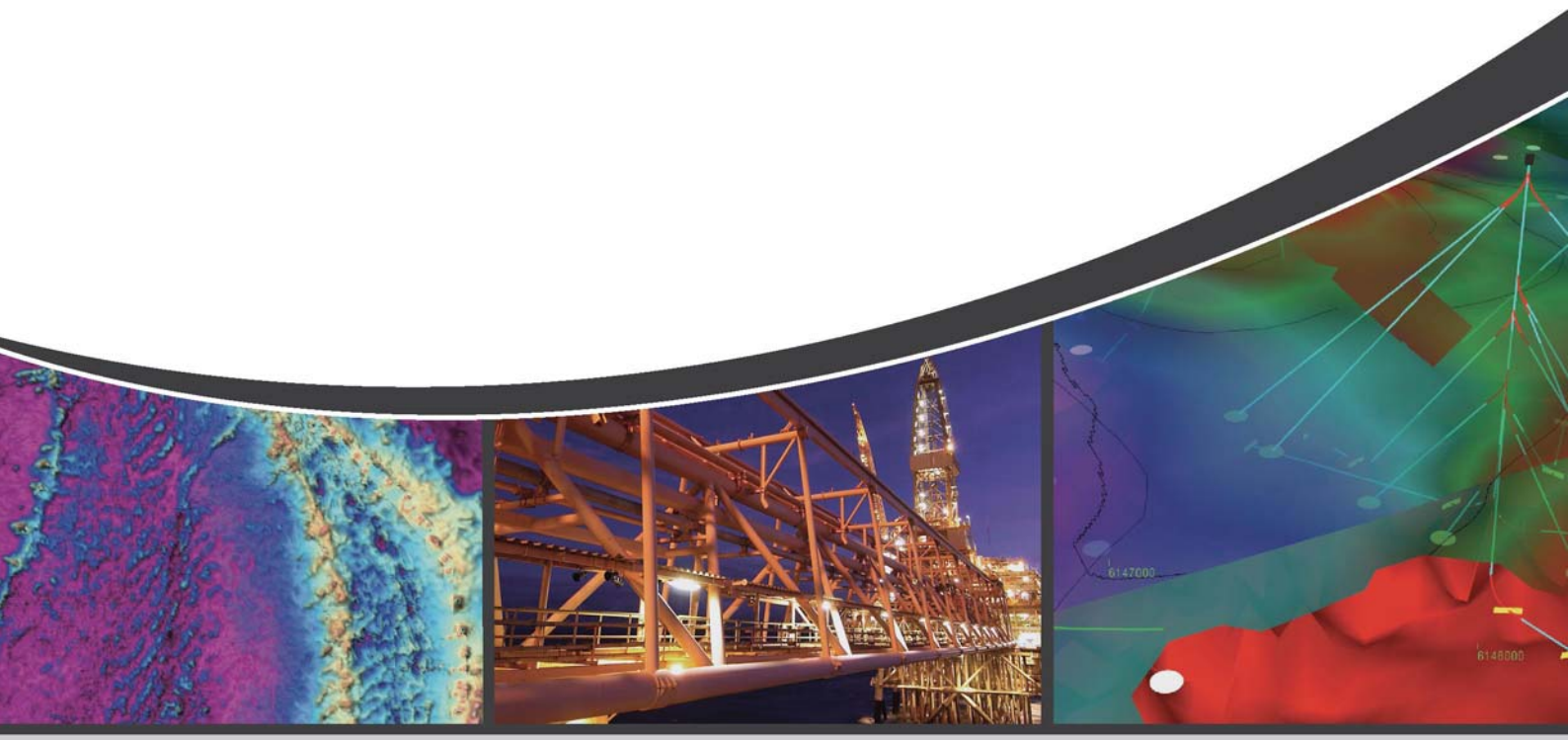
Sperry Drilling - HALLIBURTON

Directional Drilling
End of Well Report

Origin energy

Australian Drilling Associates Pty Ltd ADA

Well: Trefoil-2
Rig: Kan Tan IV
Location: Bass Basin, Australia



Contents

SECTION 1

Well Report

Customer : Origin Energy Services

Well : Trefoil-2

Job Objectives:

Vertical appraisal well to evaluate the Intra-EVCM sands (top TL10 to base TF110) in Trefoil - 2 location for the presence of commercial quantities of hydrocarbons.

Summary of Results:

The top hole sections 36" , 17-1/2" and 8-1/2" were drilled with no DD present on board.

36" hole section
****
The top 36" hole section was drilled to 155m, and a combination 30" x 20" casing was successfully run and cemented.

17-1/2" hole section
****
17-1/2" hole section was drilled to 935m with averaged ROP of 70m/hr. The hole remained vertical with inclination at TD showing 0.71° on an azimuth of 183.94°. The 13 3/8" casing was run and cemented according to program.

12 -1/4" hole section
****
The 12-1/4" section was successfully drilled to TD in two runs which was called at 2520m MD. All directional drilling requirements were fulfilled. Forward projections show the target sand will be penetrated well inside the drilling target tolerance at 26.68m from vertical. The average ROP for the run was 21m/hr. The hole was circulated clean and BHA POOH to run 9 5/8" casing

8-1/2" hole section
****
The 8-1/2" section contained two core sections and was drilled with 4 drilling runs and two coring runs
There was an MWD failure during the drilling to the first core point and a trip was required to change out the MWD but all subequent driillng and coreing runs went without any major incedent

Discussion:

BHA #	Bit #	Motor Run #	Hole Size (in)	MD In (m)	MD Out (m)	TVD In (m)	TVD Out (m)	Inc In (deg)	Inc Out (deg)	Azi In (deg)	Azi Out (deg)	Drlg hrs	Circ hrs
3	3	1	12.250	935	2271	935	2271	0.7	0.8	186	89	65	13
4	3rr1	2	12.250	2271	2520	2271	2520	0.8	1.0	89	96	19	8
5	4		8.500	2520	2523	2520	2523	1.0	1.0	96	97	3	3
6	5		8.500	2523	2633	2523	2633	1.0	1.4	97	87	11	7
7	5rr1		8.500	2633	2983	2633	2982	1.4	2.9	87	84	34	4
8	6		8.500	2983	3013	2982	3012	2.9	3.0	84	83	5	1
9	5rr2		8.500	3013	3145	3012	3144	3.0	3.8	83	83	16	6
10	6rr1		8.500	3145	3175	3144	3174	3.8	3.8	83	84	5	1
11	5rr3		8.500	3175	3235	3174	3234	3.8	4.3	84	83	12	4

Table 1 - BHA Summary

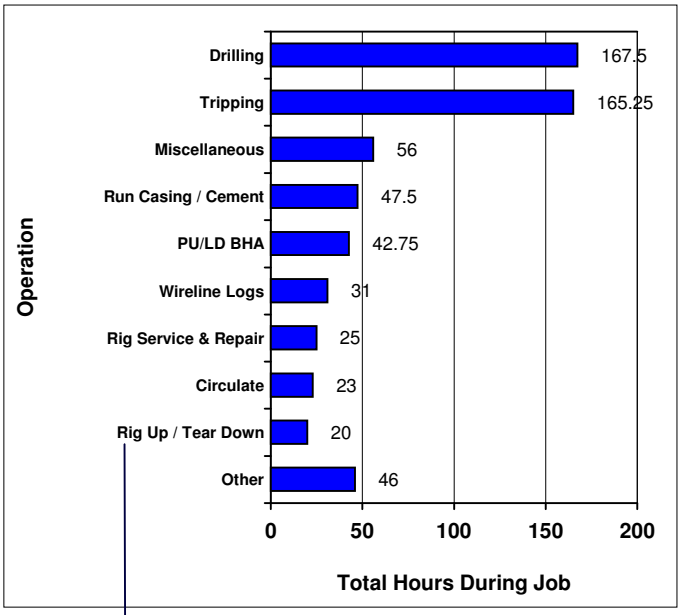
Motor Run #	Manufacturer	Type	Lobe	OD (in)	Gauge (in)	Bend (deg)	Adj	DLS (Ori) (°/100')	ROP (Ori) (m/hr)	ROP (Rot) (m/hr)
1	SSDS	SperryDrill	6/7	9.625	12.125	0.78	Y	2.03	4	21
2	SSDS	SperryDrill	6/7	9.625	12.125	0.78	Y	2.03	0	13

Table 2 - Motor Run Summary

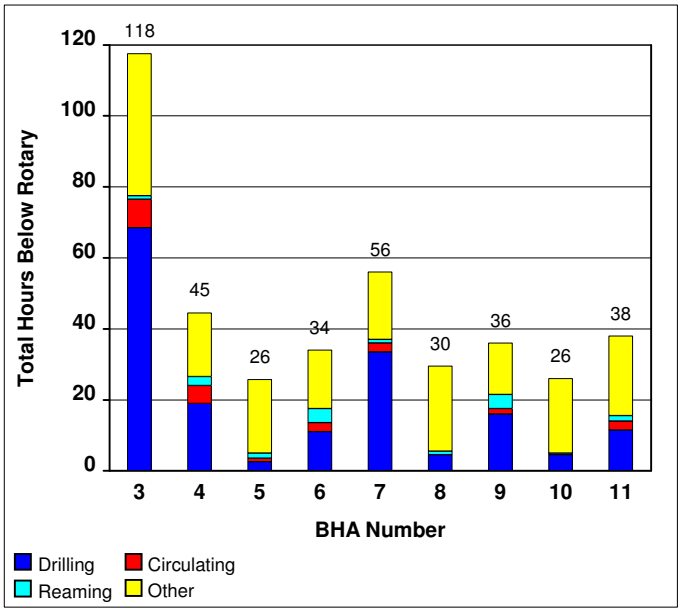
Bit #	Manufacturer	Style	OD (in)	Gge Len (in)	Nozzles (/32's)	TFA (in²)	Dull Grades I O D L B G O R	Ftge (m)	Drlg hrs	ROP (m/hr)
3	Reed Hycalog	RSR616M-A 2	12.250	4.000	8x13	1.037	1-1-BT-N -X-I-CT-PP	1336	65.00	21
3rr1	Reed Hycalog	RSR616M-A 2	12.250	4.000	8x13	1.037	1-1-CT-A -X-I-PN-TD	249	19.00	13
4	Hughes	GT-1	8.500	4.000	3x22	1.114	1-1-WT-A -1-I-NO-BHA	3	2.50	1
5	Smith	Mi616VBPX	8.500	0.000	6x14	0.902	1-1-WT-A -X-I-NO-DTF	110	11.00	10
5rr1	Smith	Mi616VBPX	8.500	0.000	6x14	0.902	1-2-CT-S -X-I-WT-CP	350	33.50	10
6	Corpro	MCP572	8.500	0.000	1x28	0.601	1-1-NO-FC-X-I-NO-BHA	30	4.50	7
5rr2	Smith	Mi616VBPX	8.500	0.000	6x14	0.902	1-2-CT-S -X-I-NO-CP	132	16.00	8
6rr1	Corpro	MCP572	8.500	0.000	1x28	0.601	1-1-NO-A -X-I-NO-BHA	30	4.50	7
5rr3	Smith	Mi616VBPX	8.500	0.000	6x14	0.902		60	11.50	5

Table 3 - Bit Run Summary

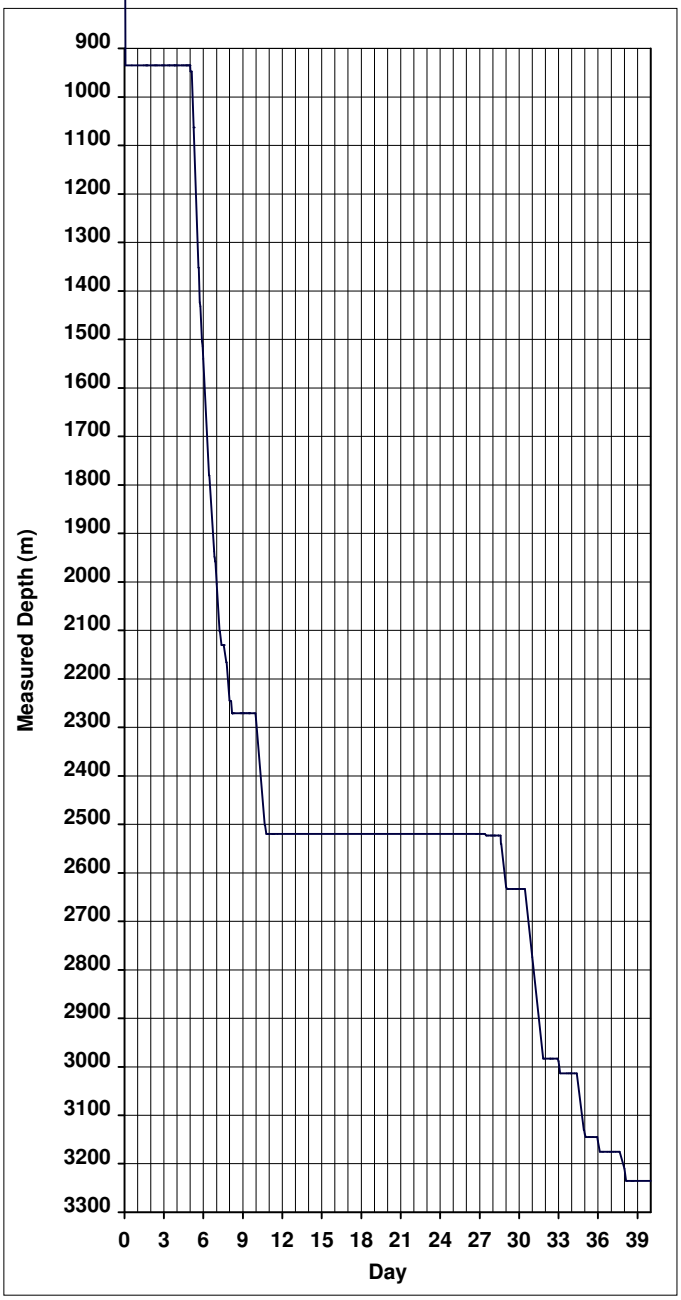
Hours by Operation Summary



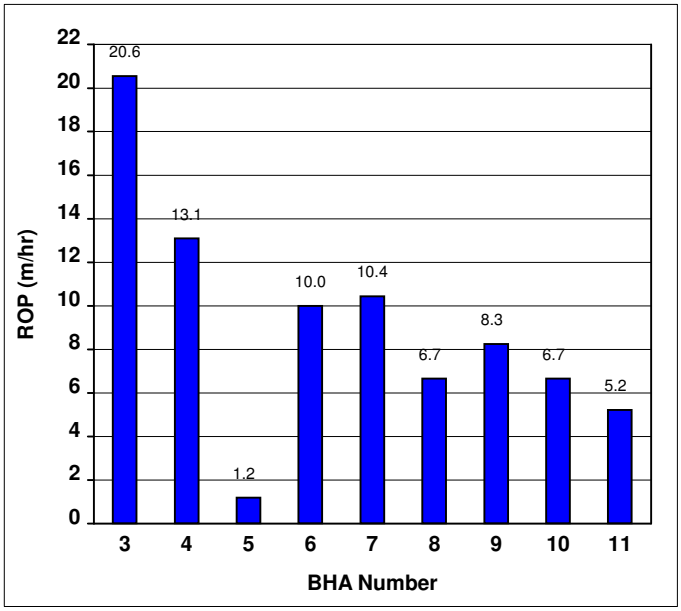
Hours per BHA Breakdown



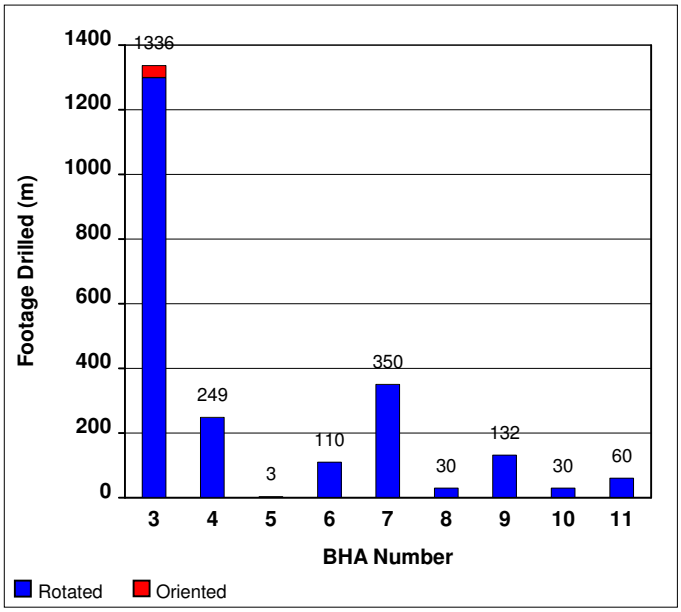
Days vs. Depth



Average Rate of Penetration per BHA



Footage per BHA



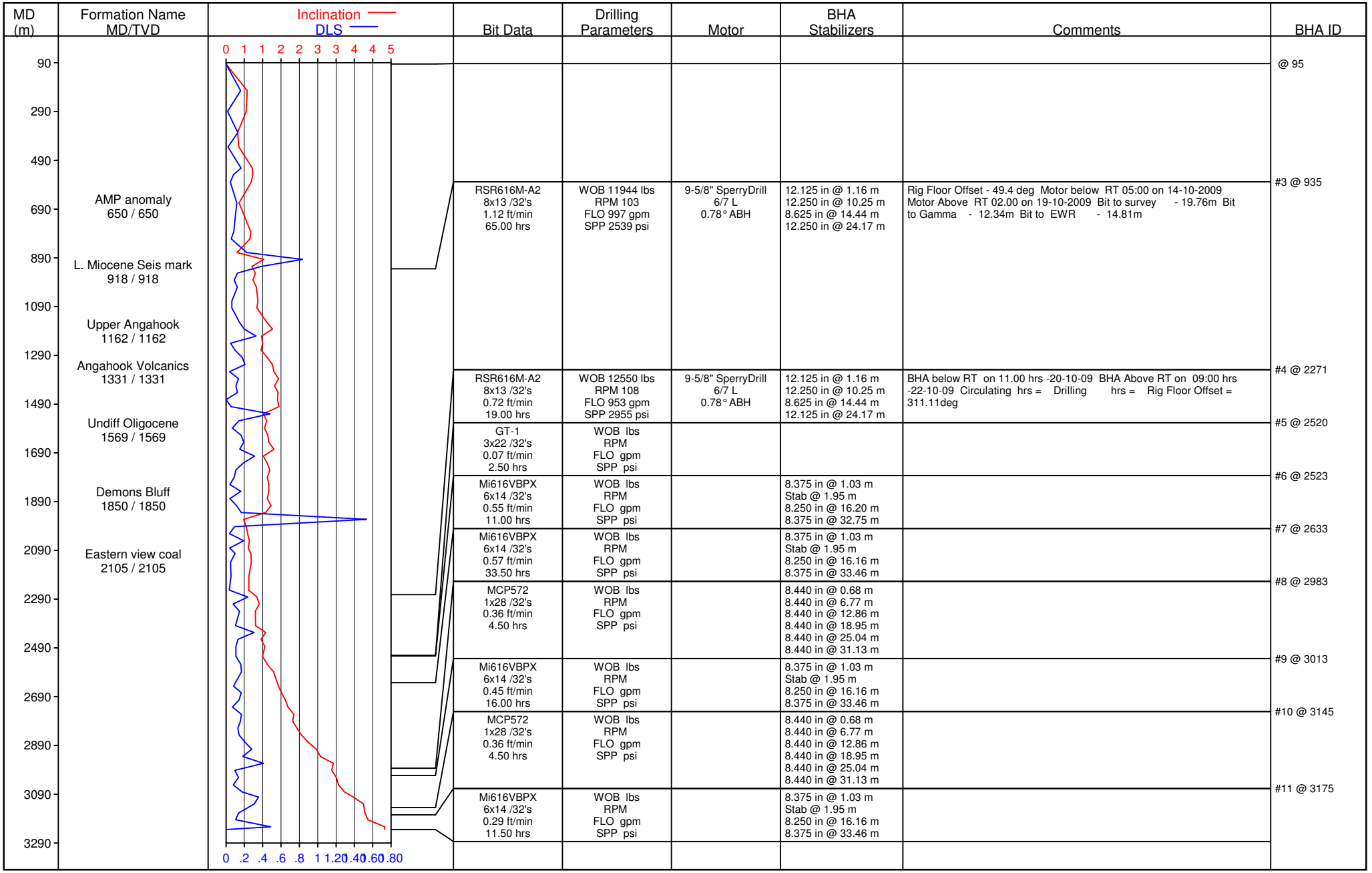
SECTION 2

Drilling Parameters

Sperry-Sun Drilling Services

Origin Energy Services
Trefoil-2
Kan Tan IV

Australia
Bass Basin
AU-DD-0006714148



SECTION 3

Definitive Survey Report

Origin Energy Resources LTD

Trefoil
Trefoil-2
Trefoil-2 - Trefoil-2

Trefoil-2

Design: Trefoil-2 Definitive Survey

Sperry Drilling Services

Combo Report

09 December, 2009

Well Coordinates: 5,583,676.59 N, 360,690.39 E (39° 53' 07.93" S, 145° 22' 14.62" E)
Water Depth: 69.00 m

Local Coordinate Origin:	Centered on Well Trefoil-2 - Slot Trefoil-2
Viewing Datum:	Rotary Table @ 26.00m (Above MSL)
TVDs to System:	N
North Reference:	Grid
Unit System:	Modified SI

Version: 2003.21 Build: 43

HALLIBURTON

Design Report for Trefoil-2 - Trefoil-2 Definitive Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System (m)	Vertical Depth (m)	Local Coordinates Northing (m)	Local Coordinates Easting (m)	Map Coordinates Northing (m)	Map Coordinates Easting (m)	Dogleg Rate (°/30m)	Vertical Section (m)	Comments
0.00	0.00	0.00	-26.00	0.00	0.00 N	0.00 E	5,583,676.59	360,690.39	0.000	0.00	
95.00	0.00	0.00	69.00	95.00	0.00 N	0.00 E	5,583,676.59	360,690.39	0.000	0.00	
204.92	0.58	282.17	178.92	204.92	0.12 N	0.54 W	5,583,676.71	360,689.85	0.158	-0.52	
289.50	0.55	277.88	263.49	289.49	0.26 N	1.36 W	5,583,676.85	360,689.02	0.018	-1.28	
376.49	0.32	238.01	350.48	376.48	0.19 N	1.98 W	5,583,676.78	360,688.40	0.127	-1.76	
435.08	0.35	232.40	409.07	435.07	0.00 S	2.26 W	5,583,676.58	360,688.12	0.023	-1.89	
521.95	0.72	199.02	495.94	521.94	0.68 S	2.65 W	5,583,675.91	360,687.74	0.162	-1.83	
547.83	0.73	193.58	521.81	547.81	1.00 S	2.74 W	5,583,675.59	360,687.64	0.081	-1.74	
579.00	0.69	195.91	552.98	578.98	1.37 S	2.84 W	5,583,675.22	360,687.55	0.047	-1.61	
665.44	0.36	203.20	639.42	665.42	2.12 S	3.09 W	5,583,674.47	360,687.30	0.117	-1.41	
782.28	0.67	192.10	756.25	782.25	3.12 S	3.38 W	5,583,673.46	360,687.01	0.083	-1.09	
812.12	0.66	196.82	786.09	812.09	3.46 S	3.47 W	5,583,673.13	360,686.92	0.056	-0.98	
868.19	0.30	224.95	842.16	868.16	3.87 S	3.66 W	5,583,672.71	360,686.73	0.225	-0.92	
896.77	1.03	195.99	870.74	896.74	4.17 S	3.79 W	5,583,672.42	360,686.60	0.820	-0.85	
925.97	0.71	183.94	899.93	925.93	4.61 S	3.87 W	5,583,671.98	360,686.52	0.377	-0.68	
952.44	0.80	188.49	926.40	952.40	4.95 S	3.91 W	5,583,671.64	360,686.48	0.122	-0.53	
981.35	0.74	192.99	955.31	981.31	5.33 S	3.98 W	5,583,671.25	360,686.41	0.088	-0.37	
1,010.20	0.83	198.72	984.16	1,010.16	5.71 S	4.09 W	5,583,670.87	360,686.30	0.124	-0.26	
1,067.21	0.87	190.96	1,041.16	1,067.16	6.53 S	4.31 W	5,583,670.06	360,686.08	0.064	0.02	
1,095.87	0.84	194.49	1,069.82	1,095.82	6.95 S	4.40 W	5,583,669.64	360,685.99	0.063	0.17	
1,153.51	1.11	191.81	1,127.45	1,153.45	7.90 S	4.62 W	5,583,668.69	360,685.77	0.142	0.51	
1,182.36	1.27	187.06	1,156.29	1,182.29	8.49 S	4.72 W	5,583,668.10	360,685.67	0.195	0.76	
1,211.30	0.97	182.63	1,185.23	1,211.23	9.06 S	4.77 W	5,583,667.53	360,685.62	0.323	1.03	
1,240.32	1.00	184.76	1,214.24	1,240.24	9.55 S	4.80 W	5,583,667.03	360,685.59	0.049	1.27	
1,269.44	0.96	179.68	1,243.36	1,269.36	10.05 S	4.82 W	5,583,666.54	360,685.57	0.098	1.53	
1,298.71	1.13	178.12	1,272.62	1,298.62	10.58 S	4.81 W	5,583,666.00	360,685.58	0.177	1.84	
1,327.95	1.27	184.82	1,301.86	1,327.86	11.20 S	4.83 W	5,583,665.39	360,685.56	0.203	2.16	
1,357.12	1.31	184.97	1,331.02	1,357.02	11.85 S	4.88 W	5,583,664.74	360,685.51	0.041	2.47	
1,385.95	1.43	187.08	1,359.84	1,385.84	12.53 S	4.95 W	5,583,664.05	360,685.43	0.135	2.79	
1,414.80	1.33	186.15	1,388.68	1,414.68	13.22 S	5.03 W	5,583,663.36	360,685.35	0.107	3.11	
1,443.26	1.42	189.23	1,417.14	1,443.14	13.90 S	5.13 W	5,583,662.69	360,685.26	0.123	3.40	
1,471.76	1.41	188.55	1,445.63	1,471.63	14.60 S	5.24 W	5,583,661.99	360,685.15	0.021	3.70	
1,500.56	1.44	186.77	1,474.42	1,500.42	15.31 S	5.33 W	5,583,661.28	360,685.06	0.056	4.01	
1,529.74	1.02	177.87	1,503.59	1,529.59	15.93 S	5.36 W	5,583,660.66	360,685.02	0.473	4.32	
1,559.00	1.11	183.32	1,532.85	1,558.85	16.47 S	5.37 W	5,583,660.11	360,685.02	0.139	4.62	
1,588.15	1.05	181.86	1,561.99	1,587.99	17.02 S	5.40 W	5,583,659.57	360,684.99	0.068	4.90	
1,617.27	1.14	175.03	1,591.11	1,617.11	17.58 S	5.38 W	5,583,659.01	360,685.01	0.163	5.22	
1,646.32	1.17	184.16	1,620.15	1,646.15	18.16 S	5.38 W	5,583,658.43	360,685.01	0.192	5.55	
1,675.15	1.31	182.99	1,648.97	1,674.97	18.78 S	5.41 W	5,583,657.80	360,684.97	0.148	5.86	

Design Report for Trefoil-2 - Trefoil-2 Definitive Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System (m)	Vertical Depth (m)	Local Coordinates Northing (m)	Local Coordinates Easting (m)	Map Coordinates Northing (m)	Map Coordinates Easting (m)	Dogleg Rate (°/30m)	Vertical Section (m)	Comments
1,703.61	1.02	183.90	1,677.43	1,703.43	19.36 S	5.45 W	5,583,657.23	360,684.94	0.306	6.15	
1,731.98	1.12	176.27	1,705.79	1,731.79	19.89 S	5.45 W	5,583,656.70	360,684.94	0.184	6.44	
1,760.71	1.20	179.48	1,734.52	1,760.52	20.47 S	5.43 W	5,583,656.12	360,684.96	0.108	6.78	
1,790.08	1.13	181.99	1,763.88	1,789.88	21.07 S	5.43 W	5,583,655.52	360,684.95	0.088	7.10	
1,819.45	1.17	182.73	1,793.24	1,819.24	21.66 S	5.46 W	5,583,654.93	360,684.93	0.044	7.41	
1,848.52	1.17	190.32	1,822.31	1,848.31	22.25 S	5.53 W	5,583,654.34	360,684.86	0.160	7.68	
1,877.80	1.13	190.92	1,851.58	1,877.58	22.82 S	5.63 W	5,583,653.77	360,684.75	0.043	7.91	
1,906.65	1.23	192.98	1,880.43	1,906.43	23.40 S	5.76 W	5,583,653.18	360,684.63	0.113	8.12	
1,934.67	1.08	194.42	1,908.44	1,934.44	23.95 S	5.89 W	5,583,652.64	360,684.50	0.164	8.32	
1,963.22	0.48	64.50	1,936.99	1,962.99	24.16 S	5.85 W	5,583,652.43	360,684.54	1.509	8.47	
1,992.33	0.56	59.70	1,966.10	1,992.10	24.04 S	5.62 W	5,583,652.55	360,684.77	0.094	8.59	
2,021.46	0.59	61.98	1,995.23	2,021.23	23.90 S	5.36 W	5,583,652.69	360,685.03	0.039	8.73	
2,050.74	0.64	78.76	2,024.50	2,050.50	23.79 S	5.07 W	5,583,652.80	360,685.32	0.191	8.91	
2,080.19	0.61	81.26	2,053.95	2,079.95	23.74 S	4.75 W	5,583,652.85	360,685.64	0.041	9.15	
2,102.20	0.68	80.27	2,075.96	2,101.96	23.70 S	4.51 W	5,583,652.89	360,685.88	0.097	9.33	
2,138.04	0.69	75.36	2,111.80	2,137.80	23.61 S	4.09 W	5,583,652.98	360,686.30	0.050	9.63	
2,195.19	0.63	82.85	2,168.94	2,194.94	23.48 S	3.44 W	5,583,653.11	360,686.94	0.055	10.09	
2,253.19	0.62	89.29	2,226.94	2,252.94	23.44 S	2.81 W	5,583,653.15	360,687.57	0.037	10.60	
2,281.35	0.84	88.95	2,255.10	2,281.10	23.43 S	2.46 W	5,583,653.16	360,687.93	0.234	10.89	
2,310.29	0.91	90.74	2,284.04	2,310.04	23.43 S	2.01 W	5,583,653.16	360,688.38	0.078	11.26	
2,339.67	0.80	84.68	2,313.41	2,339.41	23.41 S	1.58 W	5,583,653.17	360,688.81	0.145	11.62	
2,398.22	0.81	98.78	2,371.96	2,397.96	23.44 S	0.76 W	5,583,653.15	360,689.63	0.101	12.31	
2,426.57	1.08	93.16	2,400.30	2,426.30	23.48 S	0.30 W	5,583,653.10	360,690.09	0.302	12.72	
2,454.95	0.96	91.77	2,428.68	2,454.68	23.51 S	0.21 E	5,583,653.08	360,690.60	0.130	13.16	
2,484.55	1.06	89.94	2,458.27	2,484.27	23.51 S	0.73 E	5,583,653.07	360,691.12	0.106	13.59	
2,524.75	1.00	97.22	2,498.47	2,524.47	23.56 S	1.45 E	5,583,653.03	360,691.84	0.107	14.22	
2,557.55	1.13	91.00	2,531.26	2,557.26	23.60 S	2.06 E	5,583,652.99	360,692.45	0.159	14.75	
2,588.20	1.30	90.35	2,561.90	2,587.90	23.61 S	2.71 E	5,583,652.98	360,693.10	0.167	15.29	
2,646.63	1.43	86.39	2,620.32	2,646.32	23.56 S	4.10 E	5,583,653.02	360,694.49	0.082	16.43	
2,674.00	1.51	91.33	2,647.68	2,673.68	23.55 S	4.80 E	5,583,653.04	360,695.19	0.164	17.01	
2,702.98	1.62	88.34	2,676.65	2,702.65	23.55 S	5.59 E	5,583,653.04	360,695.98	0.142	17.67	
2,732.91	1.69	88.47	2,706.57	2,732.57	23.52 S	6.45 E	5,583,653.06	360,696.84	0.070	18.37	
2,762.56	1.85	89.89	2,736.20	2,762.20	23.51 S	7.37 E	5,583,653.08	360,697.76	0.168	19.13	
2,791.49	1.82	85.29	2,765.12	2,791.12	23.47 S	8.30 E	5,583,653.11	360,698.68	0.156	19.88	
2,819.89	1.94	85.21	2,793.50	2,819.50	23.40 S	9.22 E	5,583,653.19	360,699.61	0.127	20.61	
2,847.72	2.06	83.71	2,821.31	2,847.31	23.30 S	10.19 E	5,583,653.29	360,700.58	0.141	21.36	
2,876.19	2.24	81.90	2,849.76	2,875.76	23.17 S	11.25 E	5,583,653.42	360,701.64	0.203	22.17	
2,905.64	2.46	85.79	2,879.19	2,905.19	23.04 S	12.45 E	5,583,653.55	360,702.84	0.277	23.10	
2,935.67	2.58	82.74	2,909.19	2,935.19	22.91 S	13.76 E	5,583,653.68	360,704.15	0.180	24.12	

Design Report for Trefoil-2 - Trefoil-2 Definitive Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System (m)	Vertical Depth (m)	Local Coordinates Northing (m)	Local Coordinates Easting (m)	Map Coordinates Northing (m)	Map Coordinates Easting (m)	Dogleg Rate (°/30m)	Vertical Section (m)	Comments
2,963.22	2.93	85.15	2,936.71	2,962.71	22.77 S	15.08 E	5,583,653.82	360,705.47	0.401	25.15	
2,992.32	2.88	83.61	2,965.77	2,991.77	22.63 S	16.55 E	5,583,653.96	360,706.94	0.096	26.29	
3,021.53	3.01	83.20	2,994.94	3,020.94	22.45 S	18.04 E	5,583,654.14	360,708.43	0.135	27.44	
3,051.62	3.07	82.21	3,024.99	3,050.99	22.25 S	19.62 E	5,583,654.34	360,710.01	0.079	28.64	
3,080.66	3.23	81.34	3,053.99	3,079.99	22.02 S	21.20 E	5,583,654.57	360,711.59	0.173	29.84	
3,101.98	3.47	82.50	3,075.27	3,101.27	21.85 S	22.43 E	5,583,654.74	360,712.82	0.351	30.77	
3,130.21	3.75	81.59	3,103.44	3,129.44	21.60 S	24.19 E	5,583,654.99	360,714.58	0.304	32.10	
3,167.65	3.79	84.07	3,140.80	3,166.80	21.29 S	26.64 E	5,583,655.29	360,717.02	0.135	33.96	
3,194.79	3.87	83.32	3,167.88	3,193.88	21.09 S	28.44 E	5,583,655.49	360,718.83	0.104	35.36	
3,223.60	4.33	83.41	3,196.62	3,222.62	20.86 S	30.48 E	5,583,655.73	360,720.87	0.479	36.93	
3,235.00	4.33	83.41	3,207.99	3,233.99	20.76 S	31.34 E	5,583,655.83	360,721.73	0.000	37.59	Projected to TD

Design Annotations

Measured Depth (m)	Vertical Depth (m)	Local Coordinates +N/-S (m)	Local Coordinates +E/-W (m)	Comment
3,235.00	3,233.99	-20.76	31.34	Projected to TD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (m)	Origin +E/-W (m)	Start TVD (m)
User	No Target (Freehand)	123.52	Slot	0.00	0.00	0.00

Survey tool program

From (m)	To (m)	Survey/Plan	Survey Tool
95.00	925.97	Trefoil-2 - 17 1/2" MWD Survey	MWD+SAG+SC
952.44	2,484.55	Trefoil-2 - 12 1/4" MWD Survey	MWD+SAG+SC
2,524.75	3,235.00	Trefoil-2 - 8 1/2" MWD Survey	MWD+SAG+SC

Design Report for Trefoil-2 - Trefoil-2 Definitive Survey

Casing Details

Measured Depth (m)	Vertical Depth (m)	Name	Casing Diameter (in)	Hole Diameter (in)
153.00	153.00	30" Conductor	30.000	36.000
930.00	929.96	13 3/8" Casing	13.375	17.500
2,520.00	2,519.72	9 5/8" Casing	9.625	12.250

North Reference Sheet for Trefoil-2 - Trefoil-2 - Trefoil-2

All data is in Meters unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to Rotary Table @ 26.00m (Above MSL). Northing and Easting are relative to Trefoil-2 - Slot Trefoil-2

Coordinate System is Universal Transverse Mercator, Zone 55S (144 E to 150 E) using datum GDA94, ellipsoid GRS 1980

Projection method is Transverse Mercator (Gauss-Kruger)

Central Meridian is 147° 0' 0.0000 E°, Longitude Origin:0° 0' 0.0000 E°, Latitude Origin:0° 0' 0.0000 N°

False Easting: 500,000.00m, False Northing: 10,000,000.00m, Scale Reduction: 0.99983896

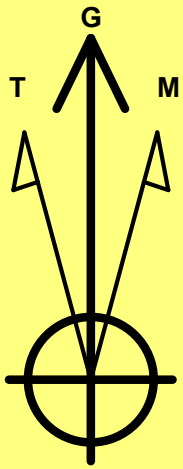
Grid Coordinates of Well: 5,583,676.59 m N, 360,690.39 m E

Geographical Coordinates of Well: 39° 53' 07.93" S, 145° 22' 14.62" E

Grid Convergence at Surface is: 1.04°

Based upon Minimum Curvature type calculations, at a Measured Depth of 3,235.00m
the Bottom Hole Displacement is 37.59m in the Direction of 123.52° (Grid).

