



Real Time Log

Natural Formation Evaluation  
Gamma Ray

Scale:

1:240

True Vertical Depth

Company: Kerr-McGee Oil & Gas Onshore LP

Well: Wirkner-Vance 30N-36HZ

Field: Weld County (Kerr McGee)

Region: Continental US Country: United States

Status:

Final Print

Surface Location:

Latitude: 40° 10' 31.274" N

Longitude: 104° 50' 42.918" W

Other Services:

Directional  
VSS

API Number:  
051233788500

Section:

TWN: 3N

Range: 67W

Permanent Datum (P.D.): Ground Level

Elevation: 4822.00 ft.

Elevations:  
4835.00 ft.  
N/A

Log Measured From: Kelly Bushing

13.00 ft. Above P.D.

KB:

DF:

GL:

Depth Reference:

Driller's Depth

KB:

DF:

GL:

4822.00 ft.

Interval Logged

Dates

Magnetic Field Reference

Top: 6573 ft. Date From: 24/Dec/13 Date To: 31/Dec/13 Dip Angle: 66.97° Az Reference North: True

Bottom: 11656 ft. Date To: 31/Dec/13 Total Mag to Reference

Spud Date: 24/Dec/13 Field Strength: 52712.0 nT North Correction: 8.59°

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
8.750 in.	1010 ft.	7576 ft.	9.625 in.	36.00 lb/ft	0 ft.	1010 ft.
6.125 in.	7576 ft.	11705 ft.	7.000 in.	26.00 lb/ft	1010 ft.	7566 ft.

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based - Fresh	1010 ft.	11705 ft.	8.750 in.	6566 ft.	0.1° / 311.2°	83.5° / 355.5°
			6.125 in.	4129 ft.	83.5° / 355.5°	90.8° / 1.3°
					/	/
					/	/
					/	/
					/	/
					/	/
					/	/
					/	/
					/	/

Acquisition System Software Version

Other

Advantage	2.20U4	Rig / Contractor:	Ensign 138	/ Ensign Drilling
PATS	6.4.1.34	Job No:	2RLYQ02	/ 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	Bottom	From	To	Start		End		
							(ft.)	(ft.)	(ft.)	(ft.)					
1	1	1	8.750	PDC	3.000	Steerable	0	0	1010	1058	25/Dec/2013 02:00		25/Dec/2013 7:30		1.7
2	2	2	8.750	PDC	3.000	Steerable	0	0	1058	6564	25/Dec/2013 8:20		27/Dec/2013 0:30		21.1
3	3	3	8.750	PDC	3.000	Steerable	6573	7525	6564	7576	27/Dec/2013 00:30		28/Dec/2013 12:00		24.98
4	4	4	6.125	PDC	6.000	Steerable	7525	11656	7576	11705	29/Dec/2013 20:00		31/Dec/2013 20:51		35.8

Crew

Name			Arrive			Depart		
			Wellsite			Wellsite		
Brad Jones			24/Dec/2013			25/Dec/2013		
Andrew Overbey			24/Dec/2013			31/Dec/2013		
Tyler Wall			26/Dec/2013			31/Dec/2013		

Jimmy Nguyen	27/Dec/2013	27/Dec/2013	Robert Bartlett	24/Dec/2013	31/Dec/2013	Will Drake	24/Dec/2013	31/Dec/2013				
Steve Martinez	24/Dec/2013	31/Dec/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+  (%)
24/Dec/2013	21:00	1	1018	Water Based - Fresh	8.5	28	8.5	N/A	99/0	Active Mud Pits	800	0.0
25/Dec/2013	21:00	2	3174	Water Based - Fresh	8.4	28	8.7	N/A	99/0	Active Mud Pits	850	0.0
26/Dec/2013	21:00	2	6564	Water Based - Fresh	9.8	36	9.1	N/A	92/1	Active Mud Pits	1100	0.0
27/Dec/2013	21:00	3	6832	Water Based - Fresh	9.8	37	9.3	N/A	91/1	Active Mud Pits	1200	0.0
28/Dec/2013	21:00	3	7576	Water Based - Fresh	10.0	38	9.0	N/A	91/1	Active Mud Pits	1200	0.0
29/Dec/2013	21:00	4	7675	Water Based - Fresh	9.3	33	9.8	N/A	95/1	Active Mud Pits	1400	0.0
30/Dec/2013	21:00	4	9122	Water Based - Fresh	9.2	37	8.9	N/A	94/1	Active Mud Pits	1350	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	12456778	Directional	57.29	6.750	3.250
1	SRIG	12673191	Gamma	53.92	6.750	3.250
2	DIR	12546334	Directional	57.31	6.750	3.250
2	SRIG	11703934	Gamma	53.94	6.750	3.250
3	DIR	12546334	Directional	53.05	6.750	3.250
3	SRIG	11703934	Gamma	49.68	6.750	3.250
4	DIR	11592525	Directional	53.28	4.750	2.625
4	SRIG	12578114	Gamma	49.90	4.750	2.625

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.) Depth measurements obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
- 2.) Baker Hughes run 1 utilized 6 3/4 inch NaviTrak services (Directional only) behind an 8 3/4 inch bit and steerable assembly from 1010 to 1058 feet MD (1010 to

1058 feet TVD).

