



Realtime Log

Natural Formation Evaluation
Gamma Ray

Scale:

Company: Anadarko

1:240 TVD
Well: Howard 29N-21HZ

True Vertical Depth
Field: Weld County

County: Weld State: Colorado

Status: Surface Location: Other Services:

Final Print Latitude: 40° 1' 49.811" N

API Number: 05-123-96792-0 Longitude: 104° 53' 58.376" W

SEC: 21 TWP: 1N RNG: 67W

Directional
VSS

Permanent Datum (P.D.): Ground Level Elevation: 5024.00 ft.

Log Measured From: Rig Floor 17.00 ft. Above P.D.

Depth Reference: Drillers Depth Elevations: N/A

Interval Logged Dates Magnetic Field Reference

Top: 6900.0 ft. Date From: 27/Aug/13 Dip Angle: 66.65° Azi Reference North: True

Bottom: 8003.0 ft. Date To: 04/Sep/14 Total Mag to Reference

Spud Date: 31/Aug/13 Field Strength: 52675.6 nT North Correction: 8.64°

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
13,500 in.	Surface	941.0 ft.	9.625 in.	36.00 lb/ft	Surface	931.0 ft.
8,750 in.	931.0 ft.	8003.0 ft.	7.000 in.	26.00 lb/ft	Surface	7993.0 ft.

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based Mud	Surface	8003.0 ft.	13,500 in.	941.0 ft.	0.0° / 0.0°	1.2° / 3.4°
			8,750 in.	7072.0 ft.	1.2° / 4.8°	89.6° / 1.0°
					/	/
					/	/
					/	/
					/	/
					/	/

Acquisition System Software Version

Other

Advantage	2.20U4	Rig:	Xtreme 6	/ Xtreme Coil Drilling
PATS	6.4.1.34	Job No:	5530089	
		District / Unit:	RMD	/ D&E

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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 (ft.)	Bottom (ft.)	From (ft.)	To (ft.)	Start	End	
1	1	2	8.750	PDC Core	0.750	Steerable	6900.0	8003.0	941.0	8003.0	31/Aug/2013 06:30	04/Sep/2013 5:00	53.4

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Matthew Delmore	02/Sep/2013	08/Sep/2013	Donald Delay	27/Aug/2013	08/Sep/2013	Jeremiah Davidson	27/Aug/2013	02/Sep/2013

Mud Properties Record

Date / Time	LWD Run No.	Measured Depth (ft.)	Mud Type	Density (ppg)	Viscosity (cp)	pH	Fluid Loss (cc)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
02/Sep/2013 22:00	1	7025.0	Water Based Mud	9.8	43	8.5	5.4	0 / 95	Active Mud Pit	300	0.0
03/Sep/2013 22:00	1	4386.0	Water Based Mud	8.5	43	8.5	5.4	0 / 100	Active Mud Pit	300	0.0
04/Sep/2013 22:00	1	7025.0	Water Based Mud	9.8	43	8.5	5.4	0 / 95	Active Mud Pit	300	0.0
05/Sep/2013 22:00	1	8003.0	Water Based Mud	9.8	40	8.5	5.0	0 / 93	Active Mud Pit	300	0.0

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	degF
WOBA	Surface Weight on Bit, 1.0 ft. Avg	klbs

Equipment and Service Data


LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (ft)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	12859420	Directional	47.23	6.750	2.313
1	SRIG	12131378	Gamma	43.85	6.750	2.313