Magnetic Convergence at surface is: -11.45° (16 October 2009, , BGGM2009)



Magnetic Model:	BGGM2009
Date:	16-Oct-09
Declination:	12.50°
Inclination/Dip:	-70.48°
Field Strength:	61021

Grid North is 1.04° East of True North (Grid Convergence)
Magnetic North is 12.50° East of True North (Magnetic Declination)
Magnetic North is 11.45° East of Grid North (Magnetic Convergence)

To convert a True Direction to a Grid Direction, Subtract 1.04°
To convert a Magnetic Direction to a True Direction, Add 12.50° East
To convert a Magnetic Direction to a Grid Direction, Add 11.45°

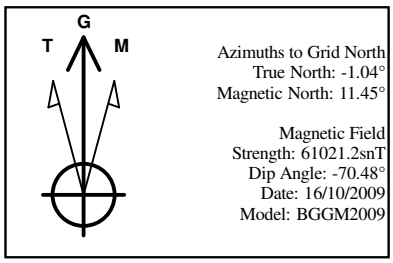
SECTION 4

A4 Plot

Sperry Drilling

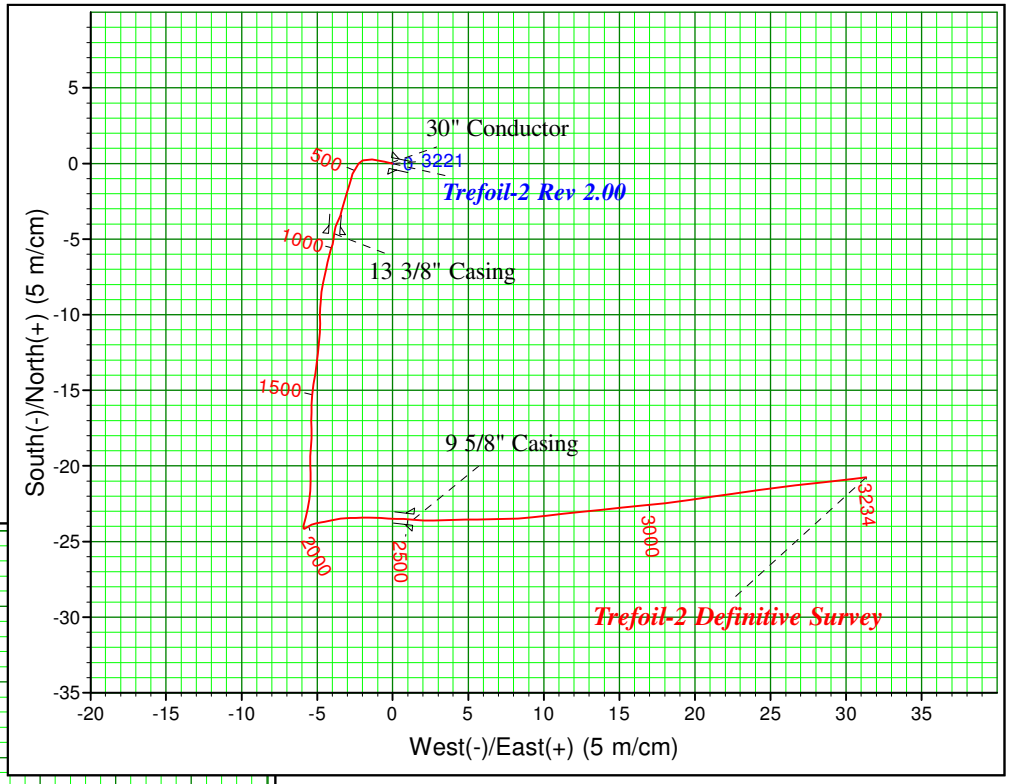
Project: Trefoil
Site: Trefoil-2
Well: Trefoil-2
Wellbore: Trefoil-2
Design: Trefoil-2 Actual V's Proposed

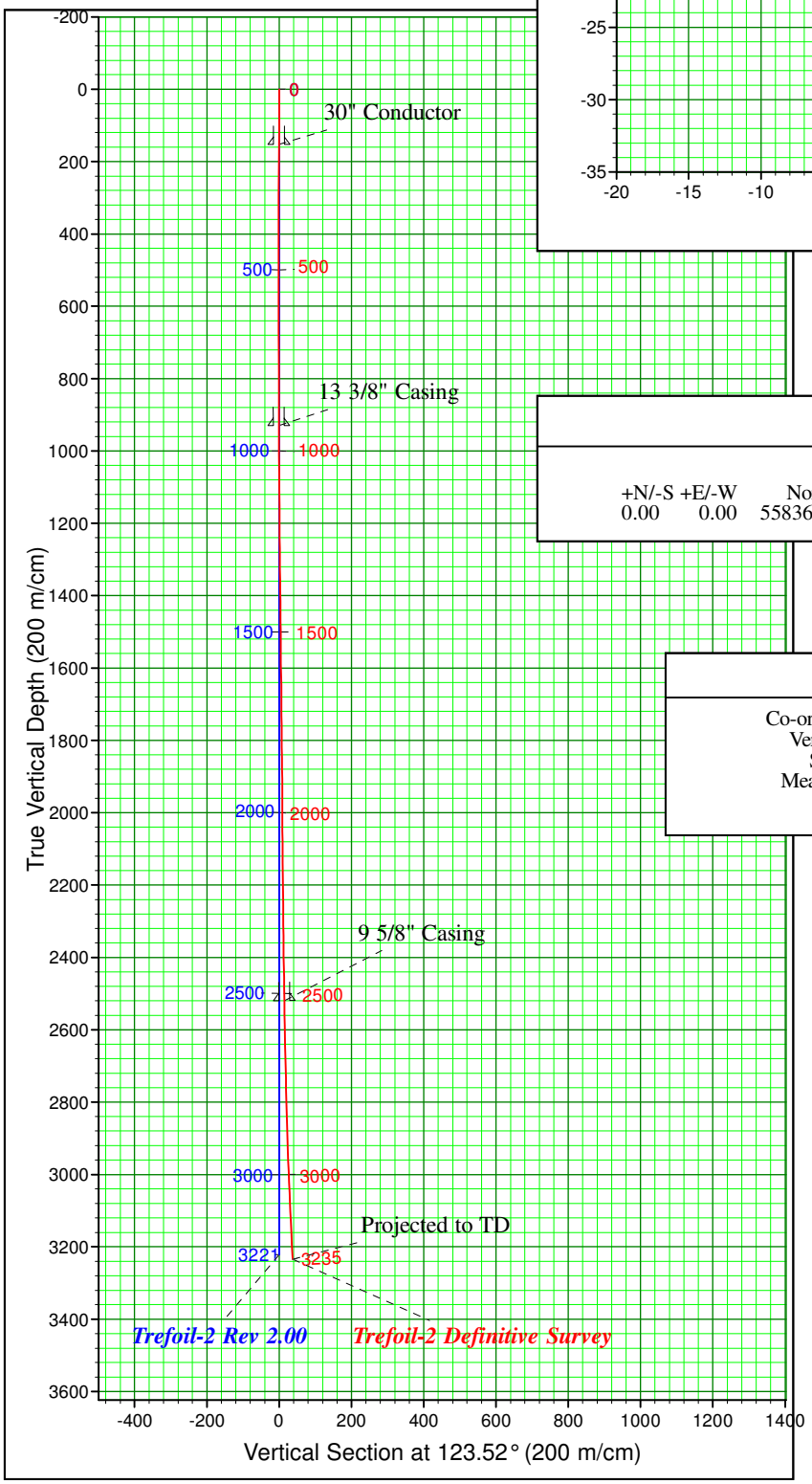
Origin energy



Azimuths to Grid North
True North: -1.04°
Magnetic North: 11.45°

Magnetic Field
Strength: 61021.2snT
Dip Angle: -70.48°
Date: 16/10/2009
Model: BGGM2009





WELL DETAILS: Trefoil-2

Water Depth: 69.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	5583676.59	360690.39	39° 53' 7.9334 S	145° 22' 14.6152 E	Trefoil-2

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Trefoil-2 - Slot Trefoil-2, Grid North
Vertical (TVD) Reference: Rotary Table @ 26.00m (Above MSL)
Section (VS) Reference: Slot - Trefoil-2(0.00N, 0.00E)
Measured Depth Reference: Rotary Table @ 26.00m (Above MSL)
Calculation Method: Minimum Curvature

CASING DETAILS

TVD	MD	Name	Size
153.00	153.00	30" Conductor	30.000
929.96	930.00	13 3/8" Casing	13.375
2519.72	2520.00	9 5/8" Casing	9.625

PROJECT DETAILS: Trefoil

Geodetic System: Universal Transverse Mercator
Datum: GDA94
Ellipsoid: GRS 1980
Zone: Zone 55S (144 E to 150 E)

System Datum: Mean Sea Level

SECTION 5

Drilling Surveys

sperry-sun
DRILLING SERVICES

Survey and Drilling Parameters

Customer : Origin Energy Services
Well : Trefoil-2
Rig : Kan Tan IV

Field : Australia
Slot : Bass Basin
Job # : AU-DD-0006714148

North Ref : Grid **Declination :** ° **VS Dir :** 0.00° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS									
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/100')	Build Rate (°/100')	Turn Rate (°/100')	WOB (lbs)	RPM	Flow Rate (gpm)	Stand Pipe (psi)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	ROP (m/hr)	BHA No. (#)	Comment
0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00										Tieon
95.00	0.00	0.00	95.0	0.0	0.0	0.0	0.00	0.00	0.00										
204.92	0.58	282.17	204.9	-0.5	0.1	-0.5	0.16	0.16	0.00										
289.50	0.55	277.88	289.5	-1.3	0.3	-1.4	0.02	-0.01	0.00										
376.49	0.32	238.01	376.5	-1.8	0.2	-2.0	0.13	-0.08	0.00										
435.08	0.35	232.40	435.1	-1.9	0.0	-2.3	0.02	0.02	0.00										
521.95	0.72	199.02	521.9	-1.8	-0.7	-2.7	0.16	0.13	0.00										
547.83	0.73	193.58	547.8	-1.7	-1.0	-2.7	0.08	0.01	0.00										
579.00	0.69	195.91	579.0	-1.6	-1.4	-2.8	0.05	-0.04	0.00										
665.44	0.36	203.20	665.4	-1.4	-2.1	-3.1	0.12	-0.12	0.00										
782.28	0.67	192.10	782.3	-1.1	-3.1	-3.4	0.08	0.08	0.00										
812.12	0.66	196.82	812.1	-1.0	-3.5	-3.5	0.06	-0.01	0.00										
868.19	0.30	224.95	868.2	-0.9	-3.9	-3.7	0.23	-0.20	0.00										
896.77	1.03	195.99	896.7	-0.9	-4.2	-3.8	0.83	0.78	0.00										
925.97	0.71	183.94	925.9	-0.7	-4.6	-3.9	0.38	-0.33	0.00										
952.44	0.80	188.49	952.4	-0.5	-5.0	-3.9	0.12	0.10	0.00	10000	80	1000	1850				55	3	
981.35	0.74	192.99	981.3	-0.4	-5.3	-4.0	0.09	-0.06	0.00	8000	100	956	1825				50	3	
1010.20	0.83	198.72	1010.2	-0.3	-5.7	-4.1	0.13	0.10	0.00	8000	100	956	1895				70	3	
1067.21	0.87	190.96	1067.2	0.0	-6.5	-4.3	0.07	0.02	0.00	5000	100	956	1860				80	3	
1095.87	0.84	194.49	1095.8	0.2	-6.9	-4.4	0.06	-0.03	0.00	6000	100	1000	2240				120	3	
1153.51	1.11	191.81	1153.4	0.5	-7.9	-4.6	0.14	0.14	0.00	7000	100	1000	2345				145	3	
1182.36	1.27	187.06	1182.3	0.8	-8.5	-4.7	0.20	0.17	-5.02	8000	100	1000	2375				150	3	
1211.30	0.97	182.63	1211.2	1.0	-9.1	-4.8	0.33	-0.32	0.00	10000	100	1000	2358				120	3	
1240.32	1.00	184.76	1240.2	1.3	-9.6	-4.8	0.05	0.03	0.00	8000	100	1000	2450				95	3	
1269.44	0.96	179.68	1269.4	1.5	-10.1	-4.8	0.10	-0.04	0.00	2000	100	1000	2280				55	3	
1298.71	1.13	178.12	1298.6	1.8	-10.6	-4.8	0.18	0.18	0.00	5000	110	1000	2230				50	3	
1327.95	1.27	184.82	1327.9	2.2	-11.2	-4.8	0.21	0.15	6.98	2000	110	1000	2201				55	3	
1357.12	1.31	184.97	1357.0	2.5	-11.8	-4.9	0.04	0.04	0.16	2000	110	1000	2320				80	3	
1385.95	1.43	187.08	1385.8	2.8	-12.5	-5.0	0.14	0.13	2.23	8000	100	1000	2520				80	3	
1414.80	1.33	186.15	1414.7	3.1	-13.2	-5.0	0.11	-0.11	-0.98	4000	100	1000	2450				70	3	

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DRILLING SERVICES

Survey and Drilling Parameters

Customer : Origin Energy Services
Well : Trefoil-2
Rig : Kan Tan IV

Field : Australia
Slot : Bass Basin
Job # : AU-DD-0006714148

North Ref : Grid **Declination :** ° **VS Dir :** 0.00° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS									
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/100')	Build Rate (°/100')	Turn Rate (°/100')	WOB (lbs)	RPM	Flow Rate (gpm)	Stand Pipe (psi)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	ROP (m/hr)	BHA No. (#)	Comment
1443.26	1.42	189.23	1443.1	3.4	-13.9	-5.1	0.12	0.10	3.30	3000	100	1000	2471	1419	1428	20R	80	3	
1471.76	1.41	188.55	1471.6	3.7	-14.6	-5.2	0.00	-0.01	-0.73	8000	110	1000	2422				70	3	
1500.56	1.44	186.77	1500.4	4.0	-15.3	-5.3	0.06	0.03	-1.88	5000	100	1000	2490				75	3	
1529.74	1.02	177.87	1529.6	4.3	-15.9	-5.4	0.48	-0.44	-9.30	6000	100	1000	2690	1504	1514	40R	60	3	
1559.00	1.11	183.32	1558.8	4.6	-16.5	-5.4	0.14	0.09	5.68	10000	100	1000	2690				65	3	
1588.15	1.05	181.86	1588.0	4.9	-17.0	-5.4	0.07	-0.06	-1.53	10000	100	1000	2600				55	3	
1617.27	1.14	175.03	1617.1	5.2	-17.6	-5.4	0.17	0.09	-7.15	10000	100	1000	2600				55	3	
1646.32	1.17	184.16	1646.1	5.5	-18.2	-5.4	0.20	0.03	9.58	10000	110	1000	2600				50	3	
1675.15	1.31	182.99	1675.0	5.9	-18.8	-5.4	0.15	0.15	-1.24	10000	110	1000	2620				45	3	
1703.61	1.02	183.90	1703.4	6.1	-19.4	-5.4	0.31	-0.31	0.97	10000	110	1000	2750				35	3	
1731.98	1.12	176.27	1731.8	6.4	-19.9	-5.4	0.19	0.11	-8.20	14000	110	1000	2740				30	3	
1760.71	1.20	179.48	1760.5	6.8	-20.5	-5.4	0.11	0.08	3.41	25000	110	1000	2790				35	3	
1790.08	1.13	181.99	1789.9	7.1	-21.1	-5.4	0.09	-0.07	2.60	22000	110	1000	2660				35	3	
1819.45	1.17	182.73	1819.2	7.4	-21.7	-5.5	0.04	0.04	0.77	28000	110	1000	2575				43	3	
1848.52	1.17	190.32	1848.3	7.7	-22.2	-5.5	0.16	0.00	7.96	25000	110	1000	2670				35	3	
1877.80	1.13	190.92	1877.6	7.9	-22.8	-5.6	0.04	-0.04	0.62	25000	110	1000	2743				38	3	
1906.65	1.23	192.98	1906.4	8.1	-23.4	-5.8	0.11	0.11	2.18	25000	110	1000	2690				35	3	
1934.67	1.08	194.42	1934.4	8.3	-24.0	-5.9	0.17	-0.16	1.57	25000	110	1000	2890				35	3	
1963.22	0.48	64.50	1963.0	8.5	-24.2	-5.9	1.53	-0.64	0.00	25000	110	1000	2875	1937	1948	15R	35	3	
														1951	1958	15R		3	
1992.33	0.56	59.70	1992.1	8.6	-24.0	-5.6	0.10	0.08	0.00	25000	100	1000	2580				30	3	
2021.46	0.59	61.98	2021.2	8.7	-23.9	-5.4	0.04	0.03	0.00	20000	100	1000	2905				25	3	
2050.74	0.64	78.76	2050.5	8.9	-23.8	-5.1	0.19	0.05	0.00	25000	100	1000	2870				25	3	
2080.19	0.61	81.26	2080.0	9.1	-23.7	-4.8	0.04	-0.03	0.00	23000	100	1000	2780				32	3	
2102.20	0.68	80.27	2102.0	9.3	-23.7	-4.5	0.10	0.10	0.00	23000	100	1000	2780				32	3	
2138.04	0.69	75.36	2137.8	9.6	-23.6	-4.1	0.05	0.01	0.00	10000	110	1000	3060				45	3	
2195.19	0.63	82.85	2194.9	10.1	-23.5	-3.4	0.06	-0.03	0.00	15000	100	1000	3120				30	3	
2253.19	0.62	89.29	2252.9	10.6	-23.4	-2.8	0.04	-0.01	0.00	10000	100	1000	3150				12	3	
2281.35	0.84	88.95	2281.1	10.9	-23.4	-2.5	0.24	0.24	0.00	20000	110	950	2910				15	4	
2310.29	0.91	90.74	2310.0	11.3	-23.4	-2.0	0.08	0.07	0.00	12000	100	975	2885				18	4	
2339.67	0.80	84.68	2339.4	11.6	-23.4	-1.6	0.15	-0.11	0.00	20000	110	950	2825				30	4	

sperry-sun DRILLING SERVICES

Survey and Drilling Parameters

Customer : Origin Energy Services
Well : Trefoil-2
Rig : Kan Tan IV

Field : Australia
Slot : Bass Basin
Job # : AU-DD-0006714148

North Ref : Grid **Declination :** ° **VS Dir :** 0.00° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS									
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/100')	Build Rate (°/100')	Turn Rate (°/100')	WOB (lbs)	RPM	Flow Rate (gpm)	Stand Pipe (psi)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	ROP (m/hr)	BHA No. (#)	Comment
2398.22	0.81	98.78	2398.0	12.3	-23.4	-0.8	0.10	0.01	0.00	10000	100	950	2903				18	4	
2426.57	1.08	93.16	2426.3	12.7	-23.5	-0.3	0.31	0.29	0.00	10000	110	950	3050				20	4	
2454.95	0.96	91.77	2454.7	13.2	-23.5	0.2	0.13	-0.13	0.00	10000	110	950	3045				20	4	
2484.55	1.06	89.94	2484.3	13.6	-23.5	0.7	0.11	0.10	0.00	10000	110	950	3050				25	4	
2524.75	1.00	97.22	2524.5	14.2	-23.6	1.5	0.11	-0.05	0.00									6	
2557.55	1.13	91.00	2557.3	14.7	-23.6	2.1	0.16	0.12	0.00									6	
2588.20	1.30	90.35	2587.9	15.3	-23.6	2.7	0.17	0.17	-0.65									6	
2646.63	1.43	86.39	2646.3	16.4	-23.6	4.1	0.08	0.07	-2.07									7	
2674.00	1.51	91.33	2673.7	17.0	-23.6	4.8	0.17	0.09	5.50									7	
2702.98	1.62	88.34	2702.6	17.7	-23.5	5.6	0.14	0.12	-3.14									7	
2732.91	1.69	88.47	2732.6	18.4	-23.5	6.5	0.07	0.07	0.13									7	
2762.56	1.85	89.89	2762.2	19.1	-23.5	7.4	0.17	0.16	1.46									7	
2791.49	1.82	85.29	2791.1	19.9	-23.5	8.3	0.16	-0.03	-4.85									7	
2819.89	1.94	85.21	2819.5	20.6	-23.4	9.2	0.13	0.13	-0.09									7	
2847.72	2.06	83.71	2847.3	21.4	-23.3	10.2	0.14	0.13	-1.64									7	
2876.19	2.24	81.90	2875.8	22.2	-23.2	11.2	0.21	0.19	-1.94									7	
2905.64	2.46	85.79	2905.2	23.1	-23.0	12.4	0.28	0.23	4.03									7	
2935.67	2.58	82.74	2935.2	24.1	-22.9	13.8	0.18	0.12	-3.10									7	
2963.22	2.93	85.15	2962.7	25.1	-22.8	15.1	0.41	0.39	2.67									7	
2992.32	2.88	83.61	2991.8	26.3	-22.6	16.5	0.10	-0.05	-1.61									8	
3021.53	3.01	83.20	3020.9	27.4	-22.5	18.0	0.14	0.14	-0.43									9	
3051.62	3.07	82.21	3051.0	28.6	-22.3	19.6	0.08	0.06	-1.00									9	
3080.66	3.23	81.34	3080.0	29.8	-22.0	21.2	0.18	0.17	-0.91									9	
3101.98	3.47	82.50	3101.3	30.8	-21.8	22.4	0.36	0.34	1.66									9	
3130.21	3.75	81.59	3129.4	32.1	-21.6	24.2	0.31	0.30	-0.98									9	
3167.65	3.79	84.07	3166.8	34.0	-21.3	26.6	0.14	0.03	2.02									10	
3194.79	3.87	83.32	3193.9	35.4	-21.1	28.4	0.11	0.09	-0.84									11	
3223.60	4.33	83.41	3222.6	36.9	-20.9	30.5	0.49	0.49	0.10									11	
3235.00	4.33	83.41	3234.0	37.6	-20.8	31.3	0.00	0.00	0.00									11	

SECTION 6

BHA Data

sperry-sun
DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 3**

BHA# 3 : **Date In** 15/10/200 **MD In (m) :** 935 **TVD In (m) :** 935 **Date Out** 20/10/2009 **MD Out (m):** 2271 **TVD Out (m):** 2271

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
3	12.250	Reed Hycalog	RSR616M-A2	222369	8x13	1.037	1-1-BT-N -X-I-CT-PP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
1	9.625	SSDS	SperryDrill	963448	0.78°		117	77.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Reed RSR616M - A21 12-1/4" PDC	222369	12.250	3.000	12.250	377.57	P 6-5/8" Reg	0.30	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg w/Float	963448	9.625	6.135	12.125	147.21	B 6-5/8" Reg	9.22	1.16
3	12-1/4" Integral Blade Stabilizer	701049	8.000	3.000	12.250	147.22	B 6-5/8" Reg	1.86	10.25
4	8" RLL w/ EWR + DGR + HCIM	PA90218962	8.000	2.375	8.625	156.21	B 6-5/8" Reg	7.28	
5	8" Non Mag HOC w\Tm + Dir	246906	8.063	2.375		158.92	B 6-5/8" Reg	4.80	
6	12-1/4" Integral Blade Stabilizer	231191	8.063	3.000	12.250	149.92	B 6-5/8" Reg	1.88	24.17
7	6x 8-1/4" Spiral Drill collars	Rig	8.250	2.875		160.05	B 6-5/8" Reg	56.43	
8	8" Drilling Jar	17621339	8.000	3.000		147.22	B 6-5/8" Reg	9.68	
9	2x 8-1/4" Spiral Drill collar	Rig	8.250	2.875		160.05	B 6-5/8" Reg	18.63	
10	X-over Sub 6-5/8" <> 4-1/2"IF	Rig 1792	6.750	2.813		100.77	B 4-1/2" IF	1.09	
11	15 x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	141.54	
								252.71	

Parameter	Min	Max	Ave
WOB (lbs) :	2000	28000	11944
RPM (rpm) :	80	110	103
Flow (gpm) :	956	1000	997
SPP (psi) :	1810	3150	2539

Activity	Hrs
Drilling :	65.00
Reaming :	1.00
Circ-Other :	11.50
Total :	77.50

BHA Weight	(lb)
in Air (Total) :	80225
in Mud (Total) :	68976
in Air (Bel Jars) :	42513
in Mud (Bel Jars) :	36552

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2018

PERFORMANCE

	In	Out
Inclination (deg)	0.74	0.76
Azimuth (deg)	185.62	89.05

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	37.00	4			2.03
Rotated :	1299.00	21			
Total :	1336.00	21	0.00	0.00	0.03

COMMENTS

Rig Floor Offset - 49.4 deg
Motor below RT 05:00 on 14-10-2009
Motor Above RT 02.00 on 19-10-2009
Bit to survey - 19.76m
Bit to Gamma - 12.34m
Bit to EWR - 14.81m

OBJECTIVES:

The 12-1/4" section will be drilled to 2510mTVDRT or +/-418m below the top of the Eastern View Group. A deep set 9.5/8" shoe will assist with obtaining all the wire line logging data required in the subsequent 8-1/2" hole section.

RESULTS:

The six bladed Reed RSR616M PDC bit with 9-5/8" Sperry Motor and MWD/LWD tools were made up and downloaded without problems. A shallow test was performed on the first stand of HWDP at 140m, the test was conducted with 800GPM which gave 1050psi. Top of cement was tagged at 917m MD, and cement and shoe track was drilled relatively quickly with sea water to 930m. The hole was displaced to 9.1ppg KCl/Polymer mud, while the rat hole was cleaned to 935m. The assembly was worked twice through the shoe prior to drilling 3m of new formation to 938m for a FIT. While drilling the shoe track with salt water, the pump pressure was averaging 2230psi. This dropped off significantly at the start of displacing to mud averaging 1500 to 1600psi, on investigation it was discovered the mud was aerated and had to be conditioned before performing FIT.
Drilling Commenced with a significant ROP which averaged at around 160 m/hr from 938m to 1236m this was cut back to 80m/hr due to the shakers over loading, the well was circulated while the shakers were cleaned and drilling resumed once again ROP through the Upper Angahook and Angahook Volcanic Equivalent formations 1236m to 1563m was averaging 80m/hr with the following parameters 2-10kwob, 1000gpm, 100rpm. Torque 3-10-k ft-lb. Once entering the Undiff Oligocene formation at 1569m MDRT it dropped off to 30m/hr with intermittent spikes of 50m/hr seen, this trend continued through the Demons Bluff formation 1850m MDRT as well. The WOB was increased to 25K ft-lb's in an attempt to increase ROP with some success. Forward projections showed that the well path would be intersecting the targets just at the 50m radius, as a result two short slides were attempted with little success very poor tool face control at 1419m and again at 1504m. Continue drilling in rotary to 1937m where an 18m low side oriented slide was utilised to keep the inclination from building and turn the azimuth. This showed favourable results and the well path was lined up well within target 50 m radius.
The Motor performed excellent in upper section of well bore with no problems differential pressure from 100-250PSI. At 2105m the Motor stalled out twice once on bottom and again when tagging bottom. At 2132m while making a connection the saver sub on the top drive was backed out .One stand was racked back, and side entry sub made up to the string to circulate well while repairing top drive pipe handler. The string was rotated slowly in the slips. Drilling continued with little progress drill string stalled several times and it was thought the Motor was stalling but going back to bottom on one occasion the string stalled off bottom after investigating it was determined that the torque limiter on the top drive was set to 14K ft lbs, this was increased to 22K ft lbs drilling resumed with no stalling occurring. Some stick slip was experienced and measures were taken to minimize the level acceptable for tools to work without failure and satisfy the customer with a reasonable ROP.
At 2269m a pressure spike was seen along with increase in torque to 20K after which a 300-350psi pressure drop was observed. Pop off valves on pumps 1 and 2 blew on different occasions while trying to continue drilling ahead due to the fact that they were set to 3500psi and flowing at 1000gpm off bottom psi was 2950 to 3000psi. Had the mud pumps had 6" liners instead of 6-1/2" there would have been better buffer between system pressure and the pop off setting. All through this run the pump pressure has been fluctuating. Due to the pressure loss it was decided to POOH to investigate and for bit change. The hole was circulated clean, and the BHA was pooh from 2271m several tight spots were encountered and the hole was back reamed to the shoe at surface the motor was checked and tested 700gpm, 550psi ok observe bypass flow and bit spinning bearing play out - 5mm. The bit looked in good condition and was graded 1-1-BT-N-X-I-CT-PP. A decision was made to re run the same bit.

BRT hours:	117hrs
Circulating hours:	71.58hrs
On bottom Drilling Hours:	39.2hrs
Drilled from 935m to 2271m	1336m
Average ROP:	21m/hr

RECOMMENDATIONS:

The float and plugs may be more effectively drilled with a milled tooth bit, as opposed to a quite flat faced, heavy set PDC Bit. Deck rollers could be utilised to facilitate making up BHA offline thus saving rig time while picking up BHA. The use of 6" liners would have given more room between operating pressure and pop off settings, this would be particularly helpful when running a down hole motor

BHA Schematic

Origin Energy Services

Trefoil-2

BHA ID #: 3

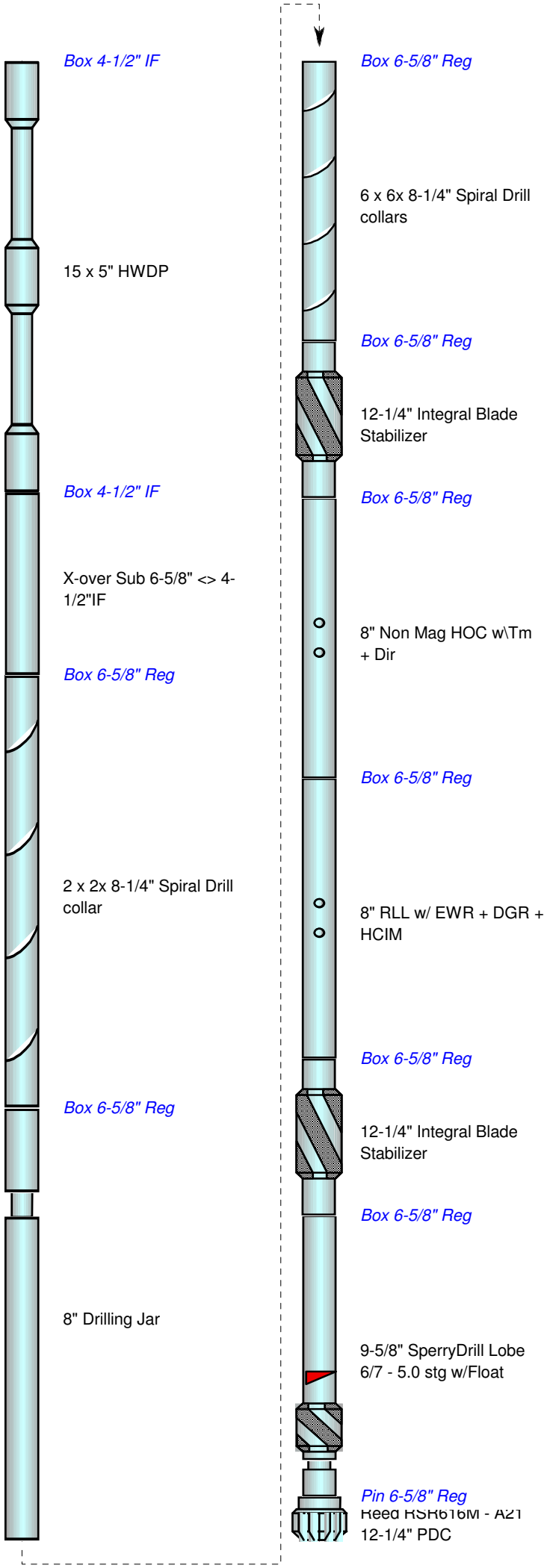
12-1/4" Performance Motor Assy

BHA Configuration

O.D.	Length	Description
12.25"	0.3m	Reed RSR616M - A21 12-1/4" PDC
9.625" w/Float	9.22m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
8"	1.86m	12-1/4" Integral Blade Stabilizer
8"	7.28m	8" RLL w/ EWR + DGR + HCIM
8.063"	4.8m	8" Non Mag HOC w\Tm + Dir
8.063"	1.88m	12-1/4" Integral Blade Stabilizer
8.25"	56.43m	6 x 6x 8-1/4" Spiral Drill collars
8"	9.68m	8" Drilling Jar
8.25"	18.63m	2 x 2x 8-1/4" Spiral Drill collar
6.75"	1.09m	X-over Sub 6-5/8" <> 4-1/2"IF
5"	141.54m	15 x 5" HWDP

BHA Discussion

Rig Floor Offset - 49.4 deg
Motor below RT 05:00 on 14-10-2009
Motor Above RT 02.00 on 19-10-2009
Bit to survey - 19.76m
Bit to Gamma - 12.34m
Bit to EWR - 14.81m



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DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 4**

BHA# 4 : **Date In** 20/10/200 **MD In (m) :** 2271 **TVD In (m) :** 2271 **Date Out** 22/10/2009 **MD Out (m):** 2520 **TVD Out (m):** 2520

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
3rr1	12.250	Reed Hycalog	RSR616M-A2	222369	8x13	1.037	1-1-CT-A -X-I-PN-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
2	9.625	SSDS	SperryDrill	963448	0.78°		112	104.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Reed RSR616M - A21 12-1/4" PDC	222369	12.250	3.000	12.250	377.57	P 6-5/8" Reg	0.30	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg w/Float	963448	9.625	6.135	12.125	147.21	B 6-5/8" Reg	9.22	1.16
3	12-1/4" Integral Blade Stabilizer	701049	8.000	3.000	12.250	147.22	B 6-5/8" Reg	1.86	10.25
4	8" RLL w/ EWR + DGR + HCIM	PA90218962	8.000	2.375	8.625	156.21	B 6-5/8" Reg	7.28	
5	8" Non Mag HOC w\Tm + Dir	246907	8.063	2.375		158.92	B 6-5/8" Reg	4.80	
6	12-1/4" Integral Blade Stabilizer	231191	8.063	3.000	12.125	149.92	B 6-5/8" Reg	1.88	24.17
7	6x 8-1/4" Spiral Drill collars	Rig	8.250	2.875		160.05	B 6-5/8" Reg	56.43	
8	8" Drilling Jar	17621339	8.000	3.000		147.22	B 6-5/8" Reg	9.68	
9	2x 8-1/4" Spiral Drill collar	Rig	8.250	2.875		160.05	B 6-5/8" Reg	18.63	
10	X-over Sub 6-5/8" <> 4-1/2"IF	Rig 1792	6.750	2.813		100.77	B 4-1/2" IF	1.09	
11	15 x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	141.54	
								252.71	

Parameter	Min	Max	Ave
WOB (lbs) :	5000	20000	12550
RPM (rpm) :	100	120	108
Flow (gpm) :	950	975	953
SPP (psi) :	2825	3050	2955

Activity	Hrs
Drilling :	19.00
Reaming :	2.50
Circ-Other :	5.00
Total :	26.50

BHA Weight	(lb)
in Air (Total) :	80225
in Mud (Total) :	68853
in Air (Bel Jars) :	42513
in Mud (Bel Jars) :	36487

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2267

PERFORMANCE

	In	Out
Inclination (deg)	0.76	1.01
Azimuth (deg)	89.05	96.32

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	0.00	0			2.03
Rotated :	249.00	13			
Total :	249.00	13	0.03	0.00	0.03

COMMENTS

BHA below RT on 11.00 hrs -20-10-09
BHA Above RT on 09:00 hrs -22-10-09
Circulating hrs =
Drilling hrs =
Rig Floor Offset = 311.11deg

OBJECTIVES:

To continue drilling 12-1/4" hole section to TD at 2510mTVDRT or +/-418m below the top of the Eastern View Group.