3.) Baker Hughes run 2 utilized 6 3/4 inch NaviTrak services (Directional only) behind an 8 3/4 inch bit and steerable assembly from 1058 to 6564 feet MD (1058 to 6503 feet TVD).

4.) Baker Hughes run 3 utilized 6 3/4 inch NaviTrak services (Directional only) behind an 8 3/4 inch bit and steerable assembly from 6564 to 6573 feet MD (6503 to 6512 feet TVD).

5.) Baker Hughes run 3 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 8 3/4 inch bit and steerable assembly from 6573 to 7576 feet MD (6512 to 7140 feet TVD).

6.) The interval from 1010 to 6573 feet MD (1010 to 6512 feet TVD) was not logged due to directional only services being provided through the straight-hole and nudge section for Baker Hughes runs 1, 2, and 3.

7.) Baker Hughes run 4 utilized 4 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 6 1/8 inch bit and steerable assembly from 7576 to 11705 feet MD (7140 to 7129 feet TVD).

8.) The interval from 11656 to 11705 feet MD (7130 to 7129 feet TVD) was not logged due gamma ray sensor to bit offset.

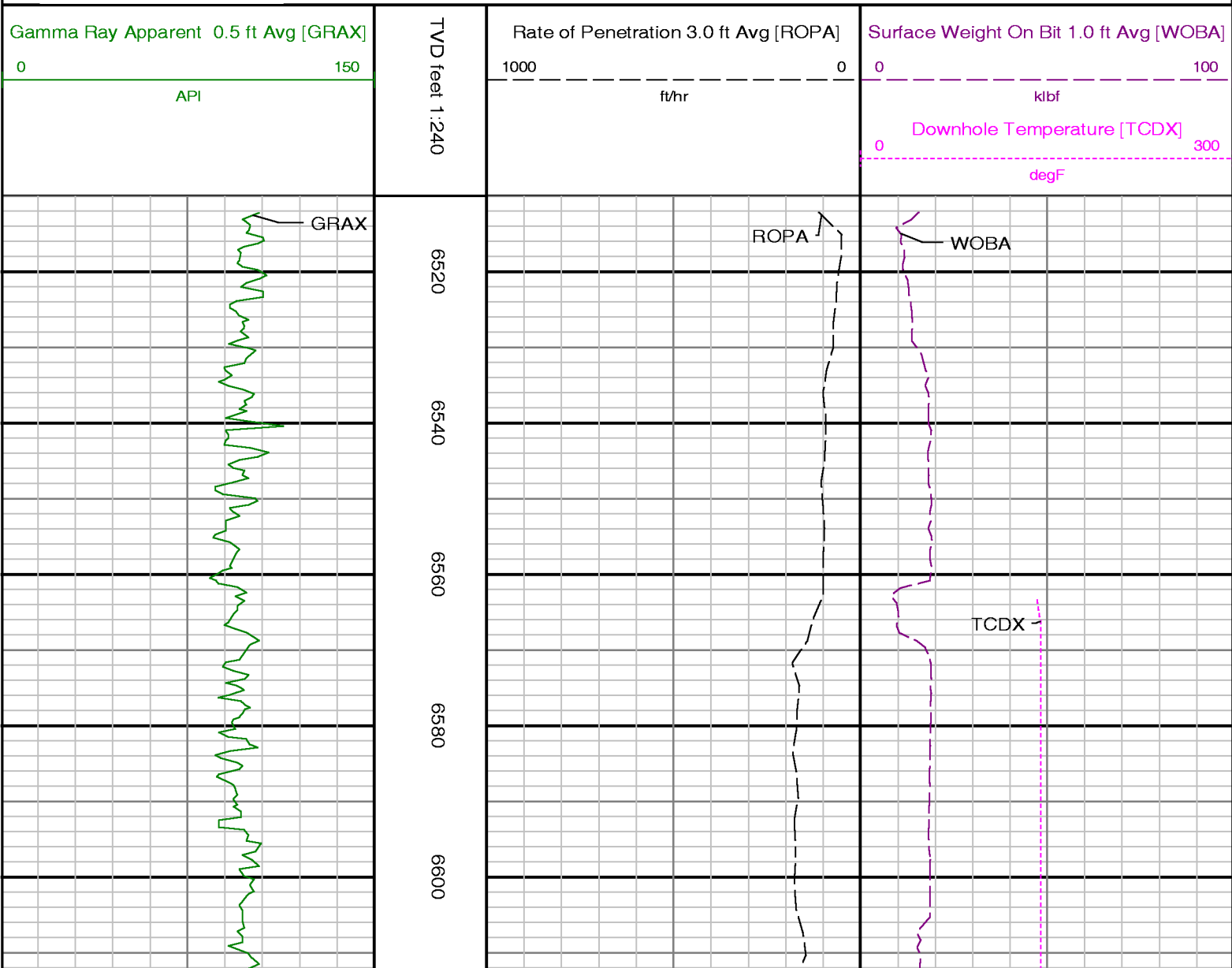


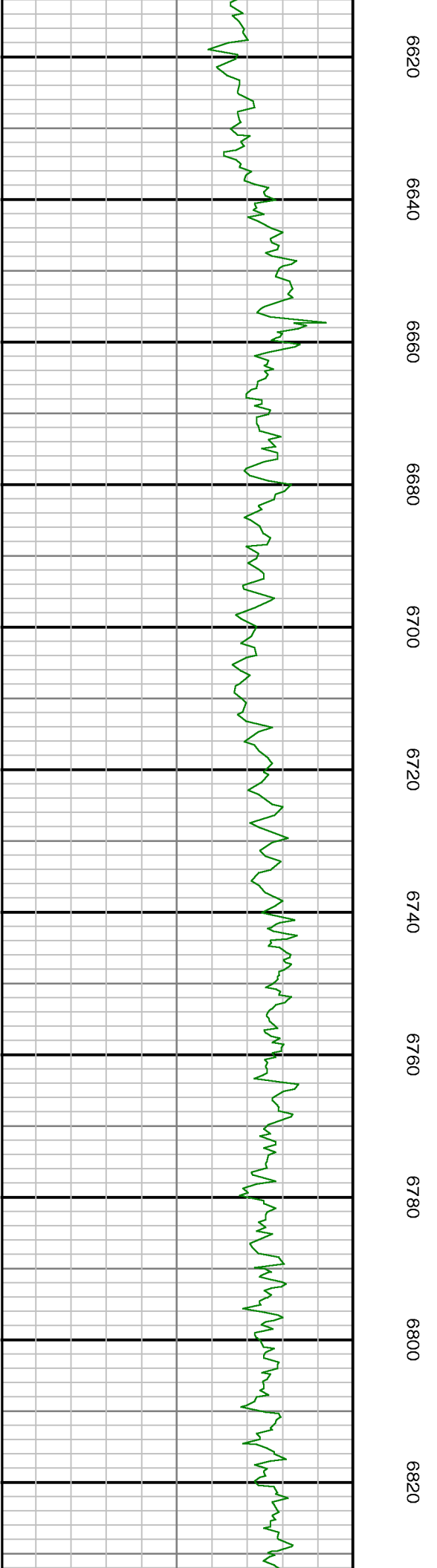
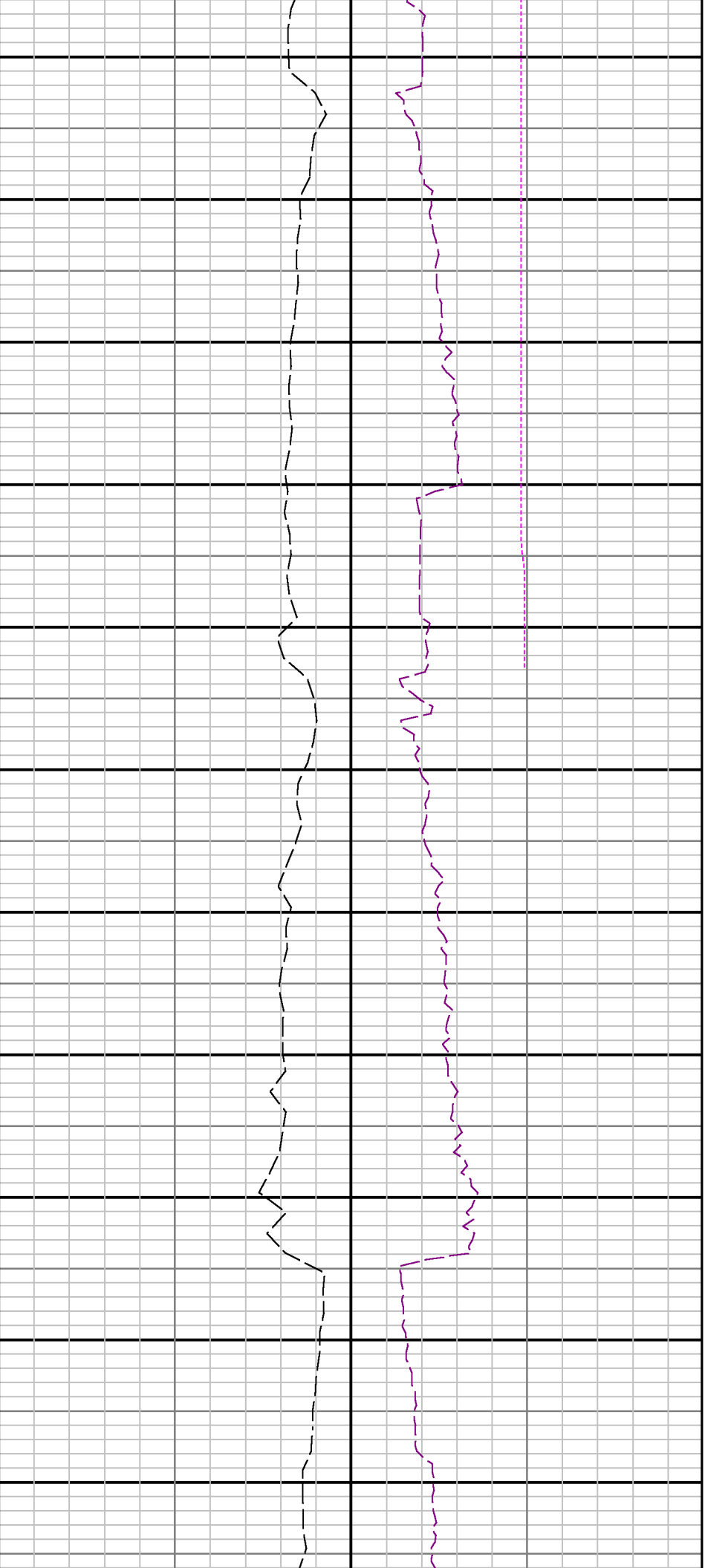
Company : Kerr-McGee Oil & Gas Onshore LP