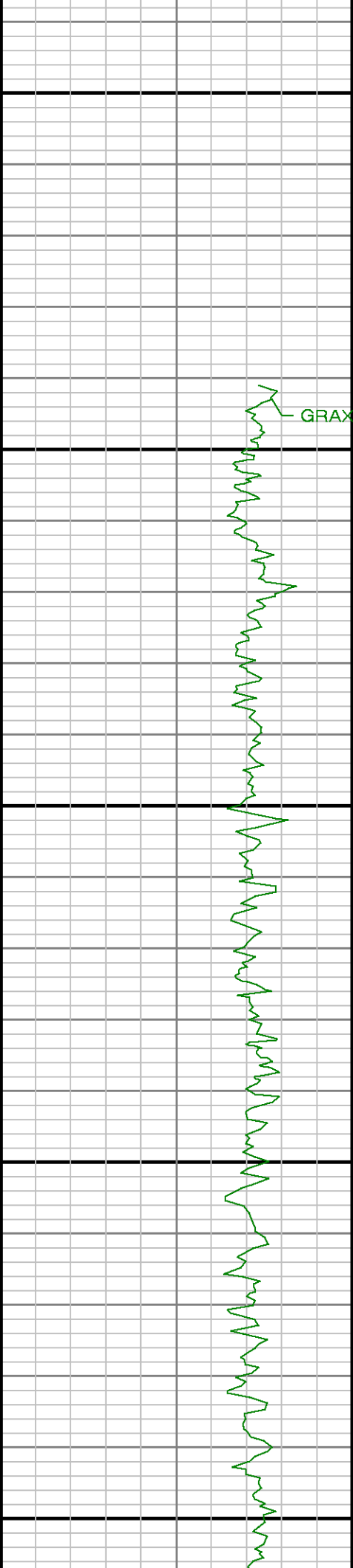
Service and Tool Mnemonics

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

Comments

<p>1. Baker Hughes INTEQ run 1 utilized 6 3/4 inch NaviTrak and NaviGamma Services. NaviTrak services (VSS, Directional) were provided behind an 8 3/4 inch bit and steerable assembly from 941 to 6950 ft MD (940.94 to 6890.78 feet TVD). NaviGamma services (VSS, Directional, Gamma Ray) were provided behind an 8 3/4 inch bit and steerable assembly from 6950 to 8003 ft MD (6890.78 to 7495.87 feet TVD).</p> <p>2. Depth Measurements were obtained from a depth tracking system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes LWD logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes are being used to present logging data.</p>

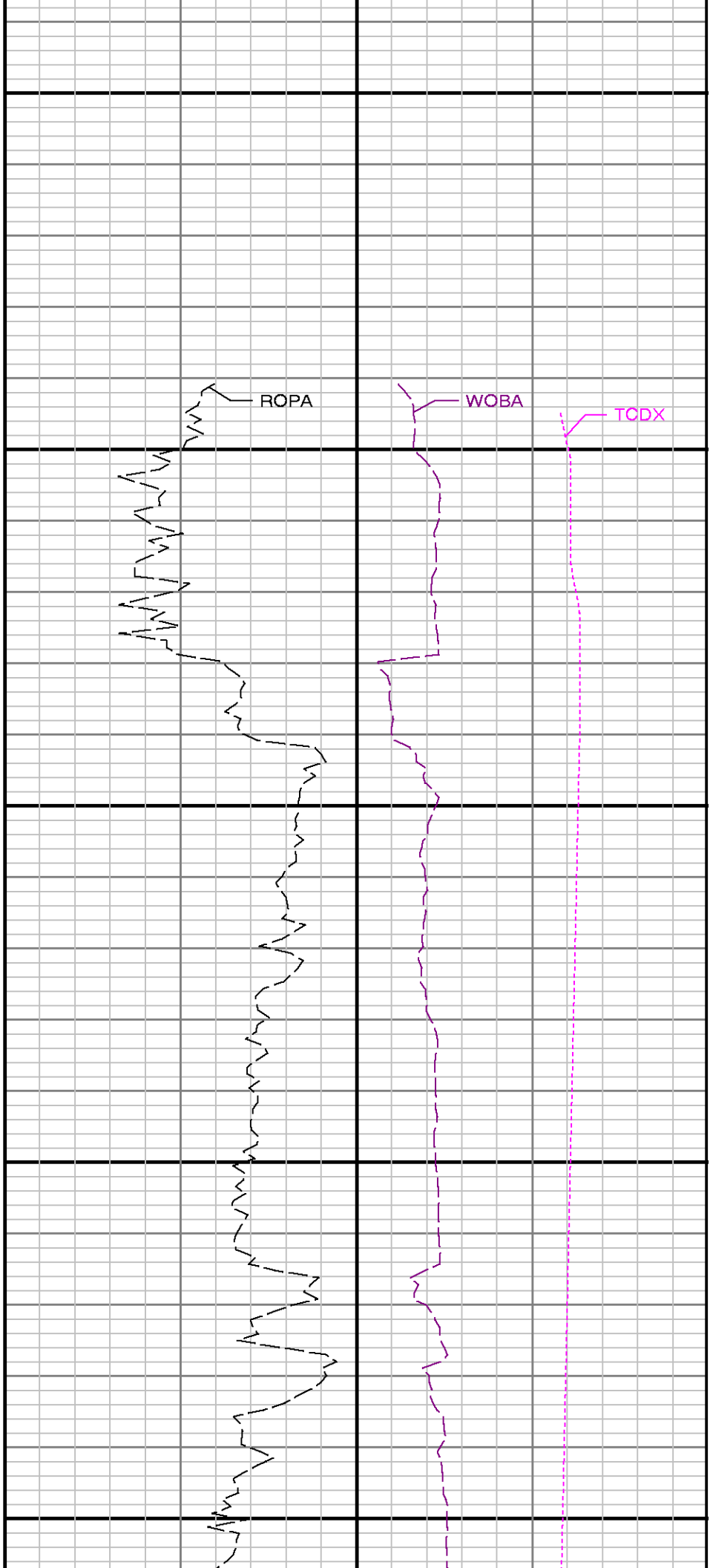
<div><div></div><div><div>Company : Anadarko</div><div>Well : HOWARD 29N-21HZ</div><div>Interval : 6785.00 - 7545.00 feet</div><div>Created : 03/Sep/2013 7:36:22 PM</div></div></div>						
Gamma Ray Apparent 0.5 ft Avg GRAX		TVD feet 1:240	Rate of Penetration 3.0 ft Avg ROP_AVG		Surface Weight On Bit 1.0 ft Avg WOB_AVG	
0150			500-----0		0-----100	
API			ft/hr		klbf	
					100Downhole Temperature TCDX200 degF	



