-3.67	-3.67	-2.20	0.48	5773597.31	573484.32	S 38 10 57.194	E 147 50 20.594
	1805.05	0.55	290.44	1805.00	-3.61	-3.61	-2.25	0.89	5773597.38	573484.27	S 38 10 57.192	E 147 50 20.592
	1833.85	0.32	60.02	1833.80	-3.52	-3.52	-2.31	0.83	5773597.46	573484.21	S 38 10 57.189	E 147 50 20.589
	1862.83	0.15	246.30	1862.78	-3.49	-3.49	-2.27	0.49	5773597.49	573484.25	S 38 10 57.188	E 147 50 20.591
	1891.75	0.15	134.08	1891.70	-3.53	-3.53	-2.28	0.26	5773597.45	573484.24	S 38 10 57.189	E 147 50 20.590
	1920.75	0.17	272.78	1920.70	-3.56	-3.56	-2.30	0.31	5773597.42	573484.22	S 38 10 57.190	E 147 50 20.590
	1949.87	0.35	186.88	1949.82	-3.64	-3.64	-2.35	0.39	5773597.34	573484.17	S 38 10 57.193	E 147 50 20.588
	1978.84	0.26	160.55	1978.79	-3.79	-3.79	-2.34	0.17	5773597.19	573484.18	S 38 10 57.198	E 147 50 20.588
	2007.56	0.14	204.19	2007.51	-3.89	-3.89	-2.33	0.19	5773597.09	573484.19	S 38 10 57.201	E 147 50 20.588
	2037.00	0.39	15.84	2036.95	-3.82	-3.82	-2.32	0.54	5773597.16	573484.20	S 38 10 57.199	E 147 50 20.589
	2065.85	0.37	104.82	2065.80	-3.75	-3.75	-2.20	0.55	5773597.23	573484.32	S 38 10 57.196	E 147 50 20.594
	2094.68	0.27	193.57	2094.63	-3.84	-3.84	-2.13	0.47	5773597.14	573484.39	S 38 10 57.199	E 147 50 20.597
	2122.77	0.23	27.70	2122.72	-3.86	-3.86	-2.12	0.53	5773597.12	573484.40	S 38 10 57.200	E 147 50 20.597
	2152.72	0.24	123.57	2152.67	-3.84	-3.84	-2.04	0.35	5773597.14	573484.48	S 38 10 57.199	E 147 50 20.601
	2181.64	0.12	259.28	2181.59	-3.88	-3.88	-2.02	0.35	5773597.10	573484.50	S 38 10 57.200	E 147 50 20.601
	2210.42	0.35	284.90	2210.37	-3.86	-3.86	-2.13	0.26	5773597.12	573484.39	S 38 10 57.200	E 147 50 20.597
	2268.77	0.26	338.68	2268.72	-3.69	-3.69	-2.35	0.15	5773597.29	573484.17	S 38 10 57.195	E 147 50 20.588
	2297.54	0.37	75.80	2297.49	-3.61	-3.61	-2.28	0.50	5773597.37	573484.24	S 38 10 57.192	E 147 50 20.590
	2326.44	0.35	145.23	2326.39	-3.66	-3.66	-2.14	0.43	5773597.32	573484.38	S 38 10 57.193	E 147 50 20.596
	2355.51	0.30	319.01	2355.46	-3.67	-3.67	-2.14	0.67	5773597.31	573484.38	S 38 10 57.194	E 147 50 20.596
	2384.59	0.39	241.02	2384.54	-3.66	-3.66	-2.28	0.45	5773597.32	573484.24	S 38 10 57.194	E 147 50 20.591
	2413.62	0.87	2.44	2413.57	-3.49	-3.49	-2.36	1.16	5773597.49	573484.16	S 38 10 57.188	E 147 50 20.587
	2442.55	1.34	312.94	2442.49	-3.04	-3.04	-2.60	1.06	5773597.94	573483.93	S 38 10 57.174	E 147 50 20.577
	2471.71	0.99	325.00	2471.65	-2.60	-2.60	-2.99	0.44	5773598.38	573483.53	S 38 10 57.159	E 147 50 20.561
	2500.45	0.06	8.13	2500.38	-2.38	-2.38	-3.13	0.99	5773598.60	573483.39	S 38 10 57.152	E 147 50 20.555
	2529.61	0.38	274.63	2529.54	-2.36	-2.36	-3.22	0.40	5773598.62	573483.30	S 38 10 57.152	E 147 50 20.551
	2558.55	0.40	283.44	2558.48	-2.33	-2.33	-3.42	0.07	5773598.65	573483.10	S 38 10 57.151	E 147 50 20.543
	2587.37	0.40	333.57	2587.30	-2.22	-2.22	-3.56	0.35	5773598.76	573482.96	S 38 10 57.147	E 147 50 20.537
	2616.44	0.18	272.94	2616.37	-2.12	-2.12	-3.65	0.36	5773598.86	573482.87	S 38 10 57.144	E 147 50 20.534
	2644.58	0.03	300.03	2644.51	-2.12	-2.12	-3.70	0.16	5773598.86	573482.82	S 38 10 57.144	E 147 50 20.532
Projected to TD	2678.00	0.06	123.22	2677.93	-2.12	-2.12	-3.69	0.08	5773598.86	573482.83	S 38 10 57.144	E 147 50 20.532

Survey Type: Definitive Survey

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

Surveying Prog:

MD From (m)	MD To (m)	EOU Freq	Survey Tool Type	Borehole -> Survey
-51.00	0.00	Act-Stns	SLB_CNSG+DPIPE	North Wirrah 1 -> North Wirrah 1 Final
0.00	862.00	Act-Stns	SLB_CNSG+DPIPE	North Wirrah 1 -> North Wirrah 1 Final
862.00	2678.00	Act-Stns	SLB_MWD-STD	North Wirrah 1 -> North Wirrah 1 Final

APPENDIX 6

RIG POSITIONING REPORT

2.0 RESULTS

2.1 Final Position

The final position of the *Ensco 102* drill stem was established by calculating the mean position from three hours of DGPS data logged between 14:03 and 17:03 on 4 September 2005. During this period, calculated drill stem coordinates from the primary and secondary positioning systems were logged at a five second interval in Starfix.Seis. Data from the primary positioning system was used for the final position calculation.

The final position in this report is identical to that issued in the preliminary positioning report (Prelim Report – North Wirrah-1.pdf) on 5 September 2005.

Differential GPS corrections were derived using a multi-reference solution with base station data from Bathurst, Melbourne and Cobar.

The GDA94 geographical position of the drill stem at North Wirrah-1 is shown in Table 2-1.

GDA94			
Position	**Method**	**Latitude**	**Longitude**
Drill Stem	DGPS	38° 10’ 57.094” S	147° 50’ 20.674” E
Proposed Location	-	38° 10’ 57.216” S	147° 50’ 20.729” E

TABLE 2-1 : GEOGRAPHICAL POSITION FOR THE DRILL STEM AT NORTH WIRRAH-1 (GDA 94)

GDA94 grid coordinates (CM 147° E) of the drill stem at North Wirrah-1 are shown in Table 2-2.

GDA94, MGA, CM 147°E			
Position	**Method**	**Easting (m)**	**Northing (m)**
Drill Stem	DGPS	573486.30	5773600.38
Proposed Location	-	573487.60	5773596.60

TABLE 2-2 : GRID COORDINATES FOR THE DRILL STEM AT NORTH WIRRAH-1 (GDA 94)

This position is 3.99m at a bearing of 341.0° (Grid) from the design location.

The final GPS antenna position in WGS84 of the *Ensco 102* at the North Wirrah-1 is shown in Table 2-3.

WGS84				
Position	**Latitude**	**Longitude**	**Latitude (DD.ddddddd)**	**Longitude (DD.ddddddd)**
Fwd GPS Antenna	38° 10’ 59.742”S	147° 50’ 24.218”E	38.1832617°S	147.8400606°E

TABLE 2-3 : GEOGRAPHICAL POSTION FOR GPS ANTENNA AT NORTH WIRRAH-1 (WGS84)

The final GPS antenna position in GDA94 at North Wirrah-1 is shown in Table 2-4.

GDA94				
Position	**Latitude**	**Longitude**	**Latitude (DD.ddddddd)**	**Longitude (DD.ddddddd)**
Fwd GPS Antenna	38° 10’ 59.762” S	147° 50’ 24.208” E	38.1832672°S	147.8400578°E

TABLE 2-4 : GEOGRAPHICAL POSTION FOR GPS ANTENNA AT NORTH WIRRAH-1 (GDA94)

The rig position field report is contained in Appendix B.

Time series graphs covering logging period can be found in Appendix C.

2.2 Final Carrier Phase Position

The final carrier phase position of the *Ensco 102* drill stem was verified by processing three hours of carrier phase GPS data logged between 14:02 and 17:03 on 4 September 2005, with AUSLIG’s AUSPOS online processing service. During this period, forward GPS antenna coordinates from the primary positioning system were logged at a five second interval. These coordinates were then combined with the vessel offsets to calculate the drill stem position.

Carrier phase data were logged using a Ashtech ZXtreme dual frequency GPS receiver with a Ashtech L1\L2 geodetic antenna.

GDA94 geographical coordinates for the carrier phase drill stem position at North Wirrah-1 are shown in Table 2-5.

GDA94			
Position	**Method**	**Latitude**	**Longitude**
Drill Stem	Carrier Phase	38° 10’ 57.094” S	147° 50’ 20.677” E

TABLE 2-5 : CARRIER PHASE GEOGRAPHICAL POSITION FOR DRILL STEM AT NORTH WIRRAH-1 (GDA 94)

GDA94 grid coordinates (CM 147°E) for the carrier phase drill stem position at North Wirrah-1 are shown in Table 2-6.

GDA94, MGA, CM 147° E			
Position	**Method**	**Easting (m)**	**Northing (m)**
Drill Stem	Carrier Phase	573486.37	5773600.37

TABLE 2-6 : CARRIER PHASE GRID COORDINATES FOR DRILL STEM AT NORTH WIRRAH-1 (GDA 94)

This position is 3.97m at a bearing of 341.9° (grid) from the design location and 0.07m at a bearing of 98.1° (grid) from the final Differential GPS drill stem position.

2.3 Comparison between DGPS and Carrier Phase Positions

A comparison was made between the DGPS and carrier phase drill stem positions of North Wirrah-1. This comparison confirms the position provided in the preliminary positioning report is accurate and therefore accepted as the definitive rig position. The result of this comparison is shown in Table 2-7.

Difference Easting (m)	Difference Northing (m)
-0.07	0.01

TABLE 2-7 : DGPS AND CARRIER PHASE COMPARISONS

Results of the AUSLIG's AUSPOS online processing report are provided in Appendix D. Rinex data and final fix data are provided on CD.

2.4 Rig Heading

The heading of the *Ensco 102* was established by calculating the average heading during three hours of corrected gyro compass readings logged between 14:03 and 17:03 on 4 September 2005. During this period, gyro readings were logged at a five second interval in Starfix.Seis.

The *Ensco 102's* rig heading is shown in Table 2-8.

Description	Method	True	Grid
Rig Heading	Gyro	135.32°	135.84°
Proposed Heading	-	135.00°	135.52°

TABLE 2-8 : RIG HEADING

2.5 Leg Penetrations

Leg penetration values were calculated by the *Ensco 102*'s Barge Engineer as follows:

Bow : 1.01m (3.3ft)
Port : 0.79m (2.6ft)
Starboard : 0.88m (2.9ft)

ENCLOSURE 1

MASTER LOG

1:500 SCALE

MASTERLOG
NORTH WIRRAH-1

GENERAL

Country : AUSTRALIA
Permit : VIC / L2
Field : WIRRAH
Basin : GIPPSLAND BASIN
Well Type : N F WILDCAT
Rig Name : ENSCO 102

SURFACE POSITON

Latitude : 38 10'57.094"S
Longitude : 147 50'20.674"E
MGA94 Coord X: 573,486.30mE
MGA94 Coord Y: 5,773,600.38mN
RT to MSL : 39.2m
RT to Sea Bed : 92.0m

HOLE / CASING INFO

20" Conductor @ 155.0mMDRT
9 5/8" Casing @ 884.0mMDRT

12 1/4" Hole to 888.0mMDRT
8 1/2" Hole to 2678.0mMDRT

DATE / DEPTH

Spud Date : 04 SEPT 2005
Total Depth Date : 18 SEPT 2005
Total Depth : 2678.0mMDRT
True Vertical Depth : 2677.9mTVDRT
Log Scale : 1/ 500
Final Status : PLUGGED & ABANDONED

ENGINEERS

Matt Boyd
Daniel van der Aa
Boris Beranek
Tom Platt
Noel Elliott
Farhad Makhad

ABBREVIATIONS

MW	Mud Weight	WOB	Weight on Bit (klbs)
FV	Funnel Viscosity	RPM	Rotations Per Min
PV	Plastic Viscosity	FLW	Flow Rate (gpm)
YP	Yield Point	SPP	Pump Pressure (psi)
Gel	Gel Strength	RR	Re-Run Bit
WL	Water Loss	TG	Trip Gas
KCl	Potassium Chloride	CG	Connection Gas
Cl	Chlorides	BG	Background Gas
Incl	Inclination	DGP	Drilled Gas Peak
Az	Azimuth	MM	Mud Motor

LITHOLOGY LEGEND

CLAYSTONE, MARL, BRYOZOA, CARB FRAGMENT
SILTSTONE, LIMESTONE, RADIOLARITES, QUARTZITE
SST: F - V FINE, DOLOMITE, ECHINOIDS, INTRUSIVES
SST: MEDIUM, CHERT, CORALS, GLAUCONITE
SST: COARSE, CONGLOMERATE, FORAMINIFERA, PYRITE
SHALE, COAL, LITHIC FRAGMENT, CEMENT

ENGINEERING LEGEND

CASING SHOE, WIRELINE LOGS
LINER HANGER, MDT POINTS:
BIT CHANGE, PRESSURE ONLY
DEVIA. SURVEY, SAMPLE
SWC UNRECOV, SEAL FAILURE
SIDEWALL CORE, TIGHT
CORE

ROP (m/hr) 0 125 250
WOB (tons) 50 25 0
MWD Gamma Ray (api) 500 50 5 .5
DEPTH (m) (TVD)
CUTTINGS LITHOLOGY % 0 100
TOTAL GAS & CHROMATOGRAPH DATA
C1, C2, C3, iC4, nC4, iC5, nC5, TG
Total Gas in Units
Chromatograph in PPM
.05 .5 5 50 500 5K
10 100 1K 10K 100K 1000K
CUT FLUOR good fair poor
DIRECT FLR good fair poor
LITHOLOGY DESCRIPTIONS and REMARKS

80
90
100 (100)
110
120 (120)
130

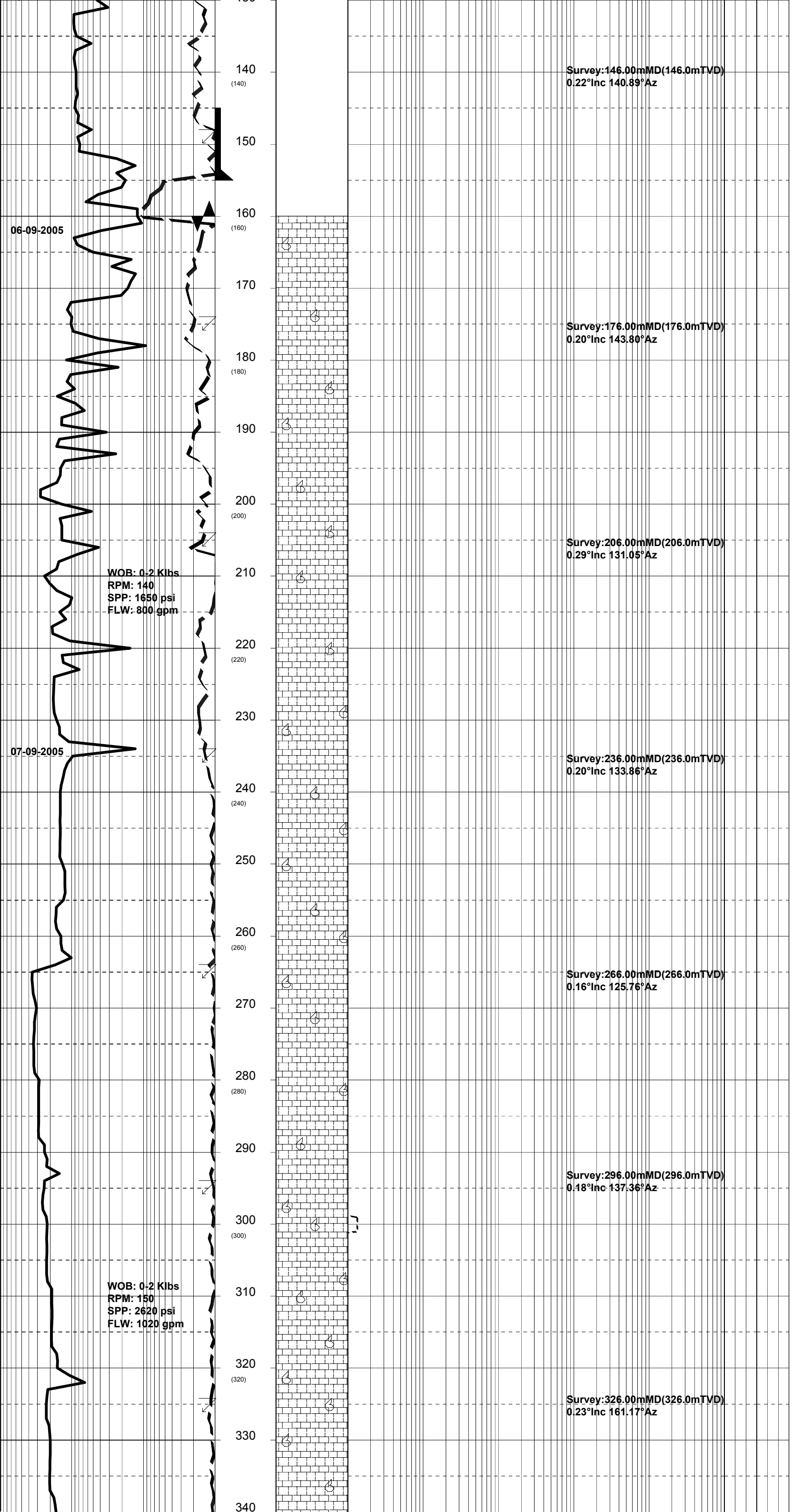
Survey:116.00mMD(116.0mTVD)
0.16°Inc 49.65°Az

NORTH WIRRAH-1 SPUDDED AT 14:45 HRS ON 04-09-2005

RETURNS TO SEABED

DRILL FROM 92m TO 160m WITH SEAWATER, SWEEPING THE HOLE WITH PREHYDRATED BENTONITE HI-VIS MUD

BIT# 1RR: 26" 558.8mm
SECURITY TCI BIT
JETS: 4 x 28,
IN: 92m OUT: 160m
RUN: 68m HRS: 4.9
COND:1-1-WT-A-E-I-NO-TD


140
(140)
150
160
(160)
06-09-2005
170
180
(180)
190
200
(200)
210
WOB: 0-2 Klbs
RPM: 140
SPP: 1650 psi
FLW: 800 gpm
220
(220)
230
07-09-2005
240
(240)
250
260
(260)
270
280
(280)
290
300
(300)
310
WOB: 0-2 Klbs
RPM: 150
SPP: 2620 psi
FLW: 1020 gpm
320
(320)
330
340
Survey:146.00mMD(146.0mTVD)
0.22°Inc 140.89°Az
20" CONDUCTOR SET @ 155.0 m
BIT# 2: 12.25" 311.15mm
REED DS40HF
JETS: 4 x 16,
IN: 160m OUT: 888m
RUN: 728m HRS: 16.2
COND:1-1-WT-A-E-X-I-TC
Survey:176.00mMD(176.0mTVD)
0.20°Inc 143.80°Az
CALCARENITE:clr-trnsl,lt gy,
wh,med-crs,abdt foss & shll frag,
forams,pred lse,frm aggs,gd intgran
vis por,no fluor.
Survey:206.00mMD(206.0mTVD)
0.29°Inc 131.05°Az
Survey:236.00mMD(236.0mTVD)
0.20°Inc 133.86°Az
CALCARENITE:clr-trnsl,lt gy,
wh,med-crs,abdt foss & shll frag,
forams,pred lse,frm aggs,gd intgran
vis por,no fluor.
Survey:266.00mMD(266.0mTVD)
0.16°Inc 125.76°Az
Survey:296.00mMD(296.0mTVD)
0.18°Inc 137.36°Az
Survey:326.00mMD(326.0mTVD)
0.23°Inc 161.17°Az
CALCARENITE:lt gy,lt gn gy
i/p,abdt foss frag,fri,occ
g/t CLCLT,gd intgran inf por,
no fluor.

500 50 5 25

10 100 1K 10K 100K 1000K

350
360
(360)
370
380
(380)
390
400
(400)
410
420
(420)
430
440
(440)
450
460
(460)
470
480
(480)
490
500
(500)
510
520
(520)
530
540
(540)
550

Survey:356.00mMD(356.0mTVD)
0.19°Inc 163.93°Az

Survey:386.00mMD(386.0mTVD)
0.25°Inc 157.87°Az

Survey:416.00mMD(416.0mTVD)
0.57°Inc 139.71°Az

Survey:446.00mMD(446.0mTVD)
0.74°Inc 141.47°Az

Survey:476.00mMD(476.0mTVD)
0.74°Inc 172.45°Az

Survey:506.00mMD(506.0mTVD)
0.56°Inc 2097.56°Az

Survey:536.00mMD(536.0mTVD)
0.65°Inc 297.54°Az

WOB: 0-2 Klbs
RPM: 155
SPP: 2700 psi
FLW: 1020 gpm

WOB: 0-3 Klbs
RPM: 150
SPP: 2800 psi
FLW: 1000 gpm

CALCARENITE:lt gy,lt gn gy i/p,abdt foss frag,fri,occ g/t CLCLT,gd intgran inf por, no fluor.

CALCARENITE:lt gy,lt gn gy i/p,abdt foss frag,fri, gd intgran inf por,no fluor.

CALCARENITE:lt gy,lt gn gy com pl gy lut mtx,i/p,abdt foss frag, fri-sft,pr vis pr,no fluor.

