



Site: Wethington 21-7 Pad
Well: Wethington 8-7
Wellbore: Wellbore #1
Design: Plan #1

Reference Details - WELL CENTRE
Geodetic System: US State Plane 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone
Northing: 1268635.84
Easting: 3190189.47
Latitude: 40° 4' 7.637 N
Longitude: 104° 49' 13.638 W
Grid Convergence: 0.44° West
Ground Elevation: 4902.00
KB Elevation: WELL @ 4917.00ft (Original Well Elev)



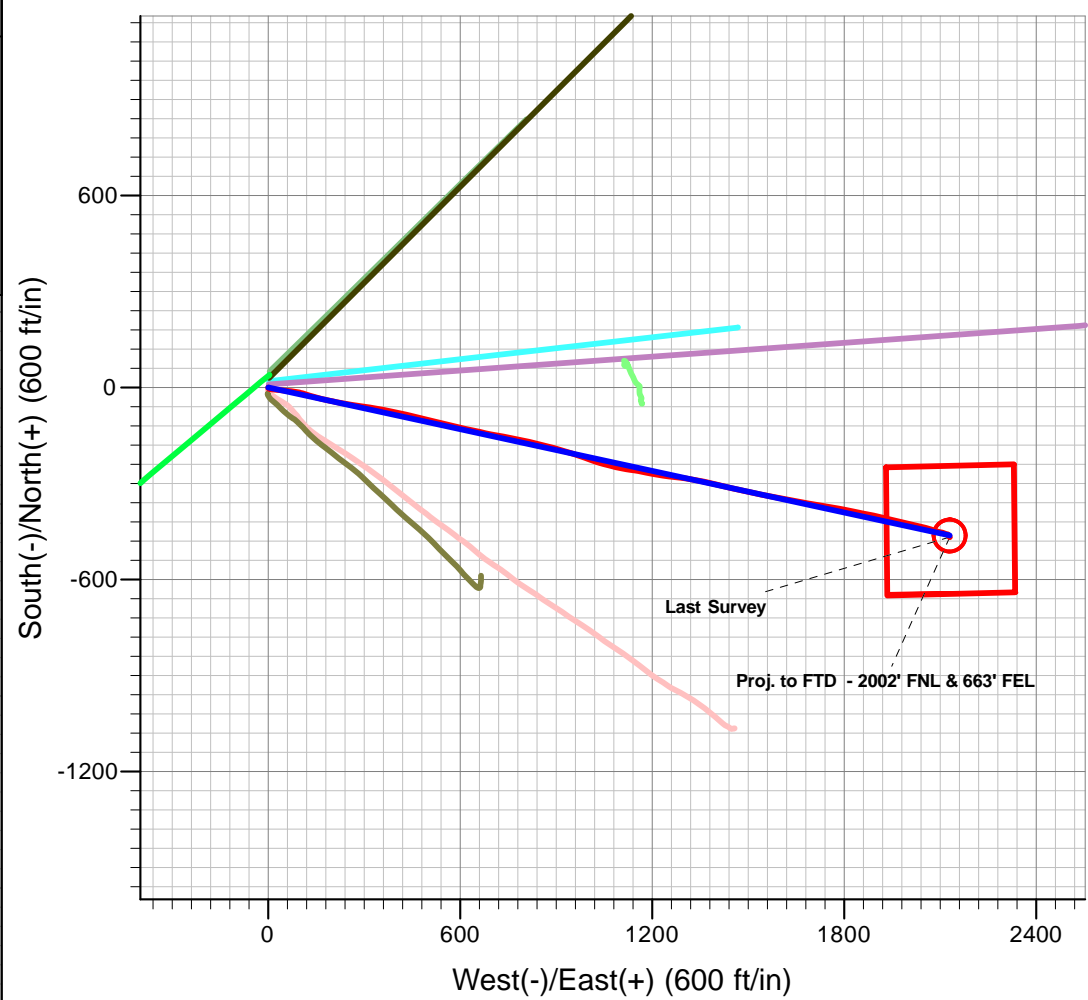
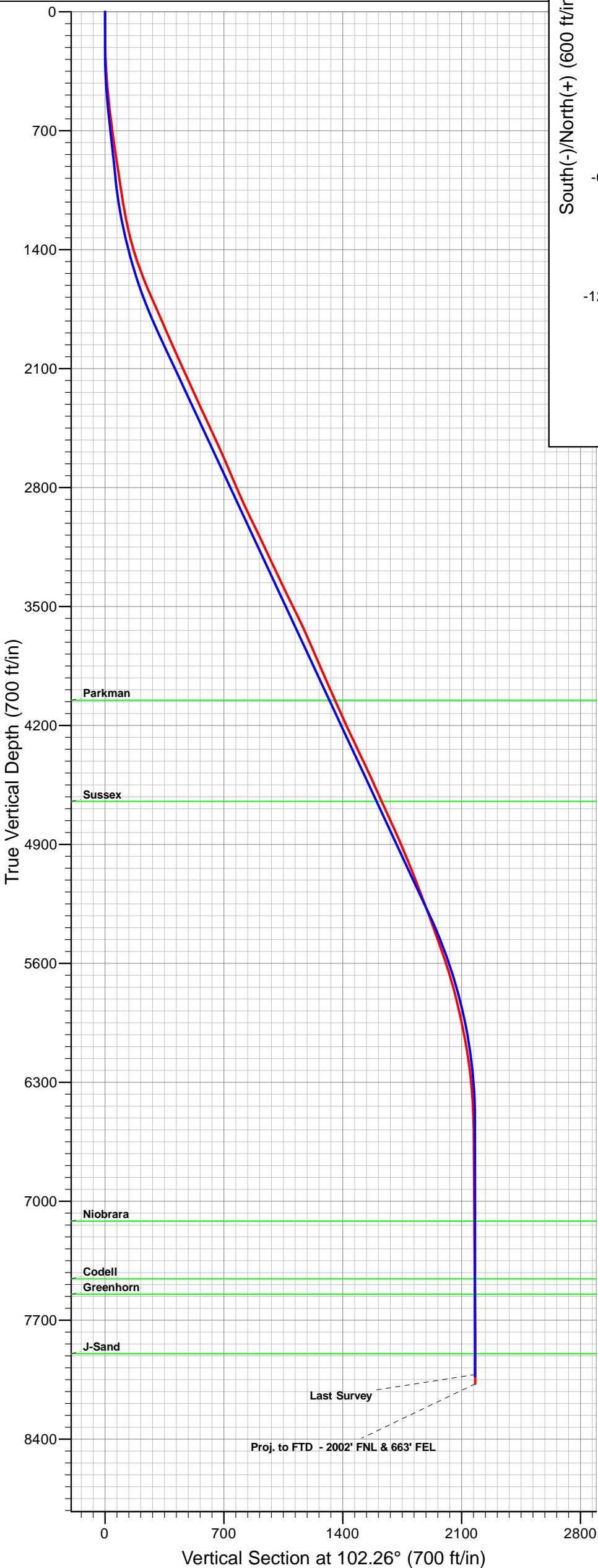
Departure
Energy Services (US) L.P.