6800

6900

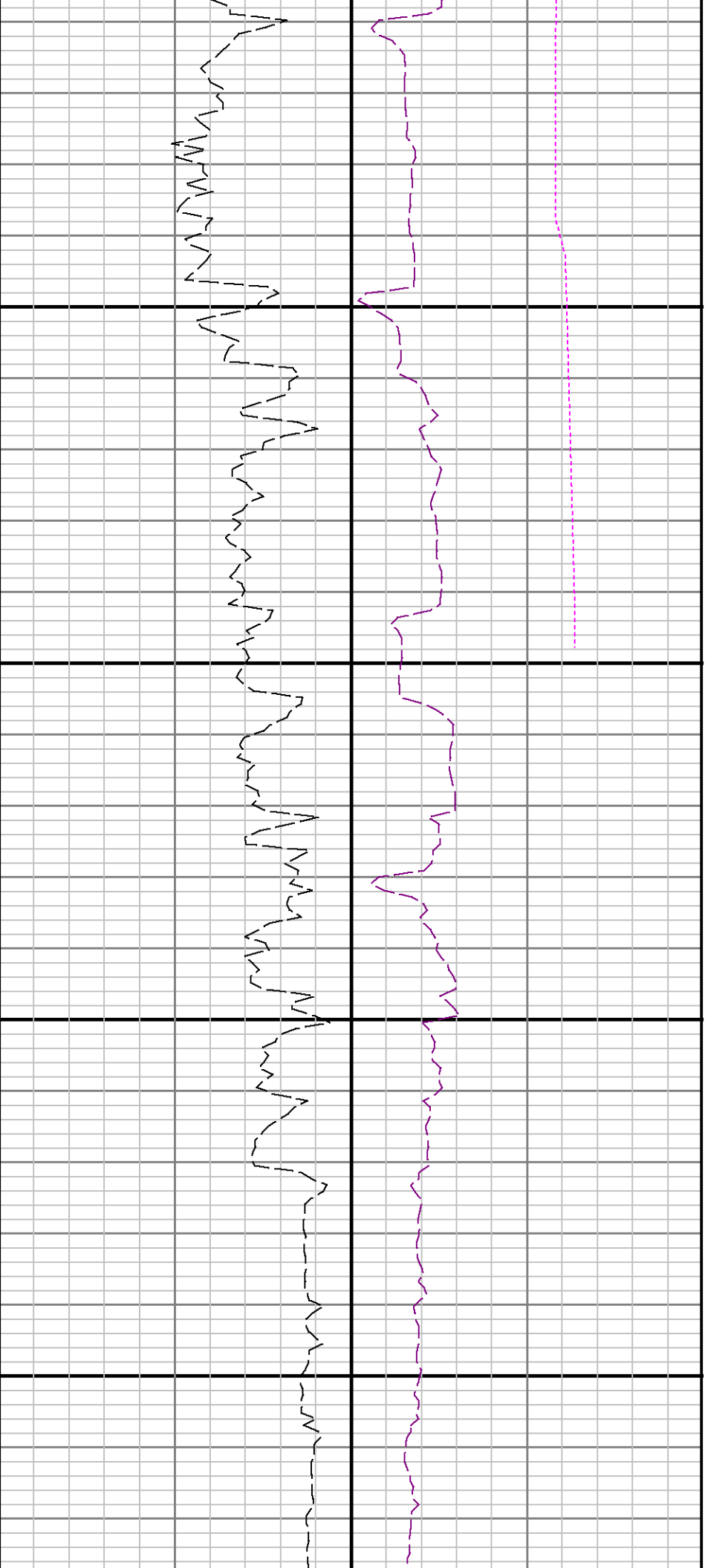
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ROPA

