



Real Time Log

Gamma Ray  
Natural Formation Evaluation

Scale: 1:240

True Vertical Depth

Company: Anadarko

Well: Howard 3C-28HZ

Field: Weld County (Kerr McGee)

Region: Rocky Mountains Country: United States

Status: Final Print

Surface Location:

Latitude: 40° 0' 55.804" N

Longitude: 104° 53' 53.336" W

Other Services:

API Number: 051233767700

Section 28 TWN: 1N Range67W

Directional & VSS

Permanent Datum (P.D.): Ground Level Elevation: 5020.00 ft.

Elevations: N/A

Log Measured From: Rig Floor 16.00 ft. Above P.D.

KB: N/A  
DF: 5036.00 ft.  
GL: 5020.00 ft.

Depth Reference: Driller's Depth

GL: 5020.00 ft.

Interval Logged

Dates

Magnetic Field Reference

Top: 7157.0 ft. Date From: 03/Sep/13 Dip Angle: 66.35° Azi Reference North: True

Bottom: 7755.0 ft. Date To: 07/Sep/13 Total Mag to Reference

Spud Date: 2/Sep/13 Field Strength: 52762.0 nT North Correction: 8.47°

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
8.750 in.	1031.0 ft.	8120.0 ft.	9.625 in.	36.00 lb/ft	Surface	1023.0 ft.

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Azi (Start)	Inc / Azi (End)
Water Based	Surface	8120.0 ft.	8.750 in.	85.0 ft.	0.4° / 281.0°	0.8° / 350.2°
					/	/
					/	/
					/	/
					/	/
					/	/
					/	/
					/	/

Acquisition System Software Version

Other

Advantage	2.20U4	Rig / Contractor:	Xtreme 24	/ Advance Drilling
PATS	6.4.1.34	Job No:	5740607	/ D & E
		District / Unit:	RMD	

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Log Run Summary

LWD Run No.	BHA Run No.	Bit Run No.	Bit Size (in.)	Bit Type	Bit Gauge Length (in.)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Time (hrs.)
							Top (m.)	Bottom (m.)	From (m.)	To (m.)	Start	End	
1	1	1	8.750	PDC	2.000	Steerable	7175.0	8070.0	7225.0	8120.0	02/Sep/2013 07:30	04/Sep/2014 02:30	30.5

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Marcus Boucher	01/Sep/2013	07/Sep/2013	Osagie Otoikhine	03/Sep/2013	07/Sep/2013			

Mud Properties Record

Date / Time	LWD	Measured	Mud	Density	Viscosity	pH	Fluid	Oil /	Source	Total	K+
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		Run No.	Depth (m.)	Type	(sg)	(cp)		Loss (cc)	Water		Chlorides (ppm)	(%)
03/Sep/13	18:00	1	7997.0	LSND	9.7	41	8.8	N/A	0.0/92.6	Flowline	1200	N/A
05/Sep/13	18:00	3	8185.0	LSND	9.1	41	9.0	N/A	0.0/95.0	Flowline	800	N/A
06/Sep/13	18:00	3	11800.0	LSND	9.1	41	8.7	N/A	0.0/95.0	Flowline	1800	N/A

Mnemonics

Curve	Description	Units
GRAX	Gamma Ray Apparent 0.5 ft. Avg.	API
ROPA	Rate of Penetration 3.0 ft. Avg.	ft/hr
TCDX	Downhole Temperature	deg F
WOBA	Surface Weight on Bit 1.0 ft Avg.	klbf

Equipment and Service Data

LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (m.)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	12566669	Directional	56.29	6.750	2.750
1	SRIG	11703994	Gamma	52.92	6.750	2.750

Service and Tool Mnemonics


Mnemonic	Name	Description
DIR	Directional	Wellbore directional survey
SRIG	Inclination and Gamma	Probe based gamma ray and inclination module

