BAKER HUGHES

REALTIME LOG

NATURAL FORMATION EVALUATION
GAMMA RAY

Scale:

1:240
TRUE VERTICAL DEPTH

Company: Kerr–McGee Oil & Gas Onshore LP

Well: Jelts 37N–19HZ

Field: Weld County (Kerr McGee)

Region: **Continental US** **Country:** **United States**

Status:

FIELD PRINT

API Number:
05–123–36564

Surface Location:
Latitude: 40° 02' 35.264" N
Longitude: 104° 55' 50.311" W
Section: 19 TWN: 1N Range: 67W

Other Services:
DIRECTIONAL
VSS

Permanent Datum (P.D.):	Ground Level	Elevation:	5147.00 ft.
Log Measured From:	Kelly Bushing	13.00 ft.	Above P.D.
Depth Reference:	Driller's Depth		

Elevations:
KB: 5160.00 ft.
DF: N/A
GL: 5147.00 ft.

Interval Logged		Dates		Magnetic Field Reference			
Top:	6983.0 ft.	Date From:	08 Jul 2013	Dip Angle:	66.64 °	Azi Reference North:	True
Bottom:	12075.0 ft.	Date To:	16 Jul 2013	Total		Mag to Reference	
		Spud Date:	07 Jul 2013	Field Strength:	52666.0 nT	North Correction:	8.70 °

Borehole Record			Casing Record			
Hole Size	From	To	Size	Weight	From	To
13.500 in.	Surface	924.0 ft.	9.625 in.	36.00 lb/ft	Surface	914.0 ft.
8.750 in.	924.0 ft.	8060.0 ft.	7.000 in.	26.00 lb/ft	Surface	8046.0 ft.
6.125 in.	8060.0 ft.	12122.0 ft.				

Mud Record			Deviation Record			
Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based	Surface	12122.0 ft.	8.750 in.	Intermediate	0.3 / 21.2 °	89.4 ° / 178.5 °
			6.125 in.	Lateral	89.4 ° / 178.5 °	89.0 ° / 175.7 °
					/	/
					/	/
					/	/
					/	/

Acquisition System	Software Version	Other	
Advantage	2.20U4	Rig: / Contractor:	Ensign 145 / Ensign Drilling
PATS	6.4.1.34	Job No:	5490835
		District: / Unit:	RMD /

INTEQ does not guarantee the accuracy or correctness of interpretations provided in or from this log. Since all interpretations are opinions based on measurements, INTEQ shall under no circumstances be responsible for consequential damages or any other loss, costs, damages or expenses incurred or sustained in connection with the use of any such interpretations. INTEQ disclaims all expressed and implied warranties related to this service. INTEQ s liabilities and obligations shall be governed by INTEQ's Standard Terms and Conditions.

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 Top (ft.)	Logged Interval Bottom (ft.)	Bit Depth Interval From (ft.)	Bit Depth Interval To (ft.)	Date / Time Start	Date / Time End	Circ. Time (hrs.)
1	1	2	8.750	PDC	2.000	Steerable	6983.0	8010.0	915.0	8060.0	08 Jul 2013 17:48	10 Jul 2013 05:40	73.9
2	2	3	6.125	PDC	6.000	Steerable	8011.0	12075.0	8060.0	12122.0	14 Jul 2013 07:54	16 Jul 2013 04:36	43.9

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Ian McCarrell	07 Jul 2013	17 Jul 2013	Matthew Dickey	07 Jul 2013	12 Jul 2013	Steven Cano	12 Jul 2013	17 Jul 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 mg/l	K+ mg/l
07 Jul 2013 20:00	1	1207.0	Water Based	8.5	26	7.0	N/A	0.0 / 100.0	Flowline	1500	N/A
08 Jul 2013 18:00	1	6305.0	Water Based	9.0	35	9.5	N/A	0.0 / 100.0	Flowline	600	N/A
12 Jul 2013 08:00	1	7665.0	Water Based	10.5	43	8.5	N/A	1.0 / 99.0	Flowline	1500	N/A
13 Jul 2013 13:30	1	7665.0	Water Based	10.2	40	8.5	N/A	1.0 / 99.0	Flowline	1900	N/A
14 Jul 2013 07:00	2	8060.0	Water Based	10.2	44	7.5	N/A	1.0 / 99.0	Flowline	1900	N/A
15 Jul 2013 07:00	2	10204.0	Water Based	10.7	44	9.0	N/A	1.0 / 99.0	Flowline	1900	N/A
15 Jul 2013 15:00	2	10773.0	Water Based	10.2	42	9.0	N/A	0.0 / 100.0	Flowline	1900	N/A
16 Jul 2013 07:00	2	12122.0	Water Based	10.6	45	9.0	N/A	1.0 / 99.0	Flowline	2200	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.	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	10170879	Directional	56.24	6.750	3.250
1	SRIG	12600744	Gamma	52.86	6.750	3.250
2	DIR	12188475	Directional	52.50	4.750	2.750
2	SRIG	12131407	Gamma	49.12	4.750	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 services (Directional, Gamma Ray, and VSS) behind an 8 3/4 inch bit and steerable assembly from 924 to 8060 feet MD (924 to 7610 feet TVD).