500 50 5 .5

10 100 1K 10K 100K 1000K

560 (560)

570

580 (580)

590

600 (600)

610

620 (620)

630

640 (640)

650

660 (660)

670

680 (680)

690

700 (700)

710

720 (720)

730

740 (740)

750

760

Survey:566.00mMD(566.0mTVD)
1.02°Inc 289.46°Az

Survey:596.00mMD(596.0mTVD)
0.83°Inc 277.69°Az

Survey:626.00mMD(626.0mTVD)
0.67°Inc 273.30°Az

Survey:656.00mMD(656.0mTVD)
0.60°Inc 266.84°Az

Survey:686.00mMD(686.0mTVD)
0.61°Inc 241.78°Az

Survey:716.00mMD(716.0mTVD)
0.45°Inc 250.69°Az

Survey:746.00mMD(746.0mTVD)
0.57°Inc 256.13°Az

WOB: 5-15 Klbs
RPM: 155
SPP: 2900 psi
FLW: 1250 gpm

CALCARENITE:lt gy,lt gn gy com pl gy lut mtx,i/p,abdt foss frag, fri-sft,pr vis pr,no fluor.

CALCARENITE:lt gy,lt gn gy rr pl gy-off wh arg mtx,abdt foss frag,com pl gn gy xln lmst, fri-sft,pr vis pr,no fluor.

CALCARENITE:lt gy,lt gn gy abdt fossil frag,com pl gn gy xln lmst,rr gn dissem glauc,fri-sft,pr vis pr,no fluor.

500 50 5 .5 10 100 1K 10K 100K 1000K

770
780
(780)
790
800
(800)
810
820
(820)
830
840
(840)
850
860
(860)
870
880
(880)
890
900
(900)
910
920
(920)
930
940
(940)
950
960
(960)
970

TOP MIOCENE SST
770.0mMDRT 770.0mTVDRT
(-730.8mTVDSS)

Survey:776.00mMD(776.0mTVD)
0.48°Inc 231.83°Az

CLAYSTONE:lt brn-lt gy,slty,sft-frm, sbblky.

SANDSTONE:quartz,cr-mlky,med, dom crs-v crs,mod wl srt,sbang-sbrnd,tr glauc,lse grns to wk occ mod calc cmtd aggregates,pr to fr infr por, no shows.

Survey:806.00mMD(806.0mTVD)
0.457°Inc 200.43°Az

WOB: 3-15 Klbs
RPM: 148
SPP: 3250 psi
FLW: 1000 gpm

CLAYSTONE:lt bn-lt gy,slty,sft-frm, blky-sbblky,v calc.

BASE MIOCENE SST
830.00mMDRT 830.0mTVDRT
(-790.8mTVDSS)

Survey:836.00mMD(836.0mTVD)
0.54°Inc 203.88°Az

Survey:862.00mMD(862.0mTVD)
0.48°Inc 210.12°Az

CALCARENITE:lt gy,lt bn/gy,com lthic frags,occ macro foss frags, com lt gy xln LMST,frm,pr vis por, no fluor.

9 5/8" CASING SHOE AT 884.0m

11-09-2005

Survey:893.68mMD(893.6mTVD)
0.54°Inc 245.83°Az

BIT# 3: 8.5" 215.9mm
REED RSX 162
JETS: 6 x 18
IN: 888m OUT: 1508m
RUN: 620m HRS: 50.0
COND:1-1-PN-N-X-1-NO-RIG

Survey:903.56mMD(903.5mTVD)
0.58°Inc 248.38°Az

CALCARENITE:lt gy-lt brn/gy,com lthic frags,arg,foss frags i/p, frm-loc hd,v pr vis por,no fluor.

Survey:932.70mMD(932.7mTVD)
0.44°Inc 234.88°Az

CALCARENITE:mott gy & wh,vf-slty, wl srt,abdt calc cmt/mtx,abdt gry arg i/p,tr glauc,fri,ti-pr vis por,no fluor.

82 / 10 / 5 / 3

WOB: 18-20 Klbs
RPM: 175-188
SPP: 1800-1900 psi
FLW: 760 gpm

CALCARENITE:mott gy & wh,vf-slty, wl srt,abdt calc cmt/mtx,abdt gy arg i/p,mnr macro foss frags,fri,pr vis por,no fluor.

MW:8.80
FV:48
PV:17
YP:17
Ck:1/32
Gel:7/9/11
HGS:1.52
Cl:35k

500 50 5 .5

980 (980)
990
1000 (1000)
1010
1020 (1020)
1030
1040 (1040)
1050
1060 (1060)
1070
1080 (1080)
1090
1100 (1100)
1110
1120 (1120)
1130
1140 (1140)
1150
1160 (1160)
1170
1180

12-09-2005

WOB: 18-21 Klbs
RPM: 80-120
SPP: 1800-1900 psi
FLW: 760 gpm

10 100 1K 10K 100K 1000K

Survey:990.76mMD(990.7mTVD)
0.26°Inc 175.81°Az

84 / 10 / 4 / 2

86 / 8 / 3 / 3

Survey:1019.54mMD(1019.5mTVD)
0.54°Inc 193.35°Az

86 / 8 / 4 / 2

Survey:1077.81mMD(1077.8mTVD)
0.29°Inc 221.48°Az

87 / 8 / 3 / 2

Survey:1106.72mMD(1106.7mTVD)
0.64°Inc 350.02°Az

86 / 8 / 4 / 1

Survey:1135.67mMD(1135.6mTVD)
0.46°Inc 115.12°Az

Survey:1164.40mMD(1164.4mTVD)
0.42°Inc 197.79°Az

LIMESTONE:(TR)pl brn,microxln, hd,blky.

Rmf:0.14 ohm @ 65°F

CALCARENITE:mott gy & wh,vf-slty, wl srt,abdt calc cmt/mtx,abdt gy arg i/p,mnr macro foss frags,fri,pr vis por,no fluor.

CALCARENITE:mott gy & wh,vf-slty, wl srt,abdt calc cmt/mtx,abdt gy arg i/p,mnr macro foss frags,fri,pr vis por,no fluor.

500 50 5 .5

MW:9.20
FV:54
PV:14
YP:33
Ck:1/2
Gel:5/7/8
HGS:0.6
Cl:34.5k

WOB: 17-21 Klbs
RPM: 80-105
SPP: 1990-2100 psi
FLW: 750 gpm

WOB: 20-30 Klbs
RPM: 80-105
SPP: 2100-2250 psi
FLW: 750 gpm

1190
1200 (1200)
1210
1220 (1220)
1230
1240 (1240)
1250
1260 (1260)
1270
1280 (1280)
1290
1300 (1300)
1310
1320 (1320)
1330
1340 (1340)
1350
1360 (1360)
1370
1380 (1380)
1390

0 100 1K 10K 100K 1000K

84 / 4 / 2 / 1 / 9

Survey:1193.40mMD(1193.4mTVD)
0.56°Inc 294.34°Az

90 / 3 / 1 / 0 / 6

Survey:1222.23mMD(1222.2mTVD)
0.52°Inc 28.54°Az

94 / 3 / 2 / 1 / tr

Survey:1251.36mMD(1251.3mTVD)
0.39°Inc 119.27°Az

Survey:1280.30mMD(1280.3mTVD)
0.08°Inc 24.79°Az

92 / 4 / 2 / 1 / 1

Survey:1309.52mMD(1309.5mTVD)
0.33°Inc 150.56°Az

95 / 2 / 1 / 1 / 1

Survey:1338.44mMD(1338.4mTVD)
0.08°Inc 121.48°Az

Survey:1367.65mMD(1367.6mTVD)
0.04°Inc 86.18°Az

CALCARENITE:mott gy & wh,vf-slty, wl srt,abdt calc cmt/mtx,abdt gy arg i/p,mnr macro foss frags,fri,pr vis por,no fluor.

CALCARENITE:dk gy-gy brn com med gy,vf,slty,wl srt,calc cmt,arg mtx,frm-hd,mnr macro foss frags,tr glauc, pr vis por,no fluor.

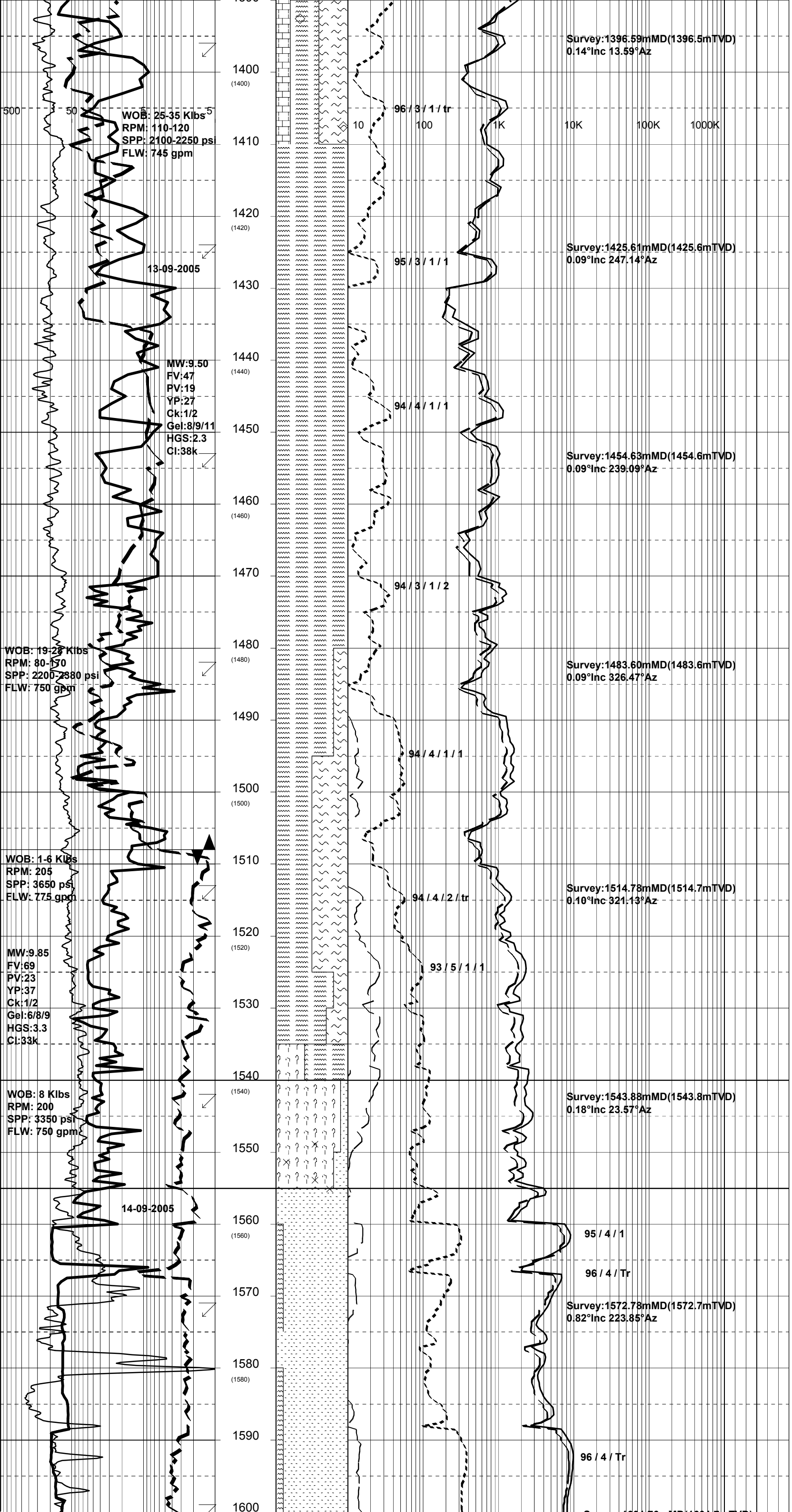
CALCARENITE:dk gy-gy brn-med gy, vf,wl srt,bec v arg i/p,frm-hd,tr glauc, pr vis por,no fluor.

CALCARENITE:pl gy,slty-vf,wl srt, sbrnd,calc cmt/mtx,com arg mtx,com micro glauc flecks,ti vis por,no fluor.

CALCISILTITE:wh,v pl gy,arg i/p g/t marl,aren i/p g/t vf calc aren,frm, sbblky.

LAKES ENTRANCE FM
1364.0mMDRT 1364.0mTVDRT
(-1272.0mTVDSS)

MARL:pl gy & wh mott w/- calc silt, tr micro glauc,tr nod pyr,frm,sbblky.



CALCISILTITE:dk gy,arg,tr diss blk spks,frm-hd,sbblky-blky.

CALCISILTITE:pl gy & wh,arg i/p g/t marl,aren i/p & g/t Calcarenite, com f grn glauc,frm,sbblky.

Changed to 5m formation samples from 1480mMDRT.

MARL:v pl gy,com glauc flecks, frm,sbblky-sbfiss.

CALCISILTITE:lt gy,aren,lam,g/t Calcarenite,arg i/p g/t marl,abdt glauc spks & occ lam,frm,sbblky.

MARL:lt gy,com glauc spks,frm, sbblky.

POOH for top drive repair due to the inability to optimise RPM, hence ROP.

BIT# 3RR: 8.5" 215.9mm
REED RSX 162
JETS: 6 x 13
IN: 1508m OUT: 2678m
RUN: 1170m HRS: 52.4
COND: 5-8-RO-S-X-1/16-LT-TD

MARL:wh & lt gy,com glauc grns,lam w/- clcslt,frm & disp,sbblky.

LATROBE GROUP
1540.0mMDRT 1540.0mTVDRT
(-1500.8mTVDSS)

CLAYSTONE:pl-med brn,abdt glauc grns,g/t silts,dis.
SILTSTONE:mott brn/gn,glauconitic, arg,sst lams,com frm,sbbly.
SANDSTONE:mott gn/brn,vf-f,mod wl srt,sa-sr,wkly cmt,abdt brn arg mtx, com nod pyr,abdt glauc,fri,nil-ti inf por,no fluor.

TOP N-150 SAND
1555.0mMDRT 1555.0mTVDRT
(-1515.8mTVDSS)

SANDSTONE:clr-trnsl,dom crs-vcrs, med,mod srt,sa-ang,lse,cln,gd inf por,no fluor.

SANDSTONE:clr-trnsl,f-crs dom med, pr srt,sa-ang,lse,cln,mnr arg mtx, gd inf por,no fluor.

CLAYSTONE:wh-pl-gy-med gy brn, slty i/p,com lith spks,sft,disp, amor-sbblky.

SANDSTONE:clr-trnsl,vf-med,dom f, mod w srt,sbang-ang,lse,arg mtx,gd inf por,no fluor.

500 50 5 .5

10 100 1K 10K 100K 1000K

1610
1620
(1620)
1630
1640
(1640)
1650
1660
(1660)
1670
1680
(1680)
1690
1700
(1700)
1710
1720
(1720)
1730
1740
(1740)
1750
1760
(1760)
1770
1780
(1780)
1790
1800
(1800)
1810

Survey:1601.76mMD(1601.7mTVD)
0.56°Inc 79.58°Az

ARGILLACEOUS SANDSTONE:olv gy-m brnsh gy,vf-f,v wl srt,dom sa,slty/arg, sft-frm,occ aggs,nil-v pr inf por, no fluor.

CLAYSTONE:pl gy-med gy,slty i/p, com lith spks,sft.disp,amor-sbblky.

TOP N.ASPER.COALS
1626.7mMDRT 1626.7mTVDRT
(-1587.5mTVDSS)

91 / 7 / 1 / 1

Survey:1630.85mMD(1630.8mTVD)
0.60°Inc 199.29°Az

COAL(TR):blk-dk brn,dll-sbvit, britt,sbblky,unev,slty i/p.

SANDSTONE:clr-trnsl,f-crs dom med-crs,sbrnd-ang,mod srt,lse,cln, tr arg mtx,gd inf por,no fluor.

89 / 9 / 1 / 1

COAL:blk-dk brn,dll-sbvit,britt, sbblky,unev,slty i/p.

CLAYSTONE:pl gy-med gy,slty i/p, com lith spks,sft.disp,amor-sbblky.

WOB: 5-15 Klbs
RPM: 200
SPP: 3420 psi
FLW: 755 gpm

Survey:1659.81mMD(1659.8mTVD)
0.43°Inc 51.27°Az

90 / 9 / 1 / Tr

COAL:blk-dk brn,dll-sbvit,britt, sbblky,unev,slty i/p.

SANDSTONE:clr-trnsl-med brnsh orng stn,med-vcrs dom med,p srt, sbang-ang,lse,tr arg mtx,com carb stn/incl,gd inf por,no fluor.

90 / 8 / 1 / 1

Survey:1688.90mMD(1688.9mTVD)
0.44°Inc 182.95°Az

SILTSTONE:med-dk gy-gysh brn,arg, com carb incl,sft-frm,sbblky.

90 / 8 / 1 / 1

TOP P.ASPER.COAL
1701.4mMDRT 1701.4mTVDRT
(-1662.2mTVDSS)

89 / 8 / 2 / 1

COAL:dk brn-blk,dll-sbvit,britt,sbblky, unev,slty.

SILTSTONE:med-dk gy-gysh brn,arg, com carb incl,sft-frm,sbblky.

89 / 8 / 2 / 1

Survey:1717.84mMD(1717.8mTVD)
0.53°Inc 41.23°Az

SANDSTONE:clr-trnsl,f-crs dom med-crs,p srt,ang-sbang,lse,tr arg mtx, gd inf por,no fluor.

TOP P-100 SAND
1721.0mMDRT 1721.0mTVDRT
(-1681.8mTVDSS)

SANDSTONE:clr-trnsl,f-crs dom med-crs,p srt,ang-sbang,strng sil cmt,com hd aggs,tr arg mtx,nil-ti inf/vis por, no fluor.

Survey:1747.00mMD(1747.0mTVD)
0.28°Inc 169.79°Az

CLAYSTONE:wh-pl brn,sft,disp,amor.

76 / 13 / 7 / 3 / 1

SILTSTONE:med gy-gysh brn,bec v arg,com carb incl,tr nod pyr,sft-frm, sbblky.

75 / 12 / 8 / 4 / 1

Survey:1775.86mMD(1775.8mTVD)
0.35°Inc 77.10°Az

COAL(tr):dk brn-blk,dll-vit,britt, sbblky,unev-conch,slty.

SILTSTONE:med gy-gysh brn,bec v arg,tr nod pyr,sft-frm,sbblky.

SANDSTONE:clr-trnsl,f dom med-crs com v crs,v p srt,srd-sa,lse,tr arg mtx,gd inf por,no fluor.

WOB: 10-15 Klbs
RPM: 200
SPP: 3420 psi
FLW: 755 gpm

500 50 5 .5

10 100 1K 10K 100K 1000K

1820 (1820)
1830
1840 (1840)
1850
1860 (1860)
1870
1880 (1880)
1890
1900 (1900)
1910
1920 (1920)
1930
1940 (1940)
1950
1960 (1960)
1970
1980 (1980)
1990
2000 (2000)
2010
2020

Survey:1833.85mMD(1833.8mTVD)
0.32°Inc 60.02°Az

Survey:1862.83mMD(1862.8mTVD)
0.15°Inc 246.30°Az

82 / 13 / 4 / 1

Survey:1891.75mMD(1891.7mTVD)
0.15°Inc 134.08°Az

WOB: 8-15 Klbs
RPM: 195
SPP: 3550 psi
FLW: 750 gpm

90 / 8 / 2 / tr

Survey:1920.75mMD(1920.7mTVD)
0.17°Inc 272.78°Az

87 / 9 / 3 / 1

88 / 8 / 3 / 1

Survey:1949.87mMD(1949.8mTVD)
0.35°Inc 186.88°Az

86 / 9 / 3 / 1 / 1

85 / 9 / 4 / 1 / 1

85 / 9 / 4 / 1 / 1

Survey:1978.84mMD(1978.8mTVD)
0.26°Inc 160.55°Az

89 / 6 / 3 / 1 / 1

WOB: 8-15 Klbs
RPM: 195
SPP: 3500 psi
FLW: 750 gpm

88 / 8 / 3 / 1 / tr

Survey:2007.56mMD(2007.5mTVD)
0.14°Inc 204.19°Az

90 / 6 / 2 / 1 / 1

SANDSTONE:clr-trnsl,f dom med-crs com v crs,v p srt,sr-sa,lse,tr arg mtx,gd inf por,no fluor.

TOP M.DIVERSUS COAL
1871.0mMDRT 1871.0mTVDRT
(-1831.8mTVDSS)

COAL:dk redsh brn-blk,eathy-sbvit,sbblky,unev-conch,slty i/p.

CLAYSTONE:v lt olv gy-whtsh gy, v sft-frm,sbblky.

TOP M-1 SAND
1890.0mMDRT 1890.0mTVDRT
(-1850.8mTVDSS)

SANDSTONE;clr-trnsl,f dom f-med,pr srt,sa-sr,lse,cln,gd inf por,no fluor.

COAL:dk redsh brn-blk,eathy-sbvit,sbblky,unev-conch,slty i/p.

CLAYSTONE:whtsh gy,frm-hd,sbblky.

SANDSTONE:clr-trnsl,f-crs dom f-med,mod srt,sbrnd-sbang,lse,cln, gd inf por,no fluor.

SILTSTONE:med gy-gysh brn,arg, com carb spks & incl,frm-hd,sbfiss-sbblky.

COAL:blk,,dl-sbvit,silty,sbconch frac-unev,brit.

SANDSTONE:clr-wh,vf-crs,dom med, mod srt,sa-sr,wk sil cmt,gen cln,com wh slty/kaol mtx,occ nod pyr,fri,gd inf por,no fluor.