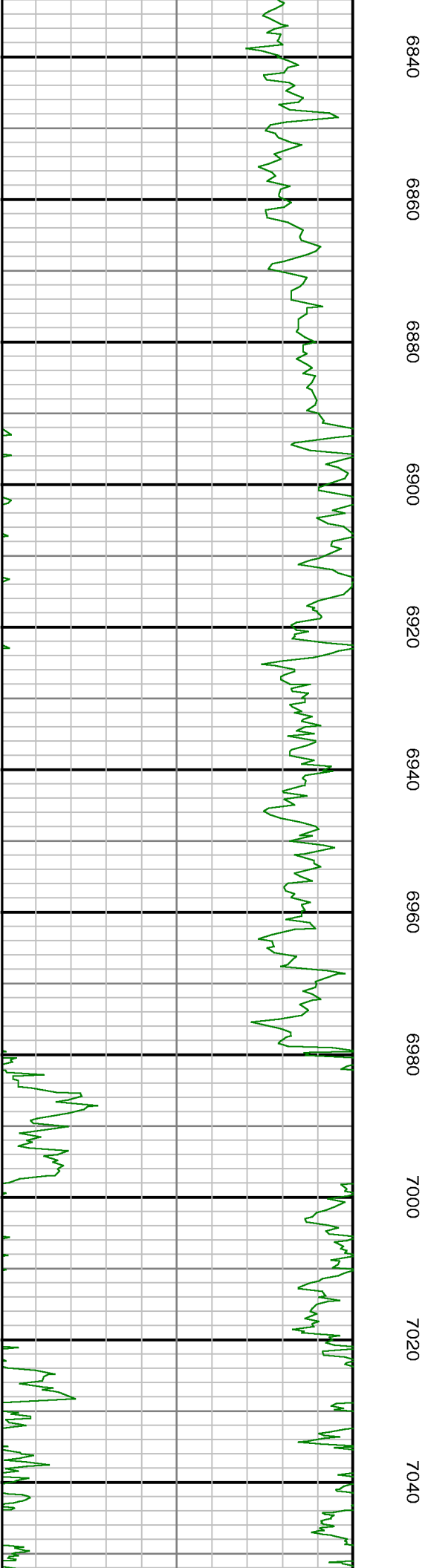
Well : Wirkner-Vance 30N-36HZ

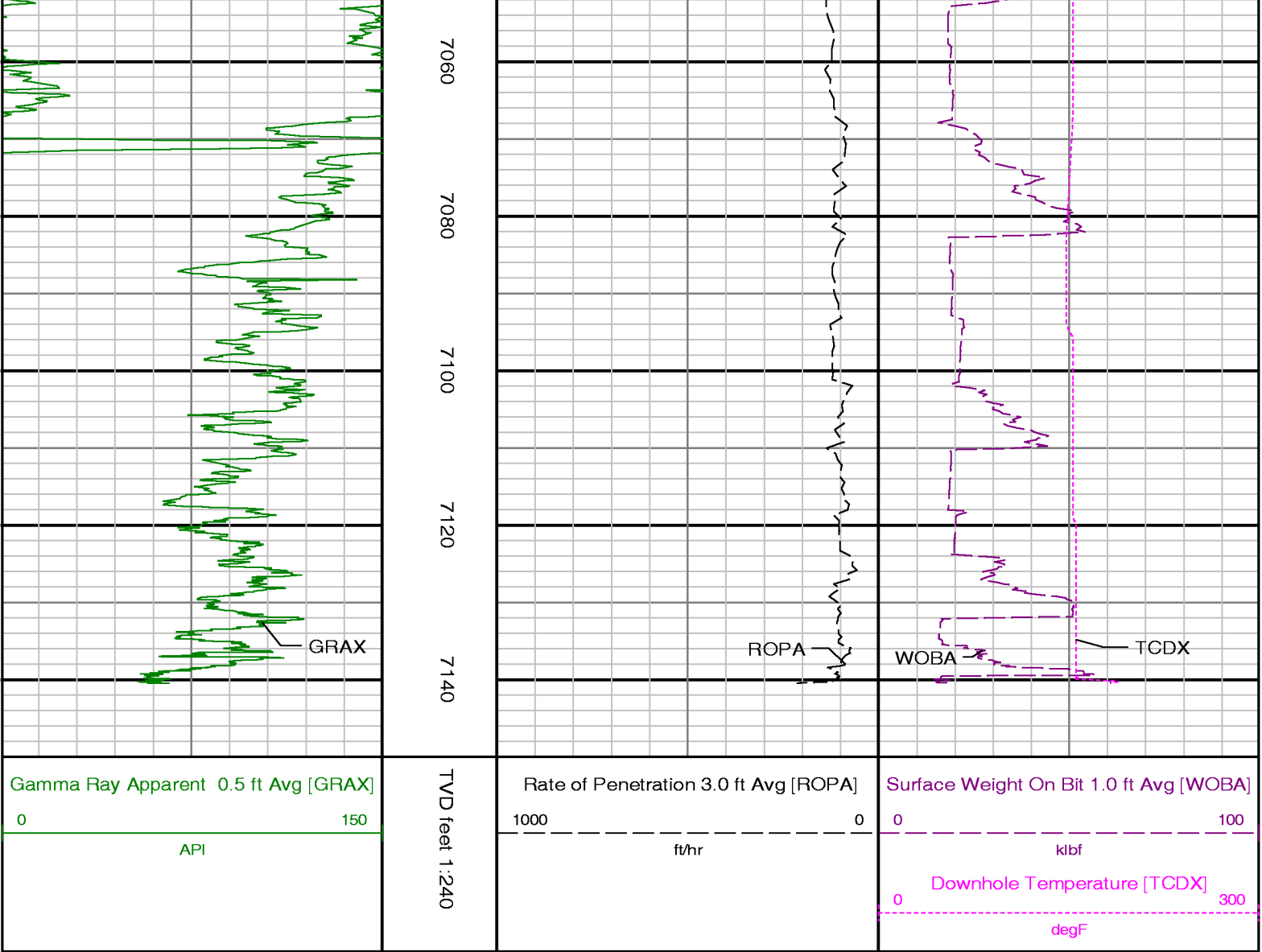
Interval : 6510.00 - 7150.00 feet

Created : 31/Dec/2013 8:54:18 PM









ADVANTAGE Field Survey Listing

Operator : Kerr-McGee Oil & Gas Onshore LP	Field : Weld County (Kerr McGee)	API No : 051233788500
Well : Wirkner-Vance 30N-36HZ	Rig : Ensign 138	Job : 2RLYQ32
Wellbore : Wirkner-Vance 30N-36HZ Orig Hole		

Well Origin

Latitude	40.1754 deg	Longitude	-104.8453 deg
North Reference	True	Drill Depth Zero	Kelly Bushing
Vertical Datum is	Mean Sea Level	Vertical Datum to DDZ	4835.00 ft
Vertical Section North	0.00 ft	Vertical Section East	0.00 ft
Vertical Section Azimuth	359.5500 deg	Vertical Section Depth	0.00ft
Grid Convergence	0.0000 deg	Magnetic Declination	8.5900 deg
Total Correction	8.5900 deg	TVD Calculation Method	Minimal Curvature
D-Raw Calculation	Magcorr1	Local Magnetic Field	52712 nT
Local Magnetic Dip Angle	66.9700 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
	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00				
	13.00	0.0000	347.2300	0.00	0.00	13.00	0.00	0.00	13.00	0.00	0.00	-98.23
	113.00	0.7300	347.2300	0.62	-0.14	113.00	0.62	0.64	100.00	0.73	0.73	0.00
	213.00	0.6400	348.4800	1.79	-0.39	212.99	1.79	1.83	100.00	0.09	-0.09	1.25