RESULTS:

This BHA was picked up with a new HOC, the motor was scribed to MWD then shallow tested on the first stand of HWDP. The BHA was run in and fill was tagged at 2165m with 20K WOB. Wash down to bottom at 2271m. Drilling commenced with reduced parameters of 900gpm, 100rpm and 2-5klbs WOB was used for the first 2-3m before bringing WOB up to 20K, 950gpm and 100rpm. High stick slip and torsional vibration was experienced with those drilling parameters. To mitigate above mentioned vibration rpm was increased to 110 and then to 120 This did not cure the vibration. The stick-slip and torsional vibrations were minimized only when picked up off bottom or when drilling with WOB less then 10klbs, but then ROP decreased below 25m/hr after consultation with client this was deemed an acceptable ROP from client point of view. Drilled to section TD at 2520m, the hole was circulated clean and a short wiper trip was made to 2271m and back to TD. The BHA was POOH to run 9 5/8" casing

RECOMMENDATIONS:

None

sperry-sun DRILLING SERVICES

BHA Schematic

Origin Energy Services

Trefoil-2

BHA ID #: 4

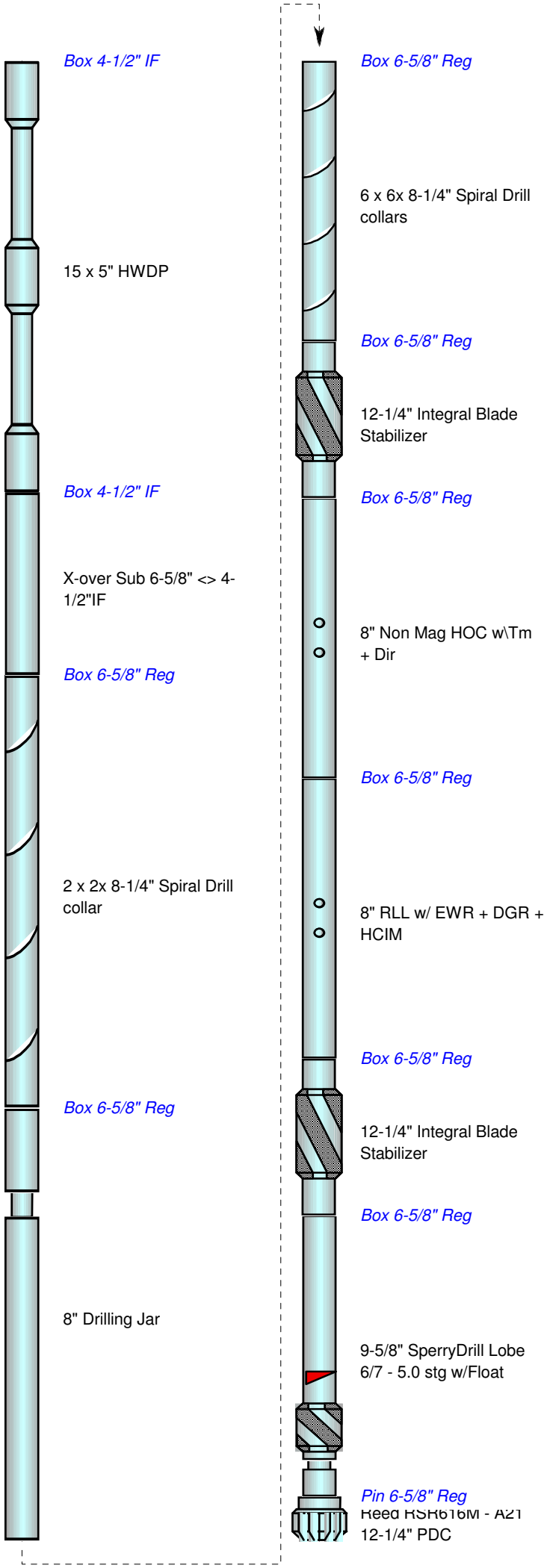
12-1/4" Performance Motor Assy

BHA Configuration

O.D.	Length	Description
12.25"	0.3m	Reed RSR616M - A21 12-1/4" PDC
9.625" w/Float	9.22m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
8"	1.86m	12-1/4" Integral Blade Stabilizer
8"	7.28m	8" RLL w/ EWR + DGR + HCIM
8.063"	4.8m	8" Non Mag HOC w\Tm + Dir
8.063"	1.88m	12-1/4" Integral Blade Stabilizer
8.25"	56.43m	6 x 6x 8-1/4" Spiral Drill collars
8"	9.68m	8" Drilling Jar
8.25"	18.63m	2 x 2x 8-1/4" Spiral Drill collar
6.75"	1.09m	X-over Sub 6-5/8" <> 4-1/2"IF
5"	141.54m	15 x 5" HWDP

BHA Discussion

BHA below RT on 11.00 hrs -20-10-09
BHA Above RT on 09:00 hrs -22-10-09
Circulating hrs =
Drilling hrs =
Rig Floor Offset = 311.11deg



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DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 5**

BHA# 5 : **Date In** 6/11/2009 **MD In (m) :** 2520 **TVD In (m) :** 2520 **Date Out** 8/11/2009 **MD Out (m):** 2523 **TVD Out (m):** 2523

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
4	8.500	Hughes	GT-1	6076381	3x22	1.114	1-1-WT-A -1-I-NO-BHA

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Hughes - GT1	6076381	8.500	3.000	8.500	169.30	B 4-1/2" Reg	0.25	
2	Bit Sub	87	6.900	2.375		112.34	B 4-1/2" IF	1.19	
3	8 x 6-3/4" Spiral Drill collar	Rig	6.750	2.813		101.00	B 4-1/2" IF	75.20	
4	6-1/2" Drilling Jar	17602018	6.500	2.813		91.91	B 4-1/2" IF	9.91	
5	3x 6-1/2" Spiral Drill collar	Rig	6.750	2.813		101.00	B 6-5/8" Reg	28.21	
6	15x 15 x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	141.13	
								255.89	

Parameter	Min	Max	Ave
WOB (lbs) :			
RPM (rpm) :			
Flow (gpm) :			
SPP (psi) :			

Activity	Hrs
Drilling :	2.50
Reaming :	1.50
Circ-Other :	1.00
Total :	5.00

BHA Weight	(lb)
in Air (Total) :	60659
in Mud (Total) :	52061
in Air (Bel Jars) :	25496
in Mud (Bel Jars) :	21882

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2267

PERFORMANCE

	In	Out
Inclination (deg)	1.01	1.00
Azimuth (deg)	96.32	96.89

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	0.00	0			
Rotated :	3.00	0			
Total :	3.00	1	-0.04	5.79	0.00

COMMENTS

OBJECTIVES:

Drill out the shoe track and 3m of formation before conducting an FIT then POOH for an FEWD assembly

RESULTS:

Assembly achieved required results without problems

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DRILLING SERVICES

BHA Schematic

Origin Energy Services

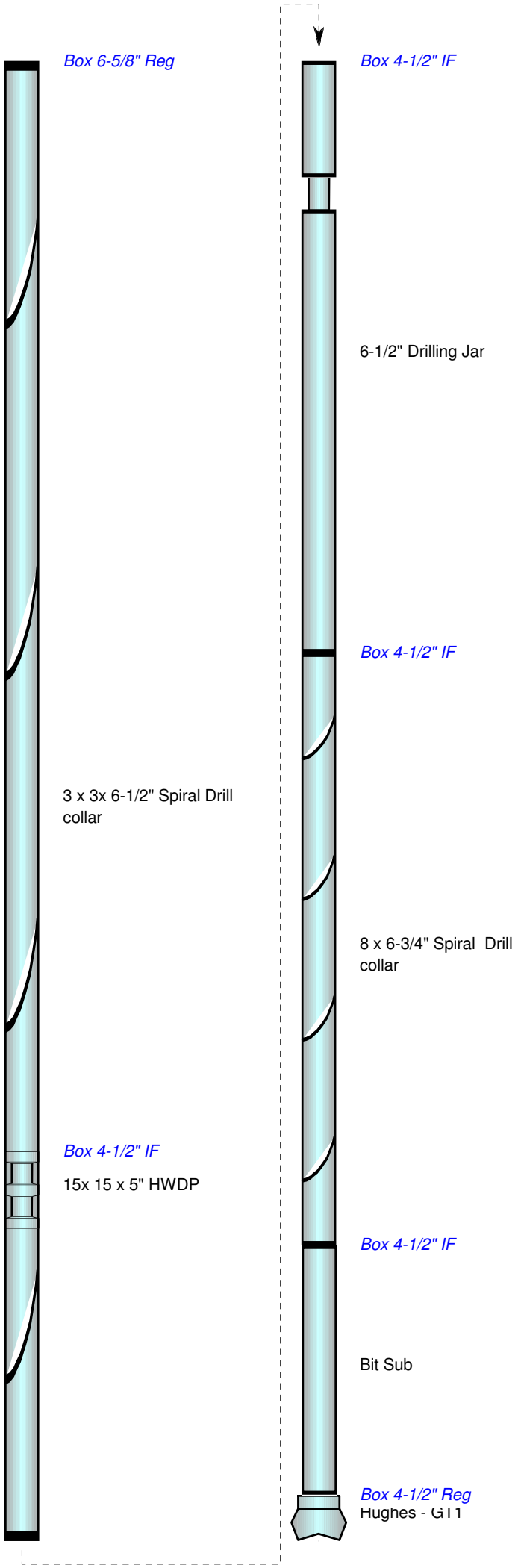
Trefoil-2

BHA ID #: 5

8-1/2" Drillout Assembly

BHA Configuration

O.D.	Length	Description
8.5"	0.25m	Hughes - GT1
6.9"	1.19m	Bit Sub
6.75"	75.2m	8 x 6-3/4" Spiral Drill collar
6.5"	9.91m	6-1/2" Drilling Jar
6.75"	28.21m	3 x 3x 6-1/2" Spiral Drill collar
5"	141.13m	15x 15 x 5" HWDP



Sperry-Sun DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 6**

BHA# 6 : **Date In** 8/11/2009 **MD In (m) :** 2523 **TVD In (m) :** 2523 **Date Out** 9/11/2009 **MD Out (m):** 2633 **TVD Out (m):** 2633

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
5	8.500	Smith	Mi616VBPX	TX2104	6x14	0.902	1-1-WT-A -X-I-NO-DTF

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Smith Mi616VBPX PDC	TX2104	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.28	
2	8-3/8" NB IB Stab w/Float	700172	6.750	2.813	8.375	100.77	B 4-1/2" IF	1.50	1.03
3	6-3/4" RLL w/DGR + EWR	90222557	6.750	1.920		112.09	B 4-1/2" IF	7.13	
4	6-3/4" PM/DM w/Dir	194443	6.750	1.920		112.09	B 4-1/2" IF	2.79	
5	6-3/4" ALD + CTN	90219755	6.750	1.920	8.250	112.09	B 4-1/2" IF	8.45	
6	6-3/4" BAT-Sonic	90227156	6.750	1.920		112.09	B 4-1/2" IF	6.72	
7	6-3/4" HOC w/TM	203846	6.750	1.920		112.09	B 4-1/2" IF	3.05	
8	6-3/4" ACAL	90223655	6.750	1.920		112.09	B 4-1/2" IF	1.83	
9	8-3/8" Integral Blade Stabilizer	700802	6.750	2.813	8.375	100.77	B 4-1/2" IF	1.70	32.75
10	8x 6-3/4" Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	74.97	
11	6-3/4" Drilling Jar	17602018	6.750	2.750		101.71	B 4-1/2" IF	9.91	
12	3x 6-3/4"Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	29.91	
13	15x 15 x 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	141.13	
								289.37	

Parameter	Min	Max	Ave
WOB (lbs) :			
RPM (rpm) :			
Flow (gpm) :			
SPP (psi) :			

Activity	Hrs
Drilling :	11.00
Reaming :	4.00
Circ-Other :	2.50
Total :	17.50

BHA Weight	(lb)
in Air (Total) :	70069
in Mud (Total) :	60137
in Air (Bel Jars) :	37039
in Mud (Bel Jars) :	31789

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2344

PERFORMANCE

	In	Out
Inclination (deg)	1.00	1.40
Azimuth (deg)	96.89	87.25

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	0.00	0			
Rotated :	110.00	0			
Total :	110.00	10	0.11	-2.67	0.12

COMMENTS

OBJECTIVES:

To drill vertically and log to the first core point at approximatly 2971m

RESULTS:

Drilled from 2553m to 2633m at which point the MWD pulser failed to start after a connection, the assebly was pulled to change out MWD

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DRILLING SERVICES

BHA Schematic

Origin Energy Services

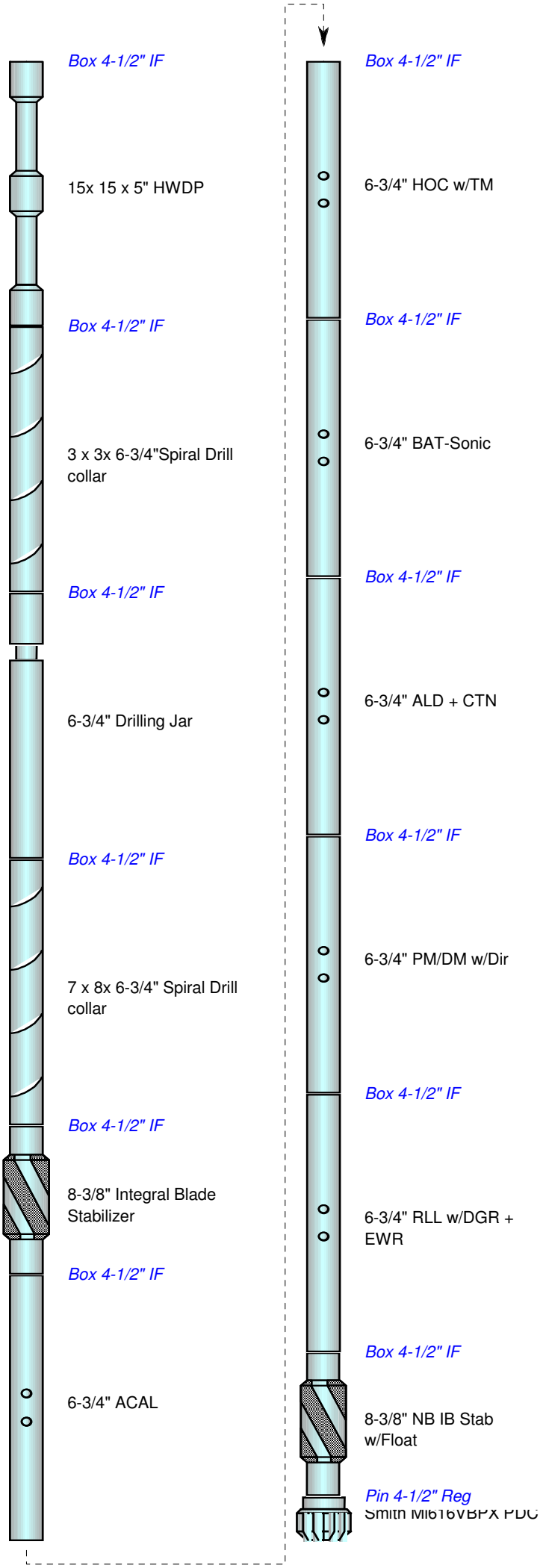
Trefoil-2

BHA ID #: 6

8.5" Rotary FEWD Assembly

BHA Configuration

O.D.	Length	Description
8.5"	0.28m	Smith Mi616VBPX PDC
6.75"	1.5m	8-3/8" NB IB Stab w/Float
6.75"	7.13m	6-3/4" RLL w/DGR + EWR
6.75"	2.79m	6-3/4" PM/DM w/Dir
6.75"	8.45m	6-3/4" ALD + CTN
6.75"	6.72m	6-3/4" BAT-Sonic
6.75"	3.05m	6-3/4" HOC w/TM
6.75"	1.83m	6-3/4" ACAL
6.75"	1.7m	8-3/8" Integral Blade Stabilizer
6.75"	74.97m	7 x 8x 6-3/4" Spiral Drill collar
6.75"	9.91m	6-3/4" Drilling Jar
6.75"	29.91m	3 x 3x 6-3/4"Spiral Drill collar
5"	141.13m	15x 15 x 5" HWDP



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DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 7**

BHA# 7 : **Date In** 9/11/2009 **MD In (m) :** 2633 **TVD In (m) :** 2633 **Date Out** 12/11/2009 **MD Out (m):** 2983 **TVD Out (m):** 2982

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
5rr1	8.500	Smith	Mi616VBPX	TX2104	6x14	0.902	1-2-CT-S -X-I-WT-CP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Smith Mi616VBPX PDC	TX2104	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.28	
2	8-3/8" NB IB Stab w/Float	700172	6.750	2.813	8.375	100.77	B 4-1/2" IF	1.50	1.03
3	6-3/4" RLL w/DGR + EWR	90222505	6.750	1.920		112.09	B 4-1/2" IF	7.07	
4	6-3/4" PM/DM w/Dir	1025744	6.750	1.920		112.09	B 4-1/2" IF	2.81	
5	6-3/4" ALD + CTN	9022683	6.750	1.920	8.250	112.09	B 4-1/2" IF	9.20	
6	6-3/4" BAT-Sonic	90227155	6.750	1.920		112.09	B 4-1/2" IF	6.76	
7	6-3/4" HOC w/TM	302842	6.750	1.920		112.09	B 4-1/2" IF	3.03	
8	6-3/4" ACAL	90223063	6.750	1.920		112.09	B 4-1/2" IF	1.81	
9	8-3/8" Integral Blade Stabilizer	700802	6.750	2.813	8.375	100.77	B 4-1/2" IF	1.70	33.46
10	8x 6-3/4" Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	74.97	
11	6-3/4" Drilling Jar	17602018	6.750	2.750		101.71	B 4-1/2" IF	9.91	
12	3x 6-3/4"Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	28.21	
13	15 x 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	141.13	
								288.38	

Parameter	Min	Max	Ave
WOB (lbs) :			
RPM (rpm) :			
Flow (gpm) :			
SPP (psi) :			

Activity	Hrs
Drilling :	33.50
Reaming :	1.00
Circ-Other :	2.50
Total :	37.00

BHA Weight	(lb)
in Air (Total) :	69768
in Mud (Total) :	59772
in Air (Bel Jars) :	37301
in Mud (Bel Jars) :	31956

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2695

PERFORMANCE

	In	Out
Inclination (deg)	1.40	2.90
Azimuth (deg)	87.25	84.11

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	0.00	0			
Rotated :	350.00	0			
Total :	350.00	10	0.13	-0.27	0.13

COMMENTS

OBJECTIVES:

To complete drilling and logging to the first core point

RESULTS:

Completed drilling to the first core point at 2983m without any problems

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DRILLING SERVICES

BHA Schematic

Origin Energy Services

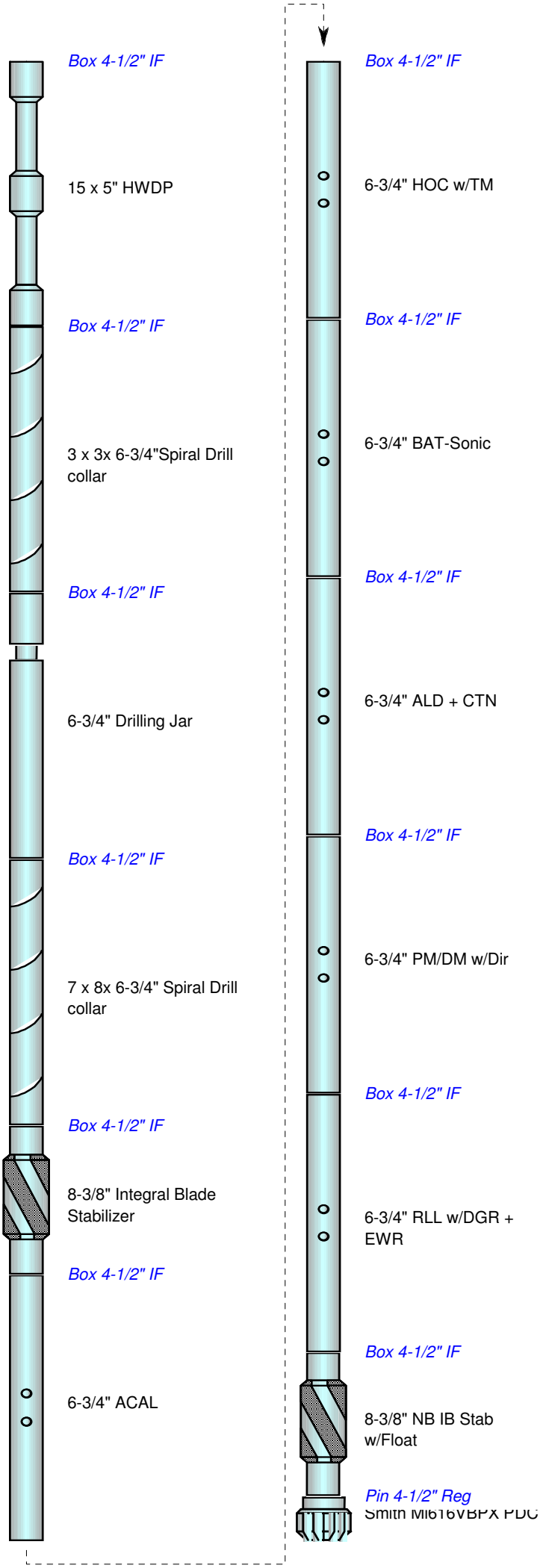
Trefoil-2

BHA ID #: 7

8-1/2" Rotary FEWD CP1 BHA

BHA Configuration

O.D.	Length	Description
8.5"	0.28m	Smith Mi616VBPX PDC
6.75"	1.5m	8-3/8" NB IB Stab w/Float
6.75"	7.07m	6-3/4" RLL w/DGR + EWR
6.75"	2.81m	6-3/4" PM/DM w/Dir
6.75"	9.2m	6-3/4" ALD + CTN
6.75"	6.76m	6-3/4" BAT-Sonic
6.75"	3.03m	6-3/4" HOC w/TM
6.75"	1.81m	6-3/4" ACAL
6.75"	1.7m	8-3/8" Integral Blade Stabilizer
6.75"	74.97m	7 x 8x 6-3/4" Spiral Drill collar
6.75"	9.91m	6-3/4" Drilling Jar
6.75"	28.21m	3 x 3x 6-3/4"Spiral Drill collar
5"	141.13m	15 x 5" HWDP



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DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 8**

BHA# 8 : **Date In** 12/11/200 **MD In (m) :** 2983 **TVD In (m) :** 2982 **Date Out** 13/11/2009 **MD Out (m):** 3013 **TVD Out (m):** 3012

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
6	8.500	Corpro	MCP572	083691	1x28	0.601	1-1-NO-FC-X-I-NO-BHA

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC Coring	083691	8.500	2.500	8.500	176.66	P 4" Mod	0.28	
2	8-7/16" Coring Stabilizer	WO137319	7.130	5.630	8.440	51.23	B 4" Mod	0.76	0.68
3	CoreBarrel	WO135110	7.130	5.630		51.23	B 4" Mod	5.33	
4	8-7/16" Coring Stabilizer	WO137237	7.130	5.630	8.440	51.23	B 4" Mod	0.76	6.77
5	CoreBarrel	WO135194	7.130	5.630		51.23	B 4" Mod	5.33	
6	8-7/16" Coring Stabilizer	WO137312	7.130	5.630	8.440	51.23	B 4" Mod	0.76	12.86
7	CoreBarrel	S8414	7.130	5.630		51.23	B 4" Mod	5.33	
8	8-7/16" Coring Stabilizer	WO137258	7.130	5.630	8.440	51.23	B 4" Mod	0.76	18.95
9	CoreBarrel	723189	7.130	5.630		51.23	B 4" Mod	5.33	
10	8-7/16" Coring Stabilizer	WO137219	7.130	5.630	8.440	51.23	B 4" Mod	0.76	25.04
11	CoreBarrel	SBO6	7.130	5.630		51.23	B 4" Mod	5.33	
12	8-7/16" Integral Blade Stabilizer	WO137014	7.130	5.630	8.440	51.23	B 4" Mod	0.76	31.13
13	Top Head	W1856027	7.130	5.630		51.23	B 4-1/2" IF	0.61	
14	8x 6-3/4" Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	74.97	
15	6-3/4" Drilling Jar	17602018	6.750	2.750		101.71	B 4-1/2" IF	9.91	
16	3x 6-3/4"Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	28.21	
17	15 x 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	141.13	
								286.32	

Parameter	Min	Max	Ave
WOB (lbs) :			
RPM (rpm) :			
Flow (gpm) :			
SPP (psi) :			

Activity	Hrs
Drilling :	4.50
Reaming :	1.00
Circ-Other :	0.00
Total :	5.50

BHA Weight	(lb)
in Air (Total) :	62776
in Mud (Total) :	53782
in Air (Bel Jars) :	30309
in Mud (Bel Jars) :	25966

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2727

PERFORMANCE

	In	Out
Inclination (deg)	2.90	2.97
Azimuth (deg)	84.11	83.32

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	0.00	0			
Rotated :	30.00	0			
Total :	30.00	7	0.08	-0.81	0.09

COMMENTS

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DRILLING SERVICES

BHA Schematic

Origin Energy Services

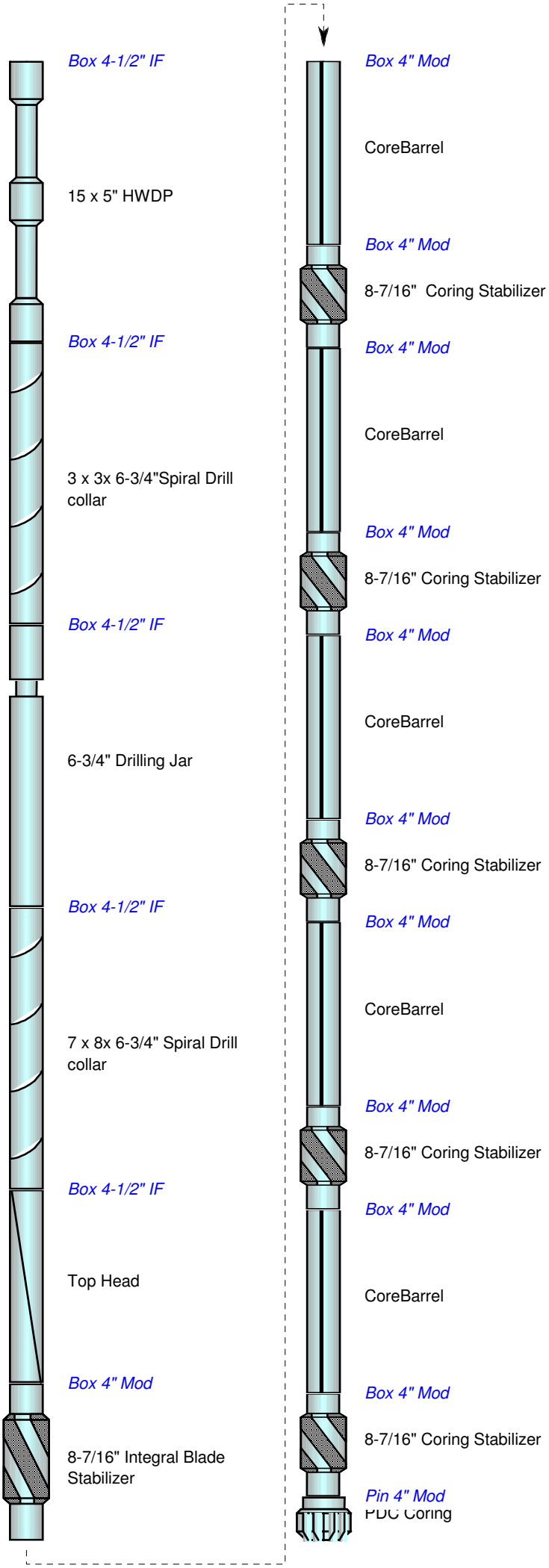
Trefoil-2

BHA ID #: 8

8-1/2" Coring Assembly - 1

BHA Configuration

O.D.	Length	Description
8.5"	0.28m	PDC Coring
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Integral Blade Stabilizer
7.13"	0.61m	Top Head
6.75"	74.97m	7 x 8x 6-3/4" Spiral Drill collar
6.75"	9.91m	6-3/4" Drilling Jar
6.75"	28.21m	3 x 3x 6-3/4"Spiral Drill collar
5"	141.13m	15 x 5" HWDP



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DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 9**

BHA# 9 : **Date In** 13/11/200 **MD In (m) :** 3013 **TVD In (m) :** 3012 **Date Out** 15/11/2009 **MD Out (m):** 3145 **TVD Out (m):** 3144

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
5rr2	8.500	Smith	Mi616VBPX	TX2104	6x14	0.902	1-2-CT-S -X-I-NO-CP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Smith Mi616VBPX PDC	TX2104	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.28	
2	8-3/8" NB IB Stab w/Float	700172	6.750	2.813	8.375	100.77	B 4-1/2" IF	1.50	1.03
3	6-3/4" RLL w/DGR + EWR	90222505	6.750	1.920		112.09	B 4-1/2" IF	7.07	
4	6-3/4" PM/DM w/Dir	1025744	6.750	1.920		112.09	B 4-1/2" IF	2.81	
5	6-3/4" ALD + CTN	9022683	6.750	1.920	8.250	112.09	B 4-1/2" IF	9.20	
6	6-3/4" BAT-Sonic	90227155	6.750	1.920		112.09	B 4-1/2" IF	6.76	
7	6-3/4" HOC w/TM	302842	6.750	1.920		112.09	B 4-1/2" IF	3.03	
8	6-3/4" ACAL	90223063	6.750	1.920		112.09	B 4-1/2" IF	1.81	
9	8-3/8" Integral Blade Stabilizer	700802	6.750	2.813	8.375	100.77	B 4-1/2" IF	1.70	33.46
10	8x 6-3/4" Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	74.97	
11	6-3/4" Drilling Jar	17602018	6.750	2.750		101.71	B 4-1/2" IF	9.91	
12	3x 6-3/4"Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	28.21	
13	15 x 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	141.13	
								288.38	

Parameter	Min	Max	Ave
WOB (lbs) :			
RPM (rpm) :			
Flow (gpm) :			
SPP (psi) :			

Activity	Hrs
Drilling :	16.00
Reaming :	4.00
Circ-Other :	1.50
Total :	21.50

BHA Weight	(lb)
in Air (Total) :	69768
in Mud (Total) :	59666
in Air (Bel Jars) :	37301
in Mud (Bel Jars) :	31899

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2857

PERFORMANCE

	In	Out
Inclination (deg)	2.97	3.76
Azimuth (deg)	83.32	82.58

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	0.00	0			
Rotated :	132.00	0			
Total :	132.00	8	0.18	-0.17	0.18

COMMENTS

OBJECTIVES:

To log the cored interval and drill to core point 2 at about 3128m

RESULTS:

Logged and drilled to core point 2 at 3145m with out any problems

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DRILLING SERVICES

BHA Schematic

Origin Energy Services

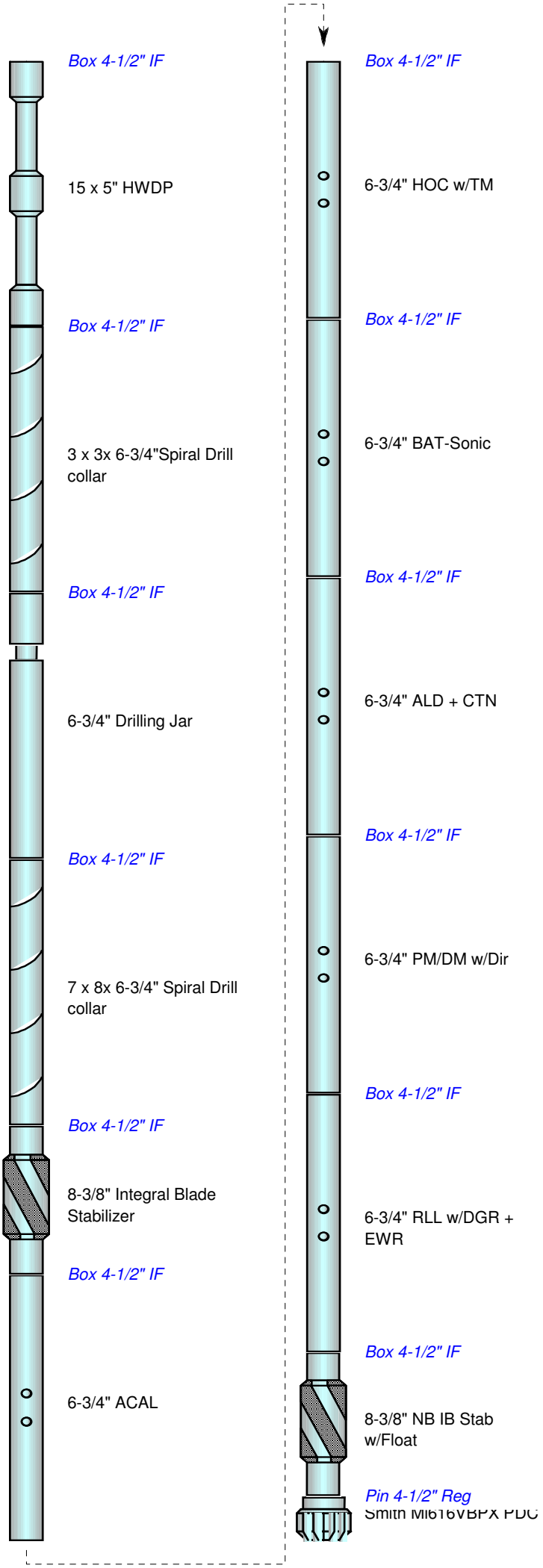
Trefoil-2

BHA ID #: 9

8-1/2" Rotary FEWD CP2 BHA

BHA Configuration

O.D.	Length	Description
8.5"	0.28m	Smith Mi616VBPX PDC
6.75"	1.5m	8-3/8" NB IB Stab w/Float
6.75"	7.07m	6-3/4" RLL w/DGR + EWR
6.75"	2.81m	6-3/4" PM/DM w/Dir
6.75"	9.2m	6-3/4" ALD + CTN
6.75"	6.76m	6-3/4" BAT-Sonic
6.75"	3.03m	6-3/4" HOC w/TM
6.75"	1.81m	6-3/4" ACAL
6.75"	1.7m	8-3/8" Integral Blade Stabilizer
6.75"	74.97m	7 x 8x 6-3/4" Spiral Drill collar
6.75"	9.91m	6-3/4" Drilling Jar
6.75"	28.21m	3 x 3x 6-3/4"Spiral Drill collar
5"	141.13m	15 x 5" HWDP