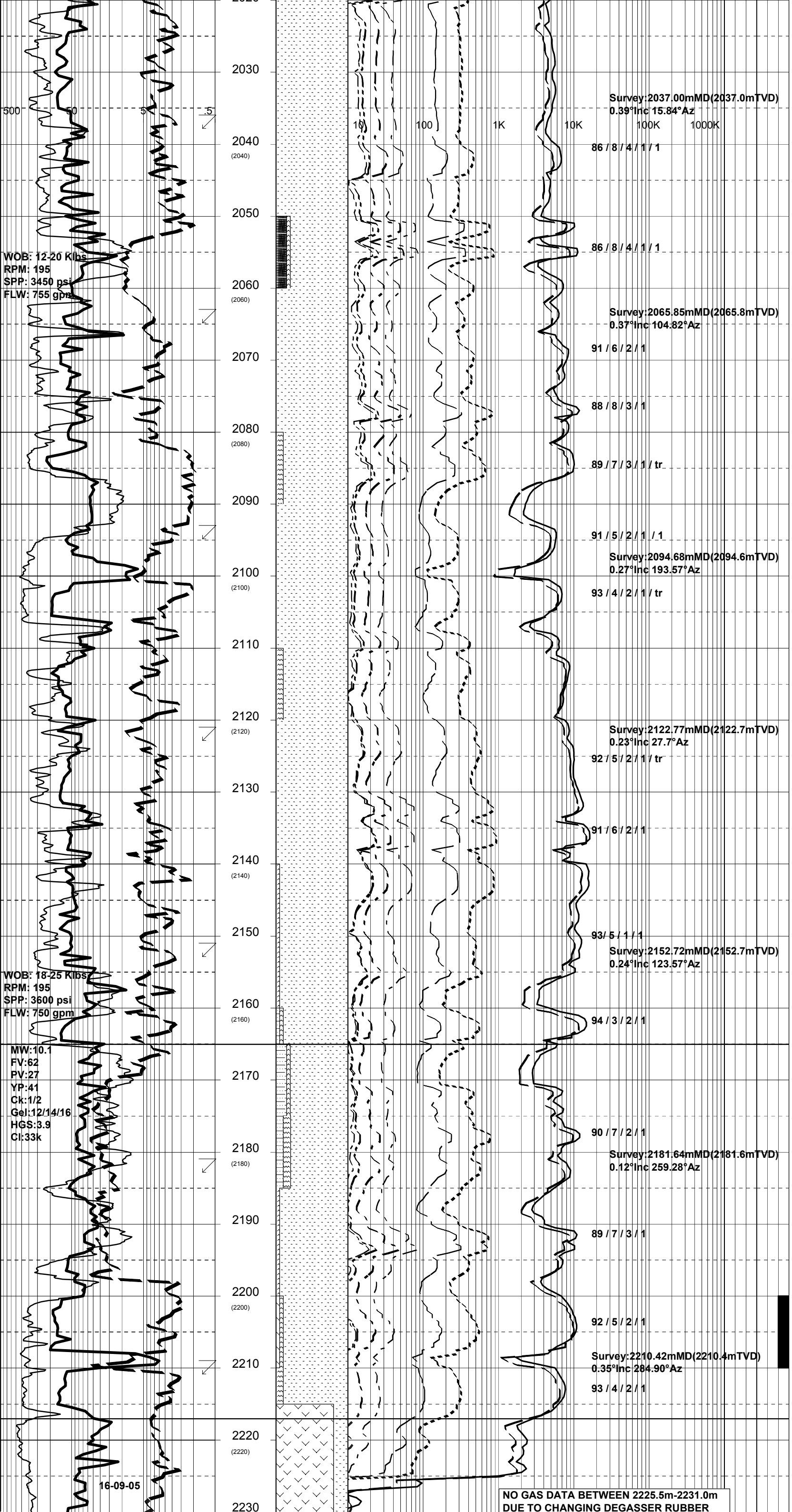
SILTSTONE:mott pl bn & wh,aren,g/t vf sst,com carb flks,mnr nod pyr, frm,sbblky.

SANDSTONE:clr-trnsl,vf-rr crs,dom med,sa-sr,unconsol,cln,tr pyr,fri, excl inf por,no fluor

SILTSTONE:mott brn & blk,arg,carb, frm,sbblky.

COAL:blk,dl-sbvit,slty,unev-sbconch frac,blky,brit.

SANDSTONE:trnsl-wh/pl gy,vf-rr crs, dom med,mod wl srt,sa(qtz o/g)-sr(vf), wk sil cmt,gen unconsol,com-abdt qtz o/gth,com wh slty/kaol mtx,tr pyr,



fri,gd inf por where cln,to pr vis por where mtx,no fluor.

SILTSTONE:pl gy & brn,aren,abdt flks, frm,sbblky.

SILTSTONE:mot brn/gy/blk,arg i/p,aren i/p,abdt carb mat,frm,sbblky.

SANDSTONE:clr-trnsl,f-rr crs,dom med,mod srt,sa-sr,unconsol,abdt qtz o/gth,cln,tr pyr,fri,gd-exel inf por, no fluor.

SAMPLES CONTAIN MINOR PROPELLOR SHAPED CAVINGS

CALC SILTSTONE:lt gn/gy,arg,hd, sbfiss.

SANDSTONE:clr-wh,f-rr crs,pred med, mod wl srt,sa,cmtd i/p,calc cmt i/p, com wh slty mtx,fri,gd inf por where cln,ti vis por where mtx,no fluor.

SILTSTONE:brn,pl gy,arg,com carb mat,frm-mod hd.

SANDSTONE:cl-trnsl,f qtz o/gth,rr crs, dom med,wl srt,sa-sr,unconsol,tr wh slty mtx,com calc mtx,fri,gd inf por, no fluor.

SILTSTONE:brn/gy,arg,aren i/p,com carb mat,mod hd,sbblky.

TOP LOWER BALMEI SHALE
2165.0mMDRT 2165.0mTVDRT
(-2073.0mTVDSS)

SILTSTONE:brn,aren,com carb mat, mod hd,sbblky.

SILTY SANDSTONE:wh,vf-f,wl srt,sr, wk sil cmt,abdt wh slty/kaol mtx-grn supp,fri,nil-ti vis por,no fluor.

SANDSTONE:clr-trnsl,f-crs dom med-crs,p srt,sa-sr,pred lse w/com wl cmtd ang crs aggs,arg mtx,ti vis,gd inf por, tr fluor.

FLUOR:2200.0m-2210.0m,TR-5%,sol dll-mod brt yell,crsh cut,tr res.

SILTSTONE:pl gnsh gy-med gy-gy brn, arg i/p,com carb incl,tr nod pyr,frm-hd,sbblky.

TOP LOWER BALMEI VOLCANIC
2217.0mMDRT 2217.0mTVDRT
(-2125.0mTVDSS)

VOLCANICS:wh-v pl gn-med gn,mott pl-med gn/wh,pl-med pnksh brn-brnsh

500 50 5 .5

10 100 1K 10K 100K 1000K

2240 (2240)

2250

2260 (2260)

2270

2280 (2280)

2290

2300 (2299.9)

2310

2320 (2319.9)

2330

2340 (2339.9)

2350

2360 (2359.9)

2370

2380 (2379.9)

2390

2400 (2399.9)

2410

2420 (2419.9)

2430

2440

WOB: 20-30 Klbs
RPM: 105
SPP: 3680 psi
FLW: 755 gpm

WOB: 26-38 Klbs
RPM: 100
SPP: 3850 psi
FLW: 750 gpm

WOB: 20-25 Klbs
RPM: 190
SPP: 3830 psi
FLW: 750 gpm

WOB: 25-35 Klbs
RPM: 205
SPP: 3900 psi
FLW: 750 gpm

94 / 3 / 2 / 1

92 / 5 / 2 / 1

Survey:2268.77mMD(2268.7mTVD)
0.26°Inc 338.68°Az

86 / 8 / 4 / 1 / 1

95 / 4 / 1 / tr

Survey:2297.54mMD(2297.5mTVD)
0.37°Inc 75.80°Az

87 / 8 / 3 / 1 / 1

86 / 8 / 4 / 1 / 1

Survey:2326.44mMD(2326.4mTVD)
0.35°Inc 145.23°Az

84 / 9 / 4 / 1 / 2

84 / 9 / 4 / 1 / 2

83 / 9 / 5 / 1 / 2

81 / 9 / 6 / 1 / 3

Survey:2355.51mMD(2355.5mTVD)
0.30°Inc 319.01°Az

91 / 5 / 2 / tr / 2

90 / 5 / 2 / 1 / 2

84 / 10 / 4 / 2 / tr

Survey:2384.59mMD(2384.6mTVD)
0.39°Inc 241.02°Az

85 / 8 / 4 / 1 / 2

93 / 5 / 2 / tr

91 / 6 / 2 / tr / 1

Survey:2413.62mMD(2413.6mTVD)
0.87°Inc 2.44°Az

91 / 6 / 2 / tr / 1

91 / 6 / 2 / tr / 1

Survey:2442.55mMD(2442.5mTVD)

gy,slty/arg,sft-frm,sbblky-blky.

VOLCANICS:wh-gn/wh mott,dk gnsh gy-dk gy,mod-dsky red-red/wh mott, slty/arg,com clr-wh f-med qtz,com frac qtz incl,sft/fri-v hd,sbfiss-sbblky.

VOLCANICS:wh-v pl gy,arg,abdt diss mic pyr,sft occ hd,amor-sbblky.

SANDSTONE:wh-v whtsh gy,vf-med, w srt,sr-sa,abdt wh vol mtx,tr diss pyr,nil-v pr por,no fluor.

VOLCANICS:v dk gnsh gy-blk,slty g/t Sltst i/p,abdt dk gn/blk grns, com wh Qtz grns/veins,com nod pyr, v hd,blky.

TOP L-450 RESERVOIR
2311.0mMDRT 2311.0mTVDRT
(-2271.8mTVDSS)

SANDSTONE:wh,vf-med occ crs,p srt, sa-sr,mnr-abdt wh vol mtx,com carb lams/incl,tr pyr,ti-gd por,w/-decr slty mtx,fluor.

FLUOR-2315m-2320m:100% dll even wh/blu fluor,sl diff wk-mod blu cut, thk ring-thn flm blu-wh res.

SANDSTONE:wh,f-occ crs,pred med, mod srt,ang-sa,abdt qtz o/gth,mod-wk sil cmt,abdt wh slty mtx in aggs,fri, ti-fr vis por w/-decr mtx,fluor.

FLUOR-2320m-2340m:(assoc w/-silty SST aggs)30%-dec 5%,mod bri, ptchy yel/wh fluor,sl cc,ptchy yel/wh res.

SANDSTONE:wh,vf-crs,pr srt,sa, wk cmt,abdt wh arg mtx,abdt qtz o/gth,com chlorite & pyr,ti-fr vis por w/-dec mtx,fluor.

FLUOR-2345m-2350m:tr fluor (in silty aggs),mod bri,ptchy yel/wh fluor,sl cc,ptchy yel/wh res.

SANDSTONE:clr-trnsl,vf-med,wl srt, sa,wk sil cmt,cln,com pyr,fri,gd inf por,no fluor.

SILTSTONE:mott brn/gy,aren,carb lams,mod hd,sbblky.

WEATHERED VOLCANICS:litharenite,w arg mtx,f grn supp,chlorite & pyr nods,dk gn/blk mafic rock frags, felds frags.

SANDSTONE:wh,vf-med,crs,mod srt, sa,wk sil cmt,abdt qtz o/gth,var wh arg mtx,fr-gd inf por w/-decr mtx,no fluor.

SILTSTONE:mott brn/gy,arg,aren i/p, carb flks,vf sst lams,mod hd,sbblky.

CLYSTONE:wh,slty,disp,sbblky.

SANDSTONE:wh-trnsl,f-crs,pr srt,sa-sr,wk sil cmt,abdt Qtz o/gth where crs,var wh arg mtx,com chlorite,tr pyr,fri,ti-gd vis por w/-dec mtx, no fluor.

500 50 5 .5

100 1K 10K 100K 1000K

MW:10.3
FV:63
PV:28
YP:59
Ck:2/2
Gel:15/17/19
HGS:4.8
Cl:36k

17-09-05

WOB: 25-30 Klbs
RPM: 185-190
SPP: 3900psi
FLW: 735 gpm

WOB: 20-30 Klbs
RPM: 190
SPP: 4000 psi
FLW: 750 gpm

2450
2460 (2459.9)
2470
2480 (2479.9)
2490
2500 (2499.9)
2510
2520 (2519.9)
2530
2540 (2539.9)
2550
2560 (2559.9)
2570
2580 (2579.9)
2590
2600 (2599.9)
2610
2620 (2619.9)
2630
2640 (2639.9)
2650

1.34°Inc 312.94°Az
89 / 7 / 3 / 1

SILTSTONE:mott & lam brn & gy,arg, abdt micro carb mat,mod hd,sbblky.

91 / 6 / 2 / tr / 1

CLAYSTONE:mott wh/gy/blk,slty & disp.

92 / 5 / 2 / 1 / tr

SANDSTONE:wh-trnsl,f-crs,pr srt,sa-sr,wk-mod sil cmt,abdt Qtz o/gth, cln-abdt wh arg mtx,fri,ti-fr por w/-dec mtx,no fluor.

84 / 10 / 5 / tr / 1

SILTSTONE:med-dk gy/blk,arg,v carb i/p,mod hd,sbfiss-sbblky.

Survey:2471.71mMD(2471.6mTVD)
0.99°Inc 325.00°Az

COAL:blk-dk brn,dll-sbvit,britt-frm,sbblky-blky,unev-conch,slty.

83 / 9 / 5 / 1 / 2

SILTY SANDSTONE:wh,vf-silty,g/t aren Sltst,abdt wh arg mtx,no vis por,fluor as below.

FLUOR-2470m-2475m:tr fluor (in silty aggs),dll ptchy yel/wh fluor,sl cc,ptchy yel/wh res.

85 / 9 / 4 / tr / 2

CLAYSTONE:wh,sft,disp,amor.

SANDSTONE:clr-trnsl,f-crs dom f-med,p srt,sr,lse,tr arg mtx,gd inf por, no fluor.

SILTSTONE:med-dk gy/blk,aren,arg i/p,tr carb,mod hd-hd,sbblky.

Survey:2500.45mMD(2500.4mTVD)
0.06°Inc 8.13°Az

86 / 8 / 4 / tr / 2

SANDSTONE:clr-trnsl,f-med,mod w srt,sr-sa,wk sil cmt,occ aggs,arg mtx,pr-fr inf/vis por,no fluor.

89 / 7 / 2 / tr / 2

CLAYSTONE:med-dk gy,slty i/p,carb, frm,sbblky.

Survey:2529.61mMD(2529.5mTVD)
0.38°Inc 274.63°Az

89 / 6 / 3 / tr / 2

SANDSTONE:clr-trnsl,f-med occ crs, pr srt,sr-sa,mod strg sil cmt,com aggs,arg mtx,ti-pr inf/vis por,no fluor.

86 / 9 / 3 / tr / 2

Survey:2558.55mMD(2558.5mTVD)
0.40°Inc 283.44°Az

90 / 7 / 2 / 1

SANDSTONE:wh-pl brn,f-crs,pr srt, sa,mod sil cmt,com wh slty mtx,mod hd ti vis por,no fluor.

SILTSTONE:brn/blk,arg,carb.mod hd, sbblky.

88 / 8 / 3 / tr / 1

CARB SILTSTONE:blk,g/t slty coal, britt,sbblky.

88 / 8 / 3 / tr / 1

89 / 7 / 3 / tr / 1

CARB SILTSTONE:gy/brn,med gy/dk dk gy i/p,arg,occ vf aren,com carb spks g/t coal i/p,micmic,tr nod & diss pyr,frm,loc hd,sbfiss-sbblky.

Survey:2587.37mMD(2587.3mTVD)
0.40°Inc 333.57°Az

91 / 6 / 2 / tr / 1

SANDSTONE:pl brn,f-med,mod srt,sa-sr,mod sil cmt,com slty mtx,mod hd,ti vis por,no fluor.

CARB SILTSTONE:med brn/brn,med gy arg-vf aren,com carb spks g/t coal i/p,occ micmic,tr nod pry,frm-hd, sbfiss-sbblky.

85 / 8 / 4 / 1 / 2

SILTSTONE:dk gy/brn,arg,carb,com chlorite min,mod hd,sbblky-sbfiss.

88 / 7 / 3 / tr / 2

SANDSTONE:wh,f-crs,pr srt,sa, wl cmt w/- silica,com wh slty mtx, abdt Qtz o/grth,com chlorite,mod hd-fri,ti vis por,no fluor.

Survey:2616.44mMD(2616.4mTVD)
0.18°Inc 272.94°Az

87 / 8 / 4 / tr / 1

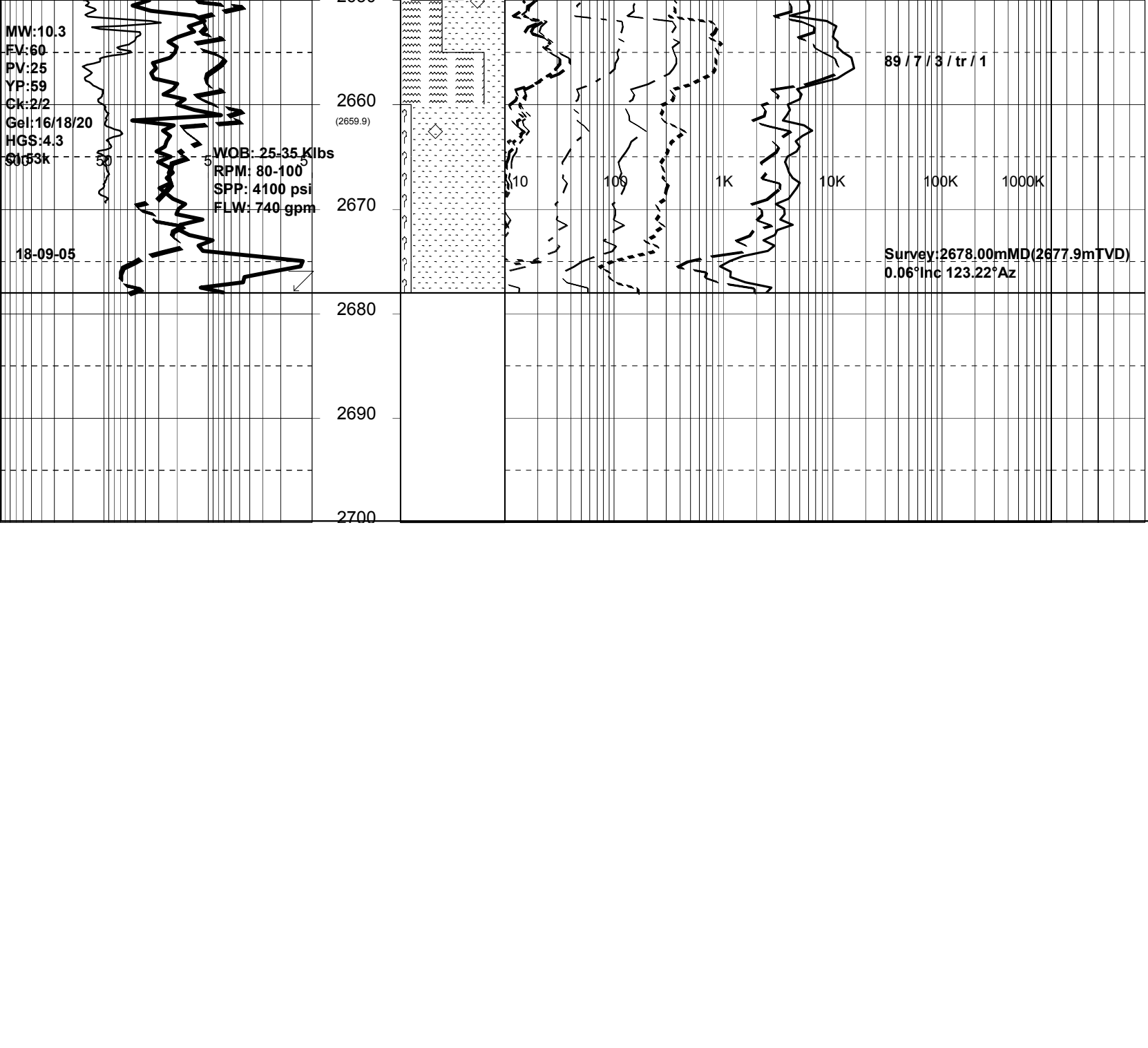
SANDSTONE:wh,vf-med,mod wl srt,sa-sr,wk-mod sil cmt,com Qtz o/gth,var (cln-abdt) wh arg mtx,fri-mod hd,ti vis to gd inf por w/-decr cmt & mtx, no fluor.

85 / 9 / 4 / tr / 2

SILTSTONE:dk gy/brn,arg,carb,com chlorite min,mod hd,sbblky-sbfiss.

84 / 9 / 5 / 1 / 1

Survey:2644.58mMD(2644.5mTVD)
0.03°Inc 300.03°Az



ARGILLACEOUS SANDSTONE:lt-med o
gy-gysh brn,vf-med dom f-med,mod w
srt,sa,mod cmt,com aggs,arg mtx,
mnr diss carb det/incl,pr vis por,
no fluor.

NORTH WIRRAH-1 TD AT
2678.00mMDRT 2677.90mTVDRT
(-2586.0mTVDSS)
AT 02:10 HRS ON 18-09-2005

WIRELINE LOGS RUN:
#1: HNGS-DSI
#2: VSP (CHECK SHOTS)

ENCLOSURE 2

MASTER LOG

1:200 SCALE

MASTERLOG
NORTH WIRRAH-1

Geoservices logging

GENERAL

Country : AUSTRALIA
Permit : VIC / L2
Field : WIRRAH
Basin : GIPPSLAND BASIN
Well Type : N F WILDCAT
Rig Name : ENSCO 102

SURFACE POSITION

Latitude : 38 10'57.094"S
Longitude : 147 50'20.674"E
MGA94 Coord X: 573,486.30mE
MGA94 Coord Y: 5,773,600.38mN
RT to MSL : 39.2m
RT to Sea Bed : 92.0m

HOLE / CASING INFO

20" Conductor at 155.0mMDRT
9 5/8" Casing at 884.0mMDRT

12 1/4" Hole to 888.0mMDRT
8 1/2" Hole to 2678.0mMDRT

DATE / DEPTH

Spud Date : 04 SEPT 2005
Total Depth Date : 18 SEPT 2005
Total Depth : 2678.0mMDRT
True Vertical Depth : 2677.9mTVDRT
Log Scale : 1/ 200
Final Status : PLUGGED & ABANDONED

ENGINEERS

Matt Boyd
Daniel van der Aa
Boris Beranek
Tom Platt
Noel Elliott
Farhad Makhad

ABBREVIATIONS

MW	Mud Weight	WOB	Weight on Bit (klbs)
FV	Funnel Viscosity	RPM	Rotations Per Min
PV	Plastic Viscosity	FLW	Flow Rate (gpm)
YP	Yield Point	SPP	Pump Pressure (psi)
Gel	Gel Strength	RR	Re-Run Bit
WL	Water Loss	TG	Trip Gas
KCl	Potassium Chloride	CG	Connection Gas
Cl	Chlorides	BG	Background Gas
Incl	Inclination	DGP	Drilled Gas Peak
Az	Azimuth	MM	Mud Motor

LITHOLOGY LEGEND

CLAYSTONE, MARL, BRYOZOA, CARB FRAGMENT
SILTSTONE, LIMESTONE, RADIOLARITES, QUARTZITE
SST: F - V FINE, DOLOMITE, ECHINOIDS, INTRUSIVES
SST: MEDIUM, CHERT, CORALS, GLAUCONITE
SST: COARSE, CONGLOMERATE, FORAMINIFERA, PYRITE
SHALE, COAL, LITHIC FRAGMENT, CEMENT

ENGINEERING LEGEND

CASING SHOE, WIRELINE LOGS
LINER HANGER, MDT POINTS:
BIT CHANGE, PRESSURE ONLY
DEVIA. SURVEY, SAMPLE
SWC UNRECOV, SEAL FAILURE
SIDEWALL CORE, TIGHT
CORE

1424

1428

1432

1436

1440
(1440)

1444

1448

1452

1456

1460
(1460)

1464

1468

1472

1476

1480
(1480)

1484

1488

1492

1496

1500
(1500)

1504

13-09-2005

MW:9.50
FV:47
PV:19
YP:27
Ck:1/2
Gel:8/9/11
HGS:2.3
Cl:38k

WOB: 19-28 Klbs
RPM: 80-170
SPP: 2200-2380 psi
FLW: 750 gpm

95 / 3 / 1 / 1

94 / 4 / 1 / 1

94 / 3 / 1 / 2

94 / 4 / 1 / 1

Survey:1425.61mMD(1425.6mTVD)
0.09°Inc 247.14°Az

Survey:1454.63mMD(1454.6mTVD)
0.09°Inc 239.09°Az

Survey:1483.60mMD(1483.6mTVD)
0.09°Inc 326.47°Az

CALCISILTITE:pl gy & wh,arg i/p g/t marl,aren i/p & g/t Calcarenite, com f grn glauc,frm,sbblky.