	313.00	0.6000	338.0600	2.82	-0.70	312.98	2.83	2.91	100.00	0.12	-0.04	-10.42
	413.00	0.4700	314.2000	3.59	-1.19	412.98	3.60	3.82	100.00	0.26	-0.13	-23.86
	513.00	0.4000	330.0100	4.18	-1.66	512.98	4.20	4.58	100.00	0.14	-0.07	15.81
	613.00	0.3400	321.6900	4.72	-2.02	612.98	4.73	5.22	100.00	0.08	-0.06	-8.32
	713.00	0.2600	327.7100	5.14	-2.32	712.97	5.16	5.74	100.00	0.09	-0.08	6.02
	813.00	0.3400	287.5100	5.42	-2.73	812.97	5.44	6.24	100.00	0.22	0.08	-40.20
	913.00	0.1500	216.2100	5.41	-3.09	912.97	5.43	6.60	100.00	0.32	-0.19	-71.30
	938.00	0.1200	311.2100	5.40	-3.13	937.97	5.42	6.64	25.00	0.80	-0.12	380.00
	1080.00	0.1000	302.7000	5.56	-3.34	1079.97	5.59	6.91	142.00	0.02	-0.01	-5.99
	1353.00	0.3000	358.2000	6.41	-3.56	1352.97	6.43	7.78	273.00	0.09	0.07	20.33
	1444.00	2.4000	260.1000	6.32	-5.45	1443.94	6.36	9.67	91.00	2.70	2.31	-107.80
	1554.00	4.3000	240.1000	3.86	-11.29	1553.75	3.95	16.00	110.00	2.00	1.73	-18.18
	1645.00	5.7000	229.2000	-0.79	-17.67	1644.41	-0.65	23.90	91.00	1.85	1.54	-11.98
	1735.00	7.2000	230.4000	-7.31	-25.40	1733.83	-7.11	34.01	90.00	1.67	1.67	1.33
	1826.00	8.5000	232.1000	-15.07	-35.10	1823.98	-14.80	46.44	91.00	1.45	1.43	1.87
	1917.00	9.6000	235.2000	-23.53	-46.64	1913.85	-23.17	60.75	91.00	1.32	1.21	3.41
	2098.00	10.0000	230.0000	-42.25	-71.07	2092.21	-41.69	91.52	181.00	0.54	0.22	-2.87
	2281.00	10.3000	235.1000	-61.82	-96.66	2272.35	-61.06	123.74	183.00	0.52	0.16	2.79
	2464.00	11.2000	234.4000	-81.53	-124.53	2452.13	-80.55	157.87	183.00	0.50	0.49	-0.38
	2646.00	11.6000	234.6000	-102.42	-153.82	2630.54	-101.21	193.85	182.00	0.22	0.22	0.11
	2830.00	12.2000	241.7000	-122.35	-186.02	2810.60	-120.89	231.72	184.00	0.86	0.33	3.86
	2922.00	12.0000	236.9000	-132.19	-202.59	2900.56	-130.59	250.99	92.00	1.11	-0.22	-5.22
	3013.00	10.9000	235.8000	-142.19	-217.63	2989.74	-140.47	269.05	91.00	1.23	-1.21	-1.21
	3106.00	12.4000	233.3000	-153.10	-232.91	3080.83	-151.26	287.82	93.00	1.70	1.61	-2.69
	3297.00	10.4000	231.0000	-176.21	-262.76	3268.05	-174.14	325.57	191.00	1.07	-1.05	-1.20
	3391.00	11.4000	237.4000	-186.55	-277.18	3360.36	-184.37	343.32	94.00	1.67	1.06	6.81
	3486.00	12.1000	234.1000	-197.45	-293.15	3453.37	-195.14	362.65	95.00	1.02	0.74	-3.47
	3580.00	11.5000	233.4000	-208.81	-308.65	3545.38	-206.38	381.88	94.00	0.66	-0.64	-0.74
	3676.00	11.1000	233.3000	-220.04	-323.75	3639.52	-217.49	400.69	96.00	0.42	-0.42	-0.10
	3771.00	12.0000	237.4000	-230.83	-339.40	3732.59	-228.15	419.70	95.00	1.28	0.95	4.32
	3868.00	11.2000	237.8000	-241.28	-355.87	3827.61	-238.48	439.20	97.00	0.83	-0.82	0.41
	3963.00	12.9000	239.5000	-251.58	-372.81	3920.52	-248.64	459.03	95.00	1.83	1.79	1.79