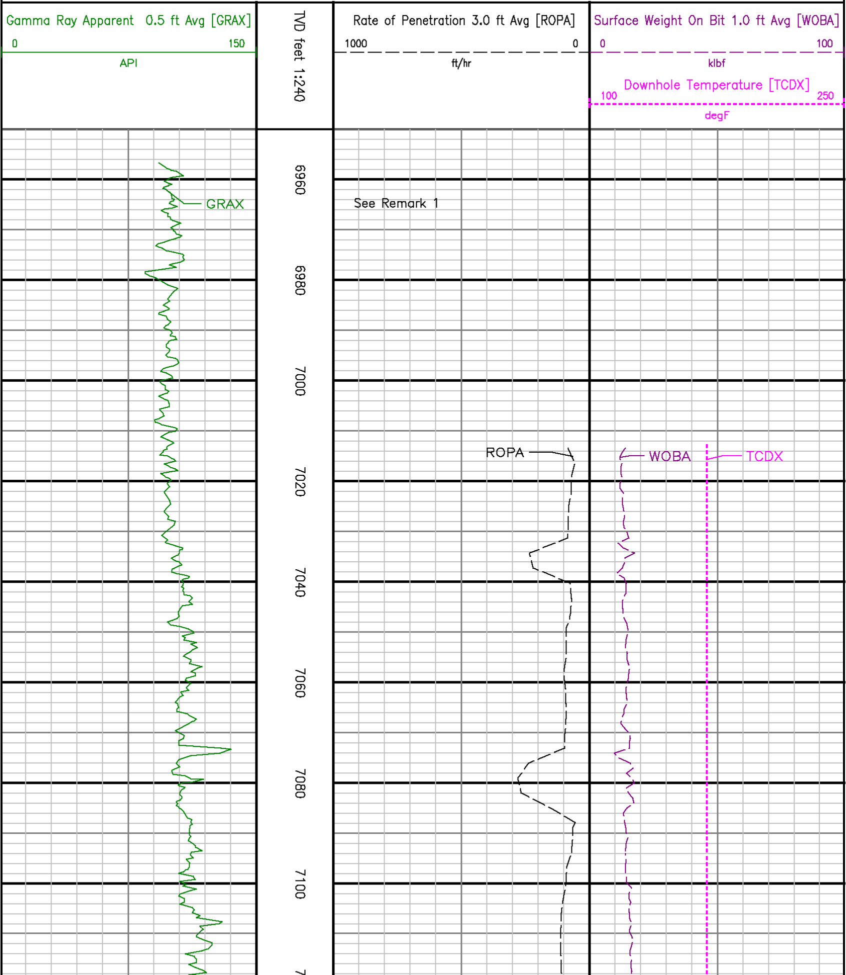
2) Baker Hughes INTEQ run 2 utilized 4 3/4 inch NaviGamma services (Directional, Gamma Ray, and VSS) behind a 6 1/8 inch bit and steerable assembly from 8060 to 12122 feet MD (7610 to 7663 feet TVD).