Changed to 5m formation samples from 1480mMDRT.

MARL:v pl gy,com glauc flecks, frm,sbblky-sbfiss.

CALCISILTITE:lt gy,aren,lam,g/t Calcarenite,arg i/p g/t marl,abdt glauc spks & occ lam,frm,sbblky.

MARL:lt gy,com glauc spks,frm,

MARL:lt gy,com glauc spks,frm, sbblky.

POOH for top drive repair due to the inability to optimise RPM, hence ROP.

WOB: 1-6 Klbs
RPM: 205
SPP: 3650 psi
FLW: 775 gpm

1508
1512

Survey:1514.78mMD(1514.7mTVD)
0.10°Inc 321.13°Az

94 / 4 / 2 / tr

BIT# 3RR: 8.5" 215.9mm
REED RSX 162
JETS: 6 x 13
IN: 1508m OUT: 2678m
RUN: 1170m HRS: 52.4
COND: 5-8-RO-S-X-1/16-LT-TD

1516
1520
(1520)

MW:9.85
FV:69
PV:23
YP:37
Ck:1/2
Gel:6/8/9
HGS:3.3
Cl:33k

1524

93 / 5 / 1 / 1

1528

MARL:wh & lt gy,com glauc grns,lam w/- clcslt,frm & disp,sbblky.

1532
1536

LATROBE GROUP
1540.0mMDRT 1540.0mTVDRT
(-1500.8mTVDSS)

1540
(1540)

WOB: 8 Klbs
RPM: 200
SPP: 3350 psi
FLW: 750 gpm

Survey:1543.88mMD(1543.8mTVD)
0.18°Inc 23.57°Az

CLAYSTONE:pl-med brn,abdt glauc grns,g/t silts,dis.

1544
1548

SILTSTONE:mott brn/gn,glauconitic, arg,sst lams,com frm,sbbly.

1552

SANDSTONE:mott gn/brn,vf-f,mod wl srt,sa-sr,wkly cmt,abdt brn arg mtx, com nod pyr,abdt glauc,fri,nil-ti inf por,no fluor.

1556

14-09-2005

TOP N-150 SAND
1555.0mMDRT 1555.0mTVDRT
(-1515.8mTVDSS)

1560
(1560)

95 / 4 / 1

1564

SANDSTONE:clr-trnsl,dom crs-vcrs, med,mod srt,sa-ang,lse,cln,gd inf por,no fluor.

96 / 4 / Tr

1568
1572

Survey:1572.78mMD(1572.7mTVD)
0.82°Inc 223.85°Az

SANDSTONE:clr-trnsl,f-crs dom med, pr srt,sa-ang,lse,cln,mnr arg mtx, gd inf por,no fluor.

1576
1580
(1580)

CLAYSTONE:wh-pl-gy-med gy brn, slty i/p,com lith spks,sft,disp, amor-sbblky.

1584
1588

1592

1596

1600
(1600)

1604

1608

1612

1616

1620
(1620)

1624

1628

1632

1636

1640
(1640)

1644

1648

1652

1656

1660
(1660)

1664

1668

1672

96 / 4 / Tr

Survey:1601.76mMD(1601.7mTVD)
0.56°Inc 79.58°Az

91 / 7 / 1 / 1

Survey:1630.85mMD(1630.8mTVD)
0.60°Inc 199.29°Az

89 / 9 / 1 / 1

Survey:1659.81mMD(1659.8mTVD)
0.43°Inc 51.27°Az

90 / 9 / 1 / Tr

WOB: 5-15 Klbs
RPM: 200
SPP: 3420 psi
FLW: 755 gpm

SANDSTONE:clr-trnsl,vf-med,dom f, mod w srt,sbang-ang,lse,arg mtx,gd inf por,no fluor.

ARGILLACEOUS SANDSTONE:olv gy-m brnsh gy,vf-f,v wl srt,dom sa,slty/arg, sft-frm,occ aggs,nil-v pr inf por, no fluor.

CLAYSTONE:pl gy-med gy,slty i/p, com lith spks,sft.disp,amor-sbblky.

TOP N.ASPER.COALS
1626.7mMDRT 1626.7mTVDRT
(-1587.5mTVDSS)

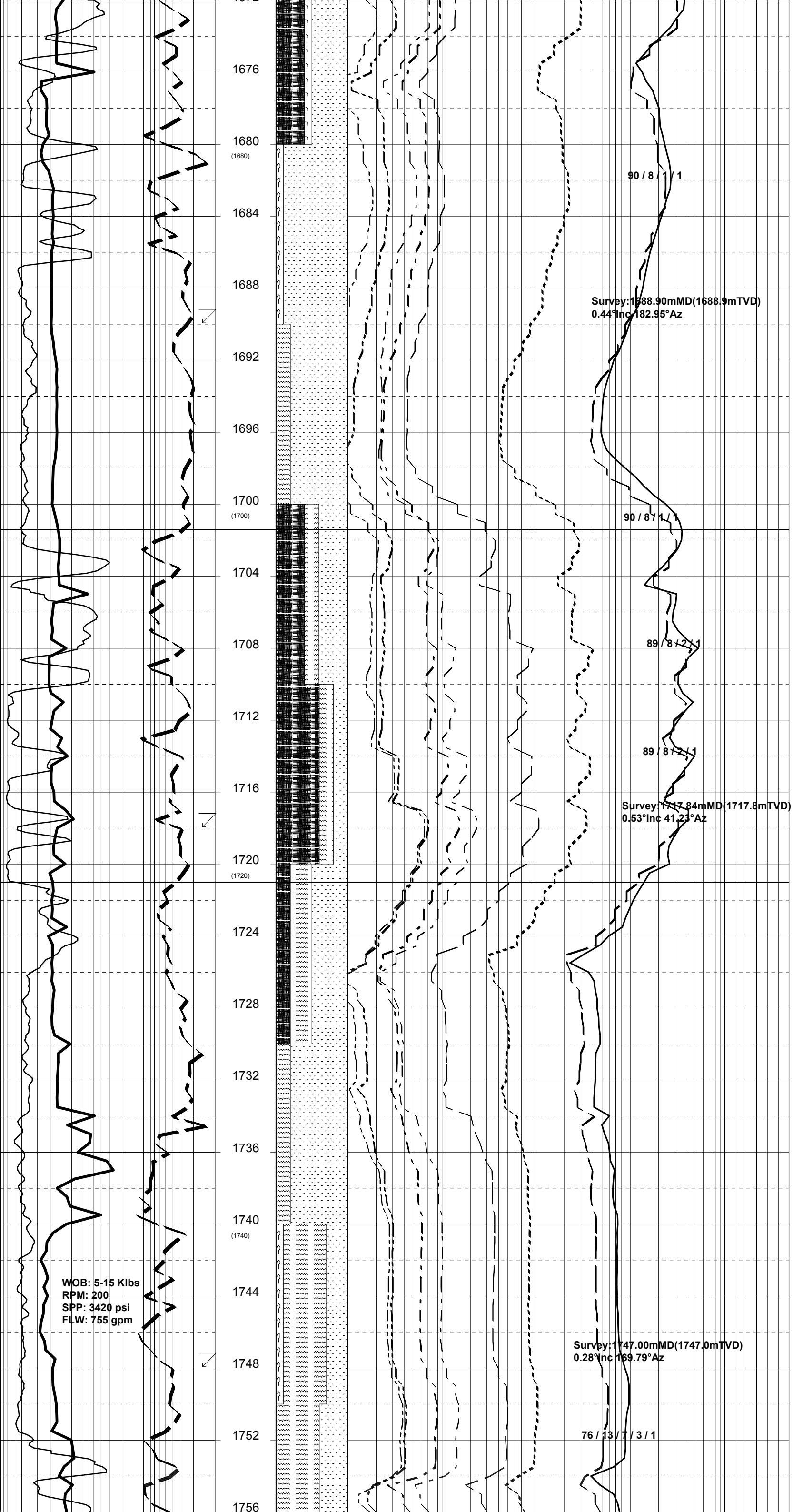
COAL(TR):blk-dk brn,dll-sbvit, britt,sbblky,unev,slty i/p.

SANDSTONE:clr-trnsl,f-crs dom med-crs,sbrnd-ang,mod srt,lse,cln, tr arg mtx,gd inf por,no fluor.

COAL:blk-dk brn,dll-sbvit,britt, sbblky,unev,slty i/p.

CLAYSTONE:pl gy-med gy,slty i/p, com lith spks,sft.disp,amor-sbblky.

COAL:blk-dk brn,dll-sbvit,britt, sbblky,unev,slty i/p.



SANDSTONE:clr-trnsl-med brnsh orng stn,med-vcrs dom med,p srt, sbang-ang,lse,tr arg mtx,com carb stn/incl,gd inf por,no fluor.

SILTSTONE:med-dk gy-gysh brn,arg, com carb incl,sft-frm,sbblky.

TOP P.ASPER.COAL
1701.4mMDRT 1701.4mTVDRT
(-1662.2mTVDSS)

COAL:dk brn-blk,dll-sbvit,britt,sbblky, unev,slty.

SILTSTONE:med-dk gy-gysh brn,arg, com carb incl,sft-frm,sbblky.

SANDSTONE:clr-trnsl,f-crs dom med-crs,p srt,ang-sbang,lse,tr arg mtx, gd inf por,no fluor.

TOP P-100 SAND
1721.0mMDRT 1721.0mTVDRT
(-1681.8mTVDSS)

SANDSTONE:clr-trnsl,f-crs dom med-crs,p srt,ang-sbang,strng sil cmt,com hd aggs,tr arg mtx,nil-ti inf/vis por, no fluor.

CLAYSTONE:wh-pl brn,sft,disp,amor.

SILTSTONE:med gy-gysh brn,bec v arg,com carb incl,tr nod pyr,sft-frm,

sbblky.

1760
(1760)

75 / 12 / 8 / 4 / 1

1764

1768

1772

Survey:1775.86mMD(1775.8mTVD)
0.35°Inc 77.10°Az

1776

1780
(1780)

1784

COAL(tr):dk brn-blk,dll-vit,britt,
sbblky,unev-conch,slty.

1788

SILTSTONE:med gy-gysh brn,bec v
arg,tr nod pyr,sft-frm,sbblky.

1792

1796

1800
(1800)

SANDSTONE:clr-trnsl,f dom med-crs
com v crs,v p srt,srd-sa,lse,tr arg
mtx,gd inf por,no fluor.

1804

1808

1812

1816

1820
(1820)

WOB: 10-15 Klbs
RPM: 200
SPP: 3420 psi
FLW: 755 gpm

1824

1828

1832

Survey:1833.85mMD(1833.8mTVD)
0.32°Inc 60.02°Az

1836

1840

1844
1848
1852
1856
1860
(1860)
1864
1868
1872
1876
1880
(1880)
1884
1888
1892
1896
1900
(1900)
1904
1908
1912
1916
1920
(1920)
1924

Survey:1862.83mMD(1862.8mTVD)
0.15°Inc 246.30°Az

82 / 13 / 4 / 1

Survey:1891.75mMD(1891.7mTVD)
0.15°Inc 134.08°Az

WOB: 8-15 Klbs
RPM: 195
SPP: 3550 psi
FLW: 750 gpm

90 / 8 / 2 / tr

Survey:1920.75mMD(1920.7mTVD)
0.17°Inc 272.78°Az

SANDSTONE:clr-trnsl,f dom med-crs com v crs,v p srt,sr-sa,lse,tr arg mtx,gd inf por,no fluor.

TOP M.DIVERSUS COAL
1871.0mMDRT 1871.0mTVDRT
(-1831.8mTVDSS)

COAL:dk redsh brn-blk,eathy-sbvit,sbblky,unev-conch,slty i/p.

CLAYSTONE:v lt olv gy-whtsh gy, v sft-frm,sbblky.

TOP M-1 SAND
1890.0mMDRT 1890.0mTVDRT
(-1850.8mTVDSS)

SANDSTONE;clr-trnsl,f dom f-med,pr srt,sa-sr,lse,cln,gd inf por,no fluor.

COAL:dk redsh brn-blk,eathy-sbvit,sbblky,unev-conch,slty i/p.

CLAYSTONE:whtsh gy,frm-hd,sbblky.

SANDSTONE:clr-trnsl,f-crs dom f-med,mod srt,sbrnd-sbang,lse,cln, gd inf por,no fluor.

1928
1932
1936
1940
(1940)
1944
1948
1952
1956
1960
(1960)
1964
1968
1972
1976
1980
(1980)
1984
1988
1992
1996
2000
(2000)
2004
2008

87 / 9 / 3 / 1

88 / 8 / 3 / 1

Survey:1949.87mMD(1949.8mTVD)
0.35°Inc 186.88°Az

86 / 9 / 3 / 1 / 1

85 / 9 / 4 / 1 / 1

85V 9 / 4 / 1 / 1

Survey:1978.84mMD(1978.8mTVD)
0.26°Inc 160.55°Az

89V 6 / 3 / 1 / 1

88 / 8 / 3 / 1 V tr

Survey:2007.56mMD(2007.5mTVD)
0.14°Inc 204.19°Az

WOB: 8-15 Klbs
RPM: 195
SPP: 3500 psi
FLW: 750 gpm

SILTSTONE:med gy-gysh brn,arg, com carb spks & incl,frm-hd,sbfiss-sbblky.

COAL:blk,,dl-sbvit,silty,sbconch frac-unev,brit.

SANDSTONE:clr-wh,vf-crs,dom med, mod srt,sa-sr,wk sil cmt,gen cln,com wh slty/kaol mtx,occ nod pyr,fri,gd inf por,no fluor.

SILTSTONE:mott pl bn & wh,aren,g/t vf sst,com carb flks,mnr nod pyr, frm,sbblky.

SANDSTONE:clr-trnsl,vf-rr crs,dom med,sa-sr,unconsol,cln,tr pyr,fri, excl inf por,no fluor

SILTSTONE:mott brn & blk,arg,carb, frm,sbblky.

COAL:blk,dl-sbvit,slty,unev-sbconch frac,blky,brit.

2012
2016
2020
(2020)
2024
2028
2032
2036
2040
(2040)
2044
2048
2052
2056
2060
(2060)
2064
2068
2072
2076
2080
(2080)
2084
2088
2092

90 / 6 / 2 / 1 / 1

SANDSTONE:trnsl-wh/pl gy,vf-rr crs, dom med,mod wl srt,sa(qtz o/g)-sr(vf), wk sil cmt,gen unconsol,com-abdt qtz o/gth,com wh slty/kaol mtx,tr pyr, fri,gd inf por where cln,to pr vis por where mtx,no fluor.

Survey:2037.00mMD(2037.0mTVD)
0.39°Inc 15.84°Az

SILTSTONE:pl gy & brn,aren,abdt flks, frm,sbblky.

86 / 8 / 4 / 1 / 1

86 / 8 / 4 / 1 / 1

SILTSTONE:mot brn/gy/blk,arg i/p,aren i/p,abdt carb mat,frm,sbblky.

WOB: 12-20 Klbs
RPM: 195
SPP: 3450 psi
FLW: 755 gpm

Survey:2065.85mMD(2065.8mTVD)
0.37°Inc 104.82°Az

91 / 6 / 2 / 1

SANDSTONE:clr-trnsl,f-rr crs,dom med,mod srt,sa-sr,unconsol,abdt qtz o/gth,cln,tr pyr,fri,gd-exel inf por, no fluor.

88 / 8 / 3 / 1

SAMPLES CONTAIN MINOR PROPELLOR SHAPED CAVINGS

89 / 7 / 3 / 1 / tr

CALC SILTSTONE:lt gn/gy,arg,hd, sbfiss.

2096

2100
(2100)

2104

2108

2112

2116

2120
(2120)

2124

2128

2132

2136

2140
(2140)

2144

2148

2152

2156

2160
(2160)

2164

2168

2172

2176

91 / 5 / 2 / 1 / 1

Survey:2094.68mMD(2094.6mTVD)
0.27°Inc 193.57°Az

93 / 4 / 2 / 1 / tr

SANDSTONE:clr-wh,f-rr crs,pred med, mod wl srt,sa,cmtd i/p,calc cmt i/p, com wh slty mtx,fri,gd inf por where cln,ti vis por where mtx,no fluor.

SILTSTONE:brn,pl gy,arg,com carb mat,frm-mod hd.

Survey:2122.77mMD(2122.7mTVD)
0.23°Inc 27.7°Az

92 / 5 / 2 / 1 / tr

SANDSTONE:cl-trnsl,f qtz o/gth,rr crs, dom med,wl srt,sa-sr,unconsol,tr wh slty mtx,com calc mtx,fri,gd inf por, no fluor.

91 / 6 / 2 / 1

SILTSTONE:brn/gy,arg,aren i/p,com carb mat,mod hd,sbblky.

93/ 5 / 2 / 1

Survey:2152.72mMD(2152.7mTVD)
0.24°Inc 123.57°Az

94 / 3 / 2 / 1

WOB: 18-25 Klbs
RPM: 195
SPP: 3600 psi
FLW: 750 gpm

MW:10.1
FV:62
PV:27
YP:41
Ck:1/2
Gel:12/14/16
HGS:3.9
Cl:33k

TOP LOWER BALMEI SHALE
2165.0mMDRT 2165.0mTVDRT
(-2073.0mTVDSS)

SILTSTONE:brn,aren,com carb mat, mod hd,sbblky.

2180
(2180)
2184
2188
2192
2196
2200
(2200)
2204
2208
2212
2216
2220
(2220)
2224
2228
2232
2236
2240
(2240)
2244
2248
2252
2256
2260

16-09-05

90 / 7 / 3 / 1

Survey:2181.64mMD(2181.6mTVD)
0.12°Inc 259.28°Az

89 / 7 / 3 / 1

92 / 5 / 2 / 1

Survey:2210.42mMD(2210.4mTVD)
0.35°Inc 284.90°Az

93 / 4 / 2 / 1

NO GAS DATA BETWEEN 2225.5m-2231.0m
DUE TO CHANGING DEGASSER RUBBER

94 / 3 / 2 / 1

92 / 5 / 2 / 1

SILTY SANDSTONE:wh,vf-f,wl srt,sr, wk sil cmt,abdt wh slty/kaol mtx-grn supp,fri,nil-ti vis por,no fluor.

SANDSTONE:clr-trnsl,f-crs dom med-crs,p srt,sa-sr,pred lse w/com wl cmtd ang crs aggs,arg mtx,ti vis,gd inf por, tr fluor.

FLUOR:2200.0m-2210.0m,TR-5%,sol dll-mod brt yell,crsh cut,tr res.

SILTSTONE:pl gnsh gy-med gy-gy brn, arg i/p,com carb incl,tr nod pyr,frm-hd,sbblky.

TOP LOWER BALMEI VOLCANIC
2217.0mMDRT 2217.0mTVDRT
(-2125.0mTVDSS)

VOLCANICS:wh-v pl gn-med gn,mott pl-med gn/wh,pl-med pnksh brn-brnsh gy,slty/arg,sft-frm,sbblky-blky.

WOB: 20-30 Klbs
RPM: 105
SPP: 3680 psi
FLW: 755 gpm

2264
2268
2272
2276
2280
(2280)
2284
2288
2292
2296
2300
(2299.9)

WOB: 26-38 Klbs
RPM: 100
SPP: 3850 psi
FLW: 750 gpm

2304
2308
2312
2316
2320
(2319.9)
2324
2328
2332
2336
2340
(2339.9)
2344

Survey:2268.77mMD(2268.7mTVD)
0.26°Inc 338.68°Az

86 / 8 / 4 / 1 / 1

95 / 4 / 1 / tr

Survey:2297.54mMD(2297.5mTVD)
0.37°Inc 75.80°Az

87 / 8 / 3 / 1 / 1

86 / 8 / 4 / 1 / 1

Survey:2326.44mMD(2326.4mTVD)
0.35°Inc 145.23°Az

84 / 9 / 4 / 1 / 2

84 / 9 / 4 / 1 / 2

83 / 9 / 5 / 1 / 2

VOLCANICS:wh-gn/wh mott,dk gnsh gy-dk gy,mod-dsky red-red/wh mott, slty/arg,com clr-wh f-med qtz,com frac qtz incl,sft/fri-v hd,sbfiss-sbblky.

VOLCANICS:wh-v pl gy,arg,abdt diss mic pyr,sft occ hd,amor-sbblky.

SANDSTONE:wh-v whtsh gy,vf-med, w srt,sr-sa,abdt wh vol mtx,tr diss pyr,nil-v pr por,no fluor.

VOLCANICS:v dk gnsh gy-blk,slty g/t Sltst i/p,abdt dk gn/blk grns, com wh Qtz grns/veins,com nod pyr, v hd,blky.

TOP L-450 RESERVOIR
2311.0mMDRT 2311.0mTVDRT
(-2271.8mTVDSS)

SANDSTONE:wh,vf-med occ crs,p srt, sa-sr,mnr-abdt wh vol mtx,com carb lams/incl,tr pyr,ti-gd por,w/-decr slty mtx,fluor.

FLUOR-2315m-2320m:100% dll even wh/blu fluor,sl diff wk-mod blu cut, thk ring-thn flm blu-wh res.

SANDSTONE:wh,f-occ crs,pred med, mod srt,ang-sa,abdt qtz o/gth,mod-wk sil cmt,abdt wh slty mtx in aggs,fri, ti-fr vis por w/-decr mtx,fluor.

FLUOR-2320m-2340m:(assoc w/-silty SST aggs)30%-dec 5%,mod bri, ptchy yel/wh fluor,sl cc,ptchy yel/wh res.