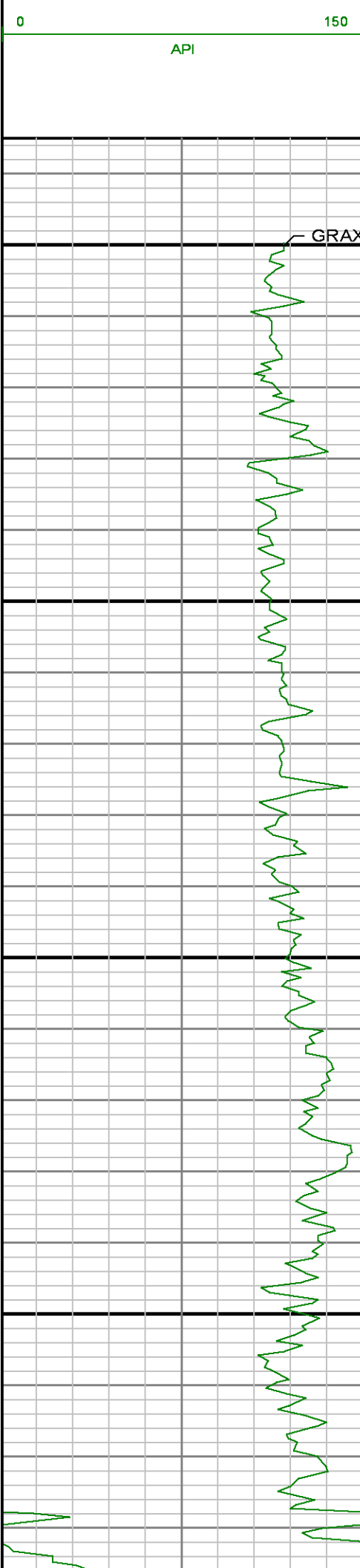
Comments

1) Baker Hughes INTEQ run 1 utilized 6 1/2 inch NaviGamma(Gamma Ray and Directional) behind a 8 3/4 inch bit and steerable assembly from 7225 feet to 8120 feet MD (7207 feet to 7781 feet TVD).
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Remarks

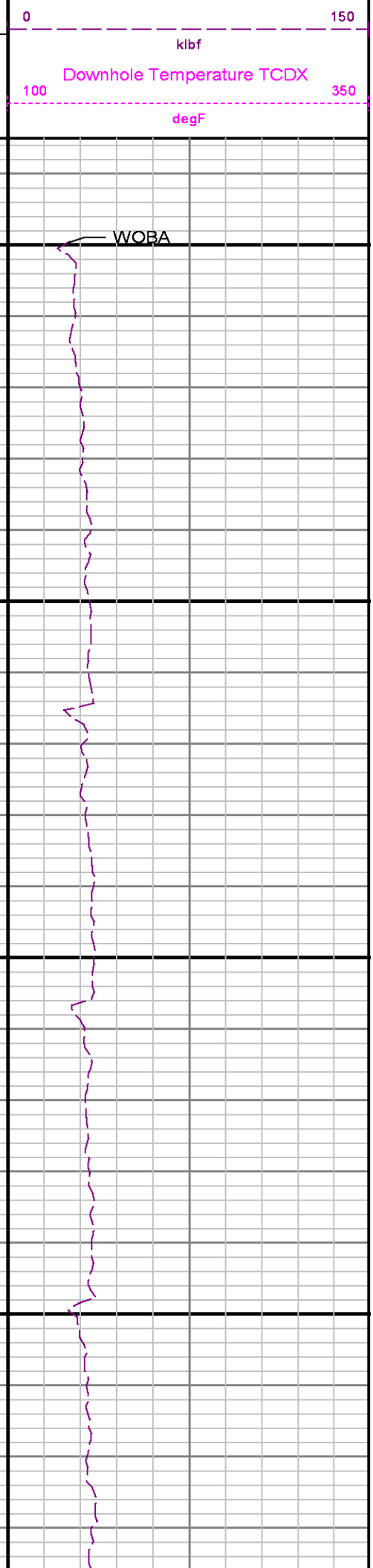
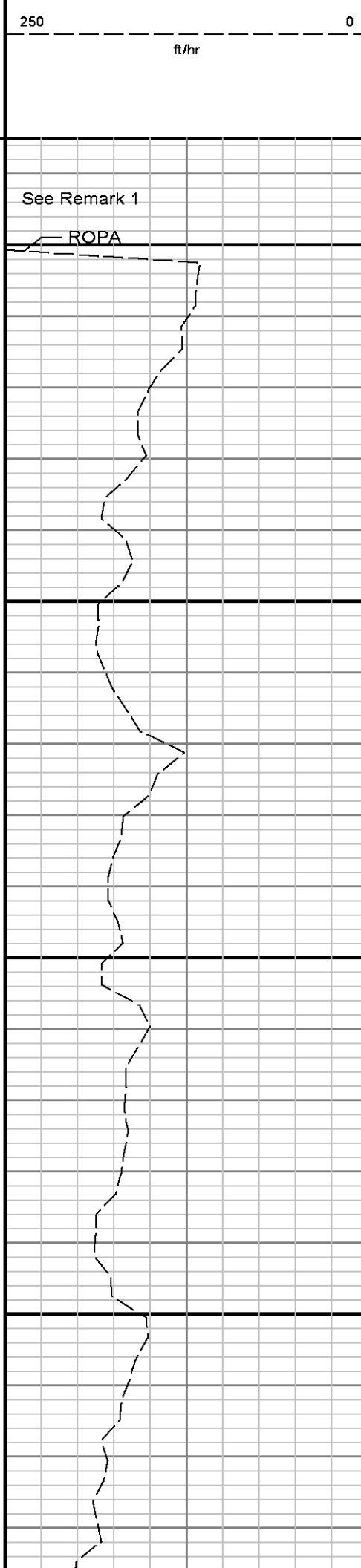
Number	Measured Depth (m.)	Hole Section (in.)	LWD Run No.	Remark
1	7175	8.750	1	The interval from surface to 7175 feet MD( 7157 feet TVD) was not logged since logging services began at kick off point.
2	8121	8.750	1	Interval from 8067 feet to 8121 feet MD (7776 feet to 7781 feet TVD) was logged more than 10 hours after drilling due to tripping for a new BHA.