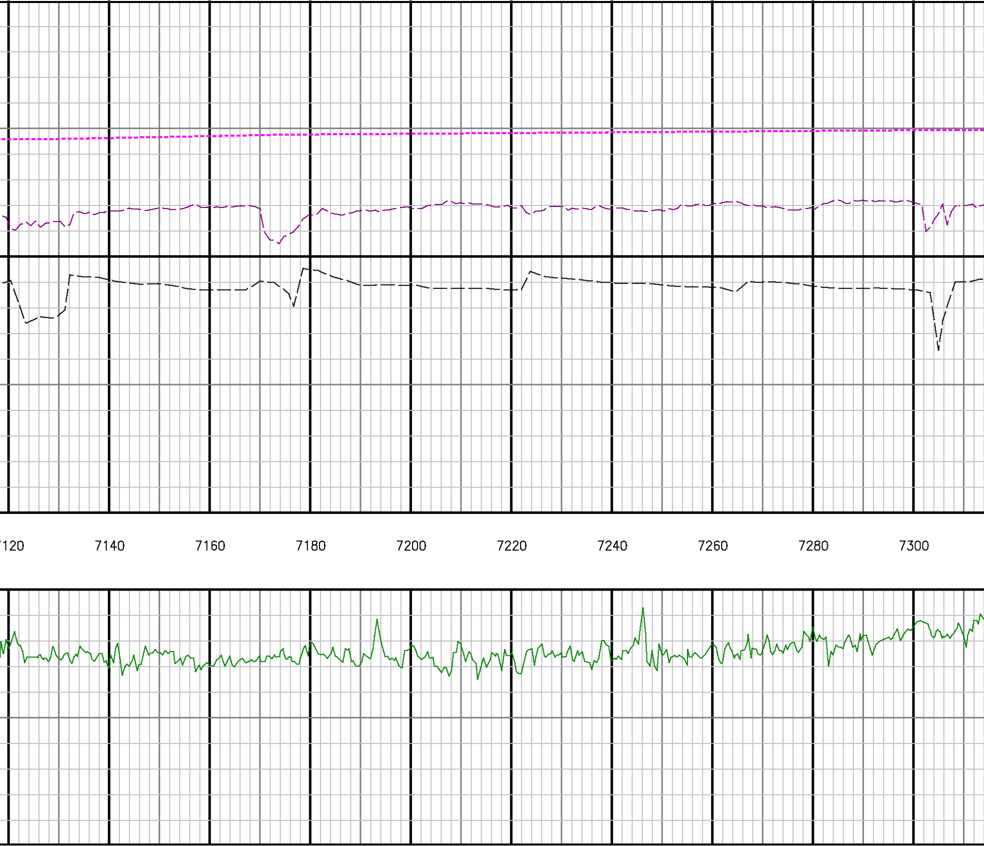
Remarks

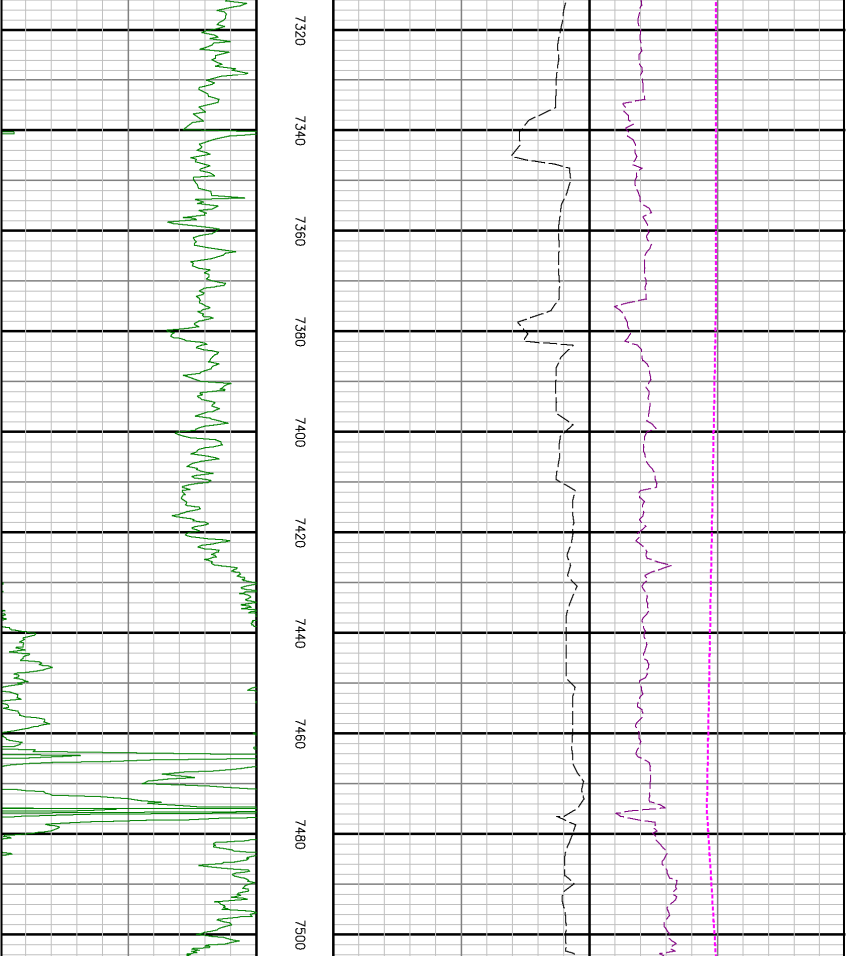
Number	Measured Depth ft)	Hole Section (in.)	LWD Run No.	Remark
1	6990	8.750	1	The interval from 6983 to 7037 feet MD (6955 to 7009 feet TVD) is missing ROPA, WOBA, GRTX, and TCDX due to the sensor to bit offset at curve kick off point.