2348
2352
2356
2360
(2359.9)
2364
2368
2372
2376
2380
(2379.9)
2384
2388
2392
2396
2400
(2399.9)
2404
2408
2412
2416
2420
(2419.9)
2424
2428

WOB: 20-25 Klbs
RPM: 190
SPP: 3830 psi
FLW: 750 gpm

81 / 9 / 6 / 1 / 3

Survey:2355.51mMD(2355.5mTVD)
0.30°Inc 319.01°Az

91 / 5 / 2 / tr / 2

90 / 5 / 2 / 1 / 2

84 / 10 / 4 / 2 / tr

Survey:2384.59mMD(2384.6mTVD)
0.39°Inc 241.02°Az

85 / 8 / 4 / 1 / 2

93 / 5 / 2 / tr

91 / 6 / 2 / tr / 1

Survey:2413.62mMD(2413.6mTVD)
0.87°Inc 2.44°Az

91 / 6 / 2 / tr / 1

SANDSTONE:wh,vf-crs,pr srt,sa, wk cmt,abdt wh arg mtx,abdt qtz o/gth,com chlorite & pyr,ti-fr vis por w/-dec mtx,fluor.

FLUOR-2345m-2350m:tr fluor (in silty aggs),mod bri,ptchy yel/wh fluor,sl cc,ptchy yel/wh res.

SANDSTONE:clr-trnsl,vf-med,wl srt, sa,wk sil cmt,cln,com pyr,fri,gd inf por,no fluor.

SILTSTONE:mott brn/gy,aren,carb lams,mod hd,sbblky.

WEATHERED VOLCANICS:litharenite,w arg mtx,f grn supp,chlorite & pyr nods,dk gn/blk mafic rock frags, felds frags.

SANDSTONE:wh,vf-med,crs,mod srt, sa,wk sil cmt,abdt qtz o/gth,var wh arg mtx,fr-gd inf por w/-decr mtx,no fluor.

SILTSTONE:mott brn/gy,arg,aren i/p, carb flks,vf sst lams,mod hd,sbblky.

CLYSTONE:wh,slty,disp,sbblky.

2432
2436
2440
(2439.9)
2444
2448
2452
2456
2460
(2459.9)
2464
2468
2472
2476
2480
(2479.9)
2484
2488
2492
2496
2500
(2499.9)
2504
2508
2512

WOB: 25-35 Klbs
RPM: 205
SPP: 3900 psi
FLW: 750 gpm

MW:10.3
FV:63
PV:28
YP:59
Ck:2/2
Gel:15/17/19
HGS:4.8
Cl:36k

17-09-05

91 / 6 / 2 / tr / 1

Survey:2442.55mMD(2442.5mTVD)
1.34°Inc 312.94°Az

89 / 7 / 3 / 1

91 / 6 / 2 / tr / 1

92 / 6 / 2 / 1 / tr

84 / 10 / 5 / tr / 1

Survey:2471.71mMD(2471.6mTVD)
0.99°Inc 325.00°Az

83 / 9 / 5 / 1 / 2

85 / 9 / 4 / tr / 2

Survey:2500.45mMD(2500.4mTVD)
0.06°Inc 8.13°Az

86 / 8 / 4 / tr / 2

SANDSTONE:wh-trnsl,f-crs,pr srt,sa-sr,wk sil cmt,abdt Qtz o/gth where crs,var wh arg mtx,com chlorite,tr pyr,fri,ti-gd vis por w/-dec mtx, no fluor.

SILTSTONE:mott & lam brn & gy,arg, abdt micro carb mat,mod hd,sbblky.

CLAYSTONE:mott wh/gy/blk,slty & disp.

SANDSTONE:wh-trnsl,f-crs,pr srt,sa-sr,wk-mod sil cmt,abdt Qtz o/gth, cln-abdt wh arg mtx,fri,ti-fr por w/-dec mtx,no fluor.

SILTSTONE:med-dk gy/blk,arg,v carb i/p,mod hd,sbfiss-sbblky.

COAL:blk-dk brn,dll-sbvit,britt-frm,sbblky-blky,unev-conch,slty.

SILTY SANDSTONE:wh,vf-silty,g/t aren Sltst,abdt wh arg mtx,no vis por,fluor as below.

FLUOR-2470m-2475m:tr fluor (in silty aggs),dll ptchy yel/wh fluor,sl cc,ptchy yel/wh res.

CLAYSTONE:wh,sft,disp,amor.

SANDSTONE:clr-trnsl,f-crs dom f-med,p srt,sr,lse,tr arg mtx,gd inf por, no fluor.

SILTSTONE:med-dk gy/blk,aren,arg i/p,tr carb,mod hd-hd,sbblky.

2516

2520
(2519.9)

2524

2528

2532

2536

2540
(2539.9)

2544

2548

2552

2556

2560
(2559.9)

2564

2568

2572

2576

2580
(2579.9)

2584

2588

2592

2596

89 / 7 / 2 / tr / 2

Survey:2529.61mMD(2529.5mTVD)
0.38°Inc 274.63°Az

89 / 6 / 3 / tr / 2

86 / 9 / 3 / tr / 2

Survey:2558.55mMD(2558.5mTVD)
0.40°Inc 283.44°Az

90 / 7 / 2 / 1

88 / 8 / 3 / tr / 1

88 / 8 / 3 / tr / 1

89 / 7 / 3 / tr / 1

Survey:2587.37mMD(2587.3mTVD)
0.40°Inc 333.57°Az

91 / 6 / 2 / tr / 1

WOB: 25-30 Klbs
RPM: 185-190
SPP: 3900psi
FLW: 735 gpm

SANDSTONE:clr-trnsl,f-med,mod w srt,sr-sa,wk sil cmt,occ aggs,arg mtx,pr-fr inf/vis por,no fluor.

CLAYSTONE:med-dk gy,slty i/p,carb, frm,sbblky.

SANDSTONE:clr-trnsl,f-med occ crs, pr srt,sr-sa,mod strg sil cmt,com aggs,arg mtx,ti-pr inf/vis por,no fluor.

SANDSTONE:wh-pl brn,f-crs,pr srt, sa,mod sil cmt,com wh slty mtx,mod hd ti vis por,no fluor.

SILTSTONE:brn/blk,arg,carb.mod hd, sbblky.

CARB SILTSTONE:blk,g/t slty coal, britt,sbblky.

CARB SILTSTONE:gy/brn,med gy/dk dk gy i/p,arg,occ vf aren,com carb spks g/t coal i/p,micmic,tr nod & diss pyr,frm,loc hd,sbfiss-sbblky.

SANDSTONE:pl brn,f-med,mod srt,sa-sr,mod sil cmt,com slty mtx,mod hd,ti vis por,no fluor.

2600
(2599.9)
2604
2608
2612
2616
2620
(2619.9)
2624
2628
2632
2636
2640
(2639.9)
2644
2648
2652
2656
2660
(2659.9)
2664
2668
2672
2676
2680

WOB: 20-30 Klbs
RPM: 190
SPP: 4000 psi
FLW: 750 gpm

MW:10.3
FV:60
PV:25
YP:59
Ck:2/2
Gel:16/18/20
HGS:4.3
Cl:53k

WOB: 25-35 Klbs
RPM: 80-100
SPP: 4100 psi
FLW: 740 gpm

18-09-05

85 / 8 / 4 / 1 / 2

88 / 7 / 3 / tr / 2

Survey:2616.44mMD(2616.4mTVD)
0.18°Inc 272.94°Az

87 / 8 / 4 / tr / 1

85 / 9 / 4 / tr / 2

84 / 9 / 5 / 1 / 1

Survey:2644.58mMD(2644.5mTVD)
0.03°Inc 300.03°Az

89 / 7 / 3 / tr / 1

Survey:2678.00mMD(2677.9mTVD)
0.06°Inc 123.22°Az

CARB SILTSTONE:med brn/brn,med gy arg-vf aren,com carb spks g/t coal i/p,occ micmic,tr nod pry,frm-hd, sbfiss-sbblky.

SILTSTONE:dk gy/brn,arg,carb,com chlorite min,mod hd,sbblky-sbfiss.

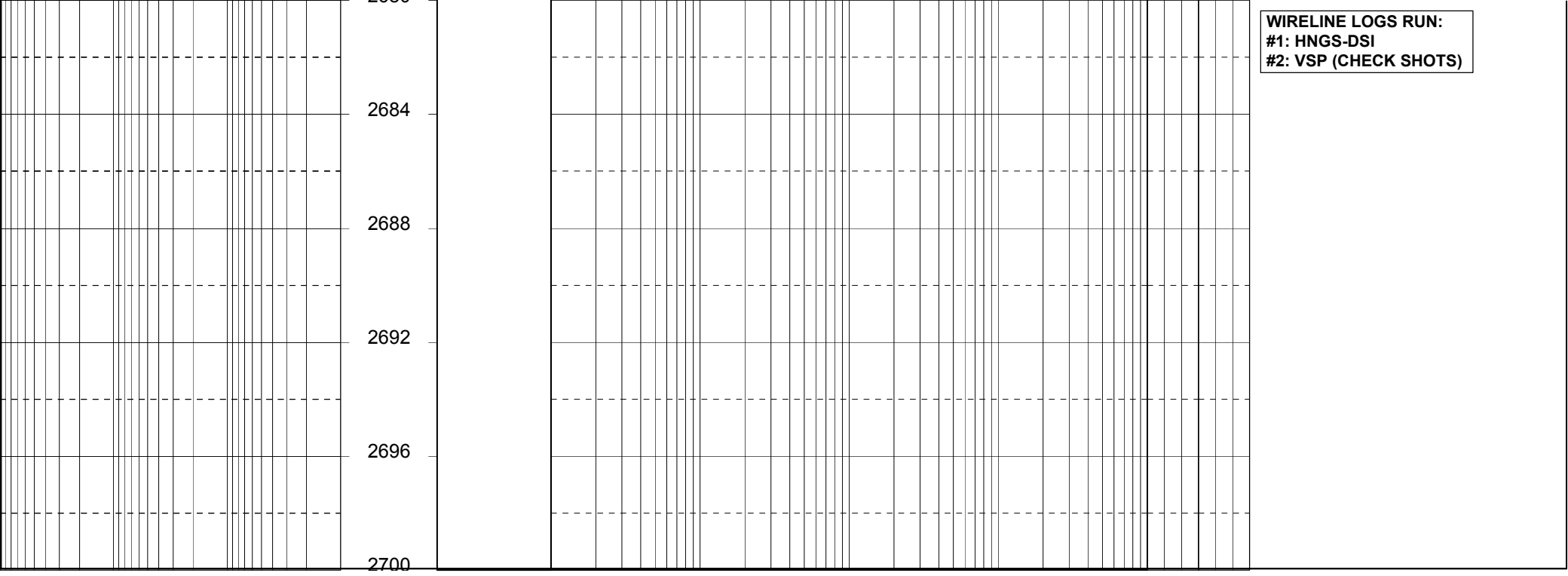
SANDSTONE:wh,f-crs,pr srt,sa, wl cmt w/- silica,com wh slty mtx, abdt Qtz o/grth,com chlorite,mod hd-fri,ti vis por,no fluor.

SANDSTONE:wh,vf-med,mod wl srt,sa-sr,wk-mod sil cmt,com Qtz o/gth,var (cln-abdt) wh arg mtx,fri-mod hd,ti vis to gd inf por w/-decr cmt & mtx, no fluor.

SILTSTONE:dk gy/brn,arg,carb,com chlorite min,mod hd,sbblky-sbfiss.

ARGILLACEOUS SANDSTONE:lt-med o gy-gysh brn,vf-med dom f-med,mod w srt,sa,mod cmt,com aggs,arg mtx, mnr diss carb det/incl,pr vis por, no fluor.

NORTH WIRRAH-1 TD AT
2678.00mMDRT 2677.90mTVDRT
(-2586.0mTVDSS)
AT 02:10 HRS ON 18-09-2005


2684
2688
2692
2696
2700
WIRELINE LOGS RUN:
#1: HNGS-DSI
#2: VSP (CHECK SHOTS)

ENCLOSURE 3

DRILLING LOG

DRILLING LOG

FROM :(mt) 80 TO :(mt) 2700 SCALE : 1/ 1000

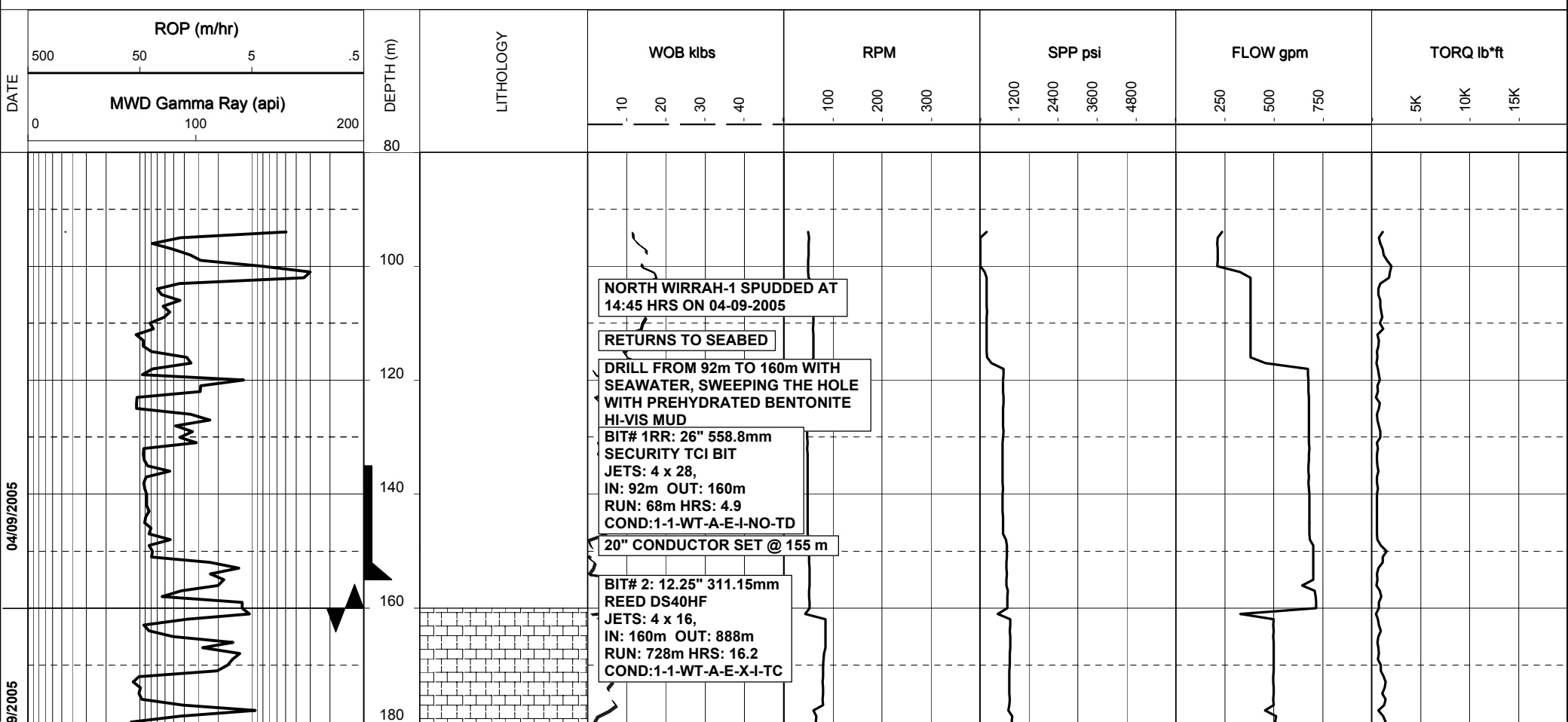
Well Name: NORTH WIRRAH-1
Company : ESSO AUSTRALIA

Country : AUSTRALIA

RT-MSL : 39.2m
RT-SEABED : 92.0m

Final TD : 2678.0mMDRT
Final TVD : 2677.9mTVDRT

Generated by ALS Package



05/0

07/09/2005

WOB: 0-2 Klbs
RPM: 140
SPP: 1650 psi
FLW: 800 gpm

WOB: 0-2 Klbs
RPM: 150
SPP: 2620 psi
FLW: 1020 gpm

WOB: 0-2 Klbs
RPM: 155
SPP: 2700 psi
FLW: 1020 gpm

WOB: 3-10 Klbs
RPM: 105
SPP: 2810 psi
FLW: 1005 gpm

200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
520
540
560
580
600

07/09/2005

WOB: 10-15 Klbs
RPM: 155
SPP: 2900 psi
FLW: 1250 gpm

620
640
660
680

WOB: 3-10 Klbs
RPM: 140
SPP: 3000 psi
FLW: 1002 gpm

700
720
740
760
780
800

WOB: 4-10 Klbs
RPM: 148
SPP: 3200 psi
FLW: 1002 gpm

820
840
860

07/09/2005

880

9 5/8" CASING SHOE AT 884m

11/09/2005

BIT# 3: 8.5" 215.9mm
REED RSX 162
JETS: 6 x 18
IN: 888m OUT: 1508m
RUN: 620m HRS: 50.0
COND:1-1-PN-N-X-1-NO-RIG

900
920
940
960
980

WOB: 18-20 Klbs
RPM: 175-188
SPP: 1800-1900 psi
FLW: 760 gpm

1000
1020

12/09/2005 12/09/2005 12/09/2005 11/09/20

MW:9.50
FV:47

WOB: 20-30 Klbs
RPM: 80-105
SPP: 2100-2250 psi
FLW: 750 gpm

WOB: 17-21 Klbs
RPM: 80-105
SPP: 1900-2100 psi
FLW: 750 gpm

1440 1420 1400 1380 1360 1340 1320 1300 1280 1260 1240 1220 1200 1180 1160 1140 1120 1100 1080 1060 1040

13/09/2005

PV:19
YP:27
Ck:1/2
Gel:8/9/11
HGS:2.3
Cl:38k

14/09/2005

WOB: 1-6 Klbs
RPM: 205
SPP: 3650 psi
FLW: 775 gpm
MW:9.85
FV:69
PV:23
YP:37
Ck:1/2
Gel:6/8/9
HGS:3.3
Cl:33k

15/09/2005

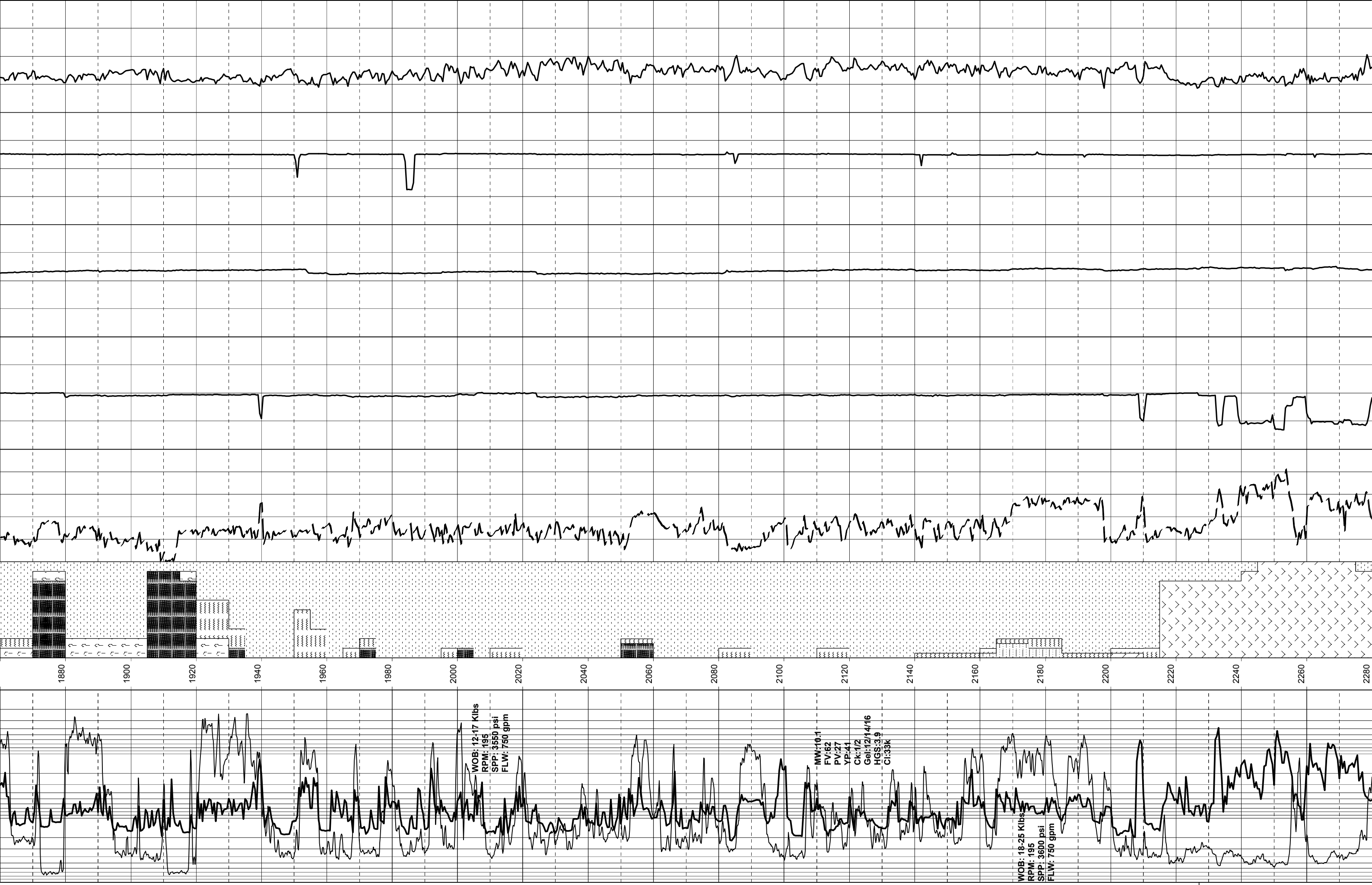
WOB: 5-8 Klbs
RPM: 200
SPP: 3350 psi
FLW: 750 gpm

WOB: 5-15 Klbs
RPM: 200
SPP: 3420 psi
FLW: 755 gpm

WOB: 8-15 Klbs
RPM: 200
SPP: 3430 psi
FLW: 755 gpm

1460
1480
1500
1520
1540
1560
1580
1600
1620
1640
1660
1680
1700
1720
1740
1760
1780
1800
1820
1840
1860

BIT# 3RR: 8.5" 215.9mm
REED RSX 162
JETS: 6 x 13
IN: 1508m OUT: 2678m
RUN: 1170m HRS: 52.4
COND: 5-8-RO-S-X-1/16-LT-TD


1880
1900
1920
1940
1960
1980
2000
2020
2040
2060
2080
2100
2120
2140
2160
2180
2200
2220
2240
2260
2280
WOB: 12-17 Klbs
RPM: 195
SPP: 3550 psi
FLW: 750 gpm
MW:10.1
FV:62
PV:27
YP:41
Ck:1/2
Gel:12/14/16
HGS:3.9
Ci:33k
WOB: 18-25 Klbs
RPM: 195
SPP: 3600 psi
FLW: 750 gpm
15/09/2005
15/09/2005
15/09/2005
16/09/2005