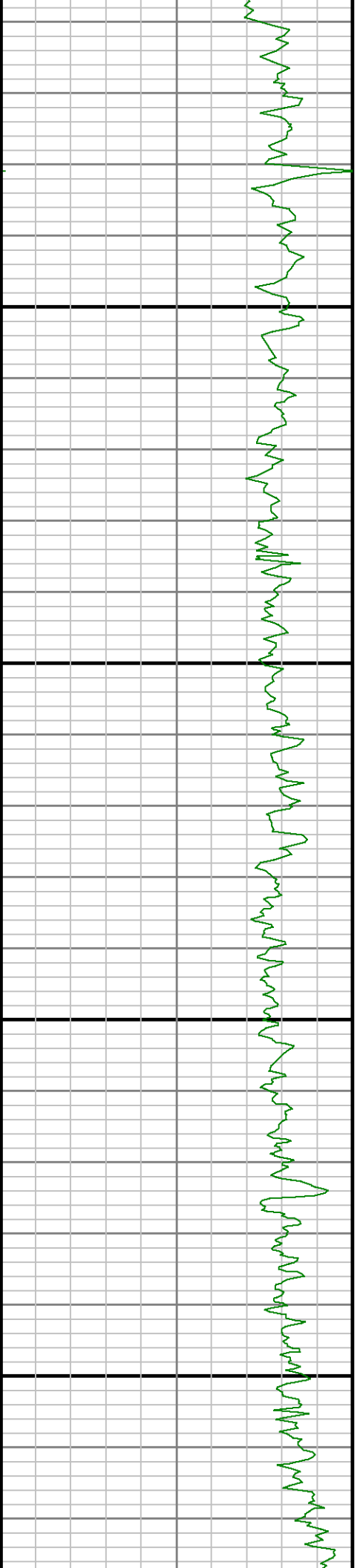
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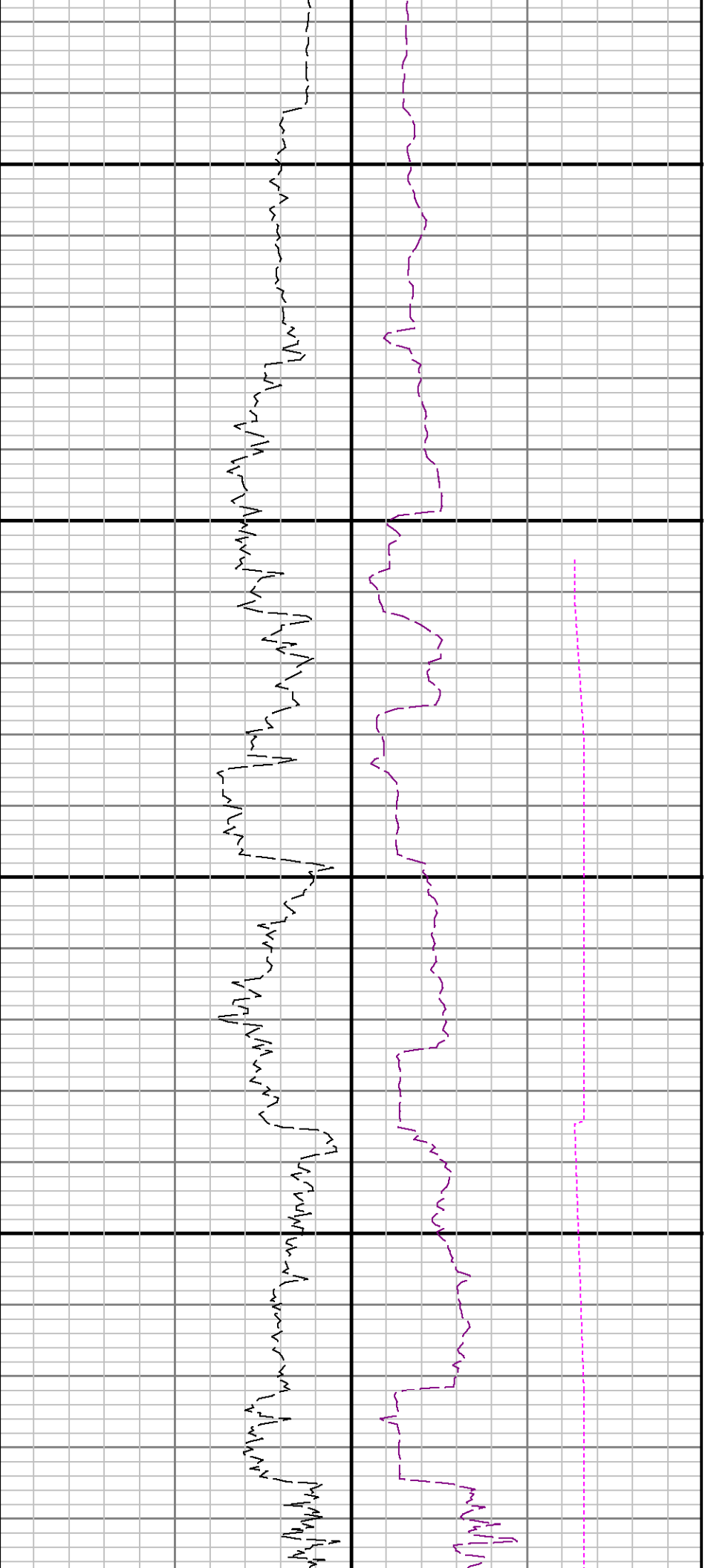
TCDX