Denver, Colorado
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Casper, Wyoming
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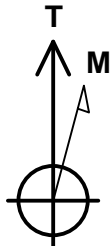
ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Closure	Annotation
250.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	KOP - Build at 2°/100'
549.45	550.00	6.00	102.26	-3.33	15.34	15.69	15.69	End of Build - Hold at 6° Inc.
979.45	982.37	6.00	102.26	-12.93	59.50	60.89	60.89	Build at 2°/100'
1890.76	1932.42	25.00	102.26	-66.58	306.47	313.62	313.62	End of Build - Hold at 25° Inc.
5314.61	5710.25	25.00	102.26	-405.54	1866.71	1910.26	1910.26	Drop at 2°/100'
6525.36	6960.29	0.00	0.00	-462.53	2129.02	2178.69	2178.69	End of Drop
8032.00	8466.93	0.00	0.00	-462.53	2129.02	2178.69	2178.69	PBHL - 1980' FNL & 660' FEL



FORMATION TOP DETAILS

TVDPPath	MDPath	Formation
4052.00	4317.10	Parkman
4647.00	4973.62	Sussex
7117.00	7551.93	Niobrara
7457.00	7891.93	Codell
7547.00	7981.93	Greenhorn
7897.00	8331.93	J-Sand



Azimuths to True North
Magnetic North: 8.83°

Magnetic Field
Strength: 52926.3snT
Dip Angle: 66.77°
Date: 09/06/2011
Model: IGRF2010



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Anadarko Petroleum Corporation