18/09/2005 | 17/09/2005 | 17/09/2005 | 17/09/2005 | 16/09/2005 | 16/09/2005

NORTH WIRRAH-1 TD AT
2678.00mMDRT 2677.90mTVDRT
(-2586.0mTVDSS)
AT 02:10 HRS ON 18-09-2005

WOB: 25-35 Klbs
RPM: 80-100
SPP: 4100 psi
FLW: 740 gpm
MW:10.3
FV:60
PV:25
YP:59
Ck:2/2
Gel:16/18/20
HGS:4.3
CI:53k

WOB: 19-26 Klbs
RPM: 95
SPP: 4070 psi
FLW: 740 gpm
MW:10.3
FV:63
PV:28
YP:59
Ck:2/2
Gel:15/17/19
HGS:4.8
CI:36k

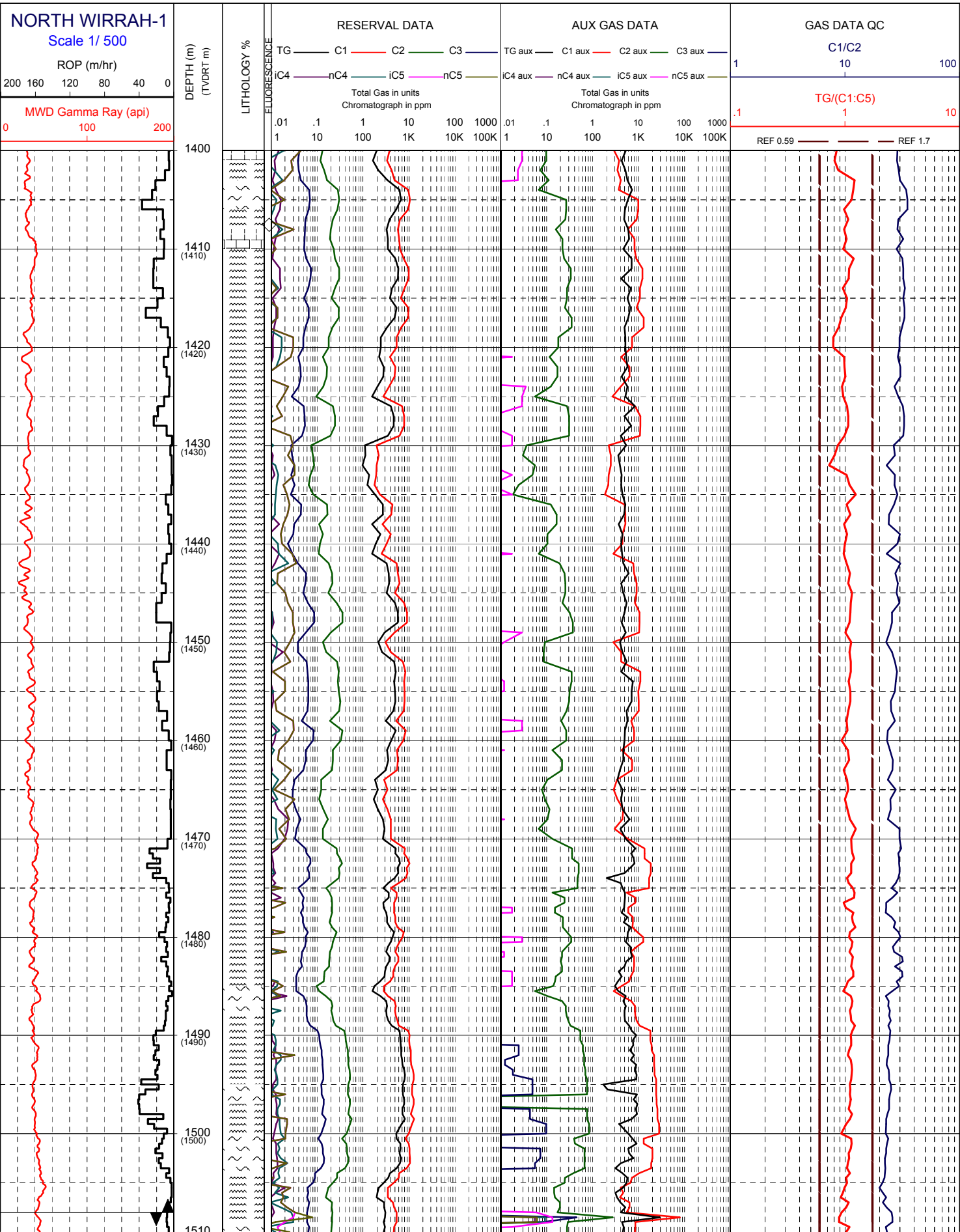
WOB: 20-25 Klbs
RPM: 190
SPP: 3830 psi
FLW: 750 gpm

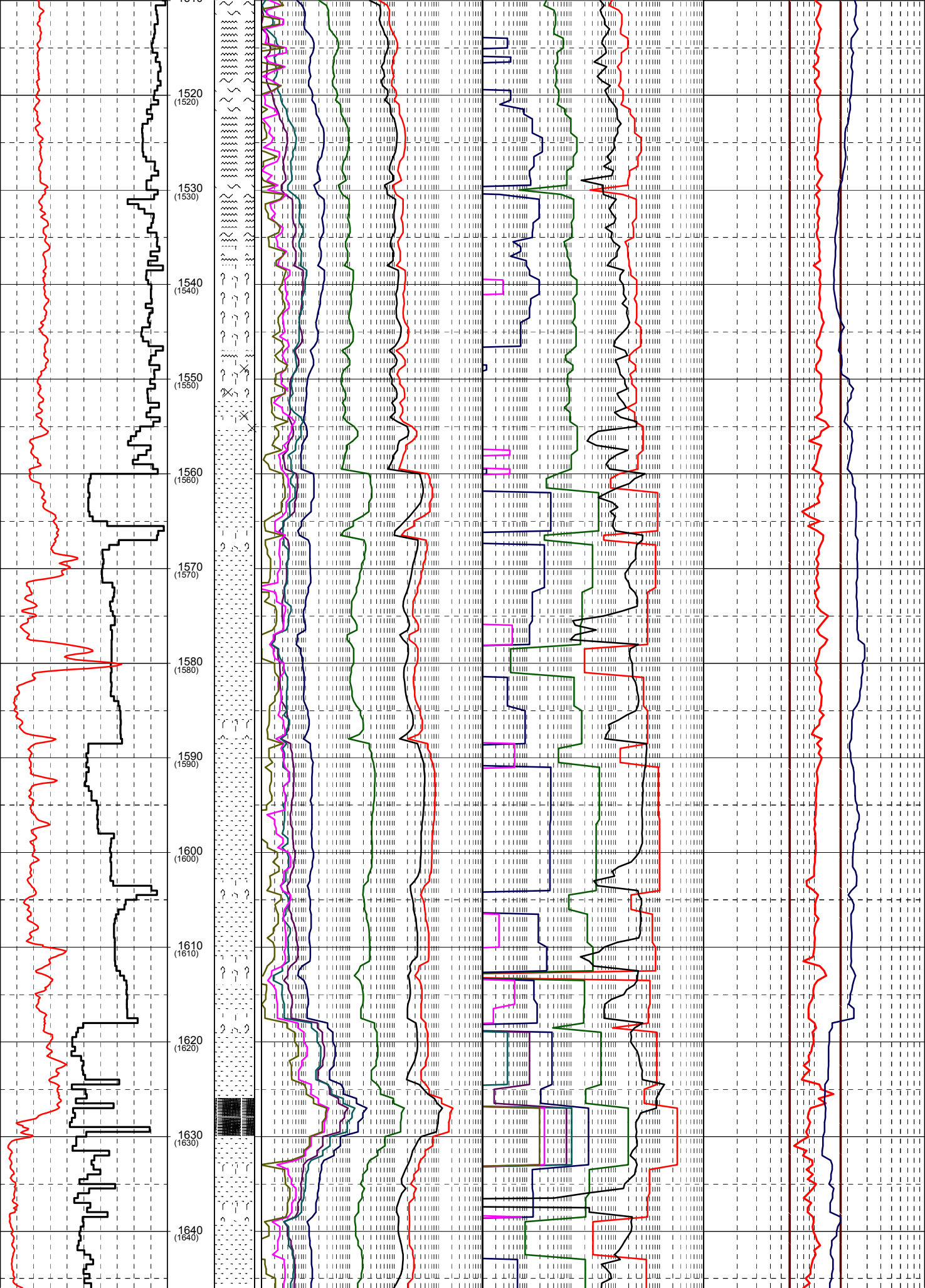
WOB: 20-30 Klbs
RPM: 105
SPP: 3680 psi
FLW: 755 gpm

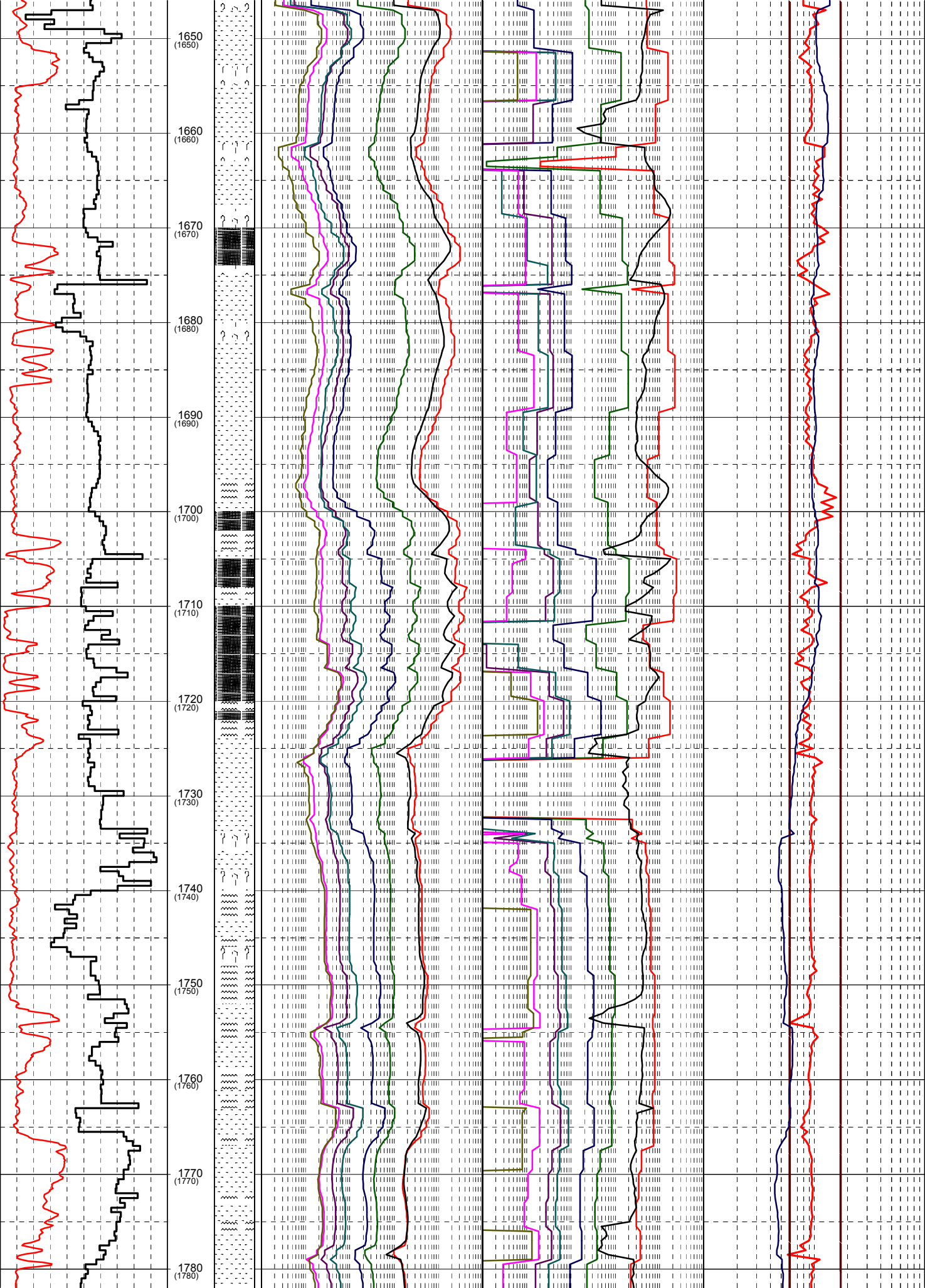
2700 2680 2660 2640 2620 2600 2580 2560 2540 2520 2500 2480 2460 2440 2420 2400 2380 2360 2340 2320 2300

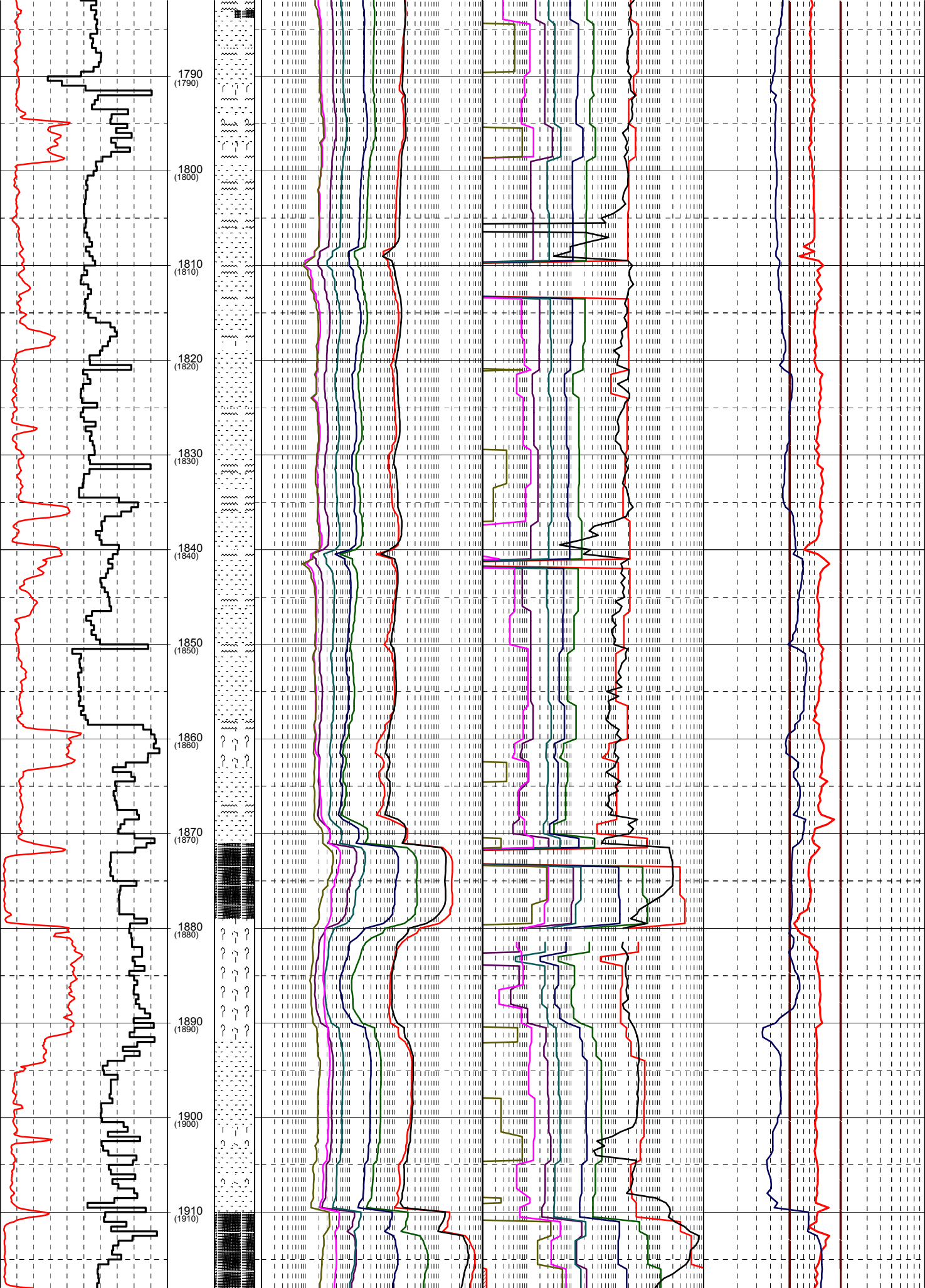
ENCLOSURE 4

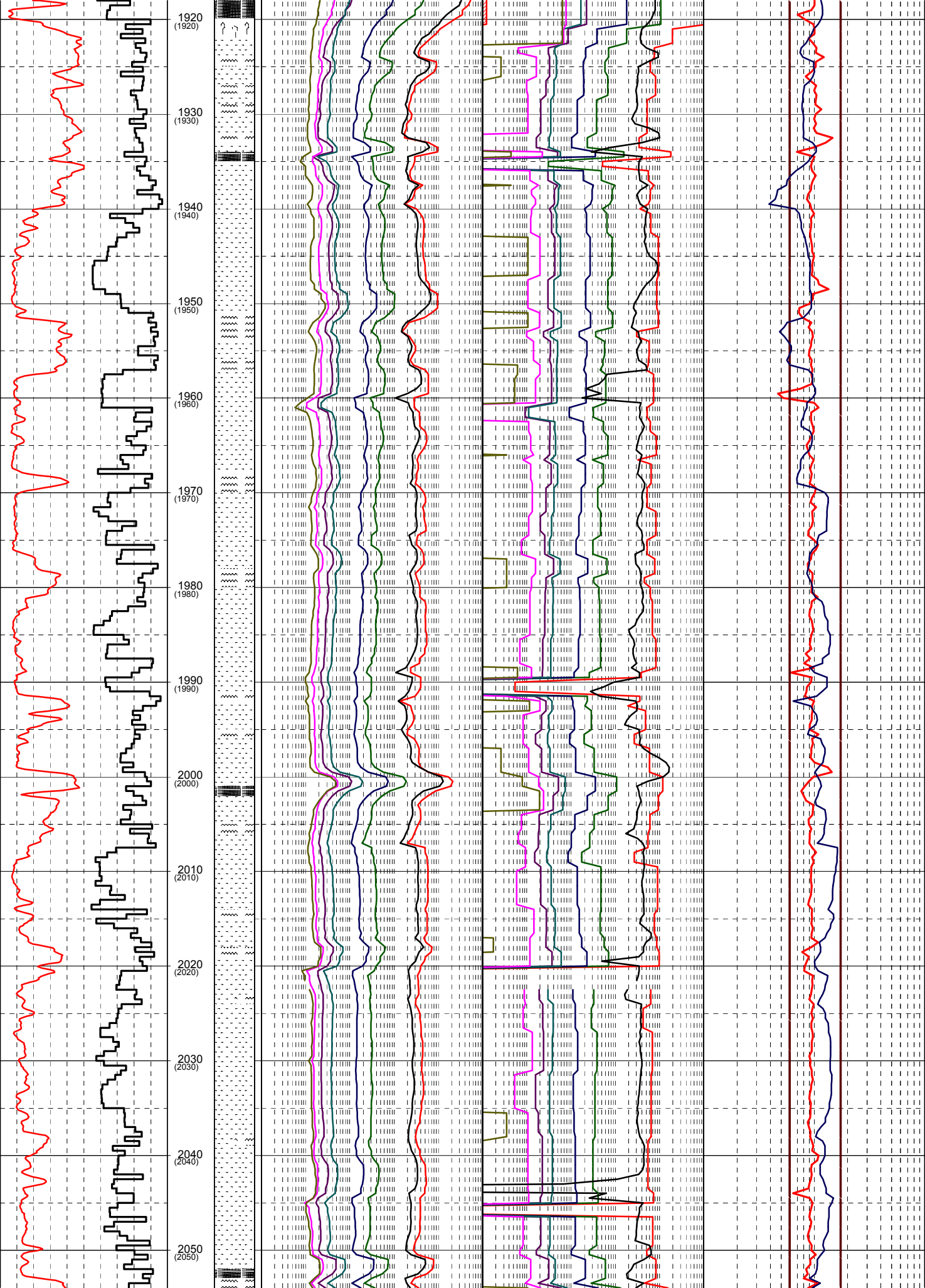
GAS RATIO LOG

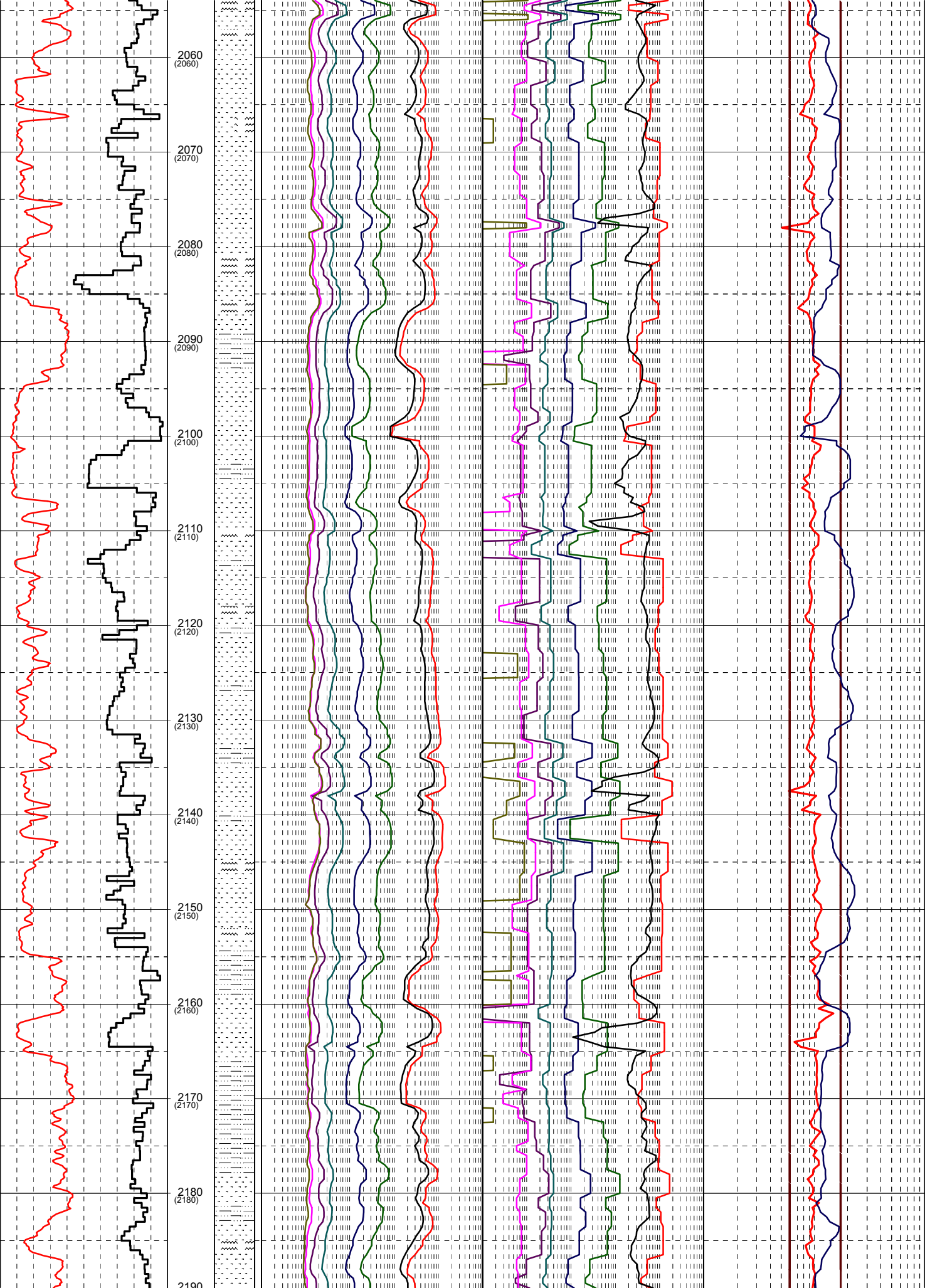

NORTH WIRRAH-1
Scale 1/ 500
ROP (m/hr)
200 160 120 80 40 0
MWD Gamma Ray (api)
0 100 200
DEPTH (m)
(TVDRT m)
LITHOLOGY %
FLUORESCENCE
RESERVAL DATA
TG C1 C2 C3
iC4 nC4 iC5 nC5
Total Gas in units
Chromatograph in ppm
.01 .1 1 10 100 1000
1 10 100 1K 10K 100K
AUX GAS DATA
TG aux C1 aux C2 aux C3 aux
iC4 aux nC4 aux iC5 aux nC5 aux
Total Gas in units
Chromatograph in ppm
.01 .1 1 10 100 1000
1 10 100 1K 10K 100K
GAS DATA QC
C1/C2
1 10 100
TG/(C1:C5)
.1 1 10
REF 0.59 REF 1.7
1400
1410 (1410)
1420 (1420)
1430 (1430)
1440 (1440)
1450 (1450)
1460 (1460)
1470 (1470)
1480 (1480)
1490 (1490)
1500 (1500)
1510