7100

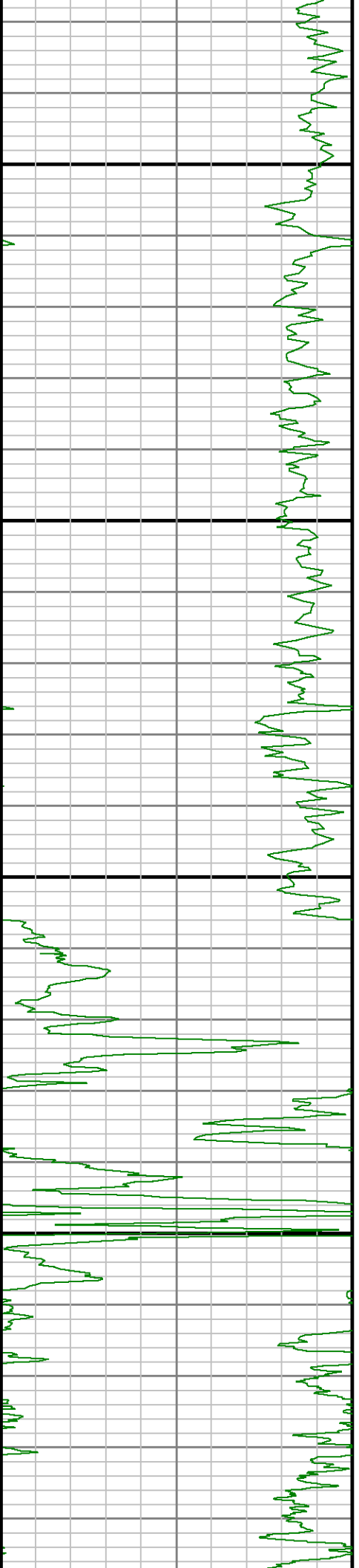
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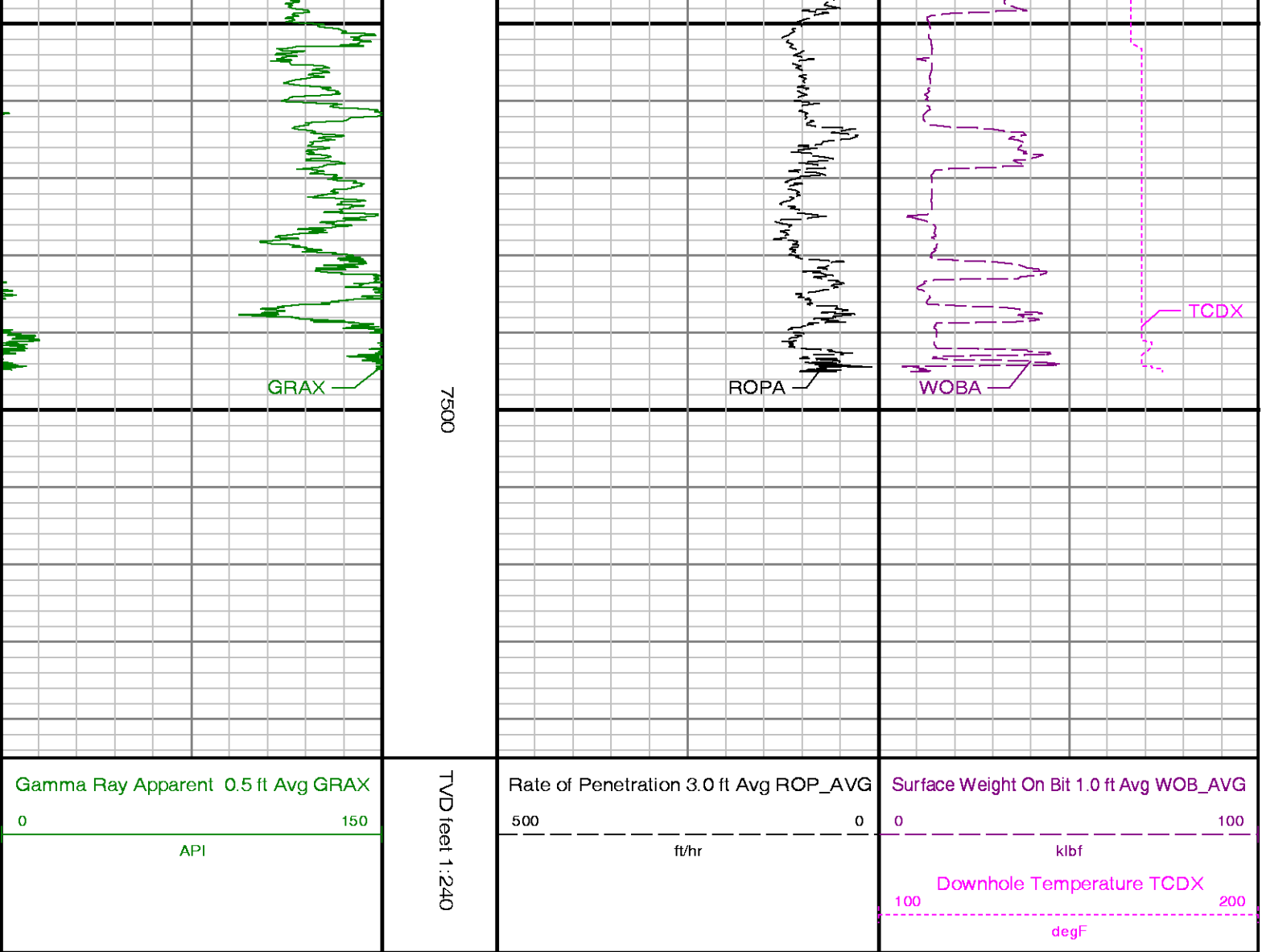




7300

7400





ADVANTAGE Final Survey Listing

Operator : Anadarko	Field : Weld County	API No : 05-123-36792-0
Well : HOWARD 29N-21HZ	Rig : Xtreme 6	Job : 5590089
Wellbore : HOWARD 29N-21HZ Orig Hole		