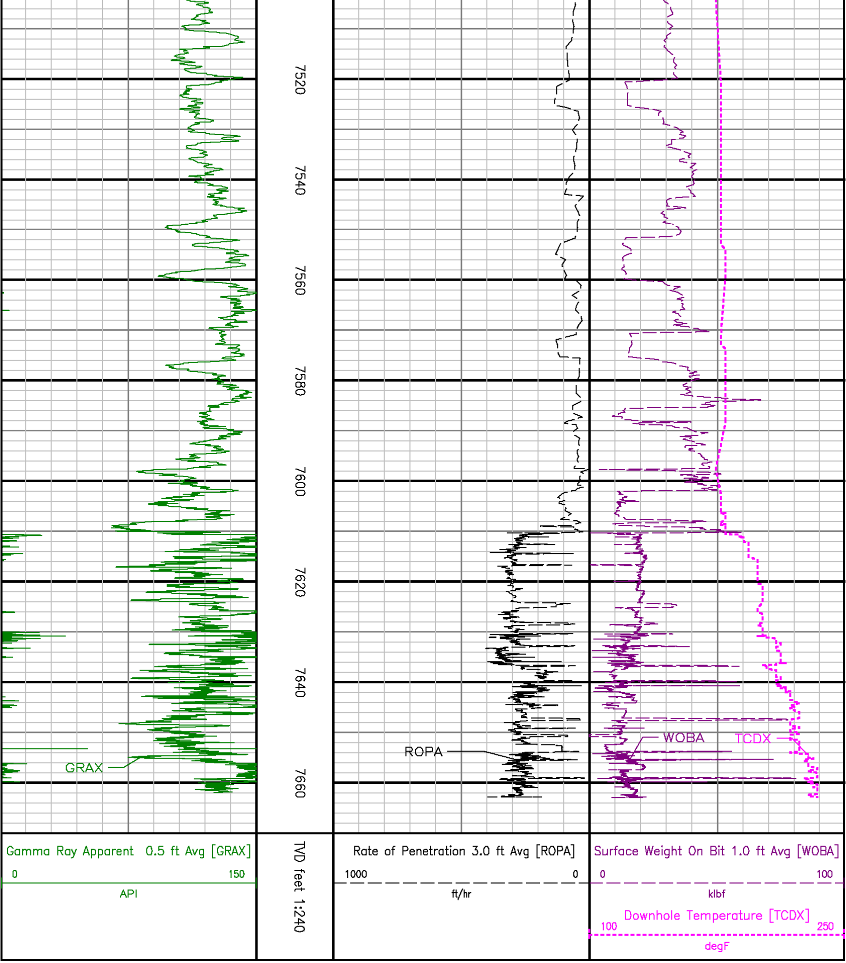
BAKER HUGHES

Company : Kerr-McGee Oil & Gas Onshore LP
Well : Jelts 37N-19HZ
Interval : 6950.00 - 7670.00 feet
Created : 16/Jul/2013 10:48:44 AM