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DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 10**

BHA# 10 : **Date In** 15/11/200 **MD In (m) :** 3145 **TVD In (m) :** 3144 **Date Out** 16/11/2009 **MD Out (m):** 3175 **TVD Out (m):** 3174

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
6rr1	8.500	Corpro	MCP572	083691	1x28	0.601	1-1-NO-A -X-I-NO-BHA

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC Coring	083691	8.500	2.500	8.500	176.66	P 4" Mod	0.28	
2	8-7/16" Coring Stabilizer	WO137319	7.130	5.630	8.440	51.23	B 4" Mod	0.76	0.68
3	CoreBarrel	WO135110	7.130	5.630		51.23	B 4" Mod	5.33	
4	8-7/16" Coring Stabilizer	WO137237	7.130	5.630	8.440	51.23	B 4" Mod	0.76	6.77
5	CoreBarrel	WO135194	7.130	5.630		51.23	B 4" Mod	5.33	
6	8-7/16" Coring Stabilizer	WO137312	7.130	5.630	8.440	51.23	B 4" Mod	0.76	12.86
7	CoreBarrel	S8414	7.130	5.630		51.23	B 4" Mod	5.33	
8	8-7/16" Coring Stabilizer	WO137258	7.130	5.630	8.440	51.23	B 4" Mod	0.76	18.95
9	CoreBarrel	723189	7.130	5.630		51.23	B 4" Mod	5.33	
10	8-7/16" Coring Stabilizer	WO137219	7.130	5.630	8.440	51.23	B 4" Mod	0.76	25.04
11	CoreBarrel	SBO6	7.130	5.630		51.23	B 4" Mod	5.33	
12	8-7/16" Integral Blade Stabilizer	WO137014	7.130	5.630	8.440	51.23	B 4" Mod	0.76	31.13
13	Top Head	W1856027	7.130	5.630		51.23	B 4-1/2" IF	0.61	
14	8x 6-3/4" Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	74.97	
15	6-3/4" Drilling Jar	17602018	6.750	2.750		101.71	B 4-1/2" IF	9.91	
16	3x 6-3/4"Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	28.21	
17	15 x 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	141.13	
								286.32	

Parameter	Min	Max	Ave
WOB (lbs) :			
RPM (rpm) :			
Flow (gpm) :			
SPP (psi) :			

Activity	Hrs
Drilling :	4.50
Reaming :	0.50
Circ-Other :	0.00
Total :	5.00

BHA Weight	(lb)
in Air (Total) :	62776
in Mud (Total) :	53782
in Air (Bel Jars) :	30309
in Mud (Bel Jars) :	25966

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2889

PERFORMANCE

	In	Out
Inclination (deg)	3.76	3.81
Azimuth (deg)	82.58	83.86

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	0.00	0			
Rotated :	30.00	0			
Total :	30.00	7	0.05	1.31	0.10

COMMENTS

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DRILLING SERVICES

BHA Schematic

Origin Energy Services

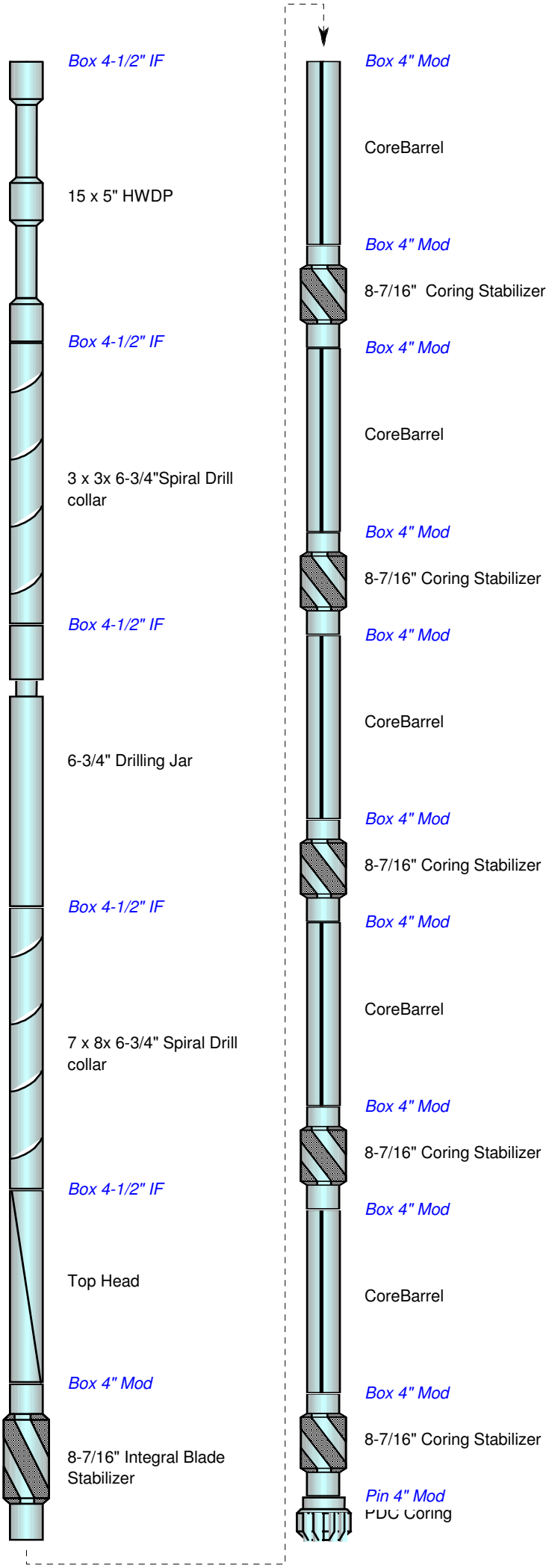
Trefoil-2

BHA ID #: 10

Coring Assembly - 2

BHA Configuration

O.D.	Length	Description
8.5"	0.28m	PDC Coring
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Coring Stabilizer
7.13"	5.33m	CoreBarrel
7.13"	0.76m	8-7/16" Integral Blade Stabilizer
7.13"	0.61m	Top Head
6.75"	74.97m	7 x 8x 6-3/4" Spiral Drill collar
6.75"	9.91m	6-3/4" Drilling Jar
6.75"	28.21m	3 x 3x 6-3/4"Spiral Drill collar
5"	141.13m	15 x 5" HWDP



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DRILLING SERVICES

BHA Report

Customer : Origin Energy Services
Well : Trefoil-2
Field : Australia
Slot : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714148 **BHA# 11**

BHA# 11 : **Date In** :17/11/200 **MD In (m) :** 3175 **TVD In (m) :** 3174 **Date Cur**: 19/11/2009 **MD Cur (m):** 3235 **TVD Cur (m):** 3234

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
5rr3	8.500	Smith	Mi616VBPX	TX2104	6x14	0.902	

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Smith Mi616VBPX PDC	TX2104	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.28	
2	8-3/8" NB IB Stab w/Float	700172	6.750	2.813	8.375	100.77	B 4-1/2" IF	1.50	1.03
3	6-3/4" RLL w/DGR + EWR	90222505	6.750	1.920		112.09	B 4-1/2" IF	7.07	
4	6-3/4" PM/DM w/Dir	1025744	6.750	1.920		112.09	B 4-1/2" IF	2.81	
5	6-3/4" ALD + CTN	9022683	6.750	1.920	8.250	112.09	B 4-1/2" IF	9.20	
6	6-3/4" BAT-Sonic	90227155	6.750	1.920		112.09	B 4-1/2" IF	6.76	
7	6-3/4" HOC w/TM	302842	6.750	1.920		112.09	B 4-1/2" IF	3.03	
8	6-3/4" ACAL	90223063	6.750	1.920		112.09	B 4-1/2" IF	1.81	
9	8-3/8" Integral Blade Stabilizer	700802	6.750	2.813	8.375	100.77	B 4-1/2" IF	1.70	33.46
10	8x 6-3/4" Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	74.97	
11	6-3/4" Drilling Jar	17602018	6.750	2.750		101.71	B 4-1/2" IF	9.91	
12	3x 6-3/4"Spiral Drill collar	Rig	6.750	2.810		100.82	B 4-1/2" IF	28.21	
13	15 x 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	141.13	
								288.38	

Parameter	Min	Max	Ave
WOB (lbs) :			
RPM (rpm) :			
Flow (gpm) :			
SPP (psi) :			

Activity	Hrs
Drilling :	11.50
Reaming :	1.50
Circ-Other :	2.50
Total :	15.50

BHA Weight	(lb)
in Air (Total) :	69768
in Mud (Total) :	59772
in Air (Bel Jars) :	37301
in Mud (Bel Jars) :	31956

Drill String	OD(in)	Len (m)
DP(S)-NC50(XH)-19.50#	5.000	2947

PERFORMANCE

	In	Out
Inclination (deg)	3.81	4.33
Azimuth (deg)	83.86	83.41

	Distance (m)	ROP (m/hr)	Build (°/100')	Turn (°/100')	DLS (°/100')
Oriented :	0.00	0			
Rotated :	60.00	0			
Total :	60.00	5	0.26	-0.23	0.26

COMMENTS

OBJECTIVES:

To log the cored interval and drill to TD

RESULTS:

Logged and drilled to TD without any problems.

sperry-sun
DRILLING SERVICES

BHA Schematic

Origin Energy Services

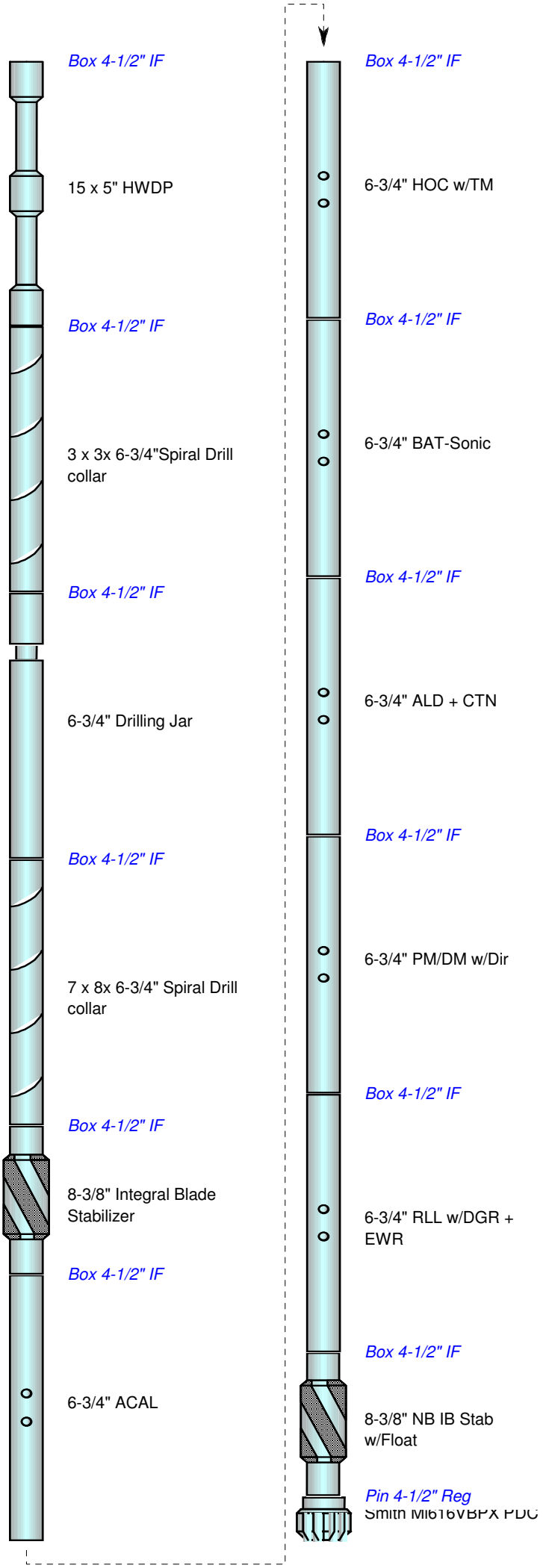
Trefoil-2

BHA ID #: 11

8-1/2" Rotary FEWDTD BHA

BHA Configuration

O.D.	Length	Description
8.5"	0.28m	Smith Mi616VBPX PDC
6.75"	1.5m	8-3/8" NB IB Stab w/Float
6.75"	7.07m	6-3/4" RLL w/DGR + EWR
6.75"	2.81m	6-3/4" PM/DM w/Dir
6.75"	9.2m	6-3/4" ALD + CTN
6.75"	6.76m	6-3/4" BAT-Sonic
6.75"	3.03m	6-3/4" HOC w/TM
6.75"	1.81m	6-3/4" ACAL
6.75"	1.7m	8-3/8" Integral Blade Stabilizer
6.75"	74.97m	7 x 8x 6-3/4" Spiral Drill collar
6.75"	9.91m	6-3/4" Drilling Jar
6.75"	28.21m	3 x 3x 6-3/4"Spiral Drill collar
5"	141.13m	15 x 5" HWDP



HALLIBURTON

Sperry Drilling

LWD End of Well Report

For

Origin Energy Resources Ltd

Trefoil-2

Rig:	**Kan Tan IV**
Field:	**Trefoil**
Country:	**Australia**
Job No:	**AU-FE-0006714148**
Date:	**03-OCT-09**

Table of Contents

General Information

Company:	Origin Energy Resources Ltd
Rig:	Kan Tan IV
Well:	Trefoil-2
Field:	Trefoil
Lease Name:	T/18P
State:	Tasmania
County:	
Country:	Australia
API Number:	
Sperry Job Number:	AU-FE-0006714148
Job start date:	03-Oct-09
Job end date:	05-Oct-09
North reference:	Grid
Declination:	12.497 deg
Dip angle:	-70.484 deg
Total magnetic field:	61022 nT
Date of magnetic data:	06 October, 2009
Wellhead coordinates N:	39 deg. 53 min 7.93 sec South
Wellhead coordinates E:	145 deg. 22 min 14.62 sec East
Vertical section direction:	0.00 deg
Unit Number:	SSH-40
MWD Engineers:	J. Lau, A. Nijhof, M. Dillon, T. Oborne, M. Ward
Company Representatives:	J. McGarrity, B. Houston
Company Geologist:	D. Archer, L. Hansen

Operational Overview

Sperry Drilling was contracted by Origin Energy Resources Ltd to provide Logging While Drilling (LWD) services for the drilling of Trefoil-2. The well was drilled in permit T/18P by the Maersk MODU Kan Tan IV.

17 1/2" (445mm) Hole Section:

This section was drilled in one bit run using a conventional rotary assembly.
A Pressure Case Gamma (PCG) was utilised for formation evaluation. Additionally a Pressure Case Directional (PCDC) was run for wellbore surveying.
The section was drilled from 155.0 mMDRT to section TD at 935.0 mMDRT. Pulled out of hole to run 340mm casing.

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

This section was drilled in two bit runs using a SperryDrill Motor assembly. LWD tools comprised of the following :
Drilling String Dynamics (DDSr-DGR) for drilling optimisation, Dual Gamma Ray (DGR) and Electromagnetic Wave Resistivity (EWR-P4) for formation evaluation. Additionally a Pressure Case Directional (PCDC) was utilised for wellbore surveying.
The first run was drilled from 935.0 to 2271.0 mMDRT.
The second run was drilled from 2271.0 mMDRT to section TD at 2520.0 mMDRT. Pulled out of hole to run 244mm casing.

8 1/2" (216mm) Hole Section:

This section was drilled in four bit runs using a conventional rotary assembly. LWD tools comprised of the following :
Drilling String Dynamics (DDS) for drilling optimisation, Dual Gamma Ray (DGR), Electromagnetic Wave Resistivity (EWR-P4), Compensated Thermal Neutron (CTN), Azimuthal Litho-Density (ALD) and Bi-Modal Acoustic (BAT) for formation evaluation. Acoustic Caliper (ACAL) was run in recorded mode to determine hole size. Additionally a Pressure Case Directional (PCDC) was utilised for wellbore surveying.
The first run was drilled from 2520.0 to 2633.0 mMDRT and pulled out of hole for LWD failure.
The second run was drilled from 2633.0 mMDRT to the first coring point at 2983.0 mMDRT.
The third run logged the core section from 2983.0 to 3013.0 mMDRT and continued drilling to the second coring point at 3145.0 mMDRT.
The fourth run logged the core section from 3145.0 to 3175.0 mMDRT and continued drilling to well TD at 3235.0 mMDRT.

Summary of MWD runs

Run No.	Bit No.	Hole Size (mm)	MWD Service	Start Depth (m)	End Depth (m)	Drill/Wipe Distance (m)	Run Start Date Time	Run End Date Time	BRT Hrs.	Oper. Hrs.	Circ. Hrs.	Max Temp. (degC)	Serv. Int.	Trip for MWD	Failure Type
100	2	445.00	D/GWD	155.000	935.000	780.000	08-Oct-09 09:00	11-Oct-09 01:30	64.50	64.500	34.850	21.10	No	No	
200	3	311.00	P4M	935.000	2271.000	1336.000	15-Oct-09 05:02	20-Oct-09 02:09	117.11	117.110	71.570	65.30	No	No	
300	4	311.00	P4M	2271.000	2520.000	249.000	20-Oct-09 11:03	22-Oct-09 09:34	46.51	46.510	23.730	86.70	No	No	
400	6	216.00	P4M	2519.000	2633.000	114.000	08-Nov-09 01:55	09-Nov-09 12:21	34.44	34.440	15.820	96.00	Yes	Yes	ALD,PCM
500	7	216.00	P4M	2633.000	2983.000	350.000	09-Nov-09 22:43	12-Nov-09 08:34	57.84	57.840	33.710	101.00	No	No	
600	9	216.00	P4M	2983.000	3145.000	162.000	13-Nov-09 18:59	15-Nov-09 12:03	41.08	41.080	18.190	109.30	No	No	
700	11	216.00	P4M	3145.000	3235.000	90.000	16-Nov-09 21:11	18-Nov-09 14:30	41.30	41.300	11.480	112.90	No	No	

Bitrun Summary

RUN TIME DATA

MWD Run	: 100	**Run Start**	: 08-Oct-09 09:00	**BRT Hrs**	: 64.50 hr	**Circ. Hrs**	: 34.85 hr
Rig Bit No	: 2	**Run End**	: 11-Oct-09 01:30	**Hole Size**	: 445.00 mm	**Oper. Hrs**	: 64.50 hr

DRILLING DATA

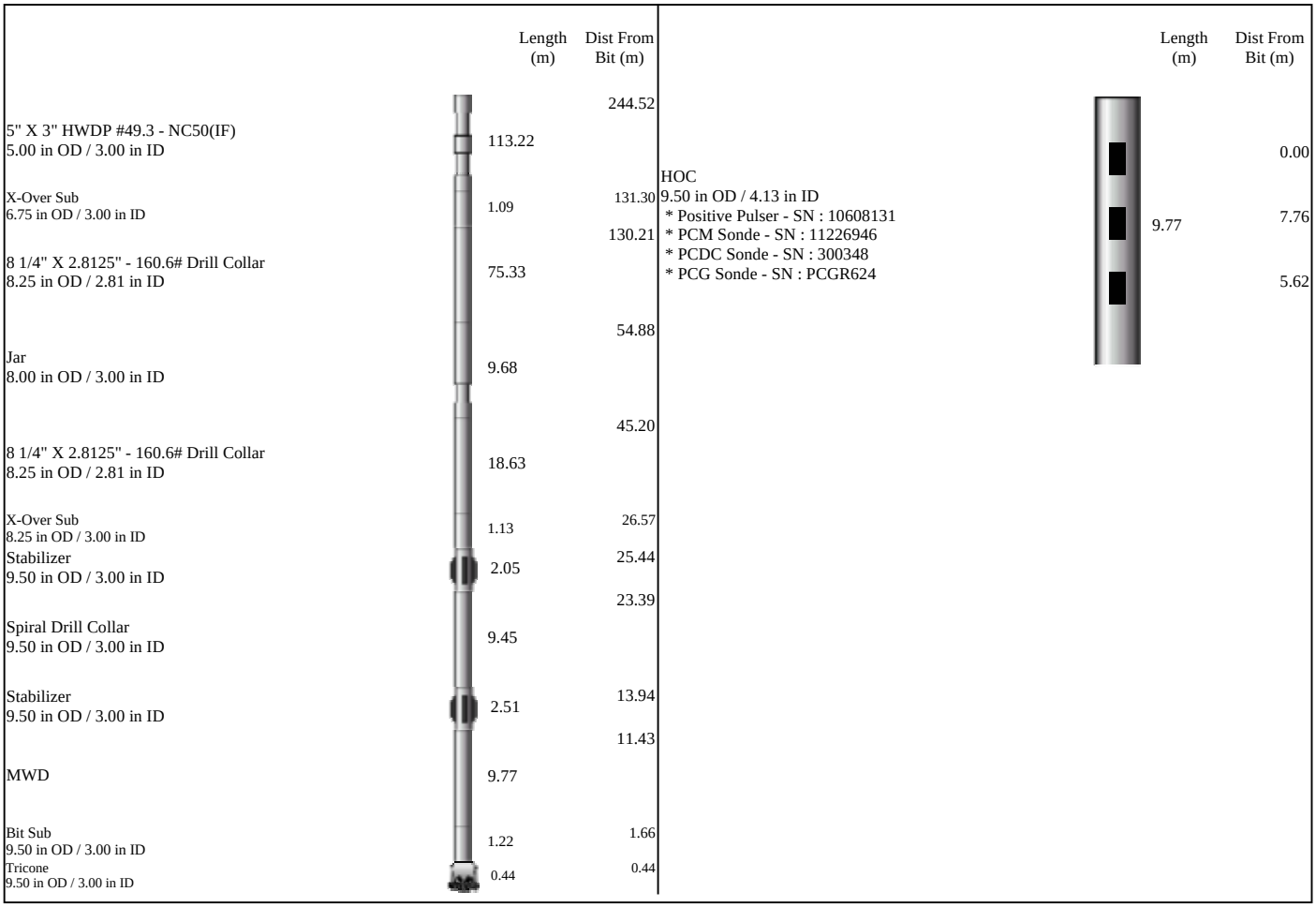
Start Depth	: 155.00 m	**Footage**	: 780.00 m	**Avg RPM**	: 90 rpm	**Avg ROP**	: 30.34 m/hr
End Depth	: 935.00 m	**Avg Flow Rate**	: 1157.00 gpm	**Avg WOB**	: 8.0 klb	**Avg SPP**	: 2185 psig
Drilling Hours	: 25.710 hr						

MUD DATA

Mud Type	: Sea Water						
Weight	: 8.76 ppg	**Viscosity**	: 0.00 spqt	**PV**	: 0 cP	**YP**	: 0.00 lhf2
Chlorides	: 0.00 ppm	**Max Temp.**	: 21.10 degC	**% Solids**	: 0.00 %	**% Sand**	: 0.00 %
pH	: 0.00 pH	**Fluid Loss**	: 0 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:100

MWD PERFORMANCE

Tool OD	: 9.50 in	**Type**	: D/GWD	**Min. Inc.**	: 0.00 deg	**Min. Inc. Depth**	: 95.000 m
Final Az.	: 183.94 deg	**Max Op. Press.**	: 1398 psig	**Max Inc.**	: 1.03 deg	**Max Inc. Depth**	: 896.770 m
	MWD Real-time %	: 99 %		**MWD Recorded %**	: 100 %		



COMMENTS

Drill 445mm hole from 155.0 mMDRT to section TD at 935.0 mMDRT. POOH to run 340mm casing. All recorded data recovered on surface.

Bitrun Summary

RUN TIME DATA

MWD Run	: 200	**Run Start**	: 15-Oct-09 05:02	**BRT Hrs**	: 117.11 hr	**Circ. Hrs**	: 71.57 hr
Rig Bit No	: 3	**Run End**	: 20-Oct-09 02:09	**Hole Size**	: 311.00 mm	**Oper. Hrs**	: 117.11 hr

DRILLING DATA

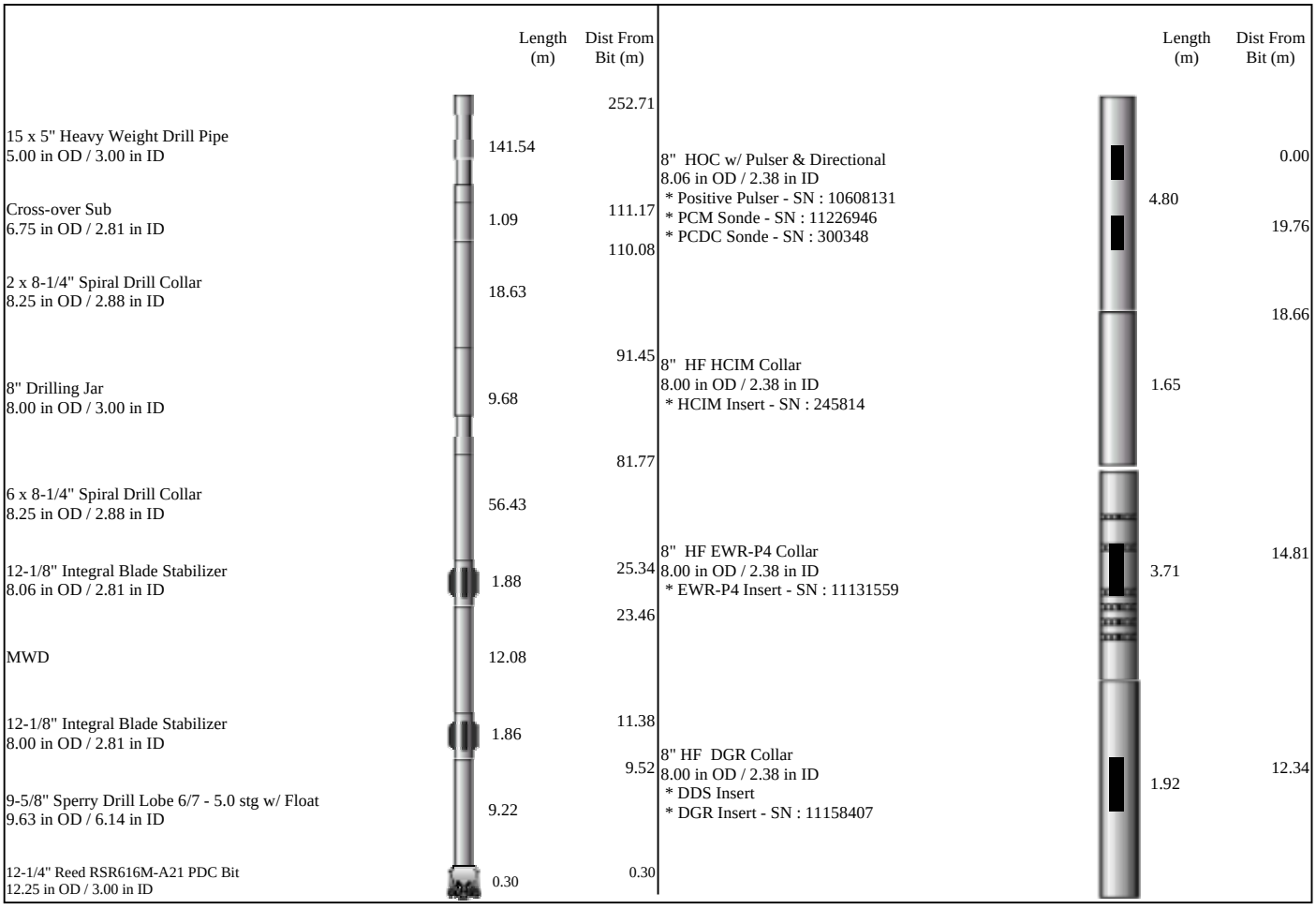
Start Depth	: 935.00 m	**Footage**	: 1336.00 m	**Avg RPM**	: 107 rpm	**Avg ROP**	: 34.08 m/hr
End Depth	: 2271.00 m	**Avg Flow Rate**	: 1000.00 gpm	**Avg WOB**	: 11.3 klb	**Avg SPP**	: 2485 psig
Drilling Hours	: 39.200 hr						

MUD DATA

Mud Type	: KCL/Polymer						
Weight	: 9.10 ppg	**Viscosity**	: 50.00 spqt	**PV**	: 15 cP	**YP**	: 27.00 lhf2
Chlorides	: 38000.00 ppm	**Max Temp.**	: 65.30 degC	**% Solids**	: 2.90 %	**% Sand**	: 0.25 %
pH	: 9.00 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:100

MWD PERFORMANCE

Tool OD	: 8.00 in	**Type**	: P4M	**Min. Inc.**	: 0.48 deg	**Min. Inc. Depth**	: 1963.220 m
Final Az.	: 82.85 deg	**Max Op. Press.**	: 3527 psig	**Max Inc.**	: 1.44 deg	**Max Inc. Depth**	: 1500.560 m
	MWD Real-time % : 100 %			**MWD Recorded %**	: 100 %		



COMMENTS

Drill 311mm hole from 935.0 to 2271.0 mMDRT. POOH due to pressure drop. All recorded data recovered on surface.

Bitrun Summary

RUN TIME DATA

MWD Run	: 300	**Run Start**	: 20-Oct-09 11:03	**BRT Hrs**	: 46.51 hr	**Circ. Hrs**	: 23.73 hr
Rig Bit No	: 4	**Run End**	: 22-Oct-09 09:34	**Hole Size**	: 311.00 mm	**Oper. Hrs**	: 46.51 hr

DRILLING DATA

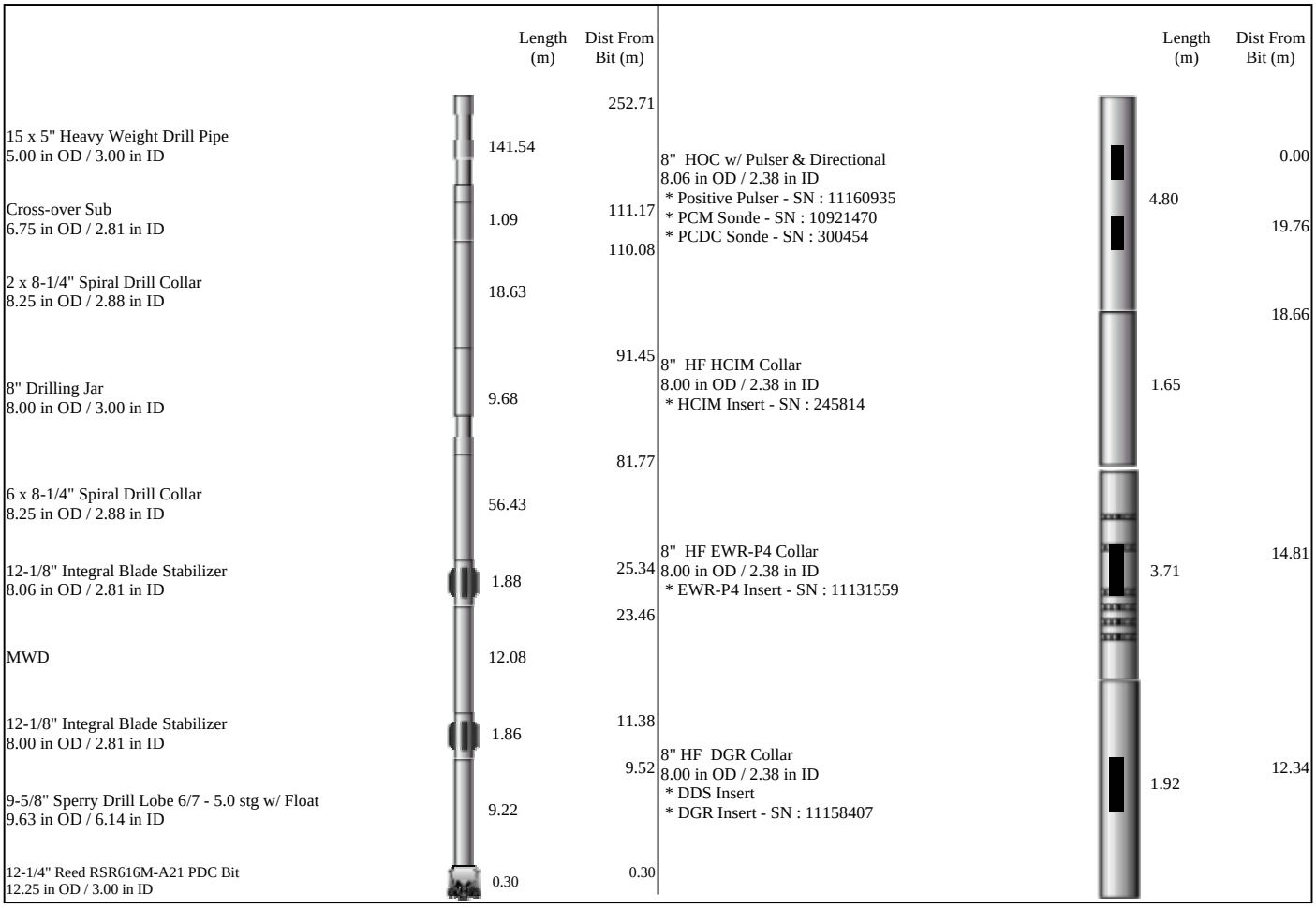
Start Depth	: 2271.00 m	**Footage**	: 249.00 m	**Avg RPM**	: 108 rpm	**Avg ROP**	: 18.12 m/hr
End Depth	: 2520.00 m	**Avg Flow Rate**	: 949.00 gpm	**Avg WOB**	: 12.1 klb	**Avg SPP**	: 2879 psig
Drilling Hours	: 13.690 hr						

MUD DATA

Mud Type	: KCL/Polymer						
Weight	: 9.40 ppg	**Viscosity**	: 56.00 spqt	**PV**	: 16 cP	**YP**	: 32.00 lhf2
Chlorides	: 44000.00 ppm	**Max Temp.**	: 86.70 degC	**% Solids**	: 4.00 %	**% Sand**	: 0.25 %
pH	: 9.00 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:100

MWD PERFORMANCE

Tool OD	: 8.00 in	**Type**	: P4M	**Min. Inc.**	: 0.84 deg	**Min. Inc. Depth**	: 2281.350 m
Final Az.	: 89.94 deg	**Max Op. Press.**	: 4061 psig	**Max Inc.**	: 1.08 deg	**Max Inc. Depth**	: 2426.570 m
	MWD Real-time %	: 97 %		**MWD Recorded %**	: 100 %		



COMMENTS

Drill 311mm hole from 2271.0 mMDRT to section TD at 2520.0 mMDRT. POOH to run 244mm casing All recorded data recovered on surface.