	4153.00	10.9000	240.8000	-271.11	-406.77	4106.42	-267.91	498.20	190.00	1.06	-1.05	0.68
	4247.00	10.5000	236.3000	-280.20	-421.65	4198.79	-276.88	515.64	94.00	0.99	-0.43	-4.79
	4342.00	11.4000	231.4000	-290.86	-436.19	4292.06	-287.42	533.67	95.00	1.36	0.95	-5.16
	4436.00	11.7000	230.5000	-302.72	-450.81	4384.16	-299.17	552.49	94.00	0.37	0.32	-0.96
	4530.00	11.3000	229.4000	-314.77	-465.16	4476.27	-311.11	571.23	94.00	0.49	-0.43	-1.17
	4624.00	10.3000	234.4000	-325.66	-478.98	4568.61	-321.89	588.83	94.00	1.46	-1.06	5.32
	4718.00	9.3000	243.6000	-333.93	-492.62	4661.24	-330.05	604.78	94.00	1.97	-1.06	9.79
	4813.00	8.2000	243.0000	-340.42	-505.53	4755.13	-336.44	619.23	95.00	1.16	-1.16	-0.63
	4907.00	7.7000	243.9000	-346.23	-517.16	4848.23	-342.16	632.23	94.00	0.55	-0.53	0.96
	5002.00	6.8000	233.4000	-352.38	-527.39	4942.47	-348.23	644.17	95.00	1.68	-0.95	-11.05
	5097.00	4.3000	237.5000	-357.65	-534.91	5037.02	-353.44	653.35	95.00	2.66	-2.63	4.32
	5191.00	2.5000	239.4000	-360.59	-539.65	5130.85	-356.34	658.93	94.00	1.92	-1.91	2.02
	5286.00	0.4000	307.3000	-361.44	-541.70	5225.82	-357.18	661.14	95.00	2.50	-2.21	71.47
	5759.00	1.3000	283.4000	-359.20	-548.23	5698.76	-354.88	668.05	473.00	0.20	0.19	-5.05
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
	5853.00	0.9000	51.3000	-358.49	-548.69	5792.75	-354.17	668.90	94.00	2.11	-0.43	136.06
	6327.00	0.7000	330.9000	-353.63	-547.19	6266.72	-349.32	673.98	474.00	0.22	-0.04	-16.96
	6613.00	7.1000	346.4000	-334.91	-552.20	6551.91	-330.56	693.37	286.00	2.25	2.24	5.42
	6707.00	10.7000	344.8000	-320.84	-555.86	6644.77	-316.46	707.90	94.00	3.84	3.83	-1.70
	6801.00	14.9000	355.3000	-300.36	-559.14	6736.42	-295.96	728.64	94.00	5.09	4.47	11.17
	6848.00	19.7000	1.6000	-286.41	-559.41	6781.29	-282.01	742.60	47.00	10.95	10.21	13.40
	6896.00	24.9000	359.9000	-268.20	-559.21	6825.68	-263.80	760.80	48.00	10.92	10.83	-3.54
	6990.00	36.6000	357.0000	-220.26	-560.71	6906.33	-215.85	808.77	94.00	12.54	12.45	-3.09
	7085.00	47.0000	359.1000	-157.07	-562.75	6977.06	-152.64	871.99	95.00	11.04	10.95	2.21
	7180.00	59.5000	0.9000	-81.10	-562.65	7033.79	-76.68	947.96	95.00	13.24	13.16	1.89
	7274.00	68.8000	2.6000	3.35	-560.02	7074.73	7.75	1032.45	94.00	10.03	9.89	1.81
	7369.00	74.3000	1.1000	93.38	-557.13	7104.79	97.76	1122.53	95.00	5.98	5.79	-1.58
	7464.00	78.6000	356.9000	185.68	-558.77	7127.05	190.06	1214.84	95.00	6.24	4.53	-4.42
	7522.00	83.5000	355.5000	242.83	-562.57	7136.07	247.24	1272.12	58.00	8.78	8.45	-2.41
	7592.00	89.5000	358.4000	312.56	-566.28	7140.34	317.00	1341.95	70.00	9.52	8.57	4.14