ADVANTAGE Final Survey Listing

Operator	**:Kerr-McGee Oil & Gas Onshore LP**	Field	**: Weld County (Kerr McGee)**	API No	**: 051233656400**
Well	**:Jelts 37N-19HZ**	Rig	**: Ensign 145**	Job	**:5490835**
Wellbore	**: Jelts 37N-19HZ Orig Hole**				

Well Origin

Latitude	**40.0431 deg**	Longitude	**-104.9306 deg**
North Reference	**True**	Drill Depth Zero	**NULL**
Vertical Datum is	**Mean Sea Level**	Vertical Datum to DDZ	**5160.00 ft**
Vertical Section North	**0.00 ft**	Vertical Section East	**0.00 ft**
Vertical Section Azimuth	**179.0200 deg**	Vertical Section Depth	**0.00ft**
Grid Convergence	**0.0000 deg**	Magnetic Declination	**8.7048 deg**
Total Correction	**8.7048 deg**	TVD Calculation Method	**Minimal Curvature**
D-Raw Calculation	**Magcorr1**	Local Magnetic Field	**52666 nT**
Local Magnetic Dip Angle	**66.6364 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	868.00	0.7900	39.8500	6.69	-0.75	867.95	-6.70	-4.53	868.00	0.09	0.09	4.59
	966.00	0.3400	21.2300	7.48	-0.21	965.95	-7.48	-3.57	98.00	0.49	-0.46	-19.00
	1065.00	0.2100	307.3400	7.86	-0.25	1064.94	-7.87	-3.19	99.00	0.35	-0.13	-74.64
	1157.00	1.5000	38.8200	8.90	0.37	1156.93	-8.90	-1.97	92.00	1.65	1.40	99.43
	1248.00	3.0700	54.3300	11.25	3.10	1247.86	-11.20	1.62	91.00	1.84	1.73	17.04
	1340.00	4.0000	42.8100	15.04	7.28	1339.68	-14.92	7.27	92.00	1.27	1.01	-12.52
	1431.00	5.0400	46.5300	20.12	12.34	1430.40	-19.91	14.44	91.00	1.19	1.14	4.09
	1523.00	7.1300	48.0300	26.72	19.52	1521.88	-26.38	24.19	92.00	2.28	2.27	1.63
	1615.00	9.4600	48.1500	35.59	29.39	1612.91	-35.08	37.46	92.00	2.53	2.53	0.13
	1706.00	11.1900	46.9200	46.61	41.42	1702.43	-45.89	53.77	91.00	1.92	1.90	-1.35
	1798.00	10.9000	44.0500	58.96	53.98	1792.73	-58.02	71.39	92.00	0.68	-0.32	-3.12
	1890.00	11.0400	41.4900	71.81	65.87	1883.05	-70.67	88.89	92.00	0.55	0.15	-2.78
	1984.00	10.9000	45.4500	84.78	78.16	1975.33	-83.43	106.77	94.00	0.82	-0.15	4.21
	2079.00	10.3500	47.8200	96.81	90.89	2068.70	-95.25	124.28	95.00	0.74	-0.58	2.49
	2173.00	10.2700	45.3000	108.38	103.10	2161.18	-106.60	141.10	94.00	0.49	-0.09	-2.68
	2268.00	10.7100	49.3400	120.09	115.82	2254.60	-118.09	158.39	95.00	0.90	0.46	4.25
	2363.00	10.2500	47.4900	131.55	128.75	2348.01	-129.33	175.66	95.00	0.60	-0.48	-1.95
	2458.00	9.9600	54.4500	142.04	141.66	2441.54	-139.59	192.30	95.00	1.32	-0.31	7.33
	2553.00	9.7400	51.9200	151.77	154.67	2535.14	-149.10	208.55	95.00	0.51	-0.23	-2.66
	2648.00	10.7300	50.1000	162.40	167.78	2628.63	-159.51	225.43	95.00	1.10	1.04	-1.92
	2743.00	10.0400	48.4900	173.56	180.77	2722.07	-170.44	242.55	95.00	0.79	-0.73	-1.69
	2838.00	9.2400	45.2200	184.42	192.38	2815.73	-181.11	258.45	95.00	1.02	-0.84	-3.44
	2932.00	8.8500	51.0700	194.28	203.36	2908.57	-190.78	273.21	94.00	1.06	-0.41	6.22
	3027.00	8.1400	47.8200	203.39	214.03	3002.52	-199.70	287.24	95.00	0.90	-0.75	-3.42
	3122.00	7.8500	47.2100	212.31	223.78	3096.60	-208.46	300.45	95.00	0.32	-0.31	-0.64
	3217.00	6.4800	44.0900	220.57	232.27	3190.86	-216.57	312.30	95.00	1.50	-1.44	-3.28
	3312.00	4.6600	43.7700	227.21	238.67	3285.40	-223.09	321.52	95.00	1.92	-1.92	-0.34
	3407.00	3.5000	32.9900	232.43	242.92	3380.16	-228.24	328.25	95.00	1.46	-1.22	-11.35
	3499.00	1.3300	58.6100	235.34	245.36	3472.08	-231.11	332.05	92.00	2.58	-2.36	27.85
	3594.00	3.2800	108.3600	235.06	248.88	3567.00	-230.77	335.58	95.00	2.76	2.05	52.37
	3688.00	1.5400	136.0500	233.30	252.31	3660.92	-228.95	339.43	94.00	2.18	-1.85	29.46
	3783.00	1.2600	109.1400	232.04	254.18	3755.89	-227.66	341.69	95.00	0.74	-0.29	-28.33
	3878.00	2.1900	182.2100	229.88	255.10	3850.86	-225.49	344.03	95.00	2.30	0.98	76.92
	3973.00	1.8900	193.6600	226.55	254.66	3945.80	-222.16	347.40	95.00	0.53	-0.32	12.05
	4068.00	1.2900	196.0400	224.00	253.99	4040.76	-219.62	350.03	95.00	0.64	-0.63	2.51
	4163.00	1.2200	218.5500	222.18	253.07	4135.74	-217.82	352.07	95.00	0.52	-0.07	23.69
	4447.00	0.9400	271.3400	219.87	248.85	4419.69	-215.58	356.88	284.00	0.35	-0.10	18.59
	4637.00	1.0200	308.5200	220.96	245.97	4609.67	-216.72	359.96	190.00	0.33	0.04	19.57
	5016.00	1.2800	64.2600	224.90	247.15	4988.63	-220.64	364.07	379.00	0.52	0.07	30.54