Bitrun Summary

RUN TIME DATA

MWD Run	: 400	**Run Start**	: 08-Nov-09 01:55	**BRT Hrs**	: 34.44 hr	**Circ. Hrs**	: 15.82 hr
Rig Bit No	: 6	**Run End**	: 09-Nov-09 12:21	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 34.44 hr

DRILLING DATA

Start Depth	: 2519.00 m	**Footage**	: 114.00 m	**Avg RPM**	: 110 rpm	**Avg ROP**	: 17.55 m/hr
End Depth	: 2633.00 m	**Avg Flow Rate**	: 725.00 gpm	**Avg WOB**	: 6.7 klb	**Avg SPP**	: 2516 psig
Drilling Hours	: 6.440 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.30 ppg	**Viscosity**	: 48.00 spqt	**PV**	: 12 cP	**YP**	: 27.00 lhf2
Chlorides	: 42500.00 ppm	**Max Temp.**	: 96.00 degC	**% Solids**	: 3.20 %	**% Sand**	: 0.25 %
pH	: 9.00 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:100

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: P4M	**Min. Inc.**	: 1.00 deg	**Min. Inc. Depth**	: 2524.750 m
Final Az.	: 90.35 deg	**Max Op. Press.**	: 4223 psig	**Max Inc.**	: 1.30 deg	**Max Inc. Depth**	: 2588.200 m
	MWD Real-time % : 100 %			**MWD Recorded %**	: 100 %		

	Length (m)	Dist From Bit (m)
		287.57
15 x 5" HWDP 6.63 in OD / 3.00 in ID	141.13	
		146.44
3 x 6 4/3" Drill Collar 6.75 in OD / 2.88 in ID	28.21	
		118.23
Jar 6.75 in OD / 2.75 in ID	9.91	
		108.32
8 x 6 3/4" Drill Collar 6.75 in OD / 2.88 in ID	74.97	
		33.35
Stabilizer 6.50 in OD / 2.81 in ID	1.70	
		31.65
MWD	29.87	
		1.78
Stabilizer w/ ported float 6.63 in OD / 3.24 in ID	1.50	
		0.28
Mi616VBPX PDC 8.00 in OD / 2.25 in ID	0.28	

	Length (m)	Dist From Bit (m)
6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : PA90223655B-6 * ACAL Insert - SN : 138159	1.83	30.20
6 3/4" HOC 6.75 in OD / 1.92 in ID SN : 203846 * Positive Pulser - SN : 11160907 * PCM Sonde - SN : 159	3.05	0.00
6 3/4" BAT 6.75 in OD / 1.92 in ID SN : PA90227156O-6 * BAT Insert - SN : 11378930	6.72	23.36
6 3/4" Nuke Collar 6.75 in OD / 1.92 in ID SN : PA90219755N2L2-6 * CTN Insert - SN : 161970 * ALD Insert - SN : 96441	8.45	18.83 14.84
6 3/4" PM Sub 6.75 in OD / 1.92 in ID SN : 203846 * PCDC Sonde - SN : 351	2.79	10.02
6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90222557H1RGV2-6 * HCIM Insert - SN : 222936 * EWR-P4 Insert - SN : 175801 * DGR Insert - SN : 218750 * DDSr-DGR - SN : 218750	7.03	5.16 2.81 0.00

COMMENTS

Drill 216 mm hole from 2520.0 to 2633.0 mMDRT. POOH for PCM failure. ALD failed during run. All remaining recorded data recovered on surface.

Bitrun Summary

RUN TIME DATA

MWD Run	: 500	**Run Start**	: 09-Nov-09 22:43	**BRT Hrs**	: 57.84 hr	**Circ. Hrs**	: 33.71 hr
Rig Bit No	: 7	**Run End**	: 12-Nov-09 08:34	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 57.84 hr

DRILLING DATA

Start Depth	: 2633.00 m	**Footage**	: 350.00 m	**Avg RPM**	: 121 rpm	**Avg ROP**	: 15.40 m/hr
End Depth	: 2983.00 m	**Avg Flow Rate**	: 702.00 gpm	**Avg WOB**	: 13.2 klb	**Avg SPP**	: 2564 psig
Drilling Hours	: 22.730 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.30 ppg	**Viscosity**	: 46.00 spqt	**PV**	: 14 cP	**YP**	: 25.00 lhf2
Chlorides	: 40000.00 ppm	**Max Temp.**	: 101.00 degC	**% Solids**	: 3.30 %	**% Sand**	: 0.25 %
pH	: 9.00 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:100

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: P4M	**Min. Inc.**	: 1.43 deg	**Min. Inc. Depth**	: 2646.630 m
Final Az.	: 85.15 deg	**Max Op. Press.**	: 4784 psig	**Max Inc.**	: 2.93 deg	**Max Inc. Depth**	: 2963.220 m
	MWD Real-time % : 100 %			**MWD Recorded %**	: 100 %		

	Length (m)	Dist From Bit (m)
		288.37
15 x 5" HWDP 6.63 in OD / 3.00 in ID	141.13	
		147.24
3 x 6 4/3" Drill Collar 6.75 in OD / 2.88 in ID	28.21	
		119.03
Jar 6.75 in OD / 2.75 in ID	9.91	
		109.12
8 x 6 3/4" Drill Collar 6.75 in OD / 2.88 in ID	74.97	
		34.15
Stabilizer 6.50 in OD / 2.81 in ID	1.70	
		32.45
MWD	30.67	
		1.78
Stabilizer w/ ported float 6.63 in OD / 3.24 in ID	1.50	
Mi616VBPX PDC 8.00 in OD / 2.25 in ID	0.28	0.28

	Length (m)	Dist From Bit (m)
6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : PA902223063B-6 * ACAL Insert - SN : 123087	1.81	31.02
6 3/4" HOC 6.75 in OD / 1.92 in ID SN : 302842 * Positive Pulser - SN : 10796450 * PCM Sonde - SN : 557	3.03	0.00
6 3/4" BAT 6.75 in OD / 1.92 in ID SN : PA90227155O-6 * BAT Insert - SN : 11378929	6.76	24.20
6 3/4" Nuke Collar 6.75 in OD / 1.92 in ID SN : PA90222683N2L2-6 * CTN Insert - SN : 231177 * ALD Insert - SN : 10507525	9.20	19.64 15.59
6 3/4" PM Sub 6.75 in OD / 1.92 in ID SN : 1025744 * PCDC Sonde - SN : 348	2.81	10.07
6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90222505H1RG-6 * HCIM Insert - SN : 232754 * EWR-P4 Insert - SN : 270277 * DGR Insert - SN : 176027 * DDSr-DGR - SN : 176027	7.07	5.17 2.83 0.00

COMMENTS

Drill 216 mm hole from 2633.0 mMDRT to coring point at 2983.0 mMDRT. All recorded data recovered on surface.

Bitrun Summary

RUN TIME DATA

MWD Run	: 600	**Run Start**	: 13-Nov-09 18:59	**BRT Hrs**	: 41.08 hr	**Circ. Hrs**	: 18.19 hr
Rig Bit No	: 9	**Run End**	: 15-Nov-09 12:03	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 41.08 hr

DRILLING DATA

Start Depth	: 2983.00 m	**Footage**	: 162.00 m	**Avg RPM**	: 82 rpm	**Avg ROP**	: 12.82 m/hr
End Depth	: 3145.00 m	**Avg Flow Rate**	: 725.00 gpm	**Avg WOB**	: 16.5 klb	**Avg SPP**	: 2888 psig
Drilling Hours	: 12.640 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.40 ppg	**Viscosity**	: 50.00 spqt	**PV**	: 12 cP	**YP**	: 29.00 lhf2
Chlorides	: 40000.00 ppm	**Max Temp.**	: 109.30 degC	**% Solids**	: 3.50 %	**% Sand**	: 0.25 %
pH	: 9.00 pH	**Fluid Loss**	: 5 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:100

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: P4M	**Min. Inc.**	: 2.88 deg	**Min. Inc. Depth**	: 2992.320 m
Final Az.	: 81.59 deg	**Max Op. Press.**	: 5073 psig	**Max Inc.**	: 3.75 deg	**Max Inc. Depth**	: 3130.210 m
	MWD Real-time %	: 100 %		**MWD Recorded %**	: 100 %		

	Length (m)	Dist From Bit (m)
15 x 5" HWDP 6.63 in OD / 3.00 in ID	141.13	288.37
3 x 6 4/3" Drill Collar 6.75 in OD / 2.88 in ID	28.21	147.24
Jar 6.75 in OD / 2.75 in ID	9.91	119.03
8 x 6 3/4" Drill Collar 6.75 in OD / 2.88 in ID	74.97	109.12
Stabilizer 6.50 in OD / 2.81 in ID	1.70	34.15
MWD	30.67	32.45
Stabilizer w/ ported float 6.63 in OD / 3.24 in ID	1.50	1.78
Mi616VBPX PDC 8.00 in OD / 2.25 in ID	0.28	0.28

	Length (m)	Dist From Bit (m)
6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : PA902223063B-6 * ACAL Insert - SN : 123087	1.81	31.02
6 3/4" HOC 6.75 in OD / 1.92 in ID SN : 302842 * Positive Pulser - SN : 10796450 * PCM Sonde - SN : 557	3.03	0.00
6 3/4" BAT 6.75 in OD / 1.92 in ID SN : PA90227155O-6 * BAT Insert - SN : 11378929	6.76	24.20
6 3/4" Nuke Collar 6.75 in OD / 1.92 in ID SN : PA90222683N2L2-6 * CTN Insert - SN : 231177 * ALD Insert - SN : 10507525	9.20	19.64 15.59
6 3/4" PM Sub 6.75 in OD / 1.92 in ID SN : 1025744 * PCDC Sonde - SN : 348	2.81	10.07
6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90222505H1RG-6 * HCIM Insert - SN : 232754 * EWR-P4 Insert - SN : 270277 * DGR Insert - SN : 176027 * DDSr-DGR - SN : 176027	7.07	5.17 2.83 0.00

COMMENTS

Wipe 216 mm coring interval from 2983.0 to 3013.0 mMDRT. Drill 216 mm hole from 3013.0 mMDRT to coring point at 3145.0 mMDRT. All recorded data recovered on surface.

Bitrun Summary

RUN TIME DATA

MWD Run	: 700	**Run Start**	: 16-Nov-09 21:11	**BRT Hrs**	: 41.30 hr	**Circ. Hrs**	: 11.48 hr
Rig Bit No	: 11	**Run End**	: 18-Nov-09 14:30	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 41.30 hr

DRILLING DATA

Start Depth	: 3145.00 m	**Footage**	: 90.00 m	**Avg RPM**	: 91 rpm	**Avg ROP**	: 0.00 m/hr
End Depth	: 3235.00 m	**Avg Flow Rate**	: 681.00 gpm	**Avg WOB**	: 13.8 klb	**Avg SPP**	: 2771 psig
Drilling Hours	: 7.450 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.40 ppg	**Viscosity**	: 56.00 spqt	**PV**	: 14 cP	**YP**	: 29.00 lhf2
Chlorides	: 38000.00 ppm	**Max Temp.**	: 112.90 degC	**% Solids**	: 3.60 %	**% Sand**	: 0.25 %
pH	: 9.00 pH	**Fluid Loss**	: 5 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:100

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: P4M	**Min. Inc.**	: 3.79 deg	**Min. Inc. Depth**	: 3167.650 m
Final Az.	: 83.41 deg	**Max Op. Press.**	: 5188 psig	**Max Inc.**	: 4.33 deg	**Max Inc. Depth**	: 3223.600 m
	MWD Real-time % : 100 %			**MWD Recorded %**	: 100 %		

	Length (m)	Dist From Bit (m)
		288.37
15 x 5" HWDP 6.63 in OD / 3.00 in ID	141.13	
		147.24
3 x 6 4/3" Drill Collar 6.75 in OD / 2.88 in ID	28.21	
		119.03
Jar 6.75 in OD / 2.75 in ID	9.91	
		109.12
8 x 6 3/4" Drill Collar 6.75 in OD / 2.88 in ID	74.97	
		34.15
Stabilizer 6.50 in OD / 2.81 in ID	1.70	
		32.45
MWD	30.67	
		1.78
Stabilizer w/ ported float 6.63 in OD / 3.24 in ID	1.50	
		0.28
Mi616VBPX PDC 8.00 in OD / 2.25 in ID	0.28	

	Length (m)	Dist From Bit (m)
6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : PA902223063B-6 * ACAL Insert - SN : 123087	1.81	31.02
6 3/4" HOC 6.75 in OD / 1.92 in ID SN : 302842 * Positive Pulser - SN : 10796450 * PCM Sonde - SN : 557	3.03	0.00
6 3/4" BAT 6.75 in OD / 1.92 in ID SN : PA90227155O-6 * BAT Insert - SN : 11378929	6.76	24.20
6 3/4" Nuke Collar 6.75 in OD / 1.92 in ID SN : PA90222683N2L2-6 * CTN Insert - SN : 231177 * ALD Insert - SN : 10507525	9.20	19.64 15.59
6 3/4" PM Sub 6.75 in OD / 1.92 in ID SN : 1025744 * PCDC Sonde - SN : 348	2.81	10.07
6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90222505H1RG-6 * HCIM Insert - SN : 232754 * EWR-P4 Insert - SN : 270277 * DGR Insert - SN : 176027 * DDSr-DGR - SN : 176027	7.07	5.17 2.83 0.00

COMMENTS

Wipe 216 mm coring interval from 3145.0 to 3175.0 mMDRT. Drill 216 mm hole from 3175.0 mMDRT to well TD at 3235.0 mMDRT. All recorded data recovered on surface.

Directional Survey Data

UTM Zone 55S, GDA 1994
All depths are taken from driller's pipe tally unless otherwise noted
RT-MSL = 26.0m
Final Survey Projected to TD.

Tie-in

0.000	0.00	0.00	0.000	0.000 N	0.000 E		***

Measured Depth (m)	Inclination (deg)	Direction (deg)	Vertical Depth (m)	Latitude (m)	Departure (m)	Vertical Section (m)	Dogleg (°/30m)
95.000	0.00	0.00	95.000	0.000 N	0.000 E	0.000	0.00
204.920	0.58	282.17	204.920	0.120 N	0.540 W	-0.520	0.16
289.500	0.55	277.88	289.490	0.260 N	1.360 W	-1.280	0.02
376.490	0.32	238.01	376.480	0.190 N	1.980 W	-1.760	0.13
435.080	0.35	232.40	435.070	0.000 N	2.260 W	-1.890	0.02
521.950	0.72	199.02	521.940	0.680 S	2.650 W	-1.830	0.16
547.830	0.73	193.58	547.810	1.000 S	2.740 W	-1.740	0.08
579.000	0.69	195.91	578.980	1.370 S	2.840 W	-1.610	0.05
665.440	0.36	203.20	665.420	2.120 S	3.090 W	-1.410	0.12
782.280	0.67	192.10	782.250	3.120 S	3.380 W	-1.090	0.08
812.120	0.66	196.82	812.090	3.460 S	3.470 W	-0.980	0.06
868.190	0.30	224.95	868.160	3.870 S	3.660 W	-0.920	0.22
896.770	1.03	195.99	896.740	4.170 S	3.790 W	-0.850	0.82
925.970	0.71	183.94	925.930	4.610 S	3.870 W	-0.680	0.38
952.440	0.80	188.49	952.400	4.950 S	3.910 W	-0.530	0.12
981.350	0.74	192.99	981.310	5.330 S	3.980 W	-0.370	0.09
1010.200	0.83	198.72	1010.160	5.710 S	4.090 W	-0.260	0.12
1067.210	0.87	190.96	1067.160	6.530 S	4.310 W	0.020	0.06
1095.870	0.84	194.49	1095.820	6.950 S	4.400 W	0.170	0.06
1153.510	1.11	191.81	1153.450	7.900 S	4.620 W	0.510	0.14
1182.360	1.27	187.06	1182.290	8.490 S	4.720 W	0.760	0.20
1211.300	0.97	182.63	1211.230	9.060 S	4.770 W	1.030	0.32
1240.320	1.00	184.76	1240.240	9.550 S	4.800 W	1.270	0.05
1269.440	0.96	179.68	1269.360	10.050 S	4.820 W	1.530	0.10
1298.710	1.13	178.12	1298.620	10.580 S	4.810 W	1.840	0.18
1327.950	1.27	184.82	1327.860	11.200 S	4.830 W	2.160	0.20
1357.120	1.31	184.97	1357.020	11.850 S	4.880 W	2.470	0.04
1385.950	1.43	187.08	1385.840	12.530 S	4.950 W	2.790	0.14
1414.800	1.33	186.15	1414.680	13.220 S	5.030 W	3.110	0.11
1443.260	1.42	189.23	1443.140	13.900 S	5.130 W	3.400	0.12
1471.760	1.41	188.55	1471.630	14.600 S	5.240 W	3.700	0.02
1500.560	1.44	186.77	1500.420	15.310 S	5.330 W	4.010	0.06
1529.740	1.02	177.87	1529.590	15.930 S	5.360 W	4.320	0.47
1559.000	1.11	183.32	1558.850	16.470 S	5.370 W	4.620	0.14
1588.150	1.05	181.86	1587.990	17.020 S	5.400 W	4.900	0.07
1617.270	1.14	175.03	1617.110	17.580 S	5.380 W	5.220	0.16
1646.320	1.17	184.16	1646.150	18.160 S	5.380 W	5.550	0.19
1675.150	1.31	182.99	1674.970	18.780 S	5.410 W	5.860	0.15
1703.610	1.02	183.90	1703.430	19.360 S	5.450 W	6.150	0.31
1731.980	1.12	176.27	1731.790	19.890 S	5.450 W	6.440	0.18
1760.710	1.20	179.48	1760.520	20.470 S	5.430 W	6.780	0.11

Directional Survey Data

Measured Depth (m)	Inclination (deg)	Direction (deg)	Vertical Depth (m)	Latitude (m)	Departure (m)	Vertical Section (m)	Dogleg (°/30m)
1790.080	1.13	181.99	1789.880	21.070 S	5.430 W	7.100	0.09
1819.450	1.17	182.73	1819.240	21.660 S	5.460 W	7.410	0.04
1848.520	1.17	190.32	1848.310	22.250 S	5.530 W	7.680	0.16
1877.800	1.13	190.92	1877.580	22.820 S	5.630 W	7.910	0.04
1906.650	1.23	192.98	1906.430	23.400 S	5.760 W	8.120	0.11
1934.670	1.08	194.42	1934.440	23.950 S	5.890 W	8.320	0.16
1963.220	0.48	64.50	1962.990	24.160 S	5.850 W	8.470	1.51
1992.330	0.56	59.70	1992.100	24.040 S	5.620 W	8.590	0.09
2021.460	0.59	61.98	2021.230	23.900 S	5.360 W	8.730	0.04
2050.740	0.64	78.76	2050.500	23.790 S	5.070 W	8.910	0.19
2080.190	0.61	81.26	2079.950	23.740 S	4.750 W	9.150	0.04
2102.200	0.68	80.27	2101.960	23.700 S	4.510 W	9.330	0.10
2138.040	0.69	75.36	2137.800	23.610 S	4.090 W	9.630	0.05
2195.190	0.63	82.85	2194.940	23.480 S	3.440 W	10.090	0.06
2253.190	0.62	89.29	2252.940	23.440 S	2.810 W	10.600	0.04
2281.350	0.84	88.95	2281.100	23.430 S	2.460 W	10.890	0.23
2310.290	0.91	90.74	2310.040	23.430 S	2.010 W	11.260	0.08
2339.670	0.80	84.68	2339.410	23.410 S	1.580 W	11.620	0.15
2398.220	0.81	98.78	2397.960	23.440 S	0.760 W	12.310	0.10
2426.570	1.08	93.16	2426.300	23.480 S	0.300 W	12.720	0.30
2454.950	0.96	91.77	2454.680	23.510 S	0.210 E	13.160	0.13
2484.550	1.06	89.94	2484.270	23.510 S	0.730 E	13.590	0.11
2524.750	1.00	97.22	2524.470	23.560 S	1.450 E	14.220	0.11
2557.550	1.13	91.00	2557.260	23.600 S	2.060 E	14.750	0.16
2588.200	1.30	90.35	2587.900	23.610 S	2.710 E	15.290	0.17
2646.630	1.43	86.39	2646.320	23.560 S	4.100 E	16.430	0.08
2674.000	1.51	91.33	2673.680	23.550 S	4.800 E	17.010	0.16
2702.980	1.62	88.34	2702.650	23.550 S	5.590 E	17.670	0.14
2732.910	1.69	88.47	2732.570	23.520 S	6.450 E	18.370	0.07
2762.560	1.85	89.89	2762.200	23.510 S	7.370 E	19.130	0.17
2791.490	1.82	85.29	2791.120	23.470 S	8.300 E	19.880	0.16
2819.890	1.94	85.21	2819.500	23.400 S	9.220 E	20.610	0.13
2847.720	2.06	83.71	2847.310	23.300 S	10.190 E	21.360	0.14
2876.190	2.24	81.90	2875.760	23.170 S	11.250 E	22.170	0.20
2905.640	2.46	85.79	2905.190	23.040 S	12.450 E	23.100	0.28
2935.670	2.58	82.74	2935.190	22.910 S	13.760 E	24.120	0.18
2963.220	2.93	85.15	2962.710	22.770 S	15.080 E	25.150	0.40
2992.320	2.88	83.61	2991.770	22.630 S	16.550 E	26.290	0.10
3021.530	3.01	83.20	3020.940	22.450 S	18.040 E	27.440	0.14
3051.620	3.07	82.21	3050.990	22.250 S	19.620 E	28.640	0.08
3080.660	3.23	81.34	3079.990	22.020 S	21.200 E	29.840	0.17
3101.980	3.47	82.50	3101.270	21.850 S	22.430 E	30.770	0.35
3130.210	3.75	81.59	3129.440	21.600 S	24.190 E	32.100	0.30
3167.650	3.79	84.07	3166.800	21.290 S	26.640 E	33.960	0.13
3194.790	3.87	83.32	3193.880	21.090 S	28.440 E	35.360	0.10
3223.600	4.33	83.41	3222.620	20.860 S	30.480 E	36.930	0.48
3235.000	4.33	83.41	3233.990	20.760 S	31.340 E	37.590	0.00

Directional Survey Data

CALCULATION BASED ON MINIMUM CURVATURE METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 0.00 DEGREES(GRID)
A TOTAL CORRECTION OF 11.45 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD
HORIZONTAL DISPLACEMENT(CLOSURE) AT 3235.00 METRES
IS 37.59 METRES ALONG 123.52 DEGREES (GRID)

Final Survey Projected to TD

Service Interrupt Report

MWD Run Number	: 400	**Time/Date of Failure**	: 08-Nov-09 12:10
Rig Bit Number	: 5	**Depth at time of Failure**	: 2510.000 m
MWD Run start time/date	: 08-Nov-09 01:55	**Lost Rig Hours**	: hr
MWD Run end time/date	: 09-Nov-09 12:21		

RIG ACTIVITY

Drilling 8 1/2" hole. Coming out of the 9 5/8" casing shoe.

DESCRIPTION OF FAILURE

Density (DLC) pulses up TOOL FAILURE or either a constant value of 1.200 g/cc (137 counts).
Delta Rho (RLC) pulses up TOOL FAILURE or either a constant value of -0.250 g/cc (0 counts).
Photoelectric Effect (PLC) pulses up TOOL FAILURE or either a variable value.

ACTION TAKEN

The pumps were cycled and a mode switch was performed.

OPERATION IMPACT

It was decided to drill ahead.

REASON FOR FAILURE

Once on surface it was determined the far detector had failed.

Service Interrupt Report

MWD Run Number	: 400	**Time/Date of Failure**	: 08-Nov-09 01:40
Rig Bit Number	: 5	**Depth at time of Failure**	: 0.000 m
MWD Run start time/date	: 08-Nov-09 01:55	**Lost Rig Hours**	: hr
MWD Run end time/date	: 09-Nov-09 12:21		

RIG ACTIVITY

Drilling 8 1/2" hole.

DESCRIPTION OF FAILURE

Tool stopped pulsing.

ACTION TAKEN

The pumps were cycled and a mode switch was performed. Confirmed functioning of the pressure transducers.

OPERATION IMPACT

Pulled out of hole and change out BHA.

REASON FOR FAILURE

Once on surface it was determined from the parameter report that communication between the FE tools and the PCM had been lost at the time of the failure.
Upon plugging in to the tool initially the PCM could not be polled. However, on second attempt communication was established and the PCM successfully passed the post run confidence test. The cause of the loss of communication down hole is unknown.

HALLIBURTON

DGR Dual Gamma Ray
EWR Electromagnetic Wave Resistivity
CTN Compensated Thermal Neutron
ALD Azimuthal Lithodensity
BAT Bi-Modal Acoustic

Powered by INSITE™

1 : 500

Sperry Drilling Services

Country : **Australia**
Field : **Trefoil**
Location : **Lat: 39° 53' 7.93" South GDA94**
Long: 145° 22' 14.62" East GDA94
Well : **Trefoil-2**
Company : **Origin Energy Resources Ltd**
Rig : **Kan Tan IV**

Company : **Origin Energy Resources Ltd**
Rig : **Kan Tan IV**
Well : **Trefoil-2**
Field : **Trefoil**
Country : **Australia**
DOE Number :

LOCATION
Latitude : **Lat: 39° 53' 7.93" South GDA94**
Longitude : **Long: 145° 22' 14.62" East GDA94**
UTM Easting = **360,690.38 m**
UTM Northing = **5,583,676.58 m**

Other Services
Directional Drilling

Permanent Datum : **Mean Sea Level** Elevation : **0.00 m**
Log Measured From : **Drill Floor** **26.00 m** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Elev. KB
DF **26.00 m**
GL
WD **69.00 m**

Depth Logged : **155.00 m** To **3,235.00 m**
Date Logged : **03-Oct-09** To **05-Oct-09**
Total Depth MD : **3,235.00 m** TVD : **3,233.99 m**
Spud Date : **06-Oct-09**

Unit No. : **SSH-40** Job No. : **AU-FE-0006714148**

Plot Type : **Final**
Plot Date : **09-Dec-09**

Run No.	Borehole Record (MD) Size	From	To
100	445.000 mm	155.00 m	935.00 m
200	311.000 mm	935.00 m	2,271.00 m
300	311.000 mm	2,271.00 m	2,520.00 m
400	216.000 mm	2,520.00 m	2,633.00 m
500	216.000 mm	2,633.00 m	2,983.00 m
600	216.000 mm	2,983.00 m	3,145.00 m
700	216.000 mm	3,145.00 m	3,235.00 m

Run No.	Borehole Record (MD) Size	From	To

Casing Record (MD) Size	Weight	From	To
30.000 in	458.00 kgpm	95.00 m	153.00 m
13.375 in	101.00 kgpm	95.00 m	930.00 m
9.625 in	70.00 kgpm	95.00 m	2,520.00 m

WELL INFORMATION

MWD Run Number	100	200	300	400	500
Date run completed	11-Oct-09	20-Oct-09	22-Oct-09	09-Nov-09	12-Nov-09
Rig Bit Number	2	3	4	6	7
Bit Size (mm)	445	311	311	216	216
Tool Nominal OD (in)	241	203	203	171	171
Log Start Depth (MD, m)	155.00	935.00	2,271.00	2,520.00	2,633.00
Log End Depth (MD, m)	935.00	2,271.00	2,520.00	2,633.00	2,983.00
Drill or Wipe	Drilling	Drilling	Drilling	Drilling	Drilling
Drill/Wipe Start Date and Time	08-Oct-09 18:33	15-Oct-09 15:53	20-Oct-09 23:21	08-Nov-09 12:18	10-Nov-09 10:17
Drill/Wipe End Date and Time	10-Oct-09 06:17	19-Oct-09 05:33	21-Oct-09 18:43	09-Nov-09 02:33	11-Nov-09 20:16
Min Inc (deg) @ Depth (MD, m)	0 @ 95.00	0.30 @ 868.19	0.62 @ 2,253.19	1.00 @ 2,524.750	1.43 @ 2,646.630
Max Inc (deg) @ Depth (MD, m)	1.03 @ 896.77	1.44 @ 1,500.56	1.08 @ 2,426.57	1.30 @ 2,588.200	2.93 @ 2,963.220
Bit TFA(in2) / Bit Type	1.24 / Smith XR+VCPS	1.04 / Reed RSX616M	1.04 / Reed RSX616M	0.90 / Smith Mi16VBPX	0.90 / Smith Mi16VBPX
Flow Rate (gpm)	1,157	1,000	949	725	702.00
Max AV (mps) / CV (mps) @ MWD	0.7 / 0.9	1.7 / 2.0	1.5 / 2.1	3.4 / 2.4	3.5 / 2.3
Fluid Type	Sea Water	KCL/Polymer	KCL/Polymer	KCl/Polymer	KCl/Polymer
Density (ppg) / Viscosity (spqt)	8.76 / N/A	9.10 / 50.00	9.40 / 56.00	9.30 / 48.00	9.30 / 46.00
Filtrate CL (ppm)	N/A	38,000	44,000	42,500	40,000
pH / Fluid Loss (mptm)	N/A / N/A	9.00 / 4.4	9.00 / 3.8	9.00 / 4.0	9.00 / 4
PV (cP) / YP (lhf2)	N/A / N/A	15 / 27.00	16 / 32.00	12 / 27.00	14 / 25.00
% Solids / % Sand	0 / 0	2.9 / 0.25	4.0 / 0.25	3.2 / 0.25	3.3 / 0.25
% Oil / Oil:Water Ratio	0 / 0:100	0 / 0:100	0 / 0:100	0 / 0:100	0 / 0:100
Rm @ Measured Temp (degC)	N/A @ N/A	0.04 @ 17.80	0.08 @ 23.30	0.07 @ 19.80	0.07 @ 25.60
Rmf @ Measured Temp (degC)	N/A @ N/A	0.03 @ 17.80	0.06 @ 21.70	0.08 @ 21.00	0.06 @ 26.70
Rmc @ Measured Temp (degC)	N/A @ N/A	0.08 @ 16.70	0.18 @ 22.20	0.04 @ 21.00	0.09 @ 25.60
Max Tool Temp (degC) / Source	21.10 / PCM	65.30 / EWR-P4	86.70 / EWR-P4	96.00 / EWR-P4	101.00 / EWR-P4
Rm @ Max Tool Temp (degC)	N/A @ N/A	0.02 @ 65.30	0.03 @ 86.70	0.02 @ 96.00	0.04 @ 101.00
Lead MWD Engineer	J. Lau	J. Lau	J. Lau	T. Oborne	T. Oborne
Customer Representative	J. McGarrity	J. McGarrity	J. McGarrity	B. Houston	B. Houston

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	HCIM	HCIM	HCIM	HCIM
Software Version	5.28	88.20	88.20	88.20	88.20
Sub Serial Number	46811	245814	245814	222936	232754
Insert Serial Number	11226946	103485	103485	10911832	10943320
Date and Time Initialized	07-Oct-09 08:43	15-Oct-09 05:03	20-Oct-09 11:04	08-Nov-09 01:56	09-Nov-09 22:44
Date and Time Read	11-Oct-09 02:33	12-Oct-09 05:27	22-Oct-09 09:34	09-Nov-09 12:21	12-Nov-09 08:34
ECMB SW Version	N/A	N/A	N/A	N/A	N/A

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	PCDC
Distance From Bit (m)	7.760	19.760	19.760	10.022	10.070
Software Version	6.09	6.09	6.09	6.09	6.09
Sub Serial Number	46811	246906	246907	194443	1025744
Sonde Serial Number	300348	300348	300454	300351	300348
Sensor ID Number	10993464	10993464	11062084	10993467	10993464
Toolface Offset (deg)	N/A	49.40	311.11	N/A	N/A

Gamma Ray Sensor Information

Tool Type	PCG	DGR	DGR	DGR	DGR
Distance From Bit (m)	5.621	12.340	12.340	2.806	2.830
Recorded Sample Period (sec)	10	10	10	10	10
Software Version	8.11	N/A	N/A	N/A	N/A
Sub Serial Number	46811	11158407	11158407	218750	176027
Insert/Sonde Serial Number	PCGR624	263664	263664	254375	126021

Resistivity Sensor Information

Tool Type		EWR-P4	EWR-P4	EWR-P4	EWR-P4
Distance From Bit (m)		14.810	14.810	5.160	5.170
Recorded Sample Period (sec)		12	10	10	10
Software Version		1.50	1.50	1.50	1.50
Sub Serial Number		11131559	11131559	175801	270277
Receiver Insert Serial Number		11079093	11079093	113356	261331
Transmitter Insert Serial Number		11072204	11072204	225155	11194015
Receiver Orientation		Down	Down	Down	Down

Neutron Sensor Information

Tool Type				CTN	CTN
Distance From Bit (m)				18.830	19.640
Recorded Sample Period (sec)				14	14
Sub Serial Number				161970	231177
Insert Serial Number				175364	230786
Source Serial Number				0102NN	0102NN
Source Factor				N/A	N/A
Pin Orientation				Up	Up

Density Sensor Information

Tool Type				ALD	ALD
Distance From Bit (m)				14.845	15.590
Recorded Sample Period (sec)				14	14
Software Version				3.04	3.04
Sub Serial Number				96441	10507525
Insert Serial Number				240578	10718194
Sensor ID Number				12055	32033
Source Serial Number				2434GW	39382B
Pin Orientation				Up	Up
Stabilizer Blade O.D. (mm)				209.6	209.6
DPA Offset				0	0

Caliper Sensor Information

Tool Type				ACAL	ACAL
Distance From Bit (m)				30.200	31.020

Software Version				0.19	0.19
Sub Serial Number				138159	123087
Insert Serial Number				132768	113327

Sonic Sensor Information

Tool Type				BAT	BAT
Distance From Bit (m)				23.365	24.200
Recorded Sample Period (sec)				18	18
Sub Serial Number				11378930	11378929
Receiver Insert Serial Number				11215928	11215930
Transmitter Insert Serial Number				11215907	133714
MIT File				QBAT_ggss_d11_q	QBAT_ggss_d11_q
Config File				R5Listen_512_DS	R5Listen_512_DS
Real-Time Window (uspf)	-	-	-	75 - 110	75 - 110
Battery Insert Serial Number				231589	157179
MCM Software Version				20.02	20.02
DAQ1/DAQ2 Software Version	/	/	/	20.01 / 20.01	20.01 / 20.01
DSM Software Version				36.65	36.65

Pulser Controller Sensor Information

Tool Type	PCM	PCM	PCM	PCM	PCM
Software Version	5.28	8.04	8.04	8.04	8.04
PIC Software Version	1.20 /	1.20 /	1.20 /	1.20 /	1.20 /
Sub/HOC Serial Number	46811	246906	246907	203846	302842
Insert/Probe/Module SN	11226946	11226946	10921470	10921384	11226946
Battery Serial Number	N/A	N/A	N/A	N/A	N/A
Valve Insert SN	N/A	N/A	N/A	N/A	N/A
DC Insert Serial Number	N/A	N/A	N/A	N/A	N/A
Choke Size (32nd)	N/A	N/A	N/A	N/A	N/A
Driver Current (uA)	N/A	N/A	N/A	N/A	N/A
Driver SMI Current (uA)	N/A	N/A	N/A	N/A	N/A
Boot Strap Version	1022	1022	1022	1022	1022

DDSr-DGR Sensor Information

Tool Type		DDSr-DGR	DDSr-DGR	DDSr-DGR	DDSr-DGR
Distance From Bit (m)		0	0	0	0
Recorded Sample Period (sec)		12	12	12	12
Software Version		10.49	10.49	10.49	10.49
Sub Serial Number		11158407	11158407	218750	176027
Insert Serial Number		263664	263664	254375	126021
Sensor ID Number		5970	5970	5729	6261

WELL INFORMATION

MWD Run Number	600	700			
Date run completed	15-Nov-09	18-Nov-09			
Rig Bit Number	9	11			
Bit Size (mm)	216	216			
Tool Nominal OD (in)	171	171			
Log Start Depth (MD, m)	2,983.000	3,145.000			
Log End Depth (MD, m)	3,145.000	3,235.000			
Drill or Wipe	Wipe/Drilling	Wipe/Drilling			
Drill/Wipe Start Date and Time	14-Nov-09 07:40	17-Nov-09 17:44			
Drill/Wipe End Date and Time	15-Nov-09 01:25	18-Nov-09 03:09			
Min Inc (deg) @ Depth (MD, m)	2.88 @ 2,992.320	3.79 @ 3,167.650			
Max Inc (deg) @ Depth (MD, m)	3.75 @ 3,130.210	4.33 @ 3,223.600			
Bit TFA(in2) / Bit Type	0.90 / Smith Mi16VBPX	0.90 / Smith Mi16VBPX			
Flow Rate (gpm)	725	681			
Max AV (mps) / CV (mps) @ MWD	3.4 / 2.5	3.3 / 2.5			
Fluid Type	KCl/Polymer	KCl/Polymer			
Density (ppg) / Viscosity (spqt)	9.40 / 50.00	9.40 / 56.00			
Filtrate CL (ppm)	40,000	38,000			
pH / Fluid Loss (mptm)	9.00 / 5	9.00 / 5			
PV (cP) / YP (lhf2)	12 / 29.00	14 / 29.00			
% Solids / % Sand	3.5 / .25	3.6 / 0.25			