<div> <div>  </div> <div> Company : Anadarko  Well : Howard 3C-28HZ  Interval : 7135.00 - 7810.00 feet  Created : 07/Sep/2013 6:39:46 AM </div> </div>							
Gamma Ray Apparent 0.5 ft Avg GRAX			⌵	Rate of Penetration 3.0 ft Avg ROP_AVG			Surface Weight On Bit 1.0 ft Avg WOB_AVG

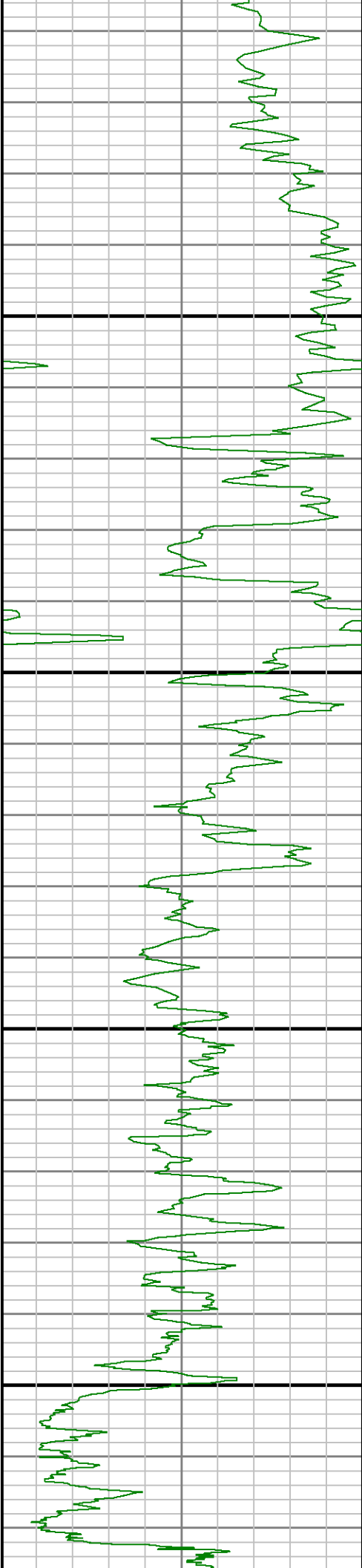


D feet 1:240

7200 7300

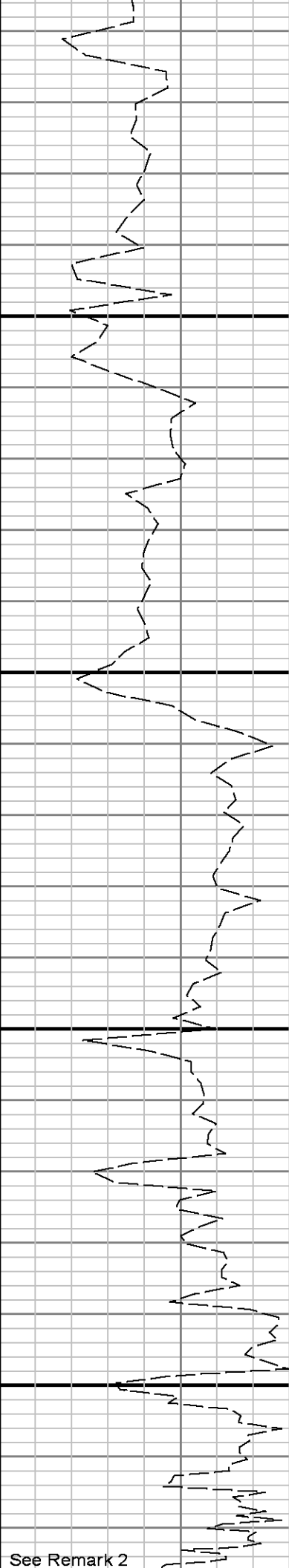






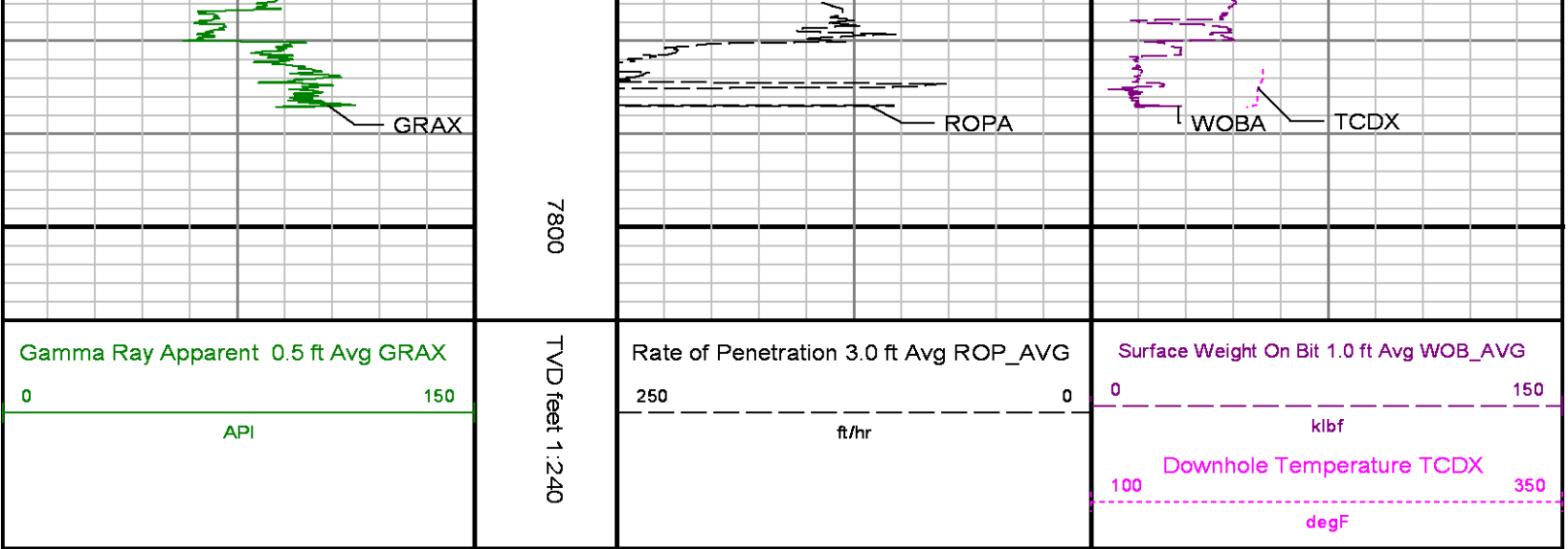
7600

7700



See Remark 2





ADVANTAGE Final Survey Listing												
Operator : Anadarko				Field : Weld County (Kerr McGee)				API No :				
Well : Howard 3C-28HZ				Rig : Xtreme 24				Job : 5740607				
Wellbore : Howard 3C-28HZ Orig Hole												
Well Origin												
Latitude		40.0155 deg				Longitude		-104.8981 deg				
North Reference		True				Drill Depth Zero		Rotary Table				
Vertical Datum is		Mean Sea Level				Vertical Datum to DDZ		5036.00 ft				
Vertical Section North		0.00 ft				Vertical Section East		0.00 ft				
Vertical Section Azimuth		359.6500 deg				Vertical Section Depth		0.00ft				
Grid Convergence		0.0000 deg				Magnetic Declination		8.4700 deg				
Total Correction		8.4700 deg				TVD Calculation Method		Minimal Curvature				
