



Site: Wethington 21-7 Pad
Well: Wethington 27-7
Wellbore: Wellbore #1
Design: Plan #1

Reference Details - WELL CENTRE
Geodetic System: US State Plane 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone
Northing: 1268665.73
Easting: 3190191.76
Latitude: 40° 4' 7.932 N
Longitude: 104° 49' 13.606 W
Grid Convergence: 0.44° West
Ground Elevation: 4902.00
KB Elevation: WELL @ 4917.00ft (Original Well Elev)