Weld County, Colorado

Section 7 - Township 1 North - Range 66 West

Wethington 8-7

S-Well

Final Surveys

Job Number: 311031

Surface location

NAD 83

Lat: 40.068788°N

Long: 104.812848°W

Final Survey Report

September 17, 2011

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Wethington 8-7
Project:	Weld County, Colorado (Northern Zone)	TVD Reference:	WELL @ 4917.00ft (Original Well Elev)
Site:	Wethington 21-7 Pad	MD Reference:	WELL @ 4917.00ft (Original Well Elev)
Well:	Wethington 8-7	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM Depart

Project	Weld County, Colorado (Northern Zone)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	Wethington 21-7 Pad, Sec 7-T1N-R66W				
Site Position:		Northing:	1,268,685.79 ft	Latitude:	40° 4' 8.130 N
From:	Lat/Long	Easting:	3,190,193.28 ft	Longitude:	104° 49' 13.584 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.44 °

Well	Wethington 8-7					
Well Position	+N/-S	0.00 ft	Northing:	1,268,635.84 ft	Latitude:	40° 4' 7.637 N
	+E/-W	0.00 ft	Easting:	3,190,189.47 ft	Longitude:	104° 49' 13.638 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,902.00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	09/06/11	8.83	66.77	52,926

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	102.26	

Survey Program	Date	09/17/11			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
42.00	8,495.00	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42.00	1.10	184.20	42.00	-0.40	-0.03	0.06	2.62	2.62	0.00
73.00	0.90	175.80	72.99	-0.94	-0.03	0.17	0.80	-0.65	-27.10
133.00	0.90	173.70	132.99	-1.88	0.05	0.45	0.05	0.00	-3.50
191.00	1.10	142.40	190.98	-2.77	0.44	1.02	0.99	0.34	-53.97
281.00	2.10	118.10	280.94	-4.24	2.42	3.27	1.32	1.11	-27.00
375.00	3.90	101.30	374.81	-5.67	7.08	8.12	2.11	1.91	-17.87
465.00	5.50	94.90	464.51	-6.64	14.38	15.46	1.87	1.78	-7.11
556.00	6.70	94.20	554.99	-7.40	24.02	25.04	1.32	1.32	-0.77
647.00	6.90	93.90	645.35	-8.16	34.77	35.71	0.22	0.22	-0.33

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Well:	Wethington 8-7	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM Depart