% Solids / % Sand	3.5 / .25	3.6 / 0.25			
% Oil / Oil:Water Ratio	0 / 0:100	0 / 0:100			
Rm @ Measured Temp (degC)	.12 @ 22.20	.11 @ 21.50			
Rmf @ Measured Temp (degC)	.10 @ 21.10	.10 @ 21.00			
Rmc @ Measured Temp (degC)	.18 @ 24.40	.16 @ 23.80			
Max Tool Temp (degC) / Source	109.30 / EWR-P4	112.90 / EWR-P4			
Rm @ Max Tool Temp (degC)	.05 @ 109.30	.04 @ 112.90			
Lead MWD Engineer	J. Lau	J. Lau			
Customer Representative	B. Houston	B. Houston			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM	HCIM			
Software Version	88.20	88.20			
Sub Serial Number	232754	232754			
Insert Serial Number	10943320	10943320			
Date and Time Initialized	13-Nov-09 19:00	16-Nov-09 21:13			
Date and Time Read	15-Nov-09 12:04	18-Nov-09 16:24			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (m)	10.070	10.070			
Software Version					
Sub Serial Number	1025744	1025744			
Sonde Serial Number	300348	300348			
Sensor ID Number	10993464	10993464			
Toolface Offset (deg)	N/A	N/A			

Gamma Ray Sensor Information

Tool Type	DGR	DGR			
Distance From Bit (m)	2.830	2.830			
Recorded Sample Period (sec)	10	10			
Software Version	N/A	N/A			
Sub Serial Number	176027	176027			
Insert/Sonde Serial Number	126021	126021			

Resistivity Sensor Information

Tool Type	EWR-P4	EWR-P4			
Distance From Bit (m)	5.170	5.170			
Recorded Sample Period (sec)	10	10			
Software Version	1.50	1.50			
Sub Serial Number	270277	270277			
Receiver Insert Serial Number	261331	261331			
Transmitter Insert Serial Number	11194015	11194015			
Receiver Orientation	Down	Down			

Neutron Sensor Information

Tool Type	CTN	CTN			
Distance From Bit (m)	19.640	19.640			
Recorded Sample Period (sec)	14	14			
Sub Serial Number	231177	231177			
Insert Serial Number	230786	230786			
Source Serial Number	0102NN	0102NN			
Source Factor	N/A	N/A			
Pin Orientation	Up	Up			

Density Sensor Information

Tool Type	ALD	ALD			
Distance From Bit (m)	15.590	15.590			
Recorded Sample Period (sec)	14	14			

Software Version	3.04	3.04			
Sub Serial Number	10507525	10507525			
Insert Serial Number	10718194	10718194			
Sensor ID Number	32033	32033			
Source Serial Number	39382B	39382B			
Pin Orientation	Up	Up			
Stabilizer Blade O.D. (mm)	209.6	209.6			
DPA Offset	0	0			

Caliper Sensor Information

Tool Type	ACAL	ACAL			
Distance From Bit (m)	31.020	31.020			
Software Version	0.19	0.19			
Sub Serial Number	123087	123087			
Insert Serial Number	113327	113327			

Sonic Sensor Information

Tool Type	BAT	BAT			
Distance From Bit (m)	24.200	24.200			
Recorded Sample Period (sec)	18	18			
Sub Serial Number	11378929	11378929			
Receiver Insert Serial Number	11215930	11215930			
Transmitter Insert Serial Number	133714	133714			
MIT File	QBAT_ggss_m12_m	QBAT_ggss_m12_m			
Config File	R5Listen_512_DS	R5Listen_512_DS			
Real-Time Window (uspf)	75 - 110	75 - 110			
Battery Insert Serial Number	157179	157179			
MCM Software Version	20.02	20.02			
DAQ1/DAQ2 Software Version	20.01 / 20.01	20.01 / 20.01			
DSM Software Version	36.65	36.65			

Pulser Controller Sensor Information

Tool Type	PCM	PCM			
Software Version	8.04	8.04			
PIC Software Version	1.20 /	1.20 /			
Sub/HOC Serial Number	302842	302842			
Insert/Probe/Module SN	11226946	11226946			
Battery Serial Number	N/A	N/A			
Valve Insert SN	N/A	N/A			
DC Insert Serial Number	N/A	N/A			
Choke Size (32nd)	N/A	N/A			
Driver Current (uA)	N/A	N/A			
Driver SMI Current (uA)	N/A	N/A			
Boot Strap Version	1022	1022			

DDSr-DGR Sensor Information

Tool Type	DDSr-DGR	DDSr-DGR			
Distance From Bit (m)	0	0			
Recorded Sample Period (sec)	12	12			
Software Version	10.49	10.49			
Sub Serial Number	176027	176027			
Insert Serial Number	126021	126021			
Sensor ID Number	6261	6261			

REMARKS

1. All depths are bit depths and referenced to the drillers pipe tally.

2. AV/CV is calculated at the MWD collar using the Power Law for water based mud.

3. Curve Mnemonics are:
   ACAL - Smoothed Acoustic Caliper, in
   SROP - Smoothed Rate of Penetration, m/hr
   SGRC - Smoothed Gamma Ray Combined, api
   SEDP - Smoothed Deep Phase-Shift Derived Resistivity, ohm-m

SEMP - Smoothed Medium Phase-Shift Derived Resistivity, ohm-m
SESP - Smoothed Shallow Phase-Shift Derived Resistivity, ohm-m
SEXP - Smoothed Extra Shallow Phase-Shift Derived Resistivity, ohm-m
SCO2 - Smoothed Low Count Rate Stand-off Correction, g/cc
SBD2 - Smoothed Low Count Rate Bulk Density, g/cc
TNPL - Smoothed Thermal Neutron Porosity, v/v
BATC - Smoothed Bi-Modal Acoustic Compressional Slowness, us/ft
SNP2 - Smoothed Near Detector Photoelectric Factor, b/e

4. CTN data has been processed based on Limestone matrix and using the following parameters:
MW = 9.00 - 9.50 sg
Formation Salinity = 15,500 - 26,500 ppm Cl
Matrix Density = 2.71 g/cc
Fluid Density = 1.00 g/cc

5. Formation Evaluation data has been processed using hole size from Acoustic Caliper.

6. Gamma Ray from 150 to 929.6 mMDRT is obtained by Pressure Case Gamma (PCG).

7. Gamma Ray (DGR) logged through casing from 2507.0 to 2518.5 mMDRT.

8. No Azimuthal Litho Density (ALD) data between 2510.0 to 2619.5 mMDRT due to tool failure.

9. Missing data at 2631.9 to 2634.8 mMDRT due to depth tracking issue.

10. Wiped 216 mm coring interval from 2983.0 to 3013.0 mMDRT.

11. Wiped 216 mm coring interval from 3145.0 to 3175.0 mMDRT.

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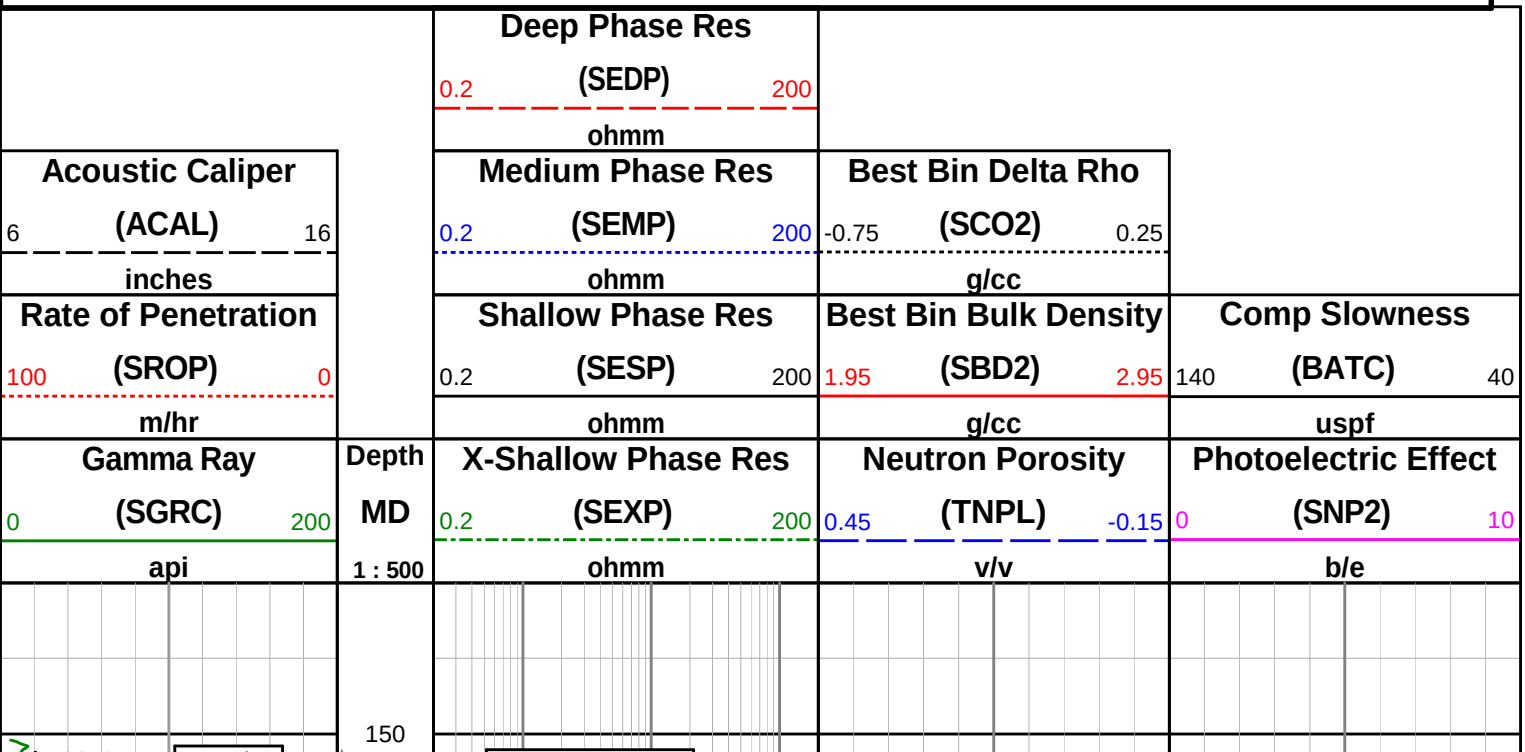