	5396.00	1.0100	107.4700	225.74	254.16	5368.56	−221.36	371.14	380.00	0.23	−0.07	11.37
	5680.00	0.5700	61.7500	225.65	257.80	5652.53	−221.21	374.77	284.00	0.26	−0.15	−16.10
	5965.00	0.9800	17.3400	228.65	259.77	5937.51	−224.17	378.36	285.00	0.24	0.14	−15.58
	6249.00	0.6500	314.4800	232.10	259.35	6221.48	−227.63	381.83	284.00	0.32	−0.12	−22.13
	6534.00	0.5800	324.8100	234.41	257.36	6506.47	−229.97	384.88	285.00	0.05	−0.02	3.62
	6819.00	1.6000	205.2100	231.99	254.84	6791.43	−227.60	388.38	285.00	0.69	0.36	−41.96
	6979.00	1.3300	214.3700	228.43	252.84	6951.38	−224.08	392.46	160.00	0.22	−0.17	5.72
	7008.00	1.3100	206.1900	227.86	252.50	6980.37	−223.51	393.12	29.00	0.65	−0.07	−28.21
	7056.00	3.3900	191.0000	225.97	251.99	7028.33	−221.63	395.08	48.00	4.49	4.33	−31.65
	7102.00	7.8500	182.7400	221.50	251.58	7074.10	−217.16	399.57	46.00	9.83	9.70	−17.96