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
738.00	7.90	93.20	735.59	-8.88	46.46	47.29	1.10	1.10	-0.77	
828.00	8.60	98.10	824.66	-10.18	59.30	60.11	1.10	0.78	5.44	
859.00	8.60	98.40	855.31	-10.84	63.89	64.73	0.14	0.00	0.97	
961.00	9.00	98.10	956.11	-13.08	79.33	80.30	0.39	0.39	-0.29	
1,052.00	8.00	98.40	1,046.11	-15.01	92.64	93.72	1.10	-1.10	0.33	
1,143.00	10.00	105.80	1,135.99	-18.09	106.51	107.92	2.54	2.20	8.13	
1,233.00	11.40	109.00	1,224.42	-23.11	122.44	124.56	1.69	1.56	3.56	
1,324.00	13.70	105.80	1,313.24	-28.97	141.32	144.25	2.64	2.53	-3.52	
1,415.00	16.50	103.70	1,401.09	-34.97	164.25	167.93	3.13	3.08	-2.31	
1,506.00	19.40	102.70	1,487.65	-41.35	191.55	195.96	3.20	3.19	-1.10	
1,596.00	21.60	99.90	1,571.95	-47.49	222.46	227.47	2.68	2.44	-3.11	
1,687.00	23.60	99.20	1,655.96	-53.28	256.94	262.39	2.22	2.20	-0.77	
1,778.00	24.10	98.80	1,739.19	-59.04	293.28	299.13	0.58	0.55	-0.44	
1,869.00	23.60	99.90	1,822.42	-65.01	329.59	335.88	0.74	-0.55	1.21	
1,959.00	23.20	100.60	1,905.01	-71.37	364.76	371.60	0.54	-0.44	0.78	
2,054.00	24.60	100.60	1,991.87	-78.45	402.59	410.07	1.47	1.47	0.00	
2,145.00	24.30	103.70	2,074.71	-86.37	439.40	447.72	1.45	-0.33	3.41	
2,236.00	24.30	103.70	2,157.65	-95.24	475.78	485.16	0.00	0.00	0.00	
2,327.00	24.30	104.80	2,240.59	-104.45	512.08	522.58	0.50	0.00	1.21	
2,417.00	25.00	104.10	2,322.38	-113.82	548.43	560.09	0.84	0.78	-0.78	
2,508.00	25.00	101.60	2,404.86	-122.37	585.91	598.54	1.16	0.00	-2.75	
2,599.00	25.00	102.30	2,487.33	-130.33	623.54	636.99	0.33	0.00	0.77	
2,690.00	24.30	103.70	2,570.04	-138.86	660.52	674.94	1.00	-0.77	1.54	
2,780.00	23.20	100.90	2,652.42	-146.60	695.92	711.18	1.75	-1.22	-3.11	
2,871.00	23.20	99.90	2,736.06	-153.07	731.18	747.01	0.43	0.00	-1.10	
2,962.00	23.20	100.90	2,819.70	-159.54	766.44	782.84	0.43	0.00	1.10	
3,053.00	25.00	102.00	2,902.77	-166.93	802.85	819.99	2.04	1.98	1.21	
3,143.00	25.90	104.40	2,984.04	-175.77	840.49	858.65	1.52	1.00	2.67	
3,234.00	26.20	104.80	3,065.79	-185.85	879.16	898.58	0.38	0.33	0.44	
3,325.00	25.30	105.10	3,147.75	-196.05	917.36	938.07	1.00	-0.99	0.33	
3,415.00	25.30	109.70	3,229.13	-207.54	954.04	976.35	2.18	0.00	5.11	
3,506.00	25.20	109.70	3,311.44	-220.62	990.58	1,014.84	0.11	-0.11	0.00	
3,597.00	26.20	107.60	3,393.43	-233.23	1,027.97	1,054.05	1.49	1.10	-2.31	
3,688.00	26.20	104.80	3,475.09	-244.44	1,066.54	1,094.13	1.36	0.00	-3.08	
3,779.00	26.20	100.60	3,556.75	-253.26	1,105.71	1,134.28	2.04	0.00	-4.62	
3,869.00	24.50	97.40	3,638.08	-259.32	1,143.75	1,172.74	2.43	-1.89	-3.56	
3,960.00	23.60	102.30	3,721.19	-265.63	1,180.27	1,209.76	2.41	-0.99	5.38	
4,051.00	23.20	99.50	3,804.71	-272.47	1,215.75	1,245.88	1.30	-0.44	-3.08	
4,142.00	23.90	97.70	3,888.13	-277.90	1,251.69	1,282.16	1.10	0.77	-1.98	
4,233.00	23.90	96.00	3,971.33	-282.30	1,288.29	1,318.86	0.76	0.00	-1.87	
4,324.00	23.90	100.20	4,054.53	-287.49	1,324.77	1,355.61	1.87	0.00	4.62	
4,414.00	24.30	101.30	4,136.68	-294.35	1,360.87	1,392.34	0.67	0.44	1.22	
4,505.00	25.00	102.70	4,219.39	-302.24	1,397.99	1,430.29	1.00	0.77	1.54	
4,596.00	25.30	104.40	4,301.77	-311.31	1,435.59	1,468.95	0.86	0.33	1.87	