Well Origin

Latitude	40.0305 deg	Longitude	-104.8995 deg
North Reference	True	Drill Depth Zero	Rig Floor
Vertical Datum is	Ground Level	Vertical Datum to DDZ	17.00 ft
Vertical Section North	0.00 ft	Vertical Section East	0.00 ft
Vertical Section Azimuth	359.7700 deg	Vertical Section Depth	0.00ft
Grid Convergence	0.0000 deg	Magnetic Declination	8.6432 deg
Total Correction	8.6432 deg	TVD Calculation Method	Minimal Curvature
D-Row Calculation	Magcorr1	Local Magnetic Field	52676 nT
Local Magnetic Dip Angle	66.6443 deg	Local Gravity Field	9.801 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
	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00				
U	846.00	1.2900	16.1600	6.32	1.06	845.96	6.31	9.14	846.00	0.15	0.15	1.91
	975.00	1.1500	358.2600	9.01	1.42	974.93	9.00	11.85	129.00	0.31	-0.11	-13.88
	1067.00	1.1300	358.6500	10.84	1.38	1066.91	10.83	13.68	92.00	0.02	-0.02	0.42

	1160.00	1.1800	357.4600	12.71	1.31	1159.89	12.71	15.55	93.00	0.06	0.05	-1.28
	1252.00	1.2700	358.3600	14.68	1.24	1251.87	14.67	17.52	92.00	0.10	0.10	0.98
	1344.00	1.2200	358.5300	16.68	1.19	1343.85	16.67	19.52	92.00	0.05	-0.05	0.18
	1435.00	3.0900	316.2300	19.42	-0.54	1434.79	19.42	22.76	91.00	2.57	2.05	-46.48
	1526.00	4.2400	315.3600	23.58	-4.60	1525.60	23.60	28.57	91.00	1.27	1.26	-0.96
	1618.00	4.4800	301.4400	27.87	-10.05	1617.34	27.91	35.52	92.00	1.18	0.26	-15.13
	1708.00	5.8400	274.4800	30.07	-17.62	1706.98	30.14	43.39	90.00	3.05	1.51	-29.96
	1800.00	6.6700	251.2700	28.72	-27.34	1798.45	28.83	53.21	92.00	2.87	0.90	-25.23
	1891.00	6.7300	229.2200	23.54	-36.39	1888.84	23.68	63.64	91.00	2.81	0.07	-24.23
	1952.00	7.7600	228.1100	18.45	-42.16	1949.35	18.62	71.33	61.00	1.70	1.69	-1.82
	2038.00	8.0600	227.9600	10.54	-50.96	2034.54	10.74	83.16	86.00	0.35	0.35	-0.17
	2123.00	8.4000	230.4800	2.60	-60.18	2118.66	2.84	95.33	85.00	0.58	0.40	2.96
	2208.00	8.7500	233.5200	-5.20	-70.16	2202.71	-4.92	108.00	85.00	0.67	0.41	3.58
	2293.00	9.5600	228.9000	-13.68	-80.68	2286.63	-13.36	121.51	85.00	1.29	0.95	-5.44
	2378.00	10.4600	229.3700	-23.35	-91.86	2370.33	-22.98	136.28	85.00	1.06	1.06	0.55
	2549.00	11.1400	229.4200	-44.20	-116.18	2538.30	-43.74	168.33	171.00	0.40	0.40	0.03
	2719.00	10.1400	229.3900	-64.63	-140.02	2705.38	-64.06	199.71	170.00	0.59	-0.59	-0.02
	2890.00	10.8400	226.5200	-85.49	-163.11	2873.52	-84.83	230.84	171.00	0.51	0.41	-1.68
	3060.00	11.2800	228.6800	-107.47	-187.20	3040.36	-106.71	263.44	170.00	0.36	0.26	1.27
	3230.00	9.2400	225.7000	-127.98	-209.46	3207.64	-127.14	293.71	170.00	1.24	-1.20	-1.75
	3401.00	11.1200	233.8100	-147.31	-232.59	3375.95	-146.37	323.86	171.00	1.38	1.10	4.74
	3571.00	11.0900	230.7800	-167.32	-258.49	3542.77	-166.29	356.59	170.00	0.34	-0.02	-1.78
	3741.00	9.6100	232.2300	-186.36	-282.38	3709.99	-185.22	387.13	170.00	0.88	-0.87	0.85
	3912.00	10.9000	237.1400	-203.87	-307.24	3878.26	-202.64	417.55	171.00	0.91	0.75	2.87
	4082.00	11.0000	239.3300	-220.87	-334.69	4045.17	-219.52	449.83	170.00	0.25	0.06	1.29
	4253.00	10.5500	233.4700	-238.51	-361.31	4213.16	-237.05	481.76	171.00	0.69	-0.26	-3.43