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
	7149.00	11.5400	180.3900	213.59	251.39	7120.42	−209.26	407.48	47.00	7.89	7.85	−5.00
	7197.00	15.6800	176.7800	202.31	251.72	7167.06	−197.97	418.77	48.00	8.80	8.63	−7.52
	7244.00	20.5200	175.3400	187.75	252.75	7211.72	−183.40	433.37	47.00	10.34	10.30	−3.06
	7292.00	26.7000	177.0200	168.57	253.99	7255.68	−164.20	452.58	48.00	12.95	12.88	3.50
	7339.00	32.3800	181.5100	145.43	254.21	7296.56	−141.06	475.73	47.00	12.96	12.09	9.55
	7386.00	35.7100	183.5900	119.15	253.02	7335.50	−114.80	502.03	47.00	7.50	7.09	4.43
	7433.00	39.2300	183.5800	90.62	251.23	7372.80	−86.31	530.62	47.00	7.49	7.49	−0.02
	7481.00	43.5900	182.9500	58.93	249.43	7408.79	−54.65	562.36	48.00	9.12	9.08	−1.31
	7528.00	47.9000	181.8000	25.30	248.05	7441.58	−21.05	596.02	47.00	9.34	9.17	−2.45
	7576.00	53.9200	180.1500	−11.93	247.44	7471.84	16.16	633.25	48.00	12.82	12.54	−3.44
	7623.00	59.2100	178.5400	−51.13	247.91	7497.72	55.37	672.46	47.00	11.61	11.26	−3.43
	7671.00	65.0200	175.9000	−93.49	249.99	7520.17	97.75	714.86	48.00	13.04	12.10	−5.50
	7718.00	67.4100	177.4100	−136.42	252.49	7539.12	140.72	757.87	47.00	5.87	5.09	3.21
	7766.00	69.7500	178.0200	−181.06	254.27	7556.65	185.39	802.55	48.00	5.02	4.87	1.27
	7813.00	71.6100	178.5000	−225.39	255.62	7572.20	229.73	846.90	47.00	4.07	3.96	1.02
	7860.00	74.8300	178.7800	−270.37	256.68	7585.77	274.72	891.89	47.00	6.87	6.85	0.60
	7907.00	80.0200	178.1800	−316.21	257.90	7596.00	320.58	937.75	47.00	11.11	11.04	−1.28
	7955.00	83.6700	177.7300	−363.69	259.60	7602.80	368.08	985.25	48.00	7.66	7.60	−0.94
	8002.00	85.1500	177.8500	−410.43	261.40	7607.38	414.84	1032.03	47.00	3.16	3.15	0.26
	8062.00	89.4100	178.4900	−470.32	263.32	7610.23	474.75	1091.95	60.00	7.18	7.10	1.07
	8156.00	90.3100	179.0700	−564.30	265.32	7610.46	568.75	1185.95	94.00	1.14	0.96	0.62
	8251.00	90.3600	178.7900	−659.28	267.09	7609.90	663.75	1280.94	95.00	0.30	0.05	−0.29
	8346.00	89.1900	179.4400	−754.26	268.56	7610.28	758.75	1375.94	95.00	1.41	−1.23	0.68
	8441.00	89.1300	179.4300	−849.25	269.50	7611.67	853.73	1470.93	95.00	0.06	−0.06	−0.01
	8536.00	88.9300	179.6300	−944.23	270.27	7613.28	948.72	1565.92	95.00	0.30	−0.21	0.21
	8631.00	88.7300	179.5200	−1039.21	270.98	7615.22	1043.69	1660.90	95.00	0.24	−0.21	−0.12
	8726.00	88.1200	177.8300	−1134.14	273.17	7617.83	1138.65	1755.86	95.00	1.89	−0.64	−1.78
	8820.00	87.2500	179.4000	−1228.04	275.45	7621.63	1232.57	1849.78	94.00	1.91	−0.93	1.67
	8915.00	87.4400	180.2800	−1322.93	275.71	7626.03	1327.45	1944.67	95.00	0.95	0.20	0.93
	9010.00	88.6400	180.3900	−1417.87	275.15	7629.28	1422.37	2039.62	95.00	1.27	1.26	0.12
	9105.00	89.7800	179.9500	−1512.86	274.87	7630.59	1517.34	2134.61	95.00	1.29	1.20	−0.46
	9200.00	89.9600	179.8300	−1607.86	275.06	7630.80	1612.33	2229.61	95.00	0.23	0.19	−0.13
	9295.00	90.4000	180.0400	−1702.86	275.16	7630.50	1707.32	2324.60	95.00	0.51	0.46	0.22
	9390.00	89.3200	180.8400	−1797.86	274.43	7630.73	1802.29	2419.60	95.00	1.41	−1.14	0.84
	9485.00	89.2500	181.0700	−1892.83	272.85	7631.92	1897.22	2514.60	95.00	0.25	−0.07	0.24
	9579.00	88.9800	179.9200	−1986.82	272.04	7633.37	1991.18	2608.58	94.00	1.26	−0.29	−1.22
	9674.00	89.1300	179.8500	−2081.81	272.23	7634.94	2086.16	2703.57	95.00	0.17	0.16	−0.07
	9769.00	89.5000	180.8100	−2176.80	271.68	7636.07	2181.12	2798.56	95.00	1.08	0.39	1.01
	9864.00	89.3200	179.3200	−2271.79	271.57	7637.05	2276.10	2893.55	95.00	1.58	−0.19	−1.57
	9959.00	88.7900	179.4700	−2366.77	272.58	7638.62	2371.08	2988.54	95.00	0.58	−0.56	0.16
	10054.00	89.3200	178.4600	−2461.74	274.29	7640.19	2466.07	3083.53	95.00	1.20	0.56	−1.06
	10148.00	90.0600	178.1000	−2555.69	277.11	7640.69	2560.06	3177.52	94.00	0.88	0.79	−0.38
	10243.00	89.7500	178.0700	−2650.64	280.29	7640.85	2655.05	3272.52	95.00	0.33	−0.33	−0.03
	10338.00	89.5900	178.1900	−2745.59	283.39	7641.40	2750.03	3367.52	95.00	0.21	−0.17	0.13
	10433.00	89.4700	178.1700	−2840.54	286.41	7642.18	2845.02	3462.52	95.00	0.13	−0.13	−0.02
	10528.00	89.0600	177.8700	−2935.47	289.69	7643.40	2940.00	3557.51	95.00	0.53	−0.43	−0.32
	10623.00	88.2400	178.6000	−3030.40	292.61	7645.64	3034.96	3652.48	95.00	1.16	−0.86	0.77
	10717.00	88.8400	179.5300	−3124.36	294.15	7648.03	3128.93	3746.45	94.00	1.18	0.64	0.99
	10812.00	88.9400	178.8100	−3219.33	295.52	7649.87	3223.91	3841.43	95.00	0.77	0.11	−0.76
	10907.00	89.1900	179.5600	−3314.30	296.87	7651.42	3318.90	3936.42	95.00	0.83	0.26	0.79