D-Row Calculation		Magcorr1				Local Magnetic Field		52762 nT				
Local Magnetic Dip Angle		66.3500 deg				Local Gravity Field		9.802 m/s^2				
Tie	MD ft	Incl deg	Azim deg	North ft	East ft	TVD ft	VS ft	Incr VS ft	Crs Len ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft
U	934.00	0.4100	281.0200	-0.07	-8.63	933.96	0.02					
	1090.00	0.4800	292.3600	0.29	-9.78	1089.96	0.35	1.21	156.00	0.07	0.04	7.27
	1184.00	0.4600	305.8400	0.66	-10.45	1183.95	0.72	1.97	94.00	0.12	-0.02	14.34
	1278.00	1.6300	149.7900	-0.28	-10.09	1277.94	-0.22	2.98	94.00	2.19	1.24	-166.01
	1373.00	3.6000	177.0900	-4.43	-9.25	1372.84	-4.37	7.20	95.00	2.40	2.07	28.74
	1466.00	5.7800	186.5400	-11.99	-9.64	1465.53	-11.94	14.78	93.00	2.48	2.34	10.16
	1561.00	7.3200	193.9100	-22.62	-11.64	1559.90	-22.55	25.60	95.00	1.84	1.62	7.76
	1655.00	8.4100	209.7000	-34.41	-16.49	1653.03	-34.31	38.34	94.00	2.56	1.16	16.80
	1749.00	9.4000	212.1500	-46.88	-23.98	1745.90	-46.73	52.89	94.00	1.13	1.05	2.61
	1843.00	9.0500	196.5400	-60.47	-30.17	1838.69	-60.28	67.82	94.00	2.68	-0.37	-16.61
	1937.00	10.5800	188.3500	-76.09	-33.52	1931.32	-75.89	83.80	94.00	2.20	1.63	-8.71