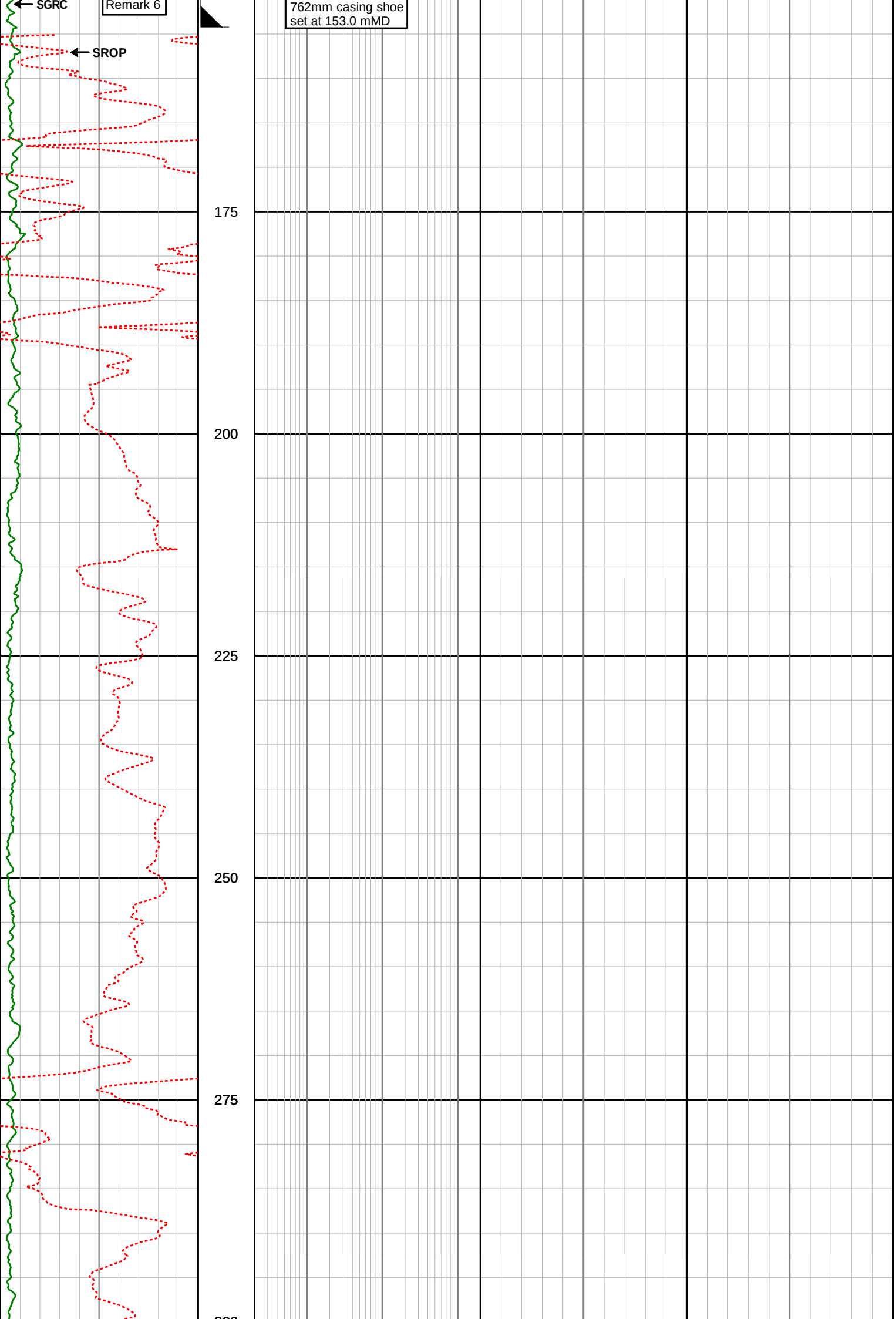
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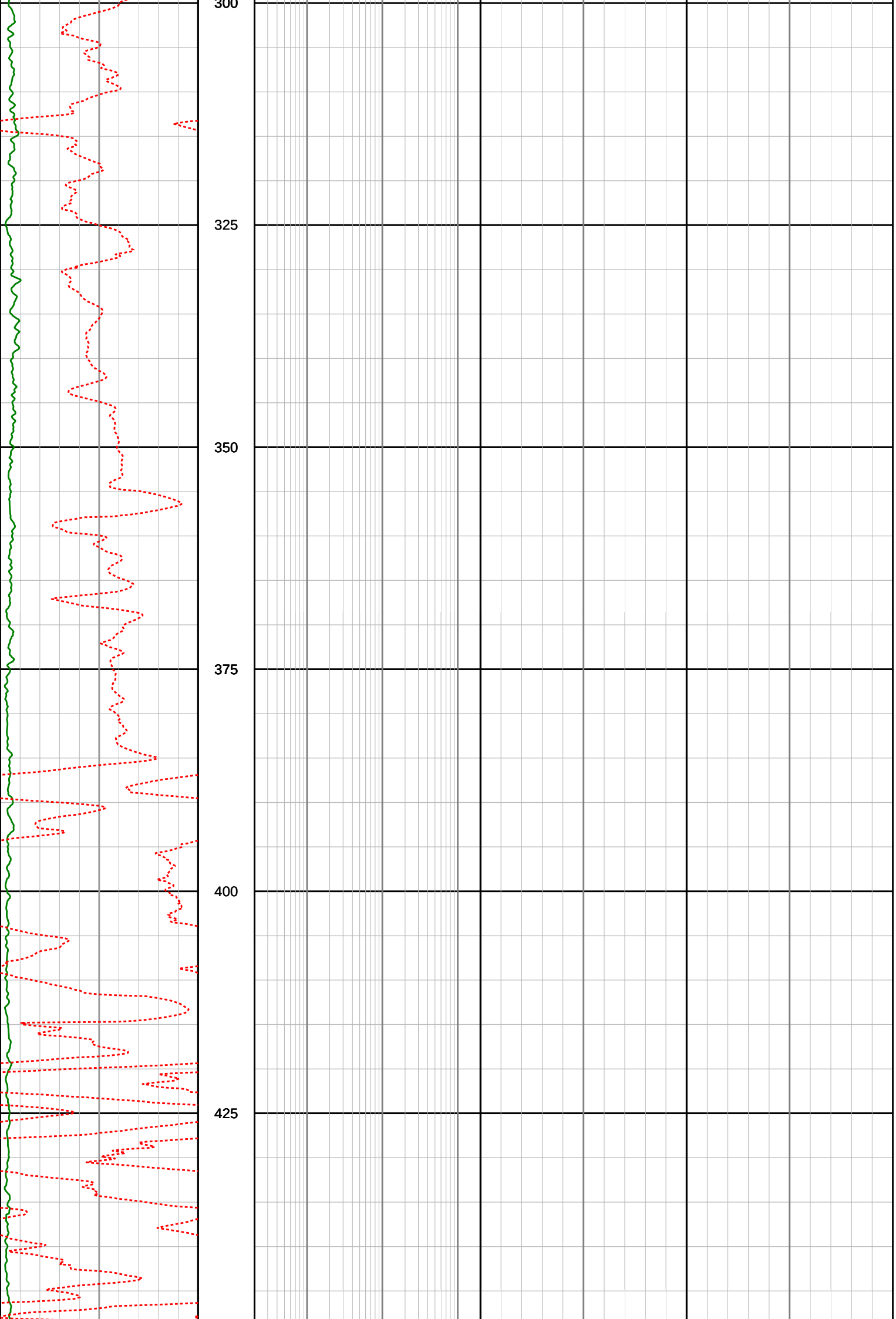
Remark 6
SROP
762mm casing shoe
set at 153.0 mMD
175
200
225
250
275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400
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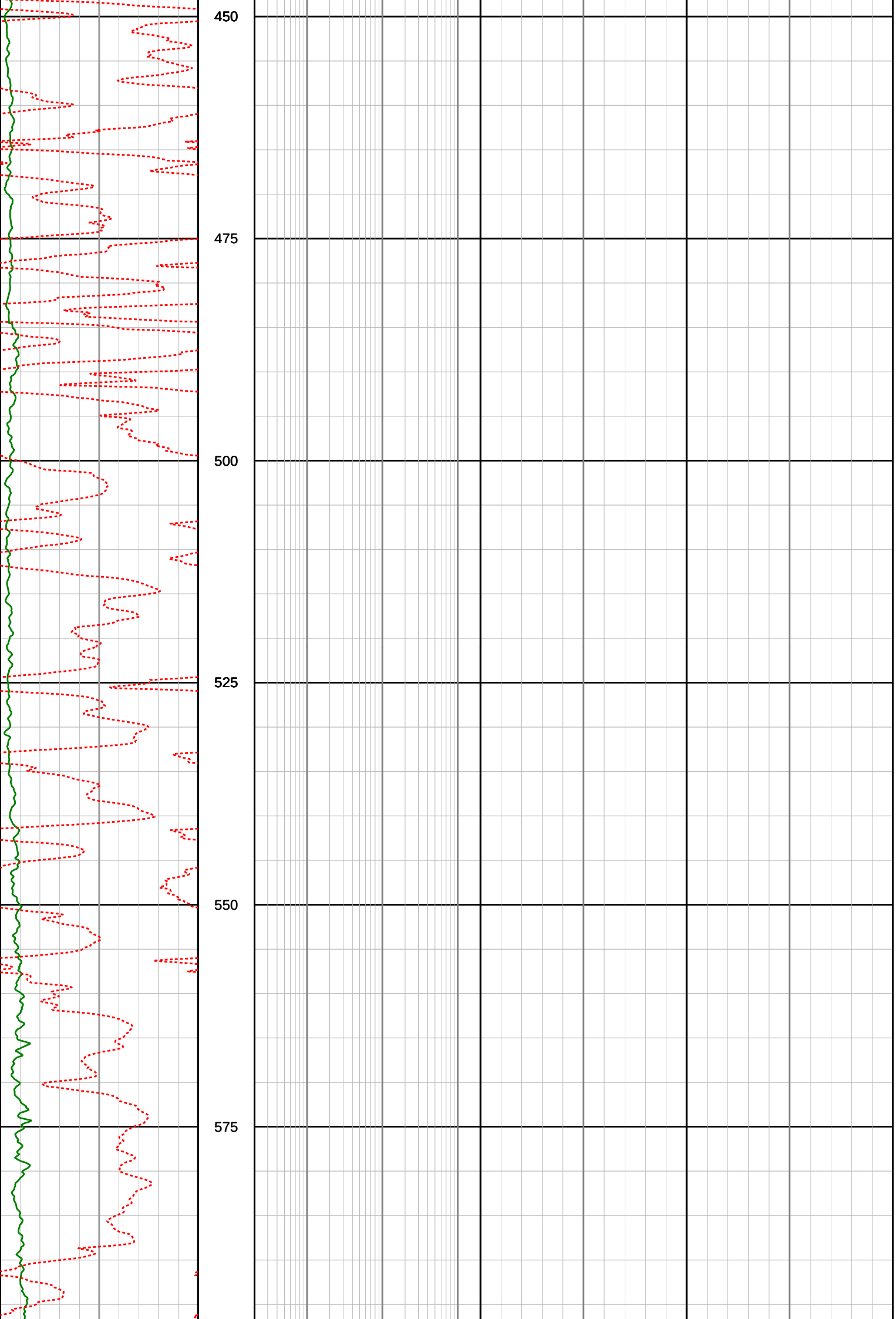
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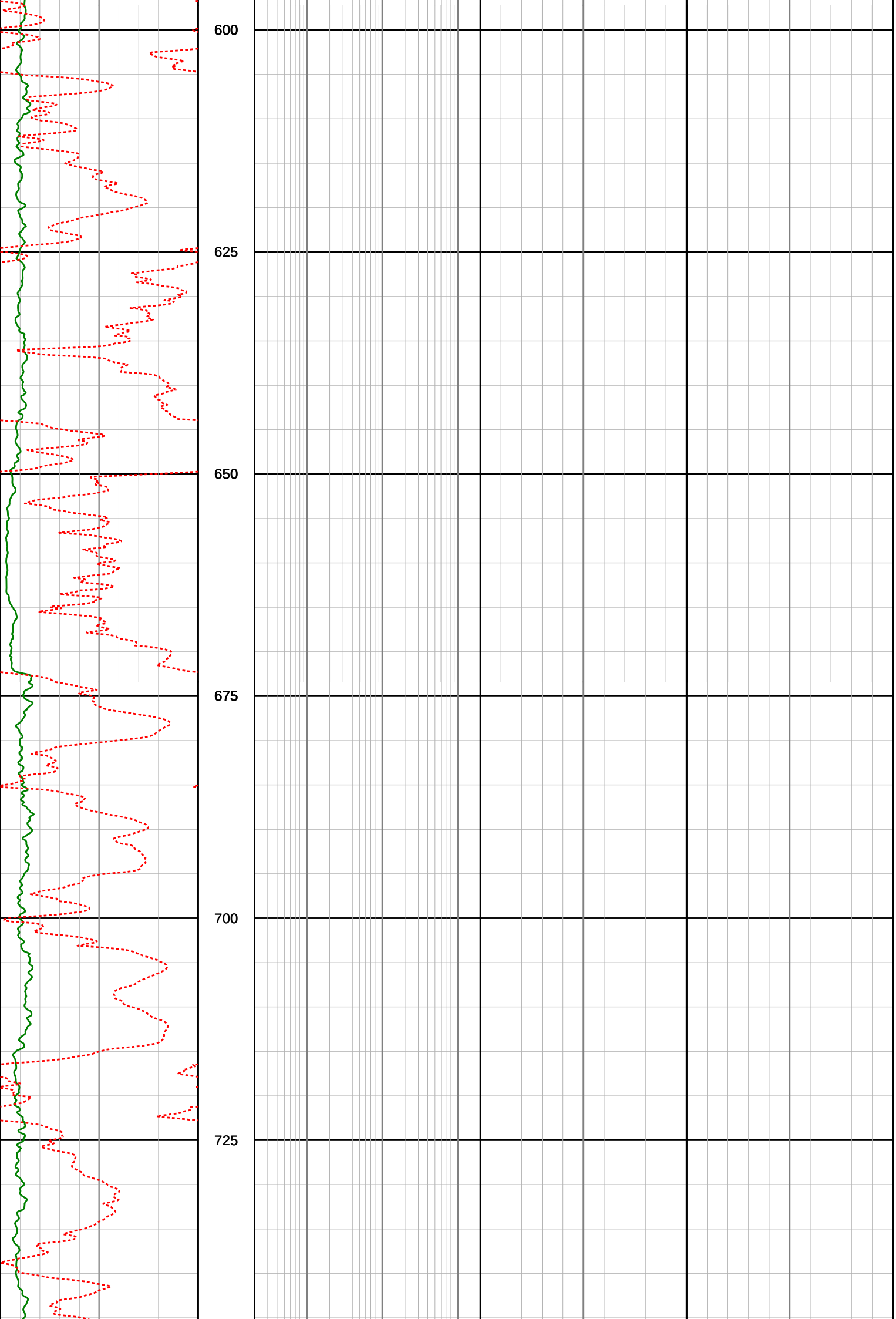
475
500
525
550
575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625
650
675
700
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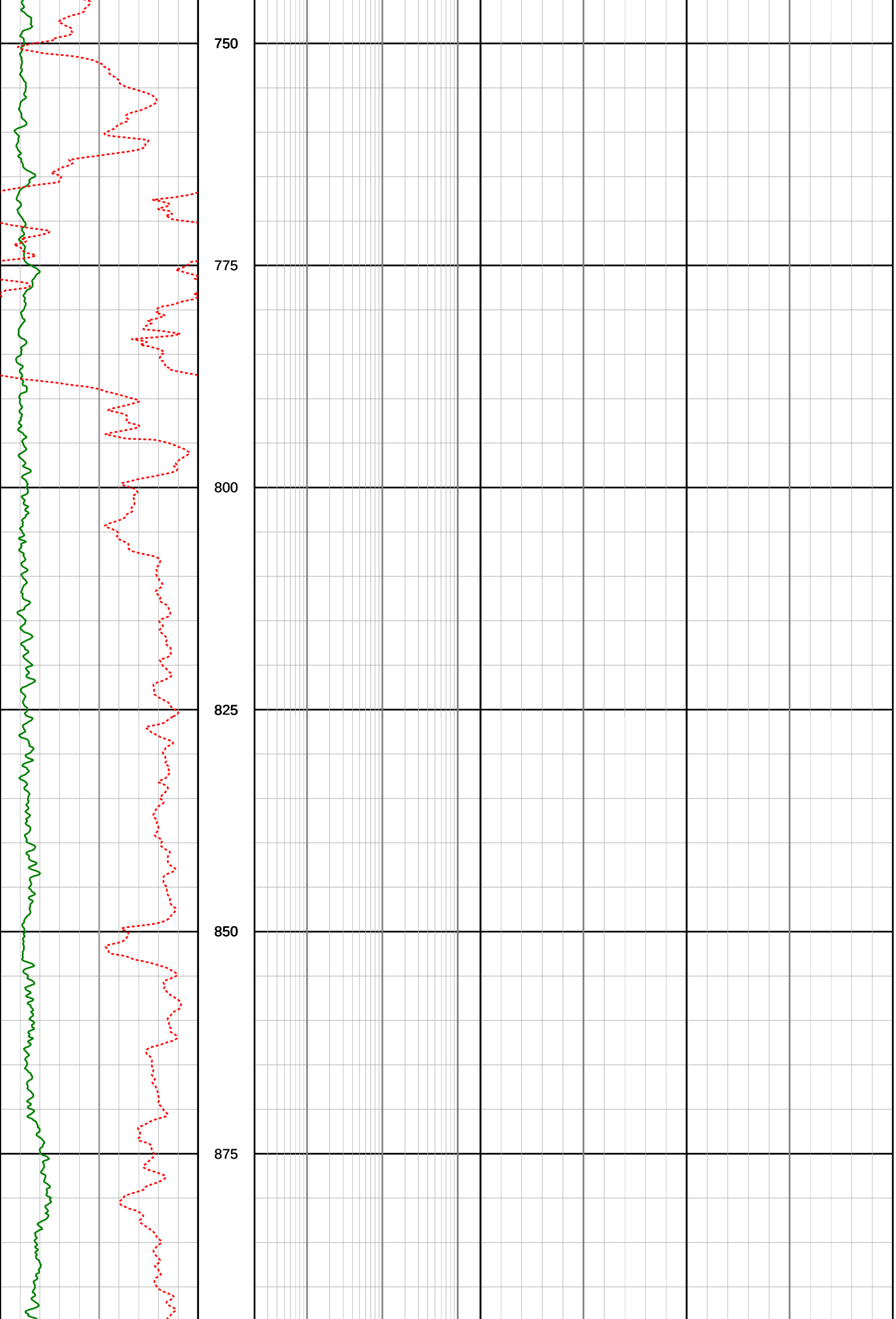
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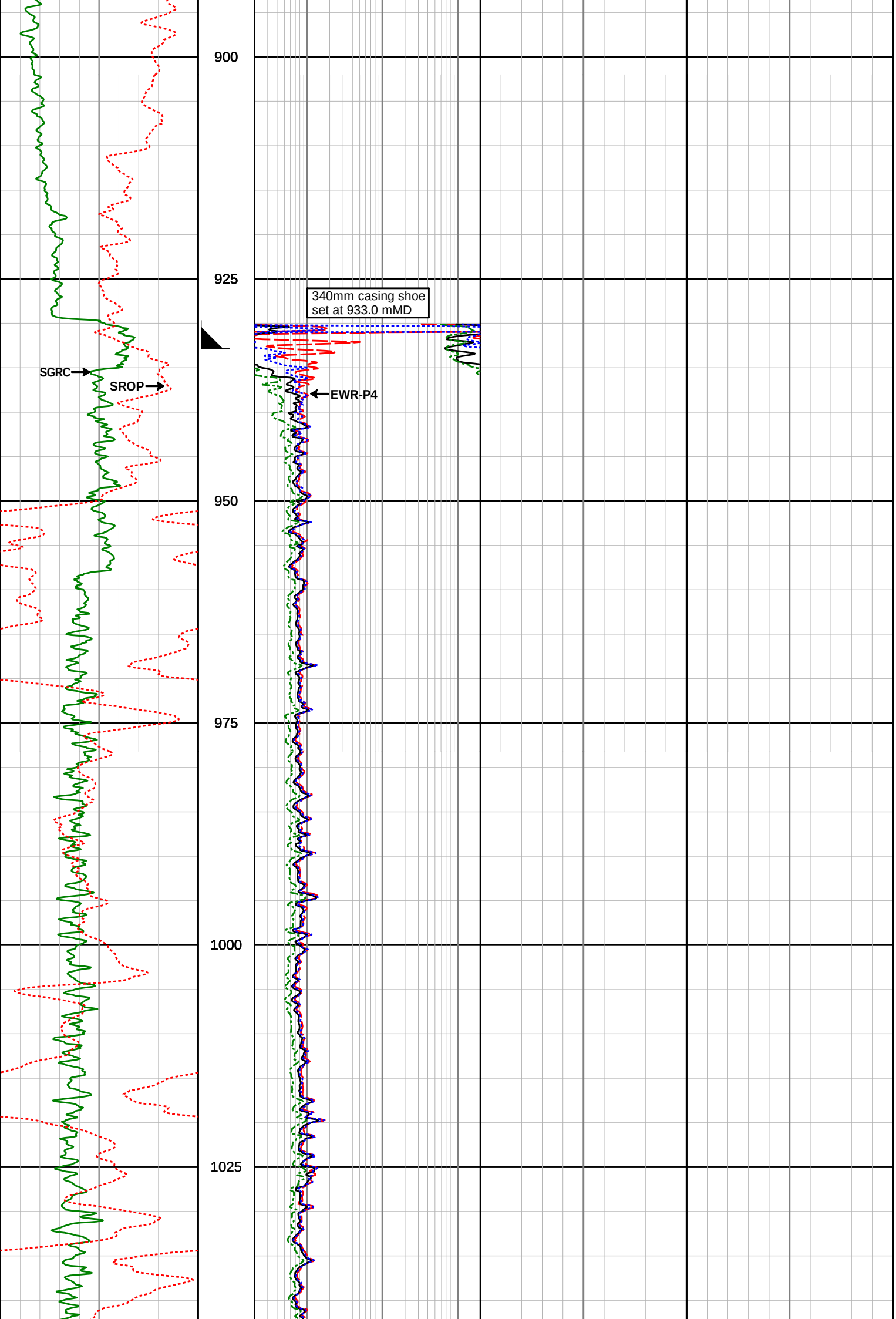
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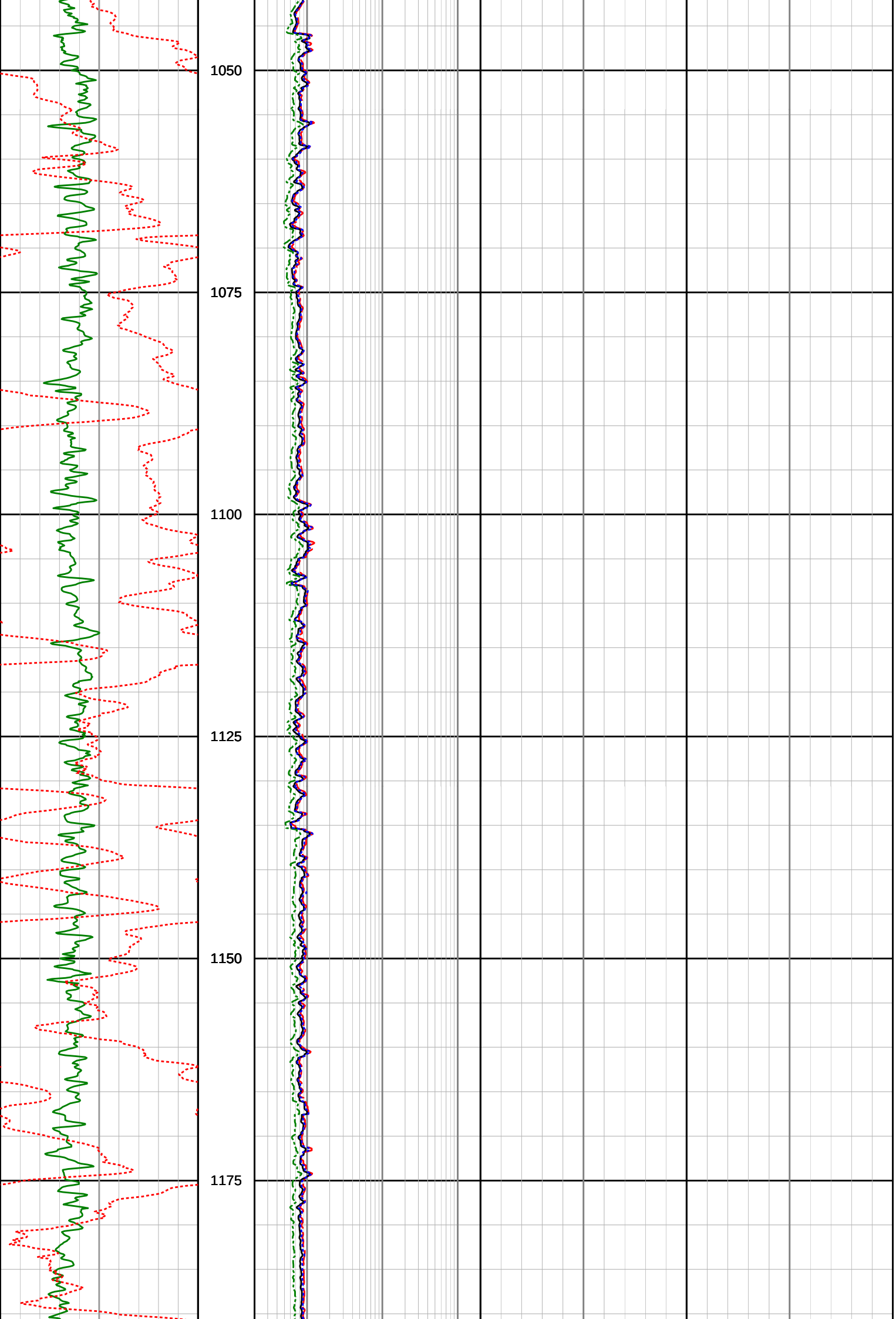
925
950
975
1000
1025
340mm casing shoe
set at 933.0 mMD
SGRC
SROP
EWR-P4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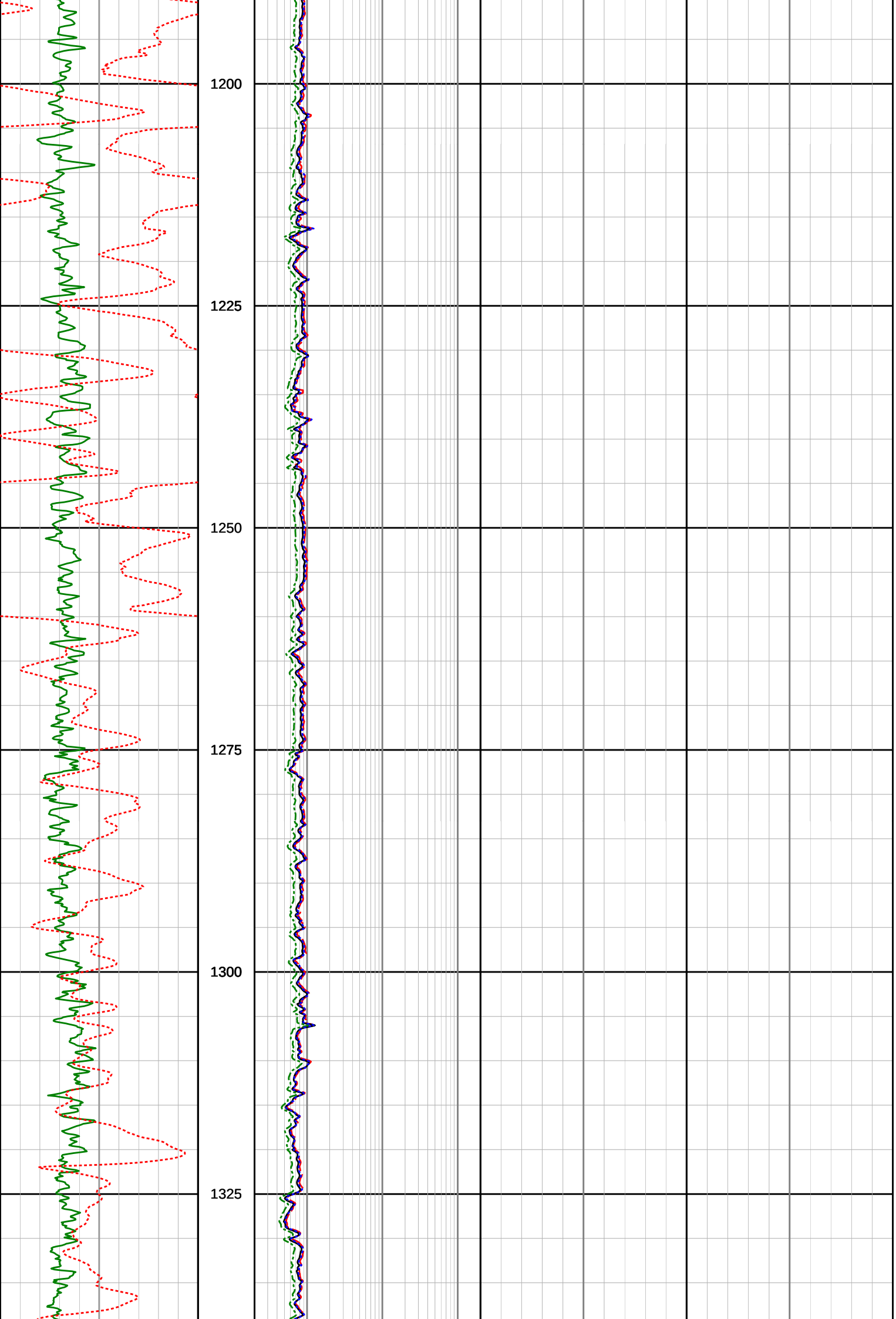
1075
1100
1125
1150
1175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1250
1275
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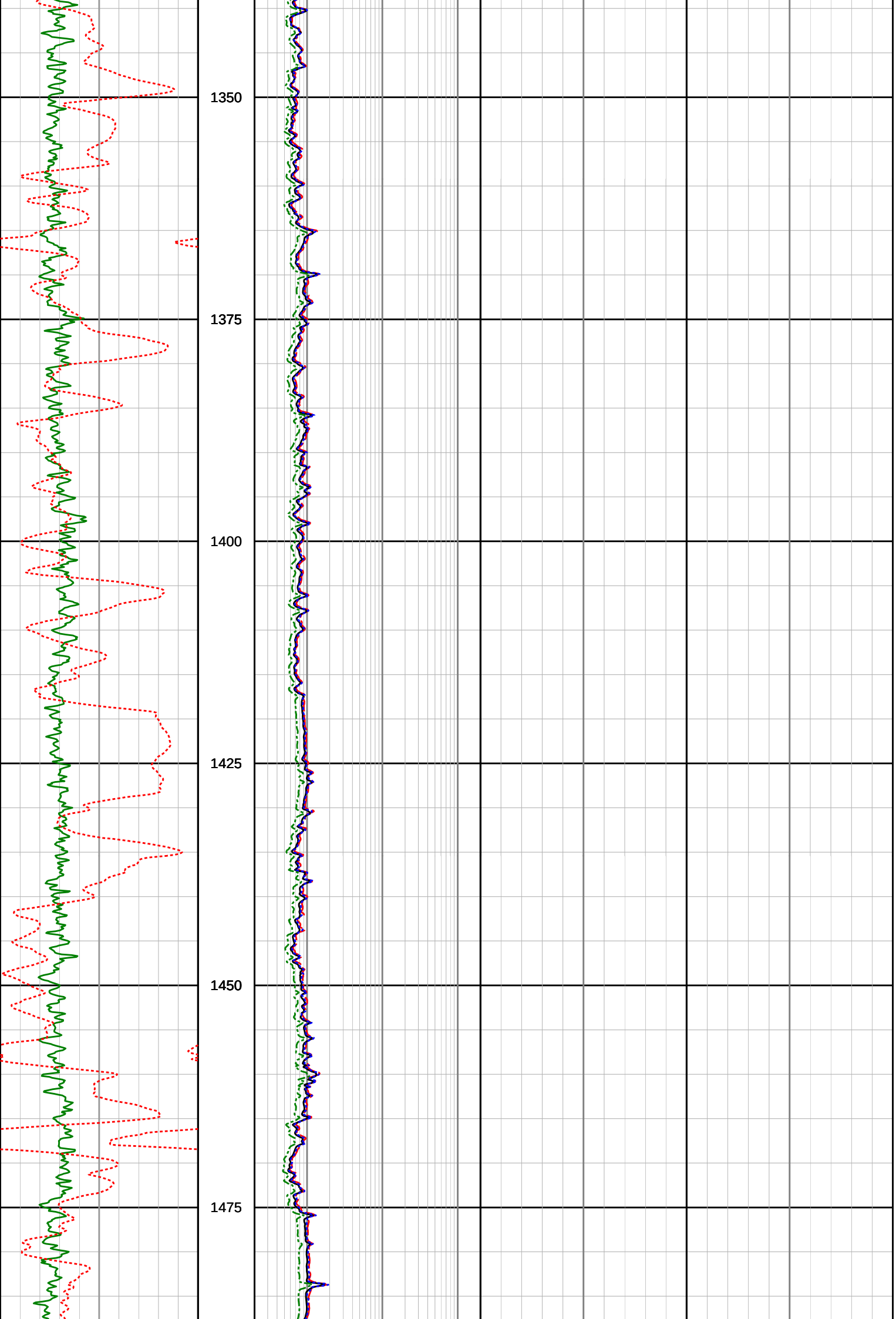
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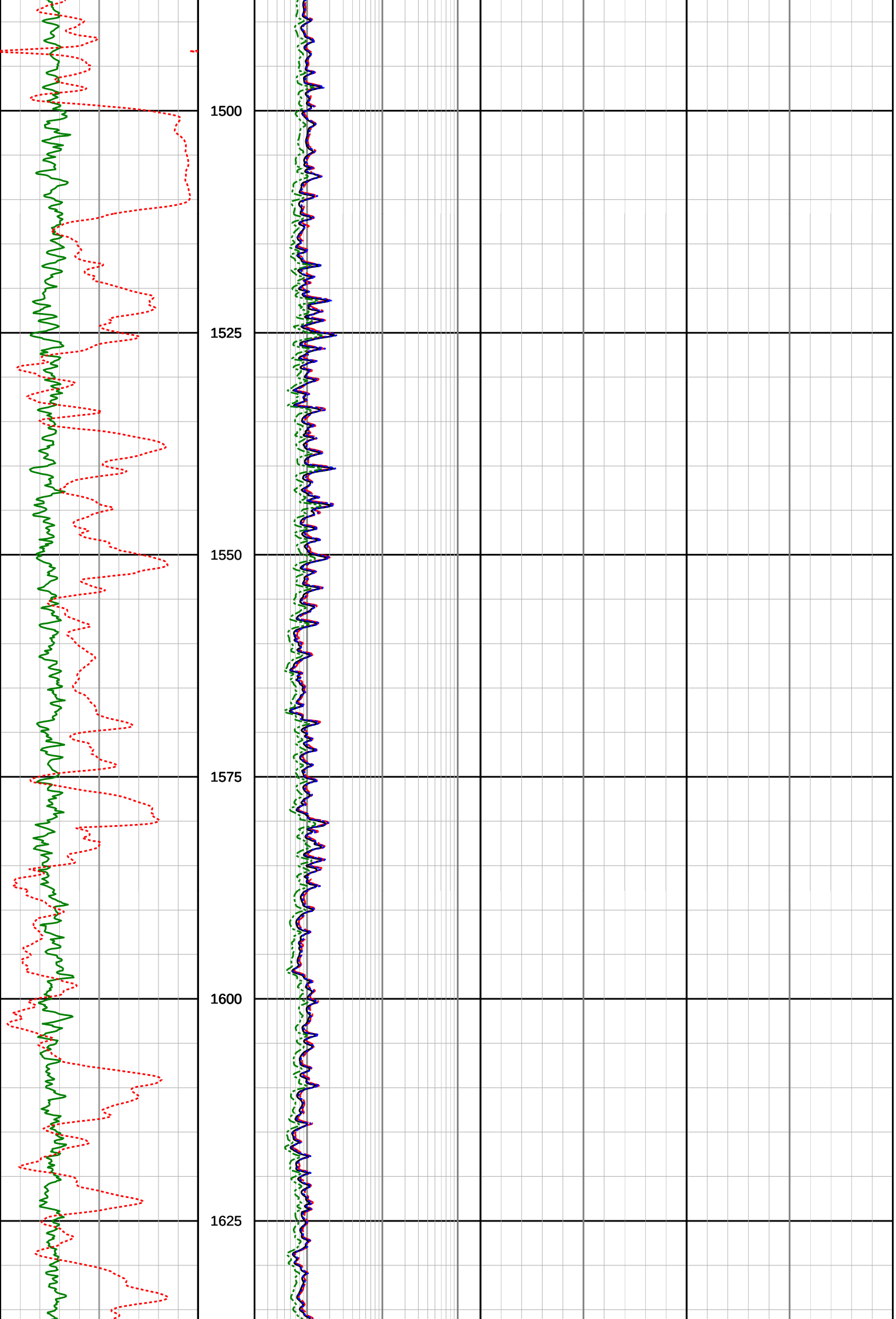
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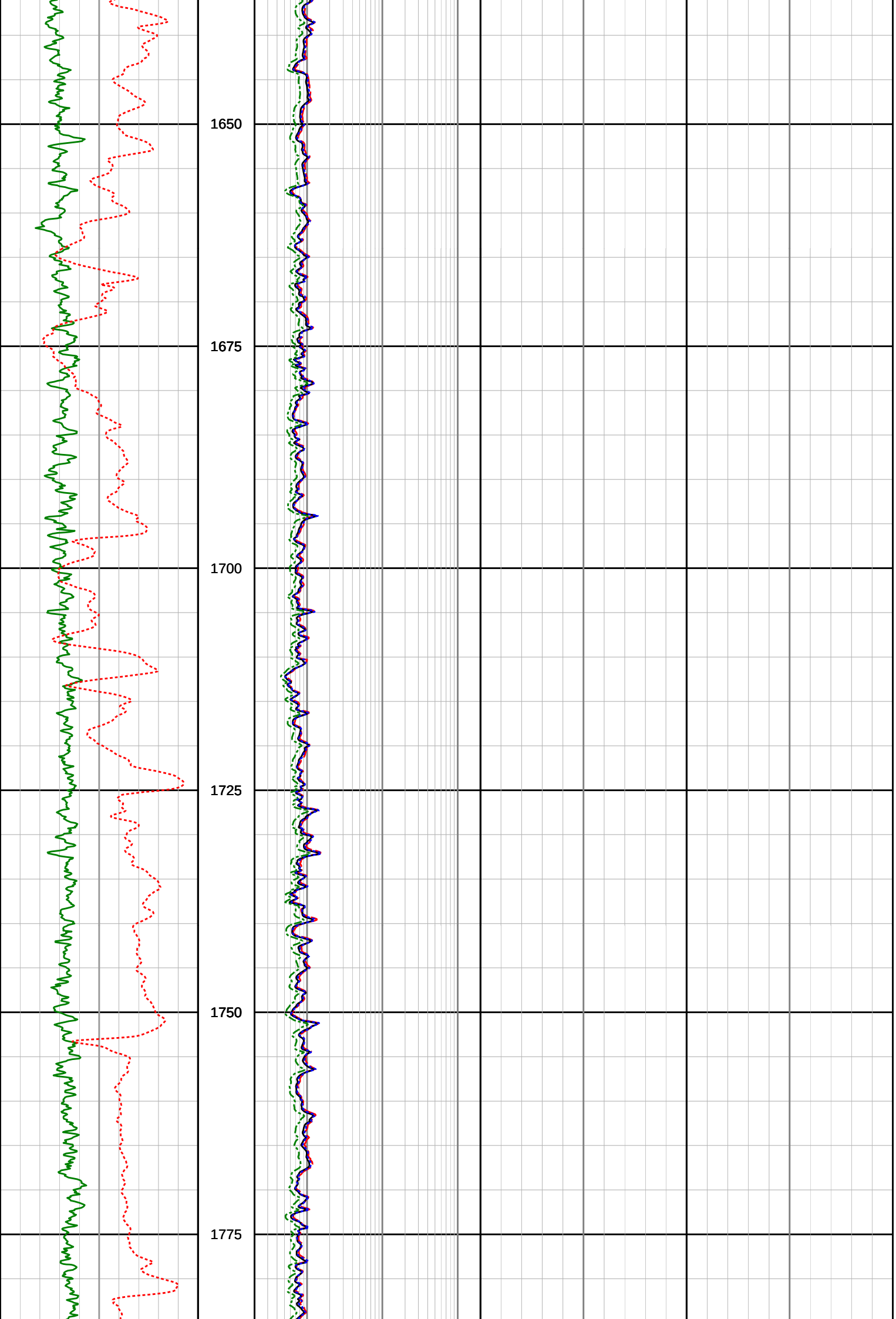
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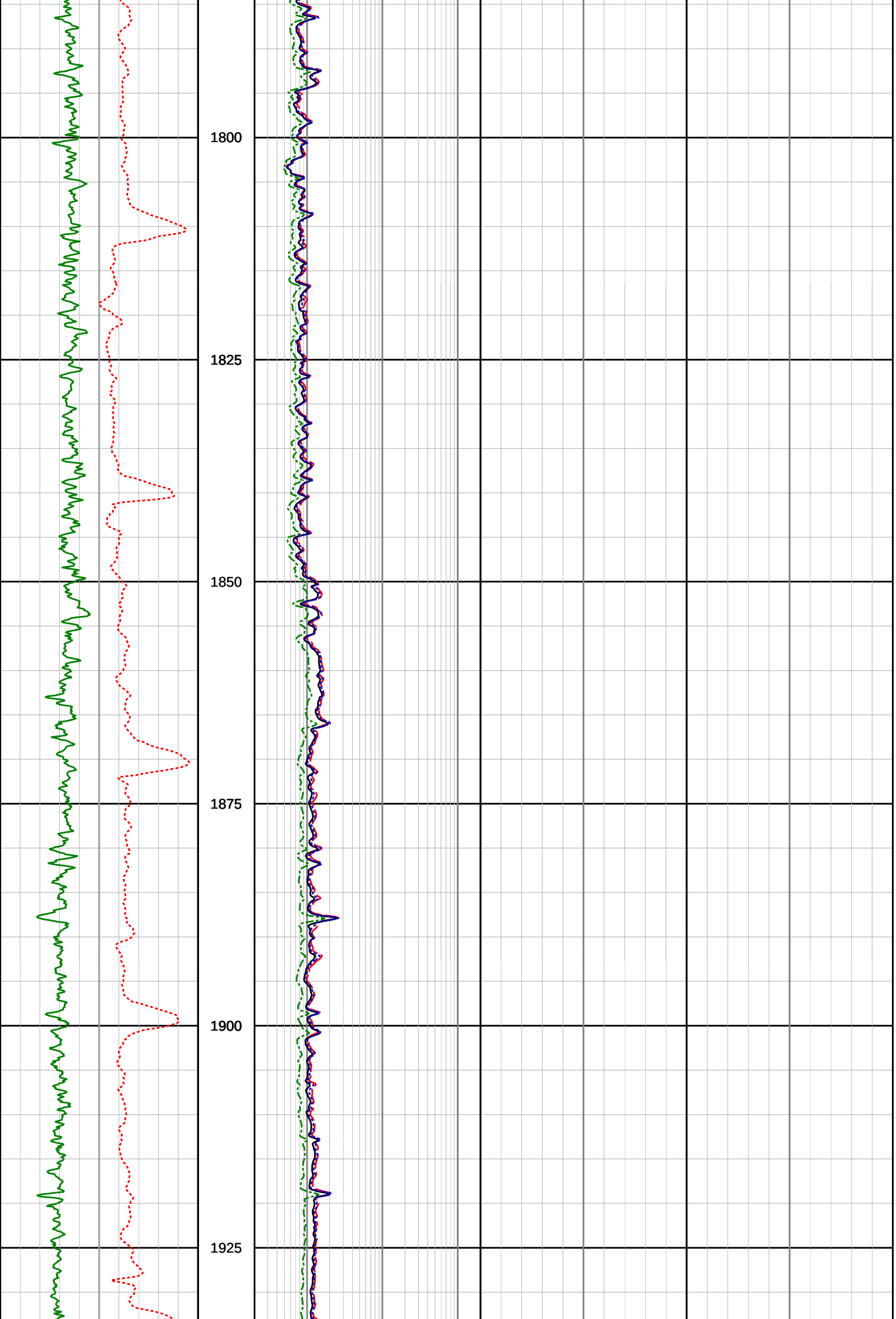
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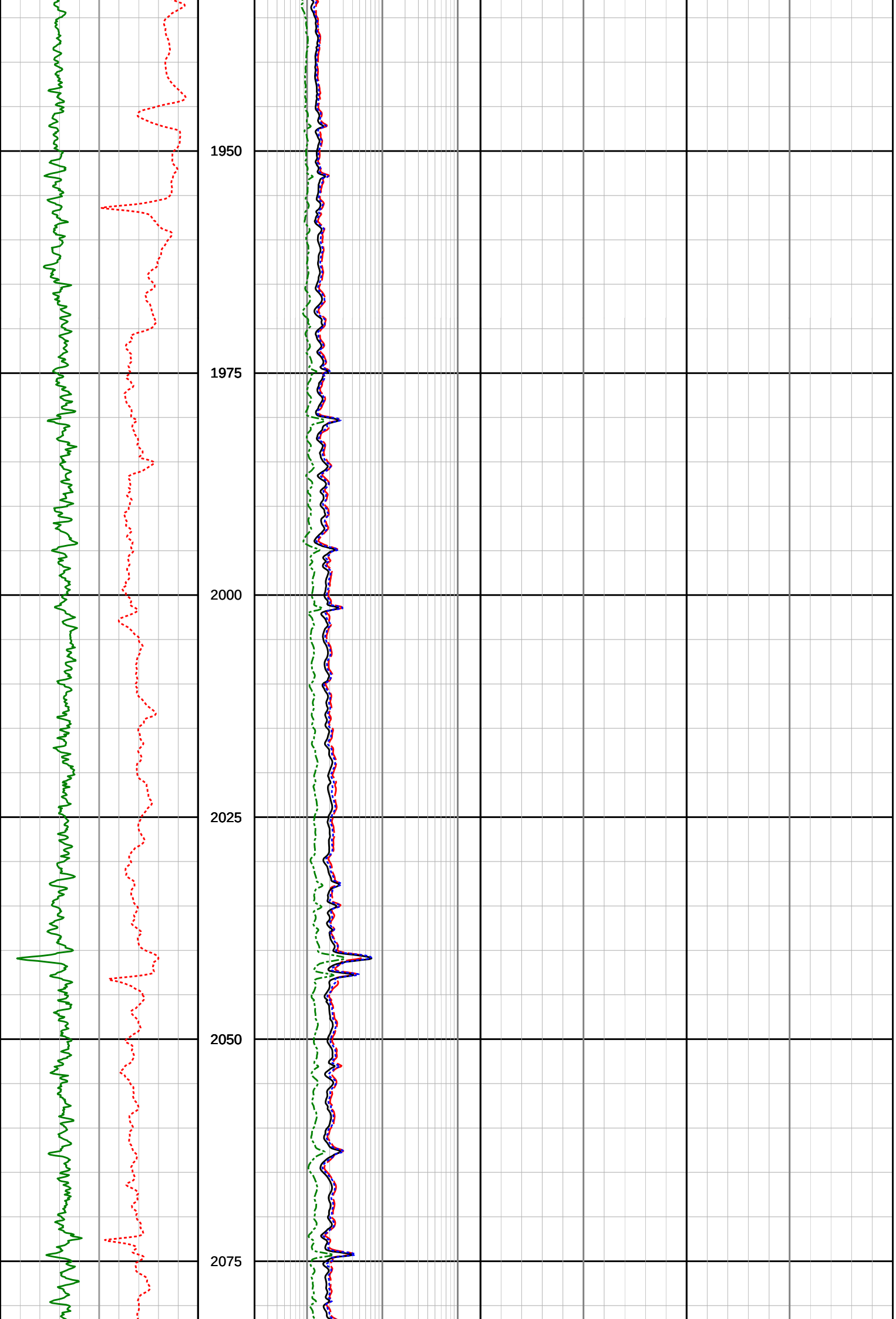
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2050
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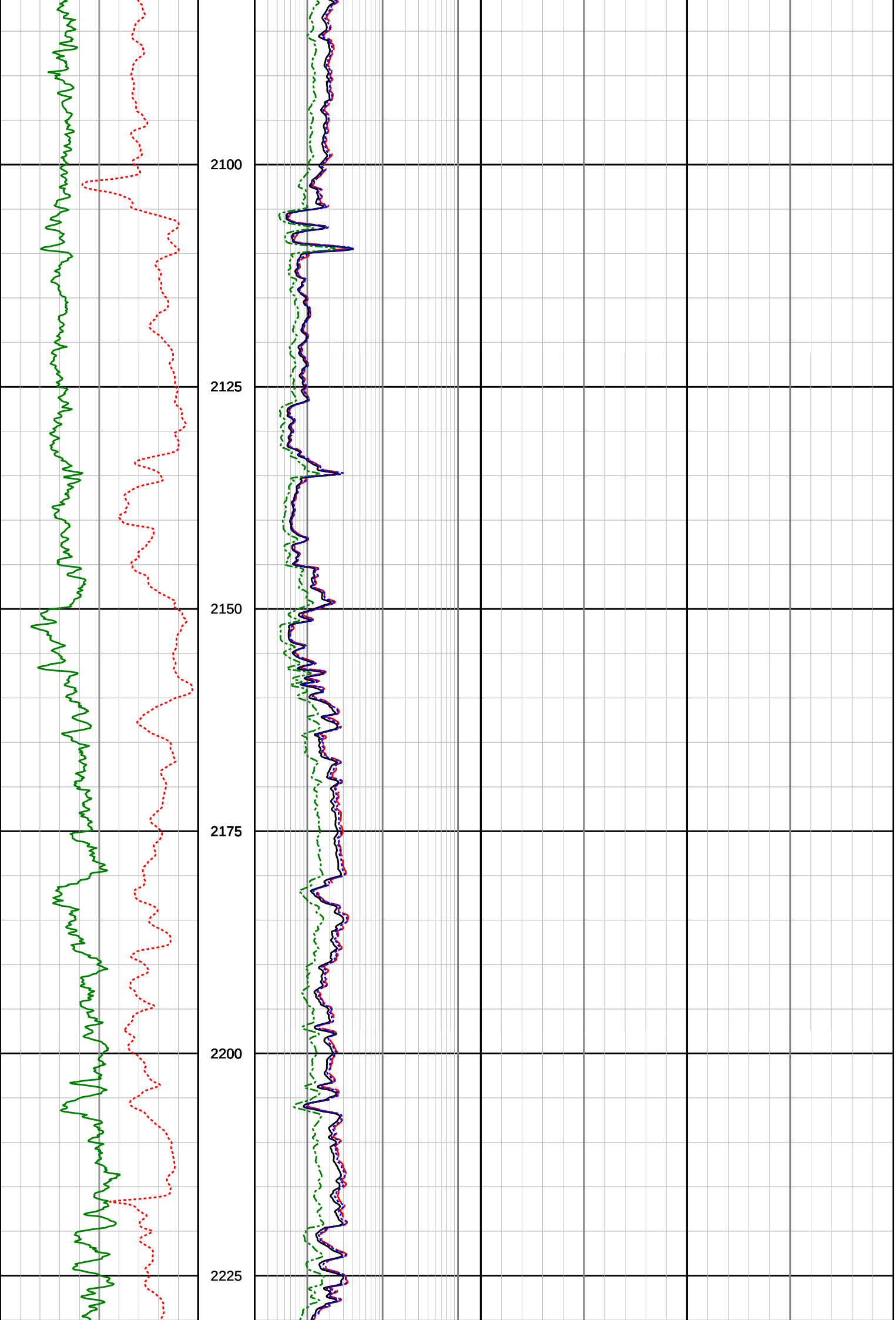
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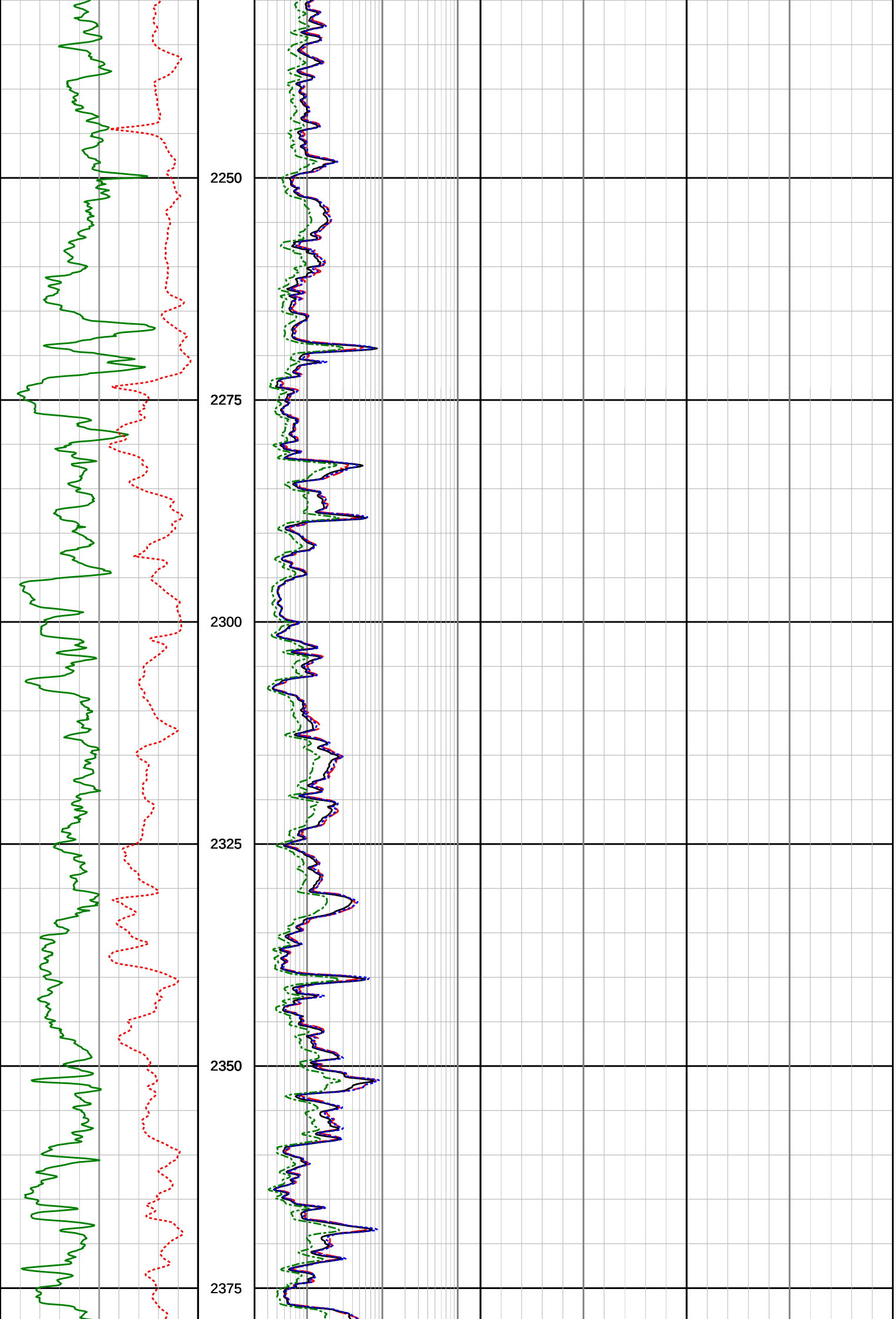
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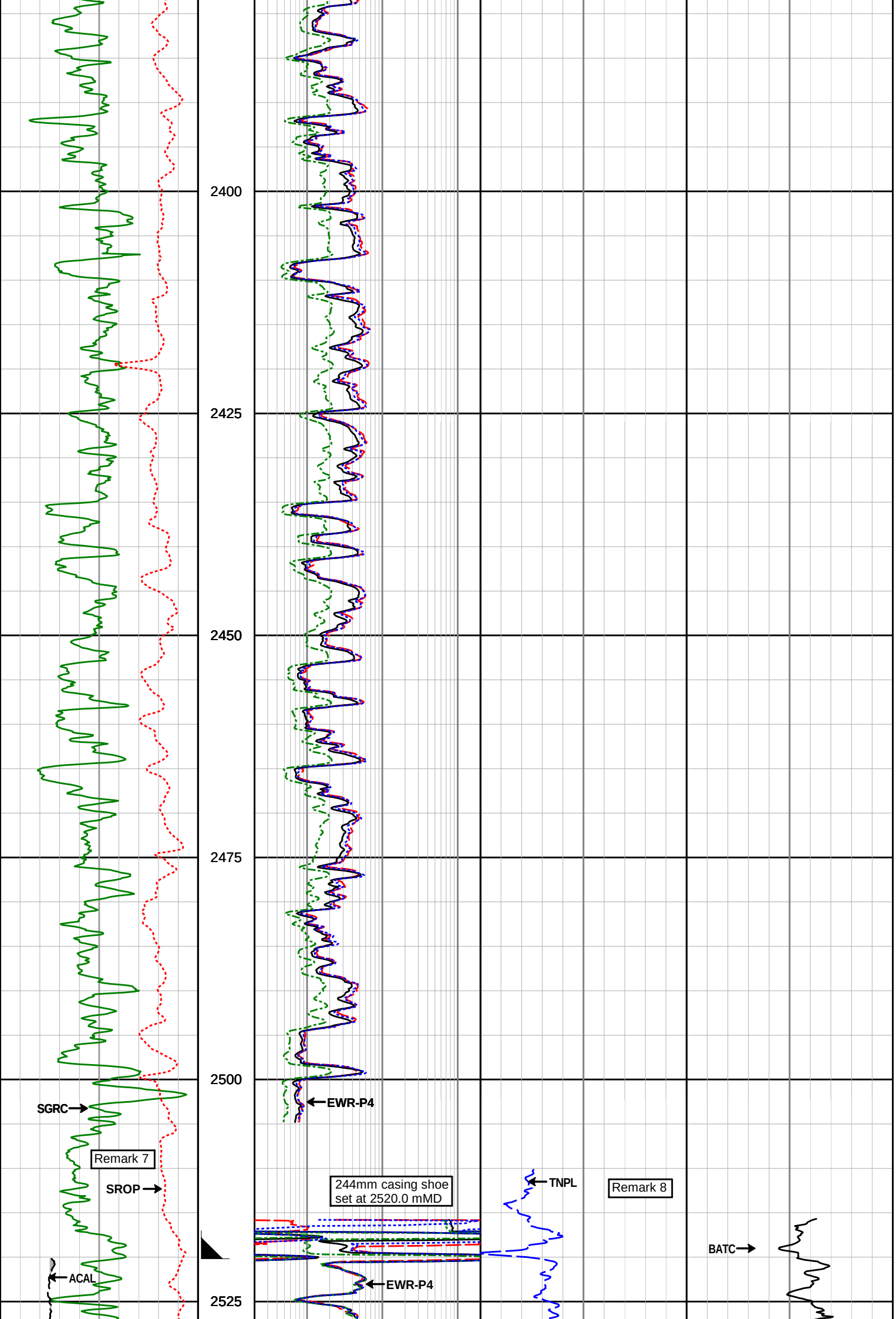
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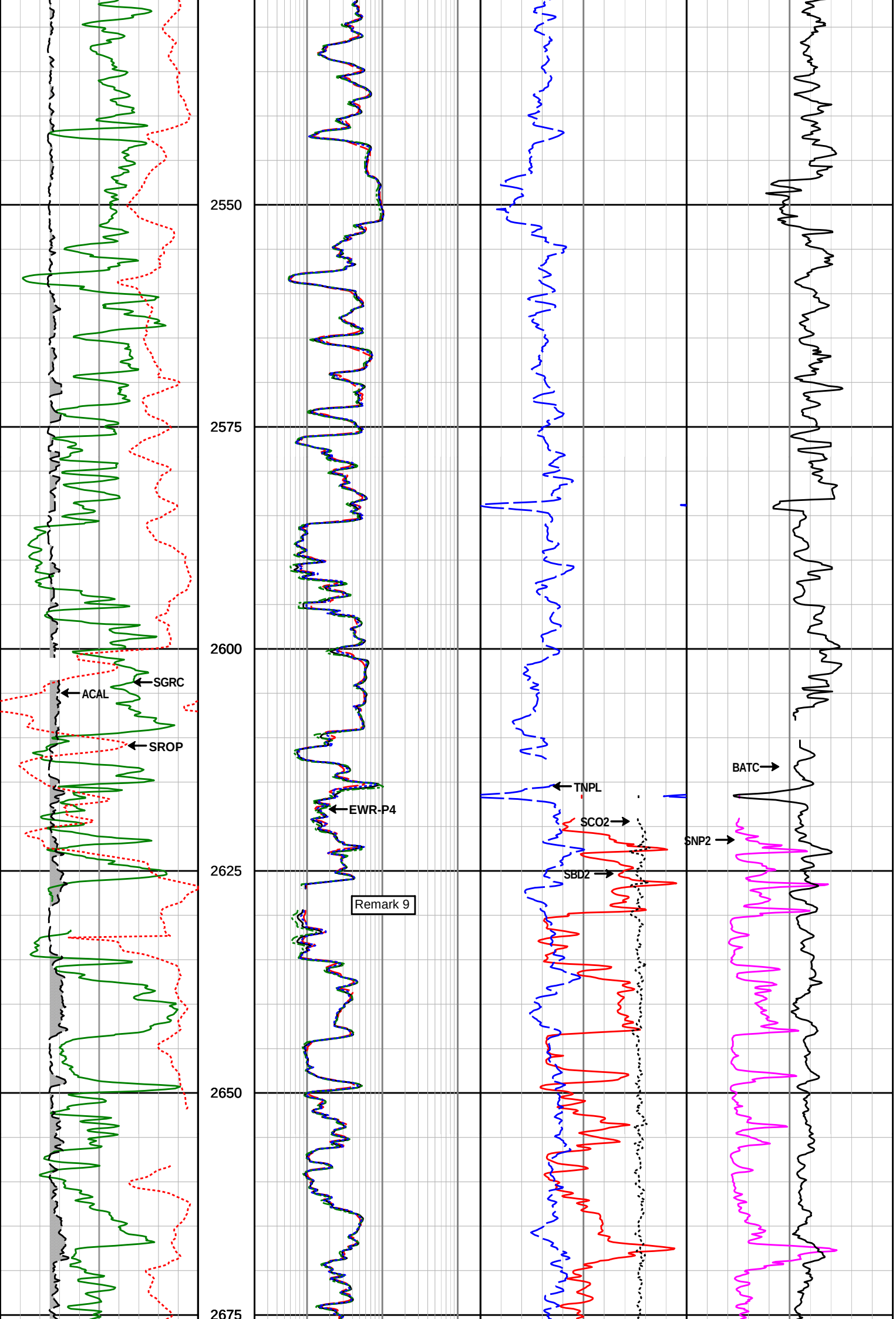
2425
2450
2475
2500
2525
SGRC
Remark 7
SROP
ACAL
EWR-P4
244mm casing shoe
set at 2520.0 mMD
EWR-P4
TNPL
Remark 8
BATC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SNP2
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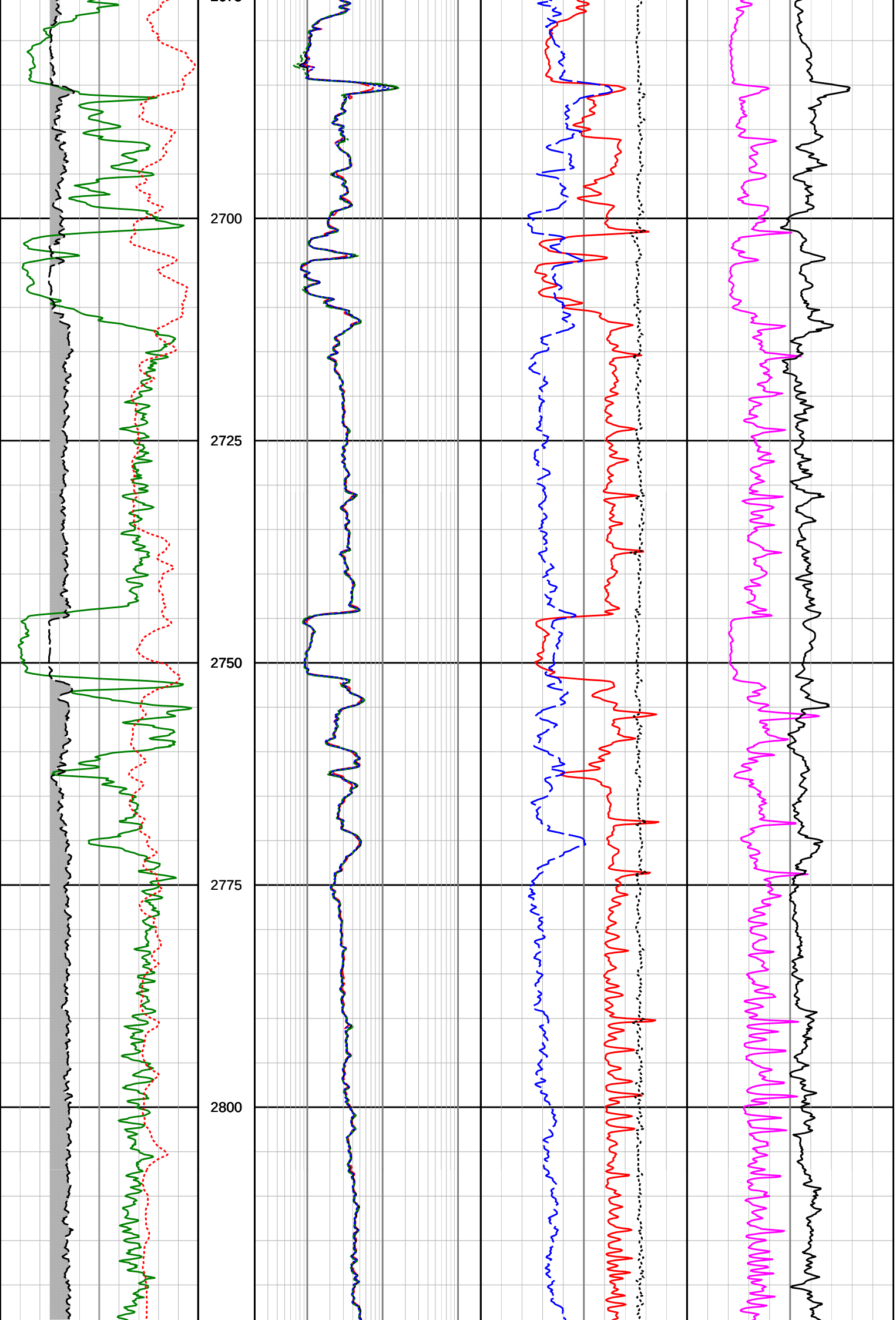
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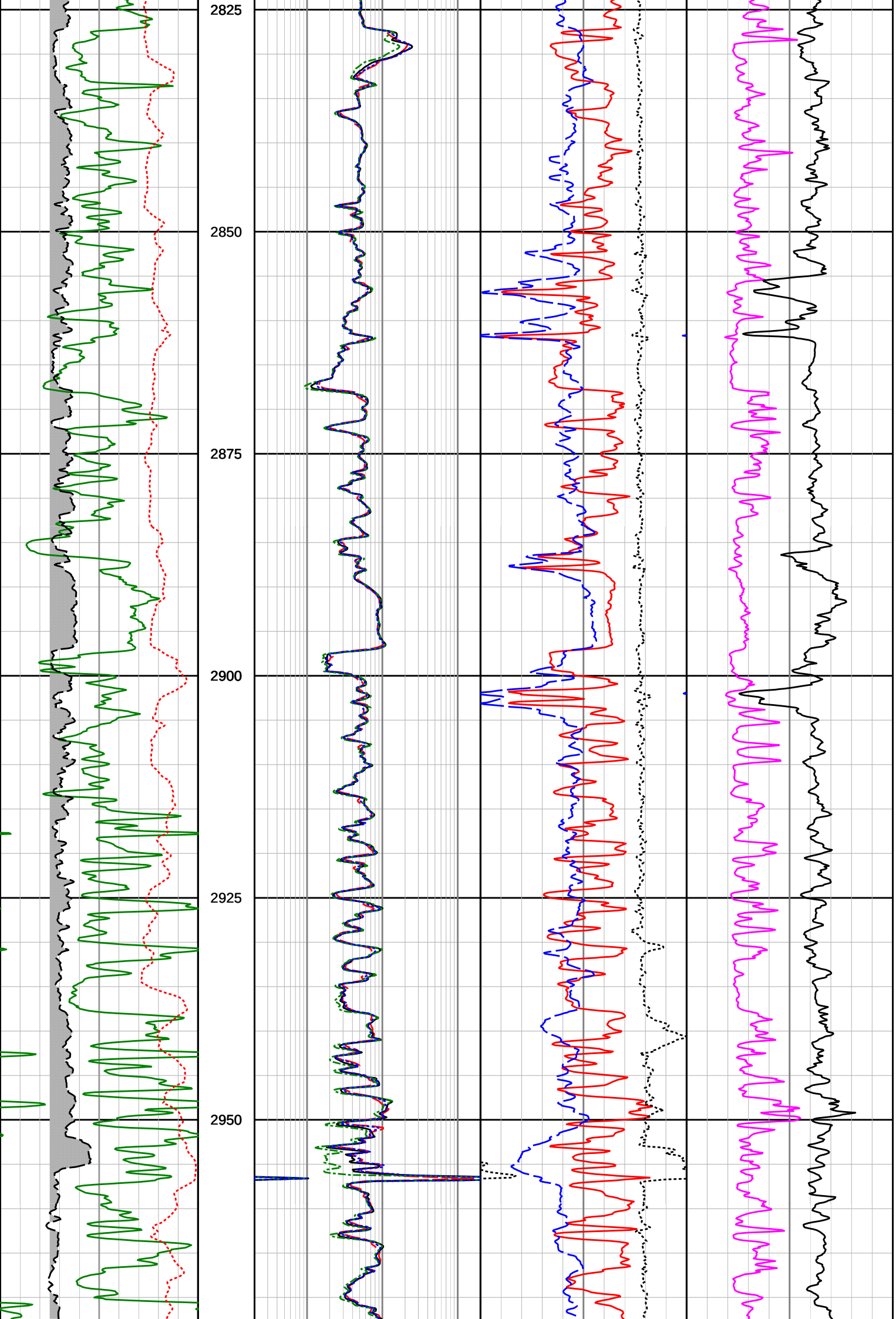
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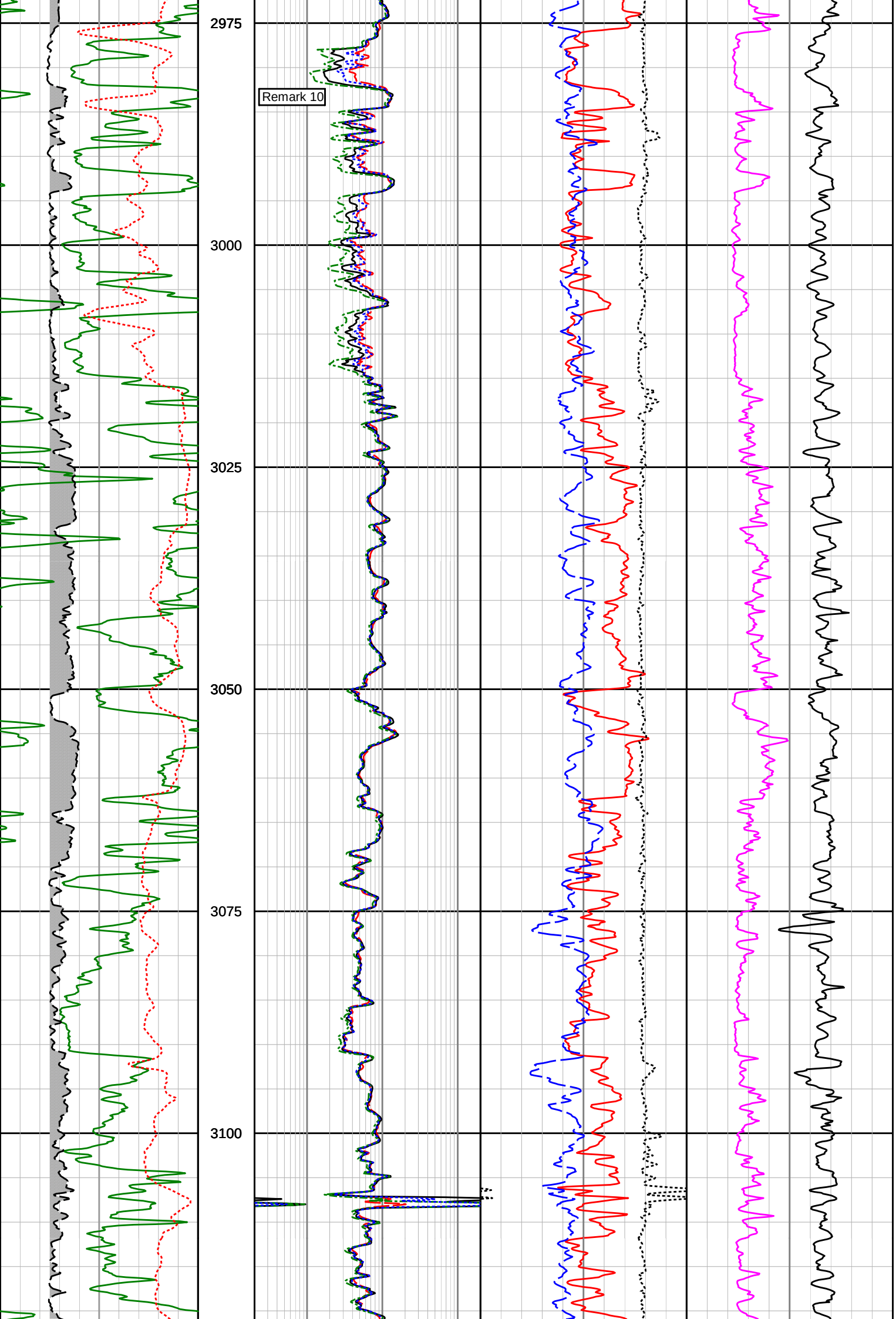
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3075
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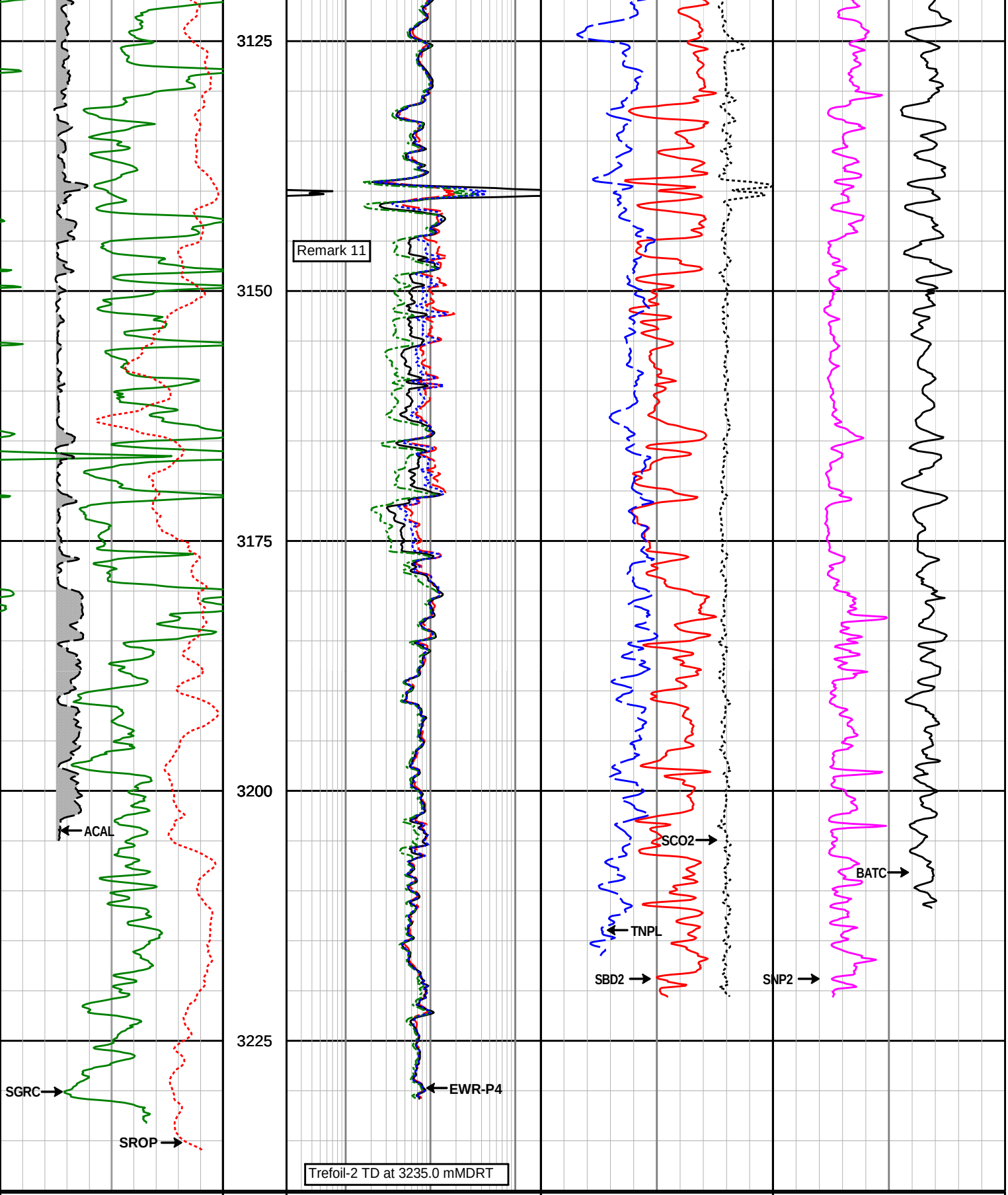