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Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,687.00	25.30	103.40	4,384.04	-320.65	1,473.34	1,507.83	0.47	0.00	-1.10
4,777.00	25.70	102.00	4,465.27	-329.16	1,511.13	1,546.57	0.80	0.44	-1.56
4,868.00	23.90	101.30	4,547.88	-336.88	1,548.51	1,584.73	2.00	-1.98	-0.77
4,959.00	24.30	99.20	4,630.95	-343.48	1,585.07	1,621.86	1.04	0.44	-2.31
5,050.00	24.30	100.90	4,713.88	-350.02	1,621.94	1,659.28	0.77	0.00	1.87
5,141.00	25.00	100.90	4,796.59	-357.19	1,659.21	1,697.22	0.77	0.77	0.00
5,232.00	23.20	100.60	4,879.66	-364.13	1,695.72	1,734.37	1.98	-1.98	-0.33
5,322.00	22.30	97.40	4,962.66	-369.59	1,730.08	1,769.10	1.70	-1.00	-3.56
5,413.00	22.20	99.90	5,046.88	-374.77	1,764.13	1,803.48	1.05	-0.11	2.75
5,504.00	20.90	101.60	5,131.52	-380.99	1,796.97	1,836.89	1.58	-1.43	1.87
5,595.00	20.80	102.30	5,216.56	-387.69	1,828.66	1,869.28	0.30	-0.11	0.77
5,686.00	20.60	101.60	5,301.69	-394.36	1,860.13	1,901.45	0.35	-0.22	-0.77
5,776.00	20.10	101.30	5,386.07	-400.57	1,890.80	1,932.74	0.57	-0.56	-0.33
5,867.00	19.50	104.10	5,471.69	-407.33	1,920.87	1,963.56	1.23	-0.66	3.08
5,958.00	19.00	101.30	5,557.60	-413.94	1,950.12	1,993.55	1.15	-0.55	-3.08
6,049.00	17.20	103.40	5,644.10	-419.96	1,977.74	2,021.81	2.10	-1.98	2.31
6,139.00	15.80	105.10	5,730.39	-426.23	2,002.52	2,047.36	1.65	-1.56	1.89
6,230.00	13.70	104.10	5,818.39	-432.09	2,024.93	2,070.50	2.32	-2.31	-1.10
6,321.00	12.30	102.30	5,907.05	-436.78	2,044.85	2,090.97	1.60	-1.54	-1.98
6,412.00	11.40	105.50	5,996.11	-441.25	2,062.99	2,109.64	1.22	-0.99	3.52
6,502.00	10.20	109.00	6,084.52	-446.22	2,079.10	2,126.44	1.52	-1.33	3.89
6,593.00	8.10	105.10	6,174.36	-450.51	2,092.91	2,140.84	2.40	-2.31	-4.29
6,684.00	6.20	102.70	6,264.65	-453.26	2,103.89	2,152.16	2.11	-2.09	-2.64
6,775.00	4.60	109.70	6,355.24	-455.57	2,112.12	2,160.69	1.90	-1.76	7.69
6,866.00	2.80	116.70	6,446.05	-457.80	2,117.54	2,166.46	2.04	-1.98	7.69
6,956.00	1.90	79.50	6,535.97	-458.52	2,120.98	2,169.97	1.92	-1.00	-41.33
7,047.00	0.50	102.70	6,626.95	-458.33	2,122.85	2,171.76	1.60	-1.54	25.49
7,138.00	0.70	139.90	6,717.95	-458.84	2,123.59	2,172.60	0.47	0.22	40.88
7,229.00	0.50	165.90	6,808.94	-459.65	2,124.05	2,173.21	0.37	-0.22	28.57
7,319.00	0.50	160.70	6,898.94	-460.40	2,124.27	2,173.59	0.05	0.00	-5.78
7,410.00	0.50	168.40	6,989.94	-461.17	2,124.48	2,173.96	0.07	0.00	8.46
7,501.00	0.50	145.60	7,080.93	-461.88	2,124.79	2,174.41	0.22	0.00	-25.05
7,592.00	0.70	132.90	7,171.93	-462.59	2,125.42	2,175.18	0.26	0.22	-13.96
7,682.00	0.50	129.40	7,261.92	-463.21	2,126.12	2,176.00	0.23	-0.22	-3.89
7,773.00	0.50	128.30	7,352.92	-463.71	2,126.74	2,176.71	0.01	0.00	-1.21
7,864.00	0.90	143.10	7,443.91	-464.53	2,127.48	2,177.61	0.48	0.44	16.26
7,955.00	0.50	127.60	7,534.91	-465.34	2,128.23	2,178.51	0.48	-0.44	-17.03
8,046.00	0.50	138.50	7,625.90	-465.88	2,128.81	2,179.19	0.10	0.00	11.98
8,136.00	0.40	121.30	7,715.90	-466.34	2,129.33	2,179.80	0.19	-0.11	-19.11
8,227.00	0.20	131.50	7,806.90	-466.61	2,129.72	2,180.24	0.23	-0.22	11.21
8,318.00	0.40	196.90	7,897.90	-467.02	2,129.75	2,180.35	0.40	0.22	71.87
8,409.00	0.40	201.50	7,988.89	-467.62	2,129.54	2,180.27	0.04	0.00	5.05
8,440.00	0.40	229.90	8,019.89	-467.79	2,129.42	2,180.19	0.63	0.00	91.61

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
Last Survey									
8,495.00	0.40	229.90	8,074.89	-468.04	2,129.13	2,179.96	0.00	0.00	0.00
Proj. to FTD - 2002' FNL & 663' FEL									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,440.00	8,019.89	-467.79	2,129.42	Last Survey
8,495.00	8,074.89	-468.04	2,129.13	Proj. to FTD - 2002' FNL & 663' FEL

Checked By: _____	Approved By: _____	Date: _____
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