	2032.00	11.2700	175.4100	-93.98	-34.05	2024.61	-93.77	101.70	95.00	2.68	0.73	-13.62
	2123.00	12.4300	166.2800	-112.36	-31.01	2113.68	-112.17	120.33	91.00	2.42	1.27	-10.03
	2215.00	11.5500	161.6200	-130.72	-25.76	2203.67	-130.56	139.42	92.00	1.42	-0.96	-5.07
	2306.00	11.0500	160.3800	-147.58	-19.96	2292.91	-147.45	157.25	91.00	0.61	-0.55	-1.36
	2397.00	9.5700	155.9200	-162.70	-13.94	2382.44	-162.61	173.53	91.00	1.85	-1.63	-4.90
	2488.00	7.5300	149.3400	-174.74	-7.82	2472.43	-174.69	187.03	91.00	2.48	-2.24	-7.23
	2579.00	6.6900	139.1400	-183.88	-1.31	2562.73	-183.87	198.25	91.00	1.66	-0.92	-11.21
	2670.00	5.1000	149.5200	-191.37	4.21	2653.25	-191.39	207.56	91.00	2.10	-1.75	11.41
	2762.00	2.3300	146.2300	-196.45	7.33	2745.04	-196.49	213.52	92.00	3.02	-3.01	-3.58
	2853.00	0.5000	129.8400	-198.24	8.66	2836.01	-198.29	215.75	91.00	2.04	-2.01	-18.01
	3035.00	0.5100	77.1600	-198.57	10.06	3018.01	-198.63	217.19	182.00	0.25	0.01	-28.95
	3124.00	0.7800	58.8700	-198.88	10.33	3003.03	-198.87	221.37	206.00	0.20	0.00	-5.00
	3213.00	0.7800	58.8700	-198.88	10.33	3003.03	-198.87	221.37	206.00	0.20	0.00	-5.00
	3302.00	0.7800	58.8700	-198.88	10.33	3003.03	-198.87	221.37	206.00	0.20	0.00	-5.00