Gamma Ray (SGRC)	Depth	X-Shallow Phase Res (SEXP)	Neutron Porosity (TNPL)	Photoelectric Effect (SNP2)
0 — 200	MD	0.2 — 200	0.45 — -0.15	0 — 10
api	1 : 500	ohmm	v/v	b/e
Rate of Penetration (SROP)		**Shallow Phase Res (SESP)**	**Best Bin Bulk Density (SBD2)**	**Comp Slowness (BATC)**
100 — 0		0.2 — 200	1.95 — 2.95	140 — 40
m/hr		ohmm	g/cc	uspf
Acoustic Caliper (ACAL)		**Medium Phase Res (SEMP)**	**Best Bin Delta Rho (SCO2)**	
6 — 16		0.2 — 200	-0.75 — 0.25	
inches		ohmm	g/cc	

Deep Phase Res

(SEDP)

0.2 200

ohmm

DIRECTIONAL SURVEY REPORT

Origin Energy Resources Ltd
Trefoil-2
Trefoil
Tasmania
Australia
AU-FE-000671414
UTM Zone 55S, GDA 1994
RT-MSL = 26.0m

Measured Depth (metres)	*Inclination (degrees)*	*Direction (degrees)*	*Vertical Depth (metres)*	*Latitude (metres)*	*Departure (metres)*	*Vertical Section (metres)*	*Dogleg (deg/30m)*
0.000	0.00	0.00	0.000	0.000 N	0.000 E	0.000	TIE-IN
95.000	0.00	0.00	95.000	0.000 N	0.000 E	0.000	0.00
204.920	0.58	282.17	204.920	0.120 N	0.540 W	-0.520	0.16
289.500	0.55	277.88	289.490	0.260 N	1.360 W	-1.280	0.02
376.490	0.32	238.01	376.480	0.190 N	1.980 W	-1.760	0.13
435.080	0.35	232.40	435.070	0.000 N	2.260 W	-1.890	0.02
521.950	0.72	199.02	521.940	0.680 S	2.650 W	-1.830	0.16
547.830	0.73	193.58	547.810	1.000 S	2.740 W	-1.740	0.08
579.000	0.69	195.91	578.980	1.370 S	2.840 W	-1.610	0.05
665.440	0.36	203.20	665.420	2.120 S	3.090 W	-1.410	0.12
782.280	0.67	192.10	782.250	3.120 S	3.380 W	-1.090	0.08
812.120	0.66	196.82	812.090	3.460 S	3.470 W	-0.980	0.06
868.190	0.30	224.95	868.160	3.870 S	3.660 W	-0.920	0.22
896.770	1.03	195.99	896.740	4.170 S	3.790 W	-0.850	0.82
925.970	0.71	183.94	925.930	4.610 S	3.870 W	-0.680	0.38
952.440	0.80	188.49	952.400	4.950 S	3.910 W	-0.530	0.12
981.350	0.74	192.99	981.310	5.330 S	3.980 W	-0.370	0.09
1010.200	0.83	198.72	1010.160	5.710 S	4.090 W	-0.260	0.12
1067.210	0.87	190.96	1067.160	6.530 S	4.310 W	0.020	0.06
1095.870	0.84	194.49	1095.820	6.950 S	4.400 W	0.170	0.06
1153.510	1.11	191.81	1153.450	7.900 S	4.620 W	0.510	0.14
1182.360	1.27	187.06	1182.290	8.490 S	4.720 W	0.760	0.20
1211.300	0.97	182.63	1211.230	9.060 S	4.770 W	1.030	0.32
1240.320	1.00	184.76	1240.240	9.550 S	4.800 W	1.270	0.05
1269.440	0.96	179.68	1269.360	10.050 S	4.820 W	1.530	0.10
1298.710	1.13	178.12	1298.620	10.580 S	4.810 W	1.840	0.18
1327.950	1.27	184.82	1327.860	11.200 S	4.830 W	2.160	0.20
1357.120	1.31	184.97	1357.020	11.850 S	4.880 W	2.470	0.04
1385.950	1.43	187.08	1385.840	12.530 S	4.950 W	2.790	0.14
1414.800	1.33	186.15	1414.680	13.220 S	5.030 W	3.110	0.11
1443.260	1.42	189.23	1443.140	13.900 S	5.130 W	3.400	0.12
1471.760	1.41	188.55	1471.630	14.600 S	5.240 W	3.700	0.02
1500.560	1.44	186.77	1500.420	15.310 S	5.330 W	4.010	0.06
1529.740	1.02	177.87	1529.590	15.930 S	5.360 W	4.320	0.47
1559.000	1.11	183.32	1558.850	16.470 S	5.370 W	4.620	0.14
1588.150	1.05	181.86	1587.990	17.020 S	5.400 W	4.900	0.07
1617.270	1.14	175.03	1617.110	17.580 S	5.380 W	5.220	0.16
1646.320	1.17	184.16	1646.150	18.160 S	5.380 W	5.550	0.19
1675.150	1.31	182.99	1674.970	18.780 S	5.410 W	5.860	0.15
1703.610	1.02	183.90	1703.430	19.360 S	5.450 W	6.150	0.31
1731.980	1.12	176.27	1731.790	19.890 S	5.450 W	6.440	0.18
1760.710	1.20	179.48	1760.520	20.470 S	5.430 W	6.780	0.11
1790.080	1.13	181.99	1789.880	21.070 S	5.430 W	7.100	0.09
1819.450	1.17	182.73	1819.240	21.660 S	5.460 W	7.410	0.04
1848.520	1.17	190.32	1848.310	22.250 S	5.530 W	7.680	0.16
1877.800	1.13	190.92	1877.580	22.820 S	5.630 W	7.910	0.04
1906.650	1.23	192.98	1906.430	23.400 S	5.760 W	8.120	0.11
1934.670	1.08	194.42	1934.440	23.950 S	5.890 W	8.320	0.16
1963.220	0.48	64.50	1962.990	24.160 S	5.850 W	8.470	1.51
1992.330	0.56	59.70	1992.100	24.040 S	5.620 W	8.590	0.09
2021.460	0.59	61.98	2021.230	23.900 S	5.360 W	8.730	0.04

2050.740	0.64	78.76	2050.500	23.790 S	5.070 W	8.910	0.19
2080.190	0.61	81.26	2079.950	23.740 S	4.750 W	9.150	0.04
2102.200	0.68	80.27	2101.960	23.700 S	4.510 W	9.330	0.10
2138.040	0.69	75.36	2137.800	23.610 S	4.090 W	9.630	0.05
2195.190	0.63	82.85	2194.940	23.480 S	3.440 W	10.090	0.06
2253.190	0.62	89.29	2252.940	23.440 S	2.810 W	10.600	0.04
2281.350	0.84	88.95	2281.100	23.430 S	2.460 W	10.890	0.23
2310.290	0.91	90.74	2310.040	23.430 S	2.010 W	11.260	0.08
2339.670	0.80	84.68	2339.410	23.410 S	1.580 W	11.620	0.15
2398.220	0.81	98.78	2397.960	23.440 S	0.760 W	12.310	0.10
2426.570	1.08	93.16	2426.300	23.480 S	0.300 W	12.720	0.30
2454.950	0.96	91.77	2454.680	23.510 S	0.210 E	13.160	0.13
2484.550	1.06	89.94	2484.270	23.510 S	0.730 E	13.590	0.11
2524.750	1.00	97.22	2524.470	23.560 S	1.450 E	14.220	0.11
2557.550	1.13	91.00	2557.260	23.600 S	2.060 E	14.750	0.16
2588.200	1.30	90.35	2587.900	23.610 S	2.710 E	15.290	0.17
2646.630	1.43	86.39	2646.320	23.560 S	4.100 E	16.430	0.08
2674.000	1.51	91.33	2673.680	23.550 S	4.800 E	17.010	0.16
2702.980	1.62	88.34	2702.650	23.550 S	5.590 E	17.670	0.14
2732.910	1.69	88.47	2732.570	23.520 S	6.450 E	18.370	0.07
2762.560	1.85	89.89	2762.200	23.510 S	7.370 E	19.130	0.17
2791.490	1.82	85.29	2791.120	23.470 S	8.300 E	19.880	0.16
2819.890	1.94	85.21	2819.500	23.400 S	9.220 E	20.610	0.13
2847.720	2.06	83.71	2847.310	23.300 S	10.190 E	21.360	0.14
2876.190	2.24	81.90	2875.760	23.170 S	11.250 E	22.170	0.20
2905.640	2.46	85.79	2905.190	23.040 S	12.450 E	23.100	0.28
2935.670	2.58	82.74	2935.190	22.910 S	13.760 E	24.120	0.18
2963.220	2.93	85.15	2962.710	22.770 S	15.080 E	25.150	0.40
2992.320	2.88	83.61	2991.770	22.630 S	16.550 E	26.290	0.10
3021.530	3.01	83.20	3020.940	22.450 S	18.040 E	27.440	0.14
3051.620	3.07	82.21	3050.990	22.250 S	19.620 E	28.640	0.08
3080.660	3.23	81.34	3079.990	22.020 S	21.200 E	29.840	0.17
3101.980	3.47	82.50	3101.270	21.850 S	22.430 E	30.770	0.35
3130.210	3.75	81.59	3129.440	21.600 S	24.190 E	32.100	0.30
3167.650	3.79	84.07	3166.800	21.290 S	26.640 E	33.960	0.13
3194.790	3.87	83.32	3193.880	21.090 S	28.440 E	35.360	0.10
3223.600	4.33	83.41	3222.620	20.860 S	30.480 E	36.930	0.48
3235.000	4.33	83.41	3233.990	20.760 S	31.340 E	37.590	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A CLOSURE OF 123.52 DEGREES (GRID)
A TOTAL CORRECTION OF 11.45 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 3235.000 METRES
IS 37.592 METRES ALONG 123.52 DEGREES (GRID)

Final Survey Projected to TD.

Date Printed:09 December 2009

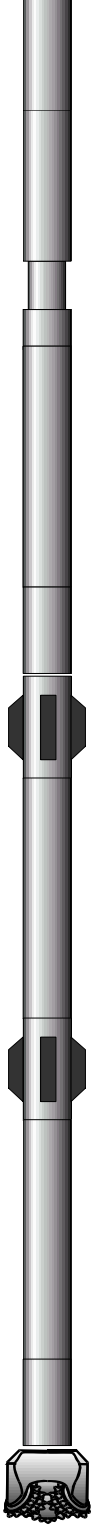
MWD RUN 100 - BHA

	Component Length (m)	Cumulative Length (m)
		244.52
Heavy Weight	113.220	
		131.30
X-Over Sub	1.090	
		130.21
Drill Collar	75.330	

MWD RUN 100 - MWD

Positive Pulser

Sensor Measure Point Distance To Bit (m)



Jar	9.680	54.88
Drill Collar	18.630	45.20
X-Over Sub	1.130	26.57
Stabilizer	2.050	25.44
Spiral Drill Collar	9.450	23.39
Stabilizer	2.510	13.94
MWD	9.770	11.43
Bit Sub	1.220	1.66
Tricone	.440	0.44

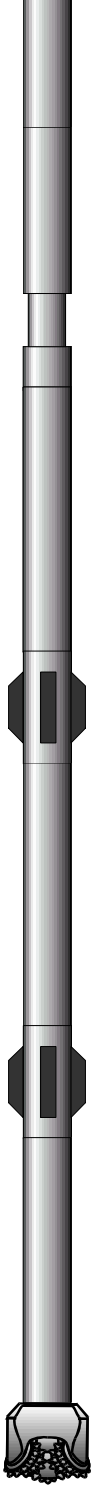
PCM Sonde		
PCDC Sonde		7.760
PCG Sonde		5.621

MWD RUN 200 - BHA

	Component Length (m)	Cumulative Length (m)
Heavy Weight	141.540	252.71
X-Over Sub	1.090	111.17
Spiral Drill Collar	18.630	110.08

MWD RUN 200 - MWD

	Sensor Measure Point Distance To Bit (m)
Positive Pulser	
PCM Sonde	



Jar
9.680
91.45

Spiral Drill Collar
56.430
81.77

Integral Blade
1.880
25.34

MWD
12.08
23.46

Integral Blade
1.860
11.38

Mud Motor
9.220
9.52

PDC
.300
0.30

PCDC Sonde
19.760

HCIM Insert

EWR-P4 Insert
14.810

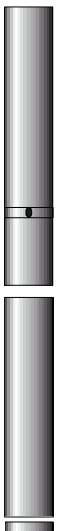
DDS Insert

DGR Insert
12.340

MWD RUN 300 - BHA

MWD RUN 300 - MWD

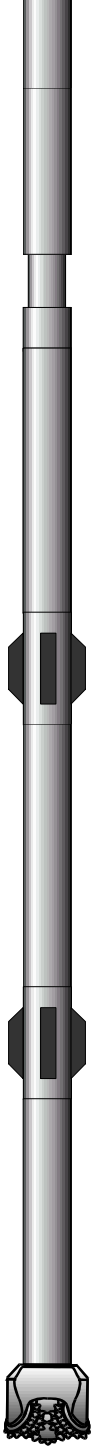
	Component Length (m)	Cumulative Length (m)
Heavy Weight	141.540	252.71
X-Over Sub	1.090	111.17
Spiral Drill Collar	18.630	110.08



Positive Pulser

PCM Sonde

Sensor Measure Point Distance To Bit (m)

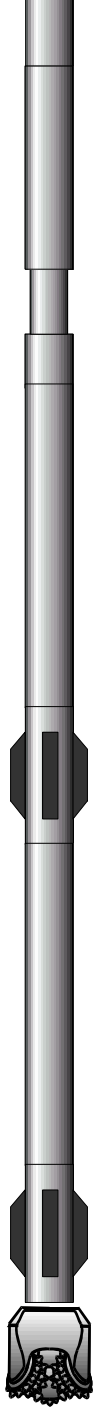


MWD RUN 400 - BHA

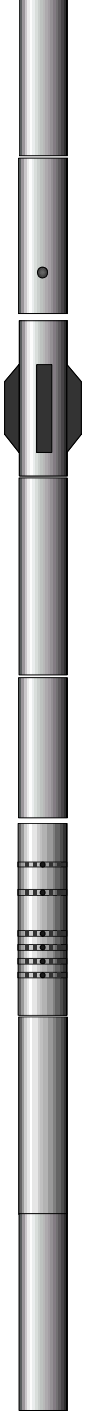
MWD RUN 400 - MWD

	Component Length (m)	Cumulative Length (m)
Heavy Weight	141.130	282.54
Drill Collar	28.210	141.41

	Sensor Measure Point Distance To Bit (m)
ACAL Insert	30.200



Jar	9.910	113.20
		103.29
Drill Collar	74.970	
		28.32
Stabilizer	1.700	
		26.62
MWD	24.84	
		1.78
Stabilizer	1.500	
		0.28
PDC	.280	



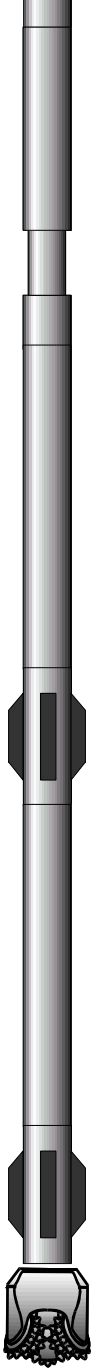
BAT Insert	23.365
CTN Insert	18.830
ALD Insert	14.845
PCDC Sonde	10.022
HCIM Insert	
EWR-P4 Insert	5.160
DGR Insert	2.806
DDSr-DGR	0

MWD RUN 500 - BHA

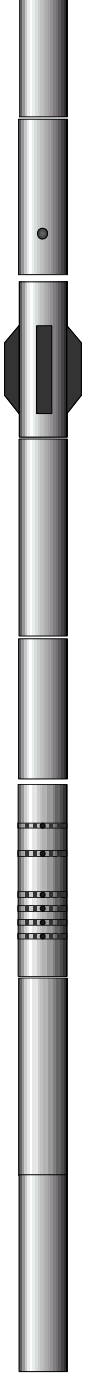
	Component Length (m)	Cumulative Length (m)
		288.37
Heavy Weight	141.130	
		147.24
Drill Collar	28.210	

MWD RUN 500 - MWD

	Sensor Measure Point Distance To Bit (m)
ACAL Insert	31.020
Positive Pulser	
PCM Sonde	
BAT Insert	



Jar	9.910	119.03
Drill Collar	74.970	109.12
Stabilizer	1.700	34.15
MWD	30.67	32.45
Stabilizer	1.500	1.78
PDC	.280	0.28



BAT Insert	24.200
CTN Insert	19.640
ALD Insert	15.590
PCDC Sonde	10.070
HCIM Insert	
EWR-P4 Insert	5.170
DGR Insert	2.830
DDSr-DGR	0

MWD RUN 600 - BHA

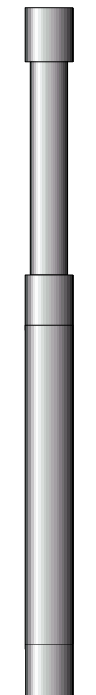
	Component Length (m)	Cumulative Length (m)
		288.37
Heavy Weight	141.130	
		147.24
Drill Collar	28.210	
		119.03

MWD RUN 600 - MWD

	Sensor Measure Point Distance To Bit (m)
ACAL Insert	31.020
Positive Pulser	
PCM Sonde	
BAT Insert	24.200

	Component Length (m)	Cumulative Length (m)
		119.03
Jar	9.910	
		109.12
Drill Collar	74.970	
		34.15
Stabilizer	1.700	
		32.45
MWD	30.67	
		1.78
Stabilizer	1.500	
		0.28
PDC	.280	

MWD RUN 700 - BHA

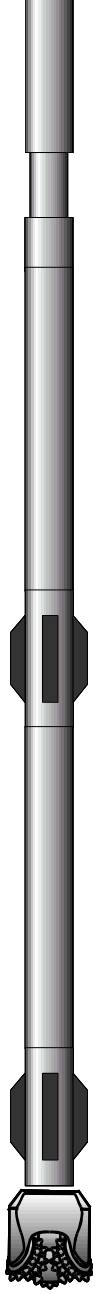


	Component Length (m)	Cumulative Length (m)
		288.37
Heavy Weight	141.130	
		147.24
Drill Collar	28.210	
		119.03

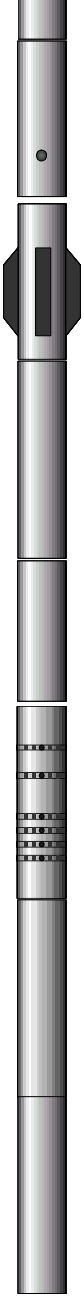
	Sensor Measure Point Distance To Bit (m)
CTN Insert	19.640
ALD Insert	15.590
PCDC Sonde	10.070
HCIM Insert	
EWR-P4 Insert	5.170
DGR Insert	2.830
DDSr-DGR	0

MWD RUN 700 - MWD

	Sensor Measure Point Distance To Bit (m)
ACAL Insert	31.020
Positive Pulser	
PCM Sonde	
BAT Insert	24.200



Jar	9.910	
		109.12
Drill Collar	74.970	
		34.15
Stabilizer	1.700	
		32.45
MWD	30.67	
		1.78
Stabilizer	1.500	
		0.28
PDC	.280	



CTN Insert	19.640	
		15.590
ALD Insert		
		10.070
PCDC Sonde		
		5.170
HCIM Insert		
		2.830
EWR-P4 Insert		
		0
DGR Insert		
DDSr-DGR		