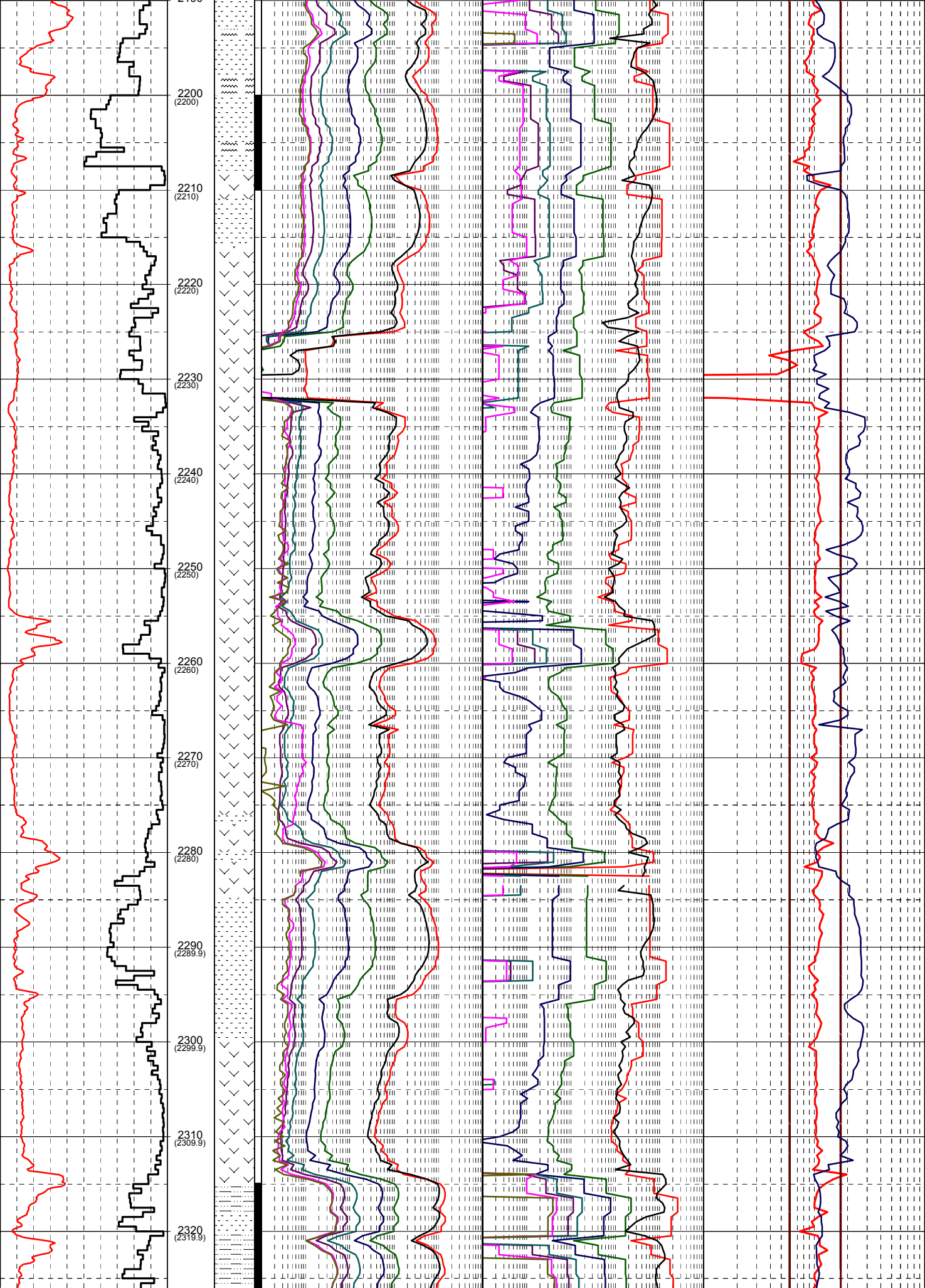

1520
(1520)
1530
(1530)
1540
(1540)
1550
(1550)
1560
(1560)
1570
(1570)
1580
(1580)
1590
(1590)
1600
(1600)
1610
(1610)
1620
(1620)
1630
(1630)
1640
(1640)

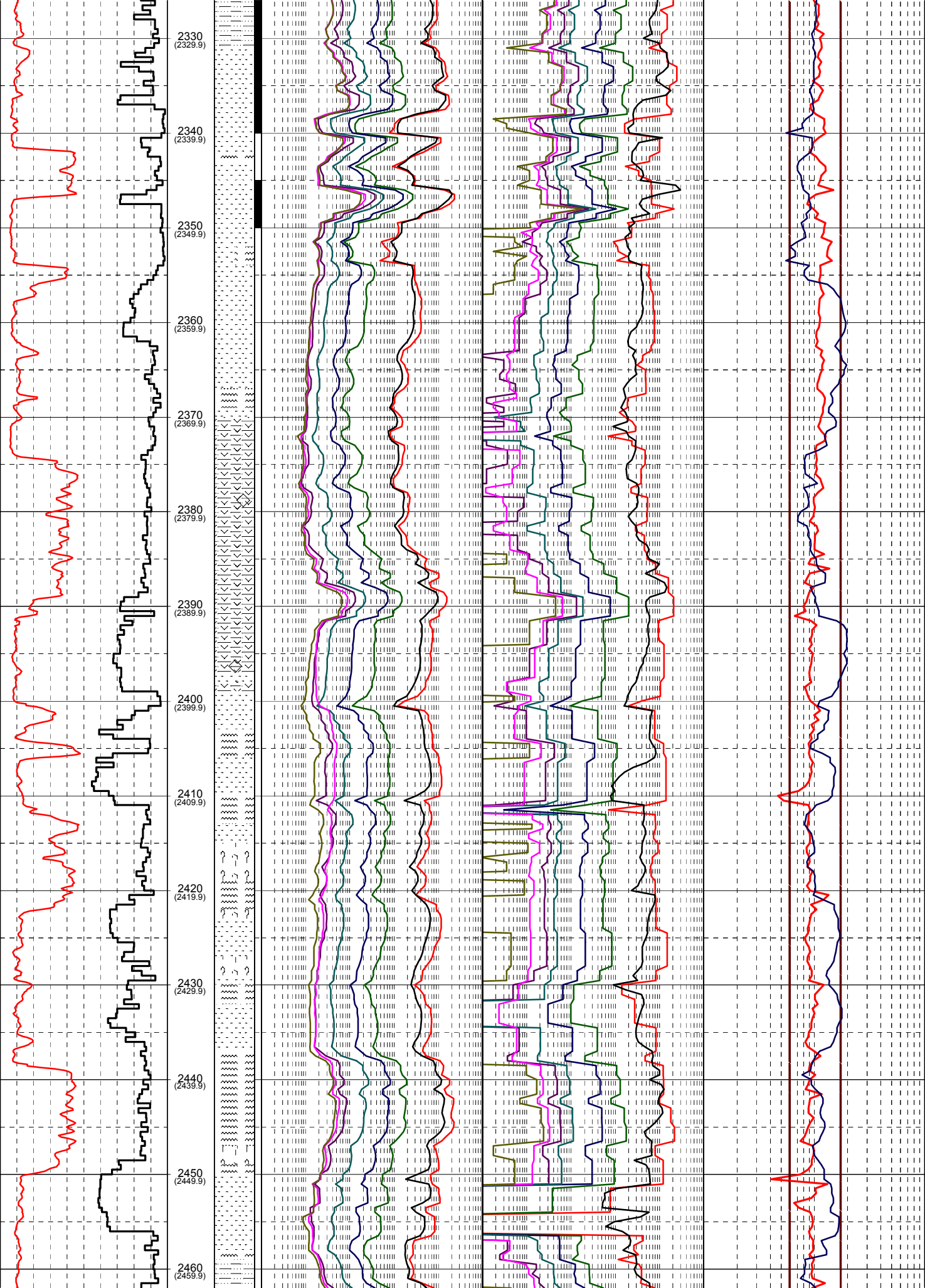

1650
(1650)
1660
(1660)
1670
(1670)
1680
(1680)
1690
(1690)
1700
(1700)
1710
(1710)
1720
(1720)
1730
(1730)
1740
(1740)
1750
(1750)
1760
(1760)
1770
(1770)
1780
(1780)

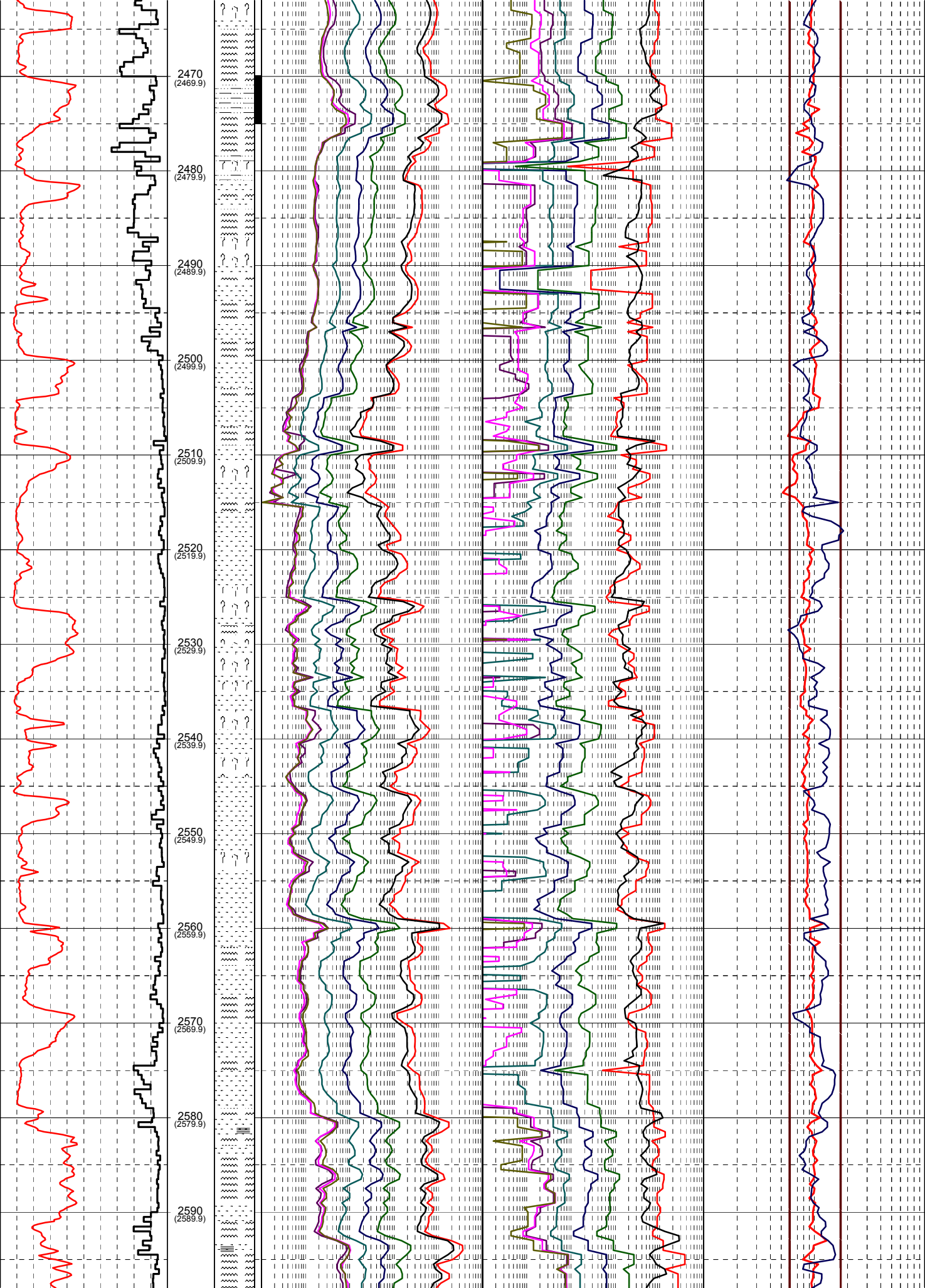

1790
(1790)
1800
(1800)
1810
(1810)
1820
(1820)
1830
(1830)
1840
(1840)
1850
(1850)
1860
(1860)
1870
(1870)
1880
(1880)
1890
(1890)
1900
(1900)
1910
(1910)

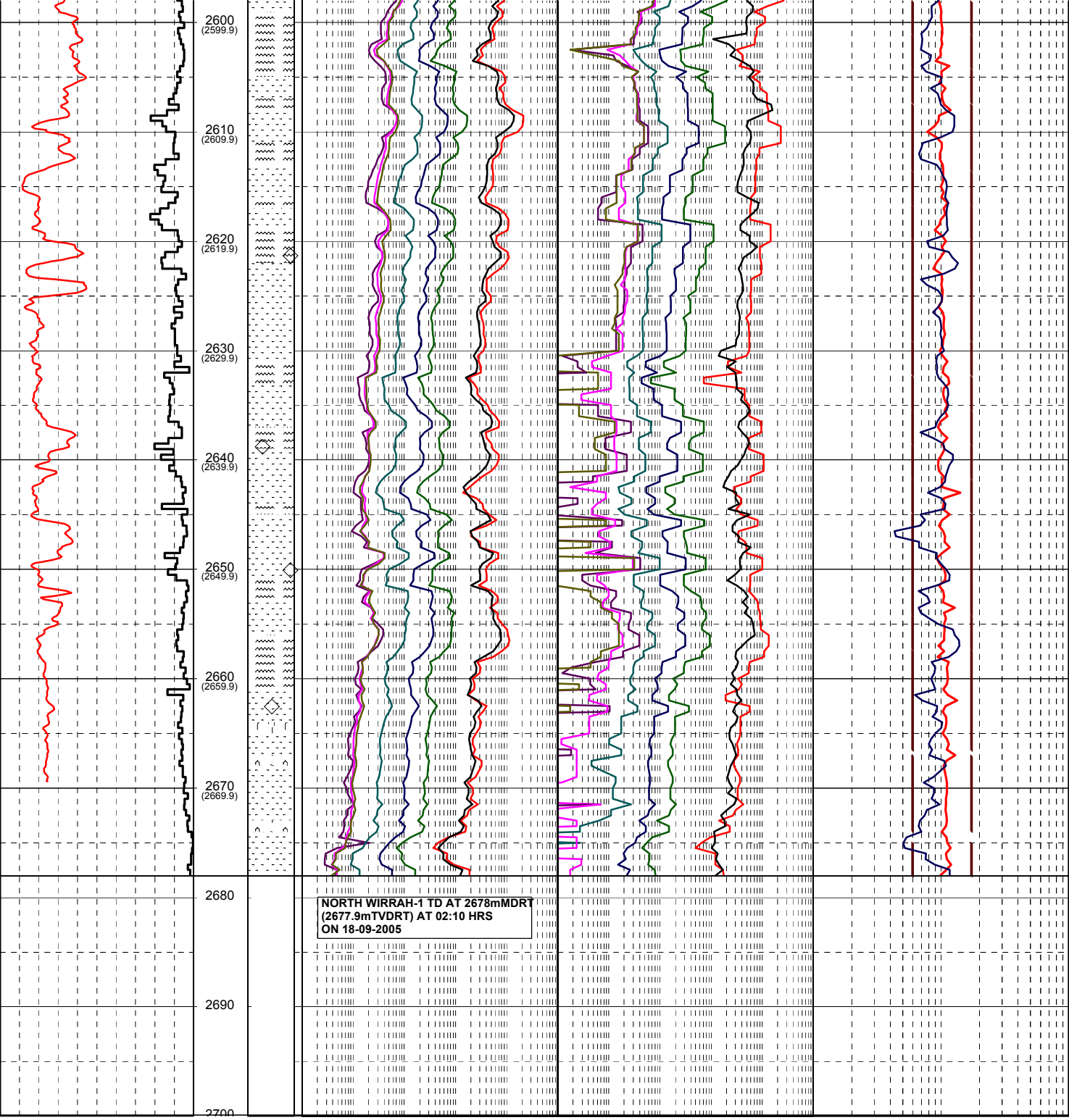

1920
(1920)
1930
(1930)
1940
(1940)
1950
(1950)
1960
(1960)
1970
(1970)
1980
(1980)
1990
(1990)
2000
(2000)
2010
(2010)
2020
(2020)
2030
(2030)
2040
(2040)
2050
(2050)


2060
(2060)
2070
(2070)
2080
(2080)
2090
(2090)
2100
(2100)
2110
(2110)
2120
(2120)
2130
(2130)
2140
(2140)
2150
(2150)
2160
(2160)
2170
(2170)
2180
(2180)


2200
(2200)
2210
(2210)
2220
(2220)
2230
(2230)
2240
(2240)
2250
(2250)
2260
(2260)
2270
(2270)
2280
(2280)
2290
(2289.9)
2300
(2299.9)
2310
(2309.9)
2320
(2319.9)


2330
(2329.9)
2340
(2339.9)
2350
(2349.9)
2360
(2359.9)
2370
(2369.9)
2380
(2379.9)
2390
(2389.9)
2400
(2399.9)
2410
(2409.9)
2420
(2419.9)
2430
(2429.9)
2440
(2439.9)
2450
(2449.9)
2460
(2459.9)


2470
(2469.9)
2480
(2479.9)
2490
(2489.9)
2500
(2499.9)
2510
(2509.9)
2520
(2519.9)
2530
(2529.9)
2540
(2539.9)
2550
(2549.9)
2560
(2559.9)
2570
(2569.9)
2580
(2579.9)
2590
(2589.9)


2600
(2599.9)
2610
(2609.9)
2620
(2619.9)
2630
(2629.9)
2640
(2639.9)
2650
(2649.9)
2660
(2659.9)
2670
(2669.9)
2680
2690
NORTH WIRRAH-1 TD AT 2678mMDRT
(2677.9mTVDRT) AT 02:10 HRS
ON 18-09-2005

ENCLOSURE 5

PRESSURE LOG

OVERPRESSURE

Geoservices logging

FROM :(mt) 0 TO :(mt) 2720 SCALE : 1/ 1000

Well name : NORTH WIRRAH-1
Company : ESSO AUST LTD

Location : BASS STRAIT
Country : AUSTRALIA

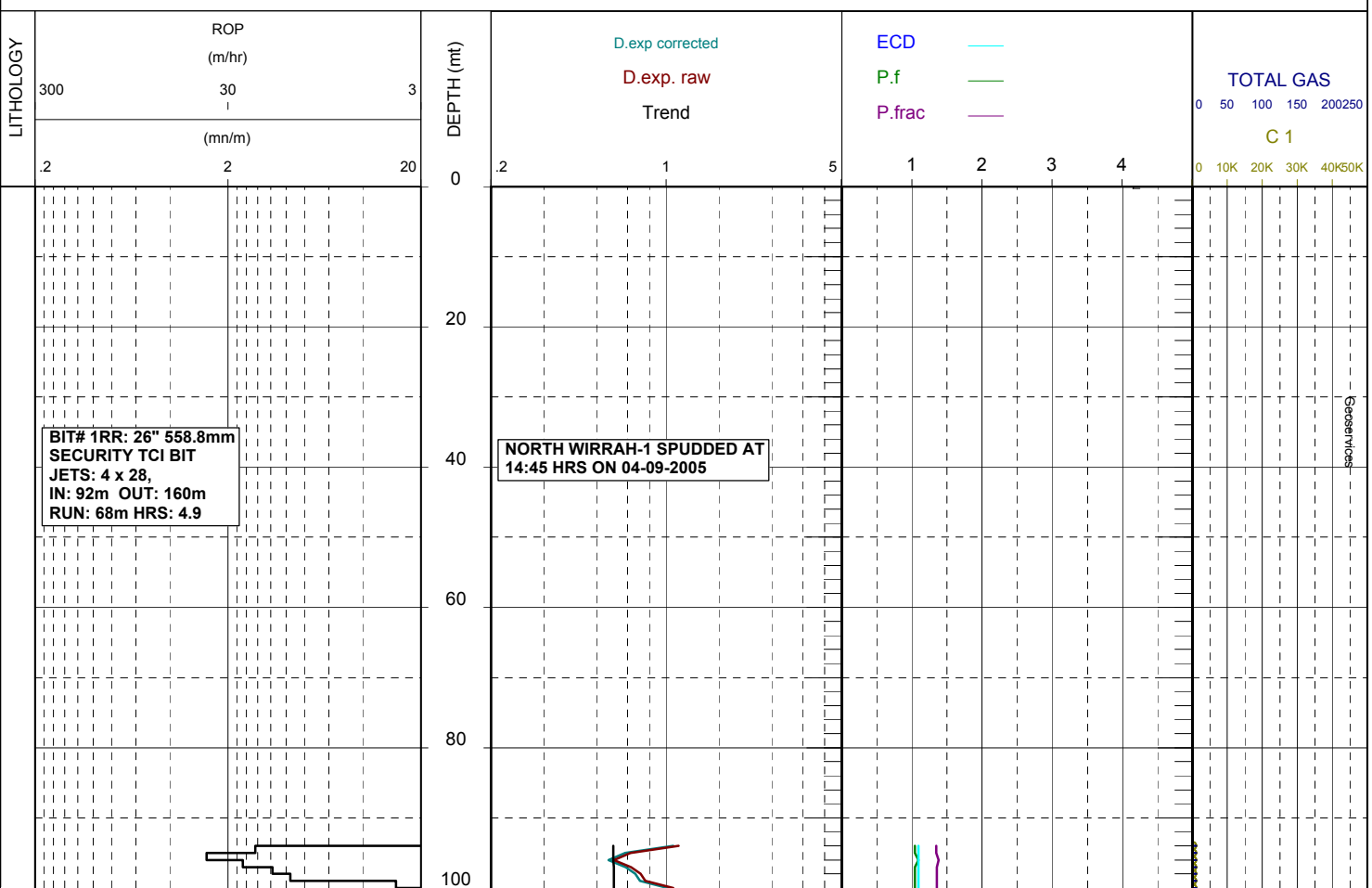
Refer. depth : Rotary Table
Water depth : 52.8m