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
	11002.00	88.9800	179.9100	−3409.29	297.31	7652.94	3413.88	4031.41	95.00	0.43	−0.22	0.37
	11097.00	89.7200	178.6700	−3504.27	298.49	7654.02	3508.87	4126.40	95.00	1.52	0.78	−1.31
	11192.00	90.1500	179.3800	−3599.26	300.11	7654.12	3603.87	4221.40	95.00	0.87	0.45	0.75
	11287.00	90.0900	179.7100	−3694.26	300.86	7653.92	3698.86	4316.40	95.00	0.35	−0.06	0.35
	11381.00	89.5900	179.7000	−3788.26	301.34	7654.19	3792.85	4410.40	94.00	0.53	−0.53	−0.01
	11476.00	89.6200	180.1900	−3883.25	301.44	7654.84	3887.84	4505.39	95.00	0.52	0.03	0.52
	11571.00	89.5000	178.1700	−3978.23	302.80	7655.57	3982.83	4600.39	95.00	2.13	−0.13	−2.13
	11666.00	89.2600	178.4600	−4073.19	305.59	7656.60	4077.82	4695.38	95.00	0.40	−0.25	0.31
	11761.00	88.9400	177.6200	−4168.12	308.84	7658.09	4172.79	4790.37	95.00	0.95	−0.34	−0.88
	11855.00	89.5600	176.7300	−4262.00	313.47	7659.32	4266.73	4884.36	94.00	1.15	0.66	−0.95
	11950.00	89.4700	175.9700	−4356.80	319.52	7660.13	4361.63	4979.35	95.00	0.81	−0.09	−0.80
	12045.00	89.0700	175.6200	−4451.54	326.48	7661.34	4456.47	5074.35	95.00	0.56	−0.42	−0.37
	12068.00	88.9500	175.6700	−4474.47	328.23	7661.73	4479.43	5097.34	23.00	0.57	−0.52	0.22
Projection to TD:												
	12122.00	88.9500	175.6700	−4528.30	332.31	7662.72	4533.32	5151.33	54.00	0.00	0.00	0.00