	3401.00	0.7200	58.0700	-196.99	13.60	3383.99	-197.07	221.07	366.00	0.08	0.06	-5.22
	3770.00	1.3200	350.9100	-191.57	14.89	3752.94	-191.66	226.64	369.00	0.33	0.16	-18.20
	3956.00	1.7300	344.4200	-186.75	13.80	3938.87	-186.83	231.59	186.00	0.24	0.22	-3.49
	4050.00	1.9300	348.0800	-183.84	13.09	4032.82	-183.91	234.59	94.00	0.25	0.21	3.89
	4143.00	1.3600	7.8600	-181.21	12.92	4125.78	-181.29	237.22	93.00	0.86	-0.61	21.27
	4237.00	1.1900	180.5000	-181.08	13.07	4219.78	-181.16	237.41	94.00	2.71	-0.18	183.66
	4423.00	1.1000	232.0000	-184.11	11.64	4405.74	-184.18	240.76	186.00	0.54	-0.05	27.69
	4789.00	1.7800	279.3600	-185.35	3.26	4771.64	-185.37	249.23	366.00	0.36	0.19	12.94
	4874.00	1.4100	289.1600	-184.79	0.97	4856.61	-184.79	251.58	85.00	0.54	-0.44	11.53
	4959.00	0.7400	304.9500	-184.13	-0.46	4941.59	-184.13	253.17	85.00	0.85	-0.79	18.58
	5215.00	0.6700	274.9500	-183.06	-3.31	5197.57	-183.03	256.21	256.00	0.14	-0.03	-11.72
	5555.00	0.5200	49.4100	-181.88	-4.12	5537.56	-181.85	257.64	340.00	0.32	-0.04	39.55
	5896.00	0.8900	55.8100	-179.39	-0.75	5878.54	-179.38	261.83	341.00	0.11	0.11	1.88
	6236.00	0.4800	18.9600	-176.56	1.89	6218.51	-176.57	265.70	340.00	0.17	-0.12	-10.84
	6578.00	0.8100	319.4900	-173.36	0.79	6560.49	-173.37	269.08	342.00	0.20	0.10	-17.39
	6663.00	1.2200	285.2300	-172.67	-0.47	6645.48	-172.66	270.52	85.00	0.84	0.48	-40.31
	6748.00	0.1100	97.6200	-172.44	-1.27	6730.48	-172.43	271.34	85.00	1.56	-1.31	202.81
	7089.00	0.7700	330.2400	-170.50	-2.08	7071.47	-170.48	273.45	341.00	0.25	0.19	-37.35
	7174.00	1.8700	336.9800	-168.72	-2.91	7156.44	-168.70	275.41	85.00	1.30	1.29	7.93
	7217.00	5.8800	339.6800	-166.01	-3.95	7199.34	-165.99	278.31	43.00	9.33	9.33	6.28
	7260.00	9.6900	342.4900	-160.49	-5.80	7241.93	-160.46	284.14	43.00	8.90	8.86	6.53
	7302.00	13.9800	344.4600	-152.23	-8.22	7283.03	-152.18	292.75	42.00	10.26	10.21	4.69
	7345.00	18.9400	345.2800	-140.47	-11.39	7324.25	-140.40	304.93	43.00	11.55	11.53	1.91
	7387.00	22.8100	348.9000	-125.88	-14.69	7363.49	-125.79	319.88	42.00	9.71	9.21	8.62
	7430.00	23.3600	353.2000	-109.24	-17.31	7403.05	-109.13	336.73	43.00	4.12	1.28	10.00
	7472.00	25.3400	357.2400	-91.99	-18.72	7441.32	-91.87	354.04	42.00	6.16	4.71	9.62
	7515.00	29.8400	1.4300	-72.09	-18.90	7479.42	-71.97	373.94	43.00	11.39	10.47	9.74
	7557.00	33.0800	1.9700	-50.18	-18.25	7515.24	-50.07	395.85	42.00	7.74	7.71	1.29
Tie	MD ft	Incl deg	Azim deg	North ft	East ft	TVD ft	VS ft	Incr VS ft	Crs Len ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft
	7600.00	38.4500	1.3300	-25.07	-17.53	7550.12	-24.96	420.98	43.00	12.52	12.49	-1.49
	7642.00	42.0600	0.8000	2.06	-17.03	7582.17	2.16	448.11	42.00	8.63	8.60	-1.26