	4423.00	11.0000	231.1800	-257.94	-386.45	4380.16	-256.38	513.54	170.00	0.37	0.26	-1.35
	4593.00	9.6900	230.2300	-277.26	-410.08	4547.39	-275.61	544.06	170.00	0.78	-0.77	-0.56
	4764.00	9.8700	227.3800	-296.39	-431.93	4715.91	-294.65	573.10	171.00	0.30	0.11	-1.67
	4934.00	11.0800	230.0300	-316.75	-455.17	4883.07	-314.92	604.00	170.00	0.77	0.71	1.56
	5019.00	11.0400	229.8000	-327.25	-467.65	4966.50	-325.37	620.31	85.00	0.07	-0.05	-0.27
	5104.00	10.1800	229.9000	-337.34	-479.61	5050.04	-335.41	635.96	85.00	1.01	-1.01	0.12
	5190.00	9.3600	228.9800	-346.82	-490.70	5134.79	-344.85	650.55	86.00	0.97	-0.95	-1.07
	5275.00	8.5800	232.4600	-355.22	-500.94	5218.75	-353.21	663.80	85.00	1.12	-0.92	4.09
	5360.00	7.3100	239.5300	-361.83	-510.63	5302.94	-359.78	675.52	85.00	1.88	-1.49	8.32
	5445.00	6.9700	239.3800	-367.20	-519.73	5387.28	-365.11	686.09	85.00	0.40	-0.40	-0.18
	5530.00	5.4000	238.4800	-371.92	-527.58	5471.78	-369.80	695.24	85.00	1.85	-1.85	-1.06
	5614.00	4.2100	242.7100	-375.40	-533.69	5555.49	-373.25	702.28	84.00	1.48	-1.42	5.04
	5699.00	3.0500	262.9600	-377.11	-538.70	5640.32	-374.94	707.58	85.00	2.01	-1.36	23.82
	5784.00	2.6200	266.7700	-377.49	-542.89	5725.21	-375.31	711.78	85.00	0.55	-0.51	4.48
	5869.00	2.5500	272.7000	-377.51	-546.72	5810.13	-375.31	715.61	85.00	0.33	-0.08	6.98
	5958.00	2.0500	233.2700	-378.37	-549.97	5899.06	-376.16	718.97	89.00	1.82	-0.56	-44.30
	6044.00	1.6300	231.3500	-380.06	-552.16	5985.02	-377.84	721.73	86.00	0.49	-0.49	-2.23
	6214.00	1.0400	243.5600	-382.25	-555.43	6154.97	-380.02	725.67	170.00	0.38	-0.35	7.18
	6383.00	1.0400	275.5600	-382.79	-558.33	6323.94	-380.54	728.62	169.00	0.34	0.00	18.93
	6553.00	1.4000	295.7400	-381.74	-561.73	6493.90	-379.48	732.19	170.00	0.33	0.21	11.87
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
	6724.00	1.4300	308.5000	-379.50	-565.29	6664.85	-377.23	736.38	171.00	0.18	0.02	7.46
	6894.00	1.3700	324.1300	-376.53	-568.14	6834.80	-374.25	740.50	170.00	0.23	-0.04	9.19
	6937.00	1.4700	323.4400	-375.67	-568.77	6877.79	-373.39	741.56	43.00	0.24	0.23	-1.60
	6979.00	5.0800	352.2900	-373.40	-569.34	6919.72	-371.11	743.91	42.00	9.19	8.60	68.69
	7022.00	10.9300	359.6300	-367.43	-569.62	6962.28	-365.14	749.88	43.00	13.78	13.60	17.07
	7064.00	16.2200	1.3600	-357.58	-569.50	7003.09	-355.29	759.74	42.00	12.63	12.60	4.12
	7107.00	17.1500	2.6000	-345.24	-569.07	7044.28	-342.95	772.08	43.00	2.32	2.16	2.88
	7150.00	19.7000	359.8300	-331.65	-568.81	7085.07	-329.37	785.67	43.00	6.27	5.93	-6.44
	7192.00	21.3500	2.8200	-316.94	-568.45	7124.41	-314.65	800.39	42.00	4.65	3.93	7.12
	7235.00	23.8800	4.8500	-300.44	-567.33	7164.10	-298.16	816.92	43.00	6.16	5.88	4.72
	7277.00	29.1800	6.2800	-281.78	-565.49	7201.66	-279.51	835.67	42.00	12.71	12.62	3.40
	7320.00	35.5200	6.0900	-258.92	-563.02	7237.97	-256.66	858.67	43.00	14.75	14.74	-0.44
	7362.00	41.9100	3.9100	-232.76	-560.76	7270.73	-230.51	884.92	42.00	15.55	15.21	-5.19
	7405.00	47.4300	1.3500	-202.58	-559.41	7301.30	-200.33	915.13	43.00	13.50	12.84	-5.95
	7448.00	50.1100	0.4500	-170.25	-558.91	7329.64	-168.01	947.47	43.00	6.43	6.23	-2.09