Final TD : 2678.0mMDRT
Final TVD : 2677.9mTVDRT

Comput. method : Daines
Hydro. gradient : 8.7559ppg

Generated by ALX Package

SHALE	Clay, Shale	slaty Shale	sl sa Shale s	sandy Shale
SILTSTONE	ca. Shale	do. Shale	CLAYSTONE	gy Shale g
sa. Shale	bitum. Shale (b	sa. ca. Shale	ca. do. Shale	sa. do. Shale
Silt	f to vf Sand f	medium Sand	coarse Sand	CEMENT
SST: F - V FINE	SST: MEDIUM	SST: COARSE	QUARTZITE	LIMESTONE
RADIOLARITES	CHERT	bedded Chert	ar. Silt ar	ar. Sandstone a
Fossils	Algae	Algae A	Ammonites	Archcaecyathids
Fissures	Karst	normal microfau	reverse microfa	disturbed forma
Test	MUD LOSS	SIDEWALL CORE	DEVIA. SURVEY	CORE

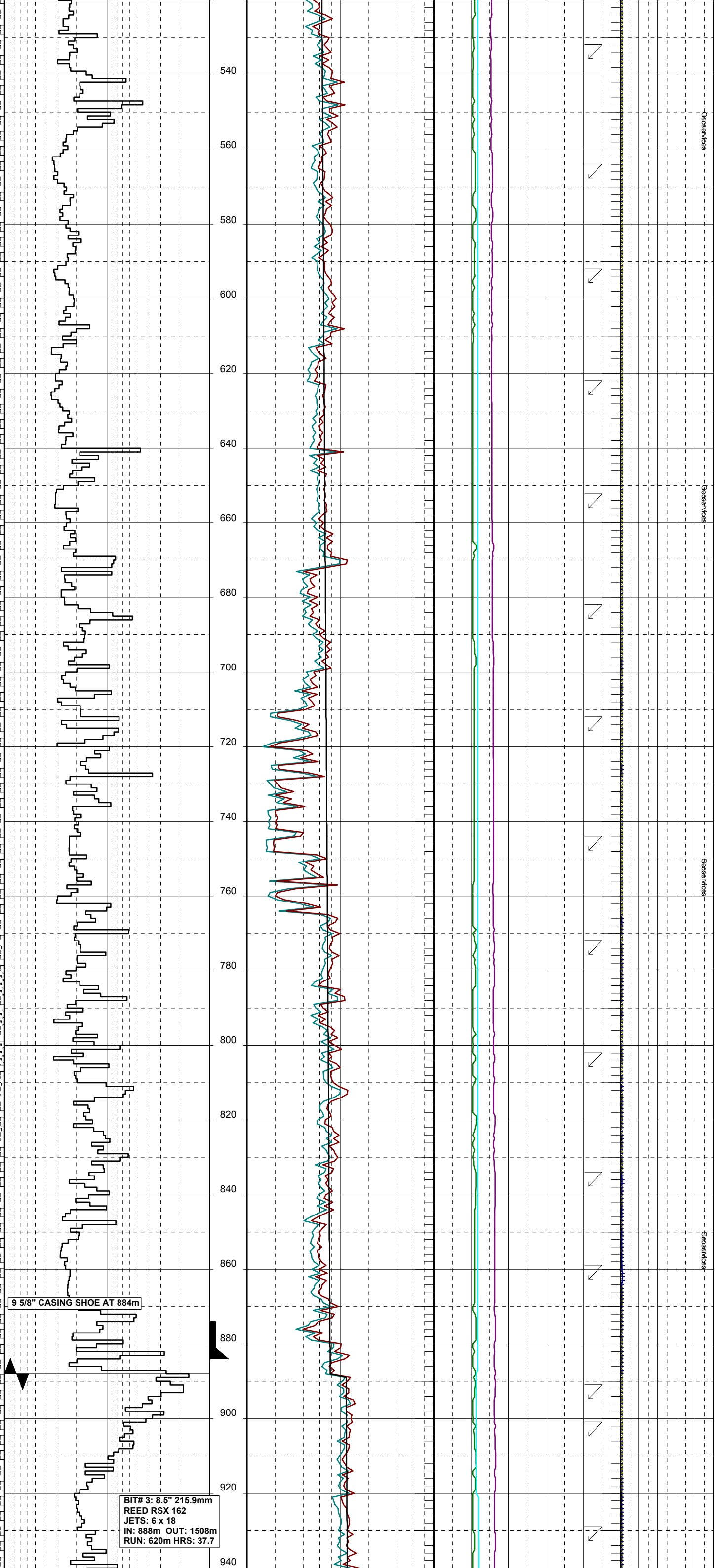


20" CONDUCTOR SET @ 155 m

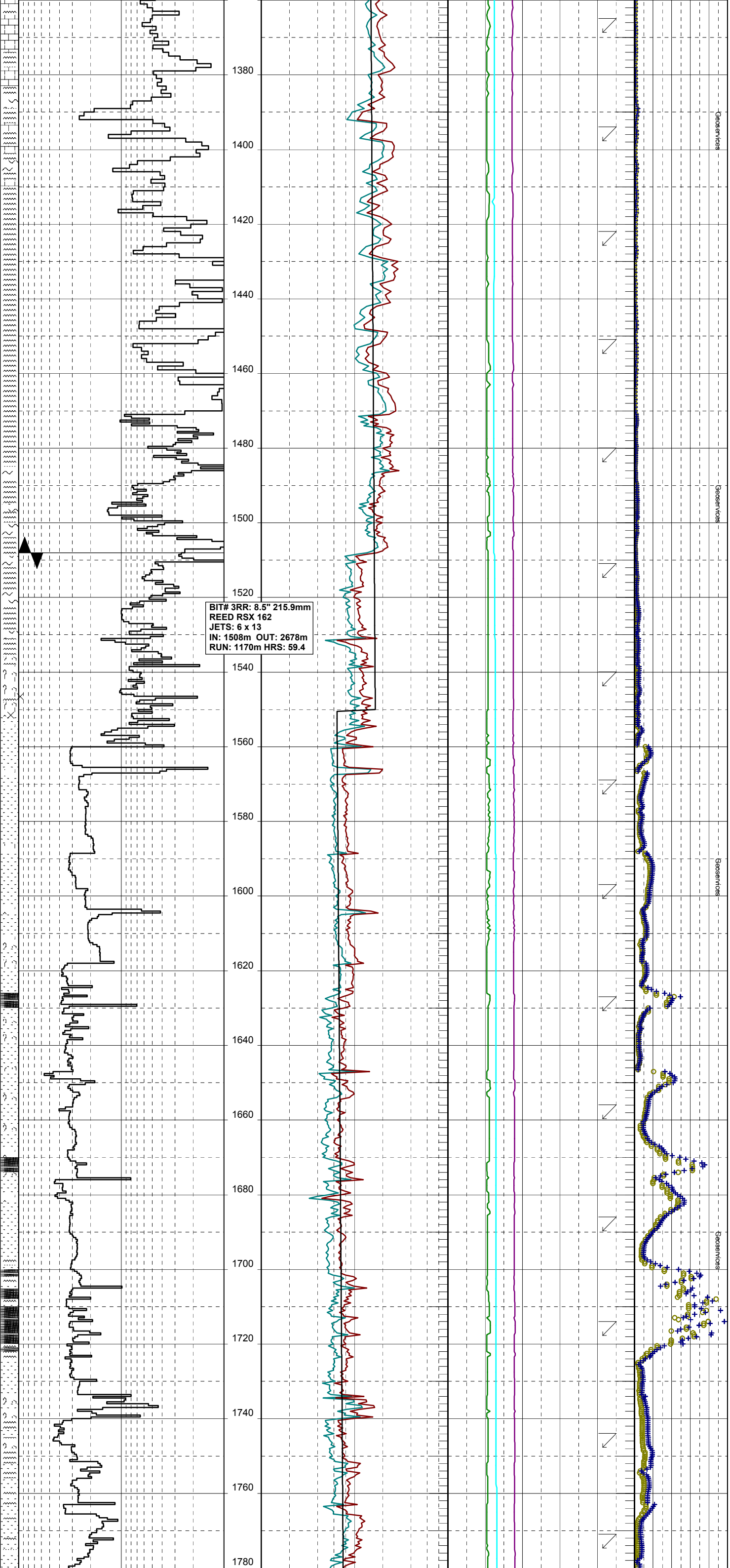
BIT# 2: 12.25" 311.15mm
REED DS40HF
JETS: 4 x 16,
IN: 160m OUT: 888m
RUN: 728m HRS: 16.2

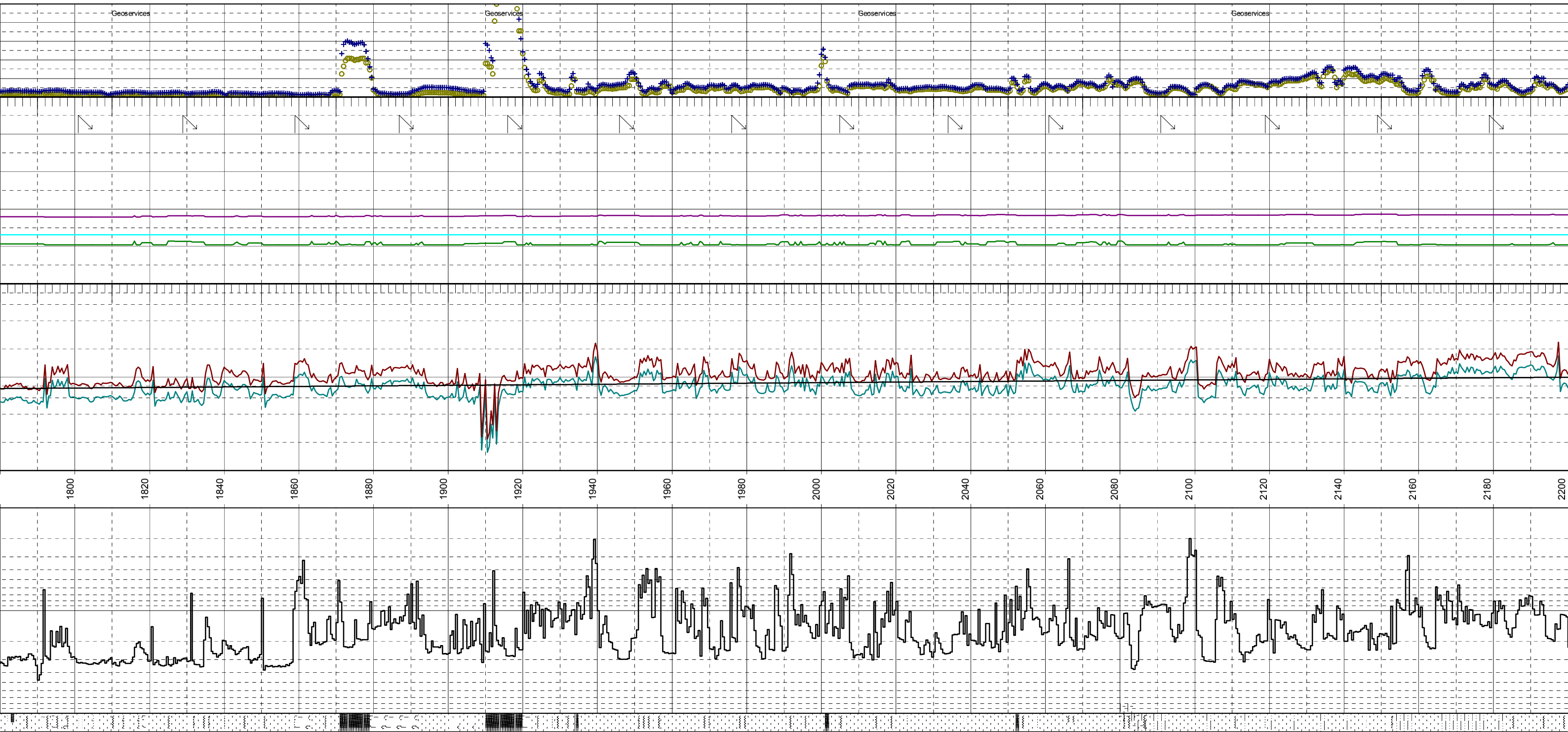
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
520

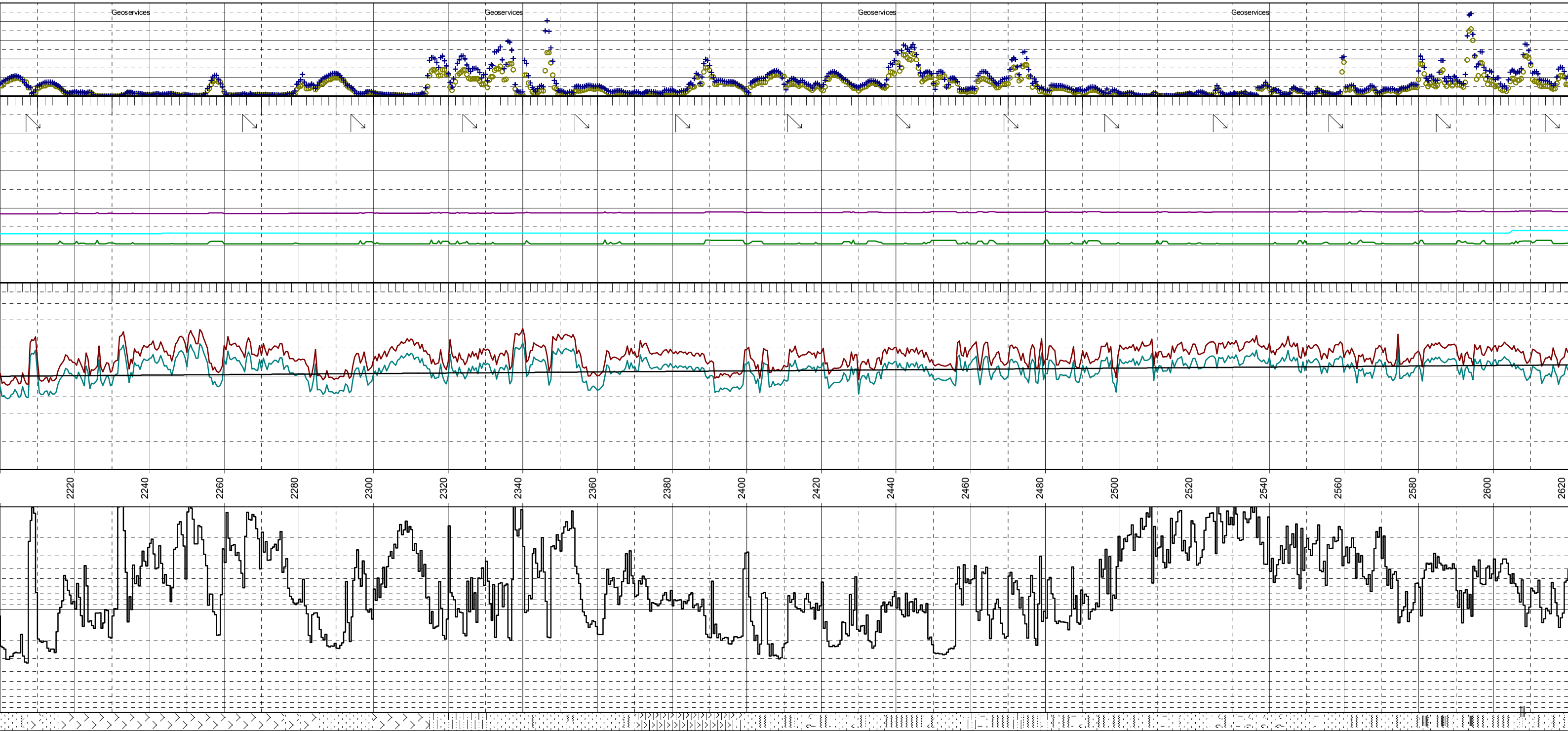
Geoservices

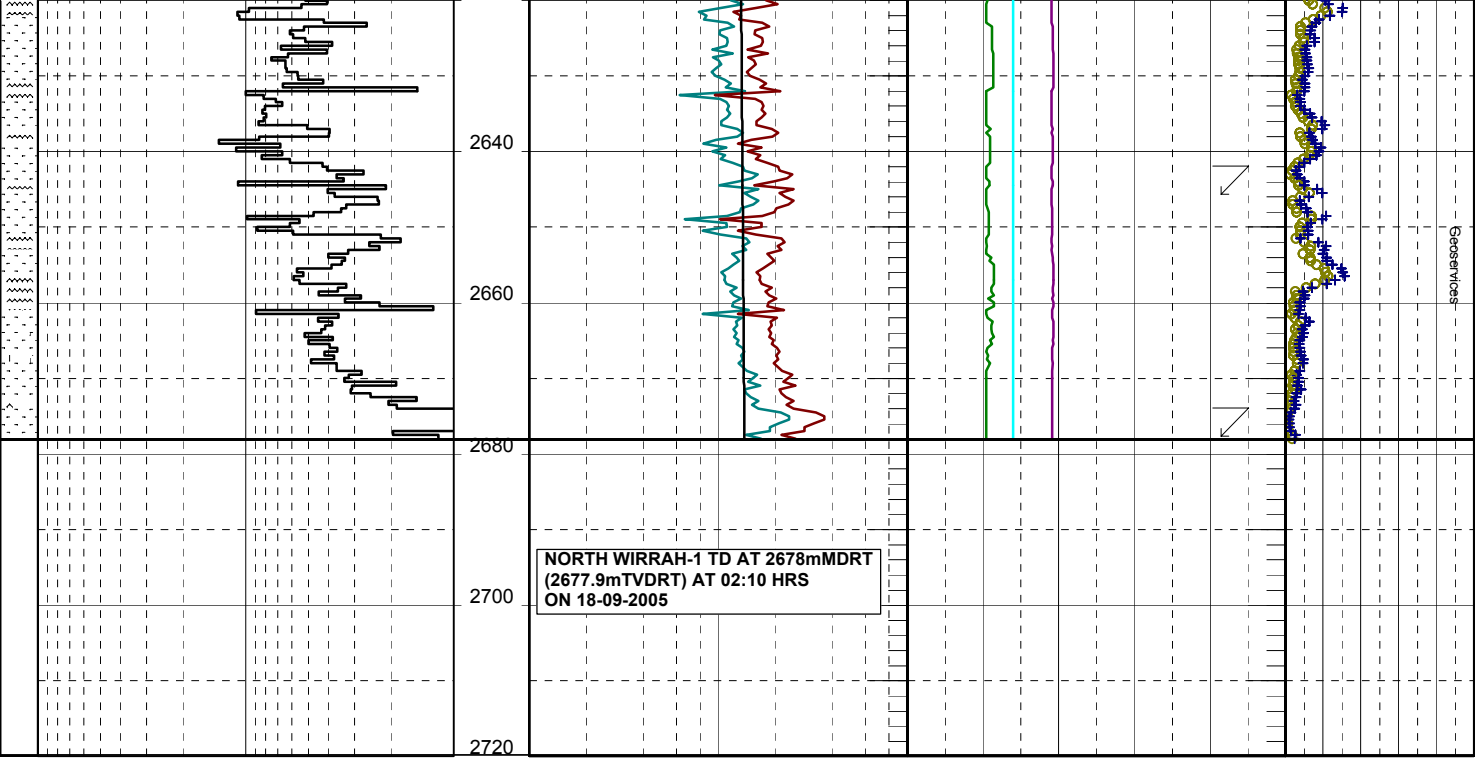

540
560
580
600
620
640
660
680
700
720
740
760
780
800
820
840
860
880
900
920
940
9 5/8" CASING SHOE AT 884m
BIT# 3: 8.5" 215.9mm
REED RSX 162
JETS: 6 x 18
IN: 888m OUT: 1508m
RUN: 620m HRS: 37.7
Geoservices
Geoservices
Geoservices
Geoservices


Geoservices
Geoservices
Geoservices
Geoservices
960
980
1000
1020
1040
1060
1080
1100
1120
1140
1160
1180
1200
1220
1240
1260
1280
1300
1320
1340
1360


1380
1400
1420
1440
1460
1480
1500
1520
1540
1560
1580
1600
1620
1640
1660
1680
1700
1720
1740
1760
1780
BIT# 3RR: 8.5" 215.9mm
REED RSX 162
JETS: 6 x 13
IN: 1508m OUT: 2678m
RUN: 1170m HRS: 59.4
Geoservices
Geoservices
Geoservices
Geoservices


Geoservices
Geoservices
Geoservices
Geoservices
1800
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020
2040
2060
2080
2100
2120
2140
2160
2180
2200


Geoservices
Geoservices
Geoservices
Geoservices
2220
2240
2260
2280
2300
2320
2340
2360
2380
2400
2420
2440
2460
2480
2500
2520
2540
2560
2580
2600
2620


2640
2660
2680
2700
2720
NORTH WIRRAH-1 TD AT 2678mMDRT
(2677.9mTVDRT) AT 02:10 HRS
ON 18-09-2005
Geoservices