	7685.00	44.1600	1.1700	31.44	-16.52	7613.56	31.54	477.50	43.00	4.92	4.88	0.86
	7727.00	49.1600	1.7400	61.97	-15.74	7642.37	62.06	508.03	42.00	11.95	11.90	1.36
	7769.00	52.4700	1.6700	94.50	-14.77	7668.91	94.59	540.58	42.00	7.88	7.88	-0.17
	7812.00	57.3700	0.3700	129.67	-14.16	7693.61	129.76	575.76	43.00	11.66	11.40	-3.02
	7854.00	62.5000	359.6000	166.01	-14.18	7714.65	166.09	612.10	42.00	12.32	12.21	-1.83
	7897.00	67.2000	0.5300	204.92	-14.13	7732.92	205.00	651.01	43.00	11.10	10.93	2.16
	7939.00	70.8100	0.0100	244.13	-13.94	7747.96	244.21	690.21	42.00	8.67	8.60	-1.24
	7982.00	74.3600	359.8200	285.15	-14.00	7760.83	285.23	731.24	43.00	8.27	8.26	-0.44
	8024.00	79.3700	0.3200	326.04	-13.95	7770.37	326.12	772.12	42.00	11.98	11.93	1.19
	8062.00	83.7000	0.9500	363.61	-13.54	7775.96	363.69	809.70	38.00	11.51	11.39	1.66
	8214.00	88.7000	1.7300	515.19	-9.99	7786.04	515.24	961.32	152.00	3.33	3.29	0.51
	8299.00	89.9600	0.7800	600.16	-8.13	7787.03	600.20	1046.31	85.00	1.86	1.48	-1.12
	8385.00	90.6400	0.3700	686.15	-7.26	7786.58	686.18	1132.31	86.00	0.92	0.79	-0.48
	8555.00	91.0100	359.9600	856.13	-6.77	7784.13	856.16	1302.29	170.00	0.32	0.22	-0.24
	8725.00	91.0200	359.8000	1026.10	-7.13	7781.12	1026.13	1472.26	170.00	0.09	0.01	-0.09
	8896.00	90.8000	3.0700	1197.01	-2.85	7778.40	1197.00	1643.22	171.00	1.92	-0.13	1.91
	9066.00	91.1400	359.1500	1366.92	0.44	7775.52	1366.89	1813.16	170.00	2.31	0.20	-2.31
	9151.00	91.1300	359.5700	1451.89	-0.50	7773.84	1451.87	1898.14	85.00	0.49	-0.01	0.49
	9237.00	89.8400	358.8300	1537.88	-1.71	7773.11	1537.86	1984.14	86.00	1.73	-1.50	-0.86
	9322.00	90.4000	358.5100	1622.86	-3.68	7772.93	1622.85	2069.14	85.00	0.76	0.66	-0.38
	9407.00	90.4000	359.1400	1707.84	-5.42	7772.34	1707.84	2154.13	85.00	0.74	0.00	0.74
	9492.00	89.6500	359.5100	1792.83	-6.42	7772.30	1792.84	2239.13	85.00	0.98	-0.88	0.44
	9578.00	89.6300	359.5500	1878.83	-7.13	7772.84	1878.83	2325.13	86.00	0.05	-0.02	0.05
	9663.00	89.9000	0.2600	1963.82	-7.27	7773.19	1963.83	2410.13	85.00	0.89	0.32	0.84
	9748.00	88.7000	359.2700	2048.81	-7.62	7774.23	2048.82	2495.12	85.00	1.83	-1.41	-1.16
	9919.00	88.8900	358.9200	2219.75	-10.32	7777.83	2219.78	2666.08	171.00	0.23	0.11	-0.20
	10089.00	89.4100	359.7300	2389.72	-12.32	7780.35	2389.75	2836.06	170.00	0.57	0.31	0.48
	10174.00	90.9200	0.3200	2474.72	-12.28	7780.10	2474.75	2921.06	85.00	1.91	1.78	0.69
	10344.00	90.3000	0.0100	2644.71	-11.79	7778.29	2644.73	3091.05	170.00	0.41	-0.36	-0.18
	10514.00	91.5700	359.9200	2814.68	-11.90	7775.52	2814.70	3261.02	170.00	0.75	0.75	-0.05
	10683.00	91.6900	359.7900	2983.61	-12.32	7770.71	2983.63	3429.95	169.00	0.10	0.07	-0.08
	10768.00	91.6700	359.3900	3068.58	-12.93	7768.30	3068.60	3514.93	85.00	0.49	0.14	0.47