	7490.00	51.4500	359.7000	-137.71	-558.87	7356.19	-135.47	980.01	42.00	3.48	3.19	-1.79
	7533.00	54.2700	358.3100	-103.45	-559.47	7382.15	-101.20	1014.28	43.00	7.05	6.56	-3.23
	7574.00	59.8900	358.0100	-69.06	-560.58	7404.43	-66.81	1048.68	41.00	13.72	13.71	-0.73
	7616.00	65.8700	356.6000	-31.74	-562.35	7423.56	-29.48	1086.05	42.00	14.55	14.24	-3.36
	7659.00	69.8100	357.0900	8.02	-564.54	7439.78	10.28	1125.86	43.00	9.22	9.16	1.14
	7700.00	73.5600	358.0800	46.90	-566.17	7452.66	49.17	1164.78	41.00	9.43	9.15	2.41
	7742.00	75.5400	358.1200	87.36	-567.51	7463.85	89.63	1205.26	42.00	4.72	4.71	0.10
	7785.00	78.0300	359.1300	129.20	-568.52	7473.68	131.48	1247.12	43.00	6.23	5.79	2.35
	7827.00	80.1600	359.7200	170.44	-568.93	7481.62	172.72	1288.36	42.00	5.26	5.07	1.40
	7870.00	83.2100	0.7100	212.98	-568.77	7487.84	215.26	1330.90	43.00	7.45	7.09	2.30
	7913.00	85.1600	0.9500	255.75	-568.15	7492.20	258.03	1373.67	43.00	4.57	4.53	0.56
	7955.00	87.8100	0.7800	297.67	-567.52	7494.77	299.94	1415.59	42.00	6.32	6.31	-0.40
	8006.00	89.6900	1.0100	348.64	-566.72	7495.89	350.92	1466.58	51.00	3.71	3.69	0.45
	8091.00	91.0700	0.9300	433.63	-565.28	7495.32	435.89	1551.57	85.00	1.63	1.62	-0.09
	8177.00	91.9400	1.0900	519.58	-563.77	7493.06	521.84	1637.54	86.00	1.03	1.01	0.19
	8262.00	92.4100	1.4200	604.50	-561.91	7489.84	606.75	1722.48	85.00	0.68	0.55	0.39
	8432.00	92.7700	1.0100	774.29	-558.30	7482.16	776.53	1892.31	170.00	0.32	0.21	-0.24
	8603.00	91.5300	0.0400	945.16	-556.74	7475.74	947.38	2063.18	171.00	0.92	-0.73	-0.57
	8773.00	91.1000	359.3800	1115.11	-557.60	7471.84	1117.34	2233.13	170.00	0.46	-0.25	-0.39
	8943.00	90.2100	359.5900	1285.09	-559.13	7469.90	1287.32	2403.12	170.00	0.54	-0.52	0.12
	9114.00	91.4700	0.1100	1456.07	-559.57	7467.39	1458.30	2574.10	171.00	0.80	0.74	0.30
	9285.00	89.2200	0.4700	1627.05	-558.71	7466.36	1629.28	2745.09	171.00	1.33	-1.32	0.21
	9455.00	89.3200	0.0400	1797.03	-557.95	7468.52	1799.26	2915.07	170.00	0.26	0.06	-0.25
	9626.00	90.9200	0.5900	1968.02	-557.01	7468.17	1970.24	3086.06	171.00	0.99	0.94	0.32
	9797.00	91.7200	1.1000	2138.96	-554.49	7464.23	2141.17	3257.02	171.00	0.55	0.47	0.30
	9968.00	91.2600	1.2700	2309.86	-550.96	7459.78	2312.06	3427.96	171.00	0.29	-0.27	0.10
	10138.00	91.9300	359.6200	2479.79	-549.64	7455.05	2481.97	3597.89	170.00	1.05	0.39	-0.97
	10308.00	92.0600	359.2900	2649.67	-551.25	7449.13	2651.87	3767.78	170.00	0.21	0.08	-0.19
	10477.00	91.5400	359.2000	2818.58	-553.48	7443.82	2820.78	3936.70	169.00	0.31	-0.31	-0.05
	10647.00	91.2000	358.8400	2988.50	-556.39	7439.76	2990.71	4106.65	170.00	0.29	-0.20	-0.21
	10818.00	91.3600	359.6300	3159.44	-558.67	7435.94	3161.66	4277.61	171.00	0.47	0.09	0.46
	10989.00	91.2000	0.1000	3330.40	-559.07	7432.12	3332.62	4448.56	171.00	0.29	-0.09	0.27
	11159.00	91.9300	358.5500	3500.32	-561.07	7427.48	3502.54	4618.49	170.00	1.01	0.43	-0.91
	11329.00	91.0700	359.2700	3670.23	-564.30	7423.03	3672.46	4788.43	170.00	0.66	-0.51	0.42
	11500.00	91.2600	358.9800	3841.17	-566.92	7419.55	3843.42	4959.40	171.00	0.20	0.11	-0.17
Tie	MD	Incl	Azim	North	East	TVD	VS	Incr VS	Crs Len	DLS	Build	Turn
	ft	deg	deg	ft	ft	ft	ft	ft	ft	deg/100ft	deg/100ft	deg/100ft
	11670.00	90.0900	359.1900	4011.13	-569.63	7417.55	4013.39	5129.38	170.00	0.70	-0.69	0.12
	11839.00	90.7400	358.9800	4180.11	-572.33	7416.32	4182.37	5298.38	169.00	0.40	0.38	-0.12
	11952.00	91.0800	359.1800	4293.08	-574.14	7414.53	4295.35	5411.36	113.00	0.35	0.30	0.18
	Projection to TD:											
	12009.00	91.0800	359.1800	4350.06	-574.96	7413.45	4352.33	5468.35	57.00	0.00	0.00	0.00