	7688.00	91.5000	358.0000	408.51	-569.30	7139.50	412.96	1437.94	96.00	2.12	2.08	-0.42
	7782.00	92.6000	357.9000	502.38	-572.66	7136.14	506.87	1531.88	94.00	1.18	1.17	-0.11
	7876.00	92.8000	358.0000	596.22	-576.01	7131.71	600.72	1625.77	94.00	0.24	0.21	0.11
	7970.00	92.6000	358.3000	690.07	-579.05	7127.29	694.59	1719.67	94.00	0.38	-0.21	0.32
	8065.00	91.6000	358.7000	784.97	-581.53	7123.80	789.51	1814.61	95.00	1.13	-1.05	0.42
	8159.00	89.7000	357.9000	878.92	-584.32	7122.74	883.48	1908.59	94.00	2.19	-2.02	-0.85
	8254.00	89.7000	358.0000	973.85	-587.72	7123.24	978.44	2003.59	95.00	0.11	0.00	0.11
	8349.00	89.8000	358.9000	1068.82	-590.29	7123.65	1073.42	2098.59	95.00	0.95	0.11	0.95
	8538.00	90.1000	357.6000	1257.72	-596.06	7123.81	1262.37	2287.59	189.00	0.71	0.16	-0.69
	8633.00	89.2000	357.4000	1352.63	-600.20	7124.40	1357.30	2382.58	95.00	0.97	-0.95	-0.21
	8728.00	89.2000	356.7000	1447.50	-605.09	7125.72	1452.20	2477.57	95.00	0.74	0.00	-0.74
	8823.00	89.4000	356.8000	1542.34	-610.48	7126.88	1547.08	2572.57	95.00	0.24	0.21	0.11
	9013.00	90.6000	357.3000	1732.08	-620.25	7126.88	1736.90	2762.56	190.00	0.68	0.63	0.26
	9108.00	90.9000	356.9000	1826.95	-625.06	7125.64	1831.80	2857.55	95.00	0.53	0.32	-0.42
	9202.00	90.9000	357.8000	1920.84	-629.41	7124.16	1925.72	2951.54	94.00	0.96	0.00	0.96
	9297.00	91.1000	357.3000	2015.73	-633.47	7122.50	2020.65	3046.53	95.00	0.57	0.21	-0.53
	9392.00	89.9000	358.3000	2110.66	-637.11	7121.68	2115.60	3141.52	95.00	1.64	-1.26	1.05
	9486.00	88.6000	358.5000	2204.61	-639.74	7122.91	2209.57	3235.51	94.00	1.40	-1.38	0.21
	9581.00	90.2000	358.6000	2299.57	-642.14	7123.90	2304.55	3330.50	95.00	1.69	1.68	0.11
	9676.00	89.4000	359.0000	2394.55	-644.13	7124.23	2399.54	3425.50	95.00	0.94	-0.84	0.42
	9770.00	89.8000	359.3000	2488.54	-645.52	7124.89	2493.53	3519.50	94.00	0.53	0.43	0.32
	9865.00	89.4000	359.3000	2583.53	-646.69	7125.55	2588.53	3614.50	95.00	0.42	-0.42	0.00
	9960.00	89.3000	0.8000	2678.52	-646.60	7126.63	2683.51	3709.49	95.00	1.58	-0.11	1.58
	10055.00	89.5000	1.9000	2773.49	-644.36	7127.62	2778.46	3804.48	95.00	1.18	0.21	1.16
	10150.00	88.9000	1.6000	2868.43	-641.46	7128.95	2873.38	3899.47	95.00	0.71	-0.63	-0.32
	10244.00	89.6000	1.3000	2962.39	-639.09	7130.18	2967.32	3993.46	94.00	0.81	0.74	-0.32
	10339.00	90.4000	1.5000	3057.36	-636.76	7130.18	3062.27	4088.46	95.00	0.87	0.84	0.21
	10624.00	91.4000	1.5000	3342.23	-629.30	7125.70	3347.07	4373.42	285.00	0.35	0.35	0.00
	10718.00	90.2000	1.8000	3436.18	-626.60	7124.39	3440.99	4467.41	94.00	1.32	-1.28	0.32
	10910.00	89.7000	2.2000	3628.06	-619.90	7124.56	3632.82	4659.41	192.00	0.33	-0.26	0.21
	11099.00	89.6000	1.5000	3816.96	-613.80	7125.71	3821.66	4848.40	189.00	0.37	-0.05	-0.37
	11288.00	89.0000	1.5000	4005.88	-608.85	7128.02	4010.53	5037.39	189.00	0.32	-0.32	0.00
	11382.00	89.7000	1.2000	4099.84	-606.64	7129.09	4104.48	5131.38	94.00	0.81	0.74	-0.32
	11478.00	89.2000	1.4000	4195.81	-604.46	7130.01	4200.43	5227.38	96.00	0.56	-0.52	0.21
	11652.00	90.8000	1.3000	4369.76	-600.36	7130.01	4374.34	5401.37	174.00	0.92	0.92	-0.06
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