	10768.00	91.3700	359.3900	3088.38	-12.93	7768.30	3088.80	3314.92	85.00	0.49	-0.14	-0.47
	10854.00	91.0100	359.8500	3154.55	-13.50	7766.36	3154.57	3600.90	86.00	0.84	-0.65	0.53
	11024.00	88.2600	359.2900	3324.53	-14.78	7767.44	3324.55	3770.88	170.00	1.65	-1.62	-0.33
	11194.00	88.8900	359.1600	3494.46	-17.08	7771.67	3494.50	3940.82	170.00	0.38	0.37	-0.08
	11279.00	89.9600	359.7900	3579.45	-17.86	7772.52	3579.49	4025.82	85.00	1.46	1.26	0.74
	11364.00	90.9500	0.1100	3664.44	-17.93	7771.85	3664.48	4110.81	85.00	1.22	1.16	0.38
	11535.00	89.9600	359.6800	3835.44	-18.24	7770.49	3835.48	4281.80	171.00	0.63	-0.58	-0.25
	11620.00	90.8300	0.0700	3920.43	-18.43	7769.90	3920.47	4366.80	85.00	1.12	1.02	0.46
	11705.00	90.5500	359.7800	4005.43	-18.54	7768.88	4005.46	4451.80	85.00	0.47	-0.33	-0.34
	11875.00	89.9300	359.3800	4175.42	-19.79	7768.17	4175.46	4621.79	170.00	0.43	-0.36	-0.24
	11961.00	90.5500	359.7400	4261.41	-20.45	7767.81	4261.46	4707.79	86.00	0.83	0.72	0.42
	12046.00	91.3500	0.1300	4346.40	-20.54	7766.40	4346.45	4792.78	85.00	1.05	0.94	0.46
	12216.00	91.4100	359.6500	4516.35	-20.87	7762.30	4516.40	4962.73	170.00	0.28	0.04	-0.28
	12386.00	90.9500	359.3200	4686.31	-22.40	7758.80	4686.36	5132.69	170.00	0.33	-0.27	-0.19
	12557.00	90.4900	358.6000	4857.27	-25.50	7756.66	4857.33	5303.68	171.00	0.50	-0.27	-0.42
	12642.00	90.9800	358.9100	4942.24	-27.35	7755.56	4942.31	5388.67	85.00	0.68	0.58	0.36
	12652.00	91.0800	358.2900	4952.23	-27.59	7755.39	4952.31	5398.67	10.00	6.28	1.00	-6.20
Tie	MD ft	Incl deg	Azim deg	North ft	East ft	TVD ft	VS ft	Incr VS ft	Crs Len ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft
—Projection to TD: —												
	12707.00	91.0800	358.2900	5007.20	-29.23	7754.35	5007.28	5453.66	55.00	0.00	0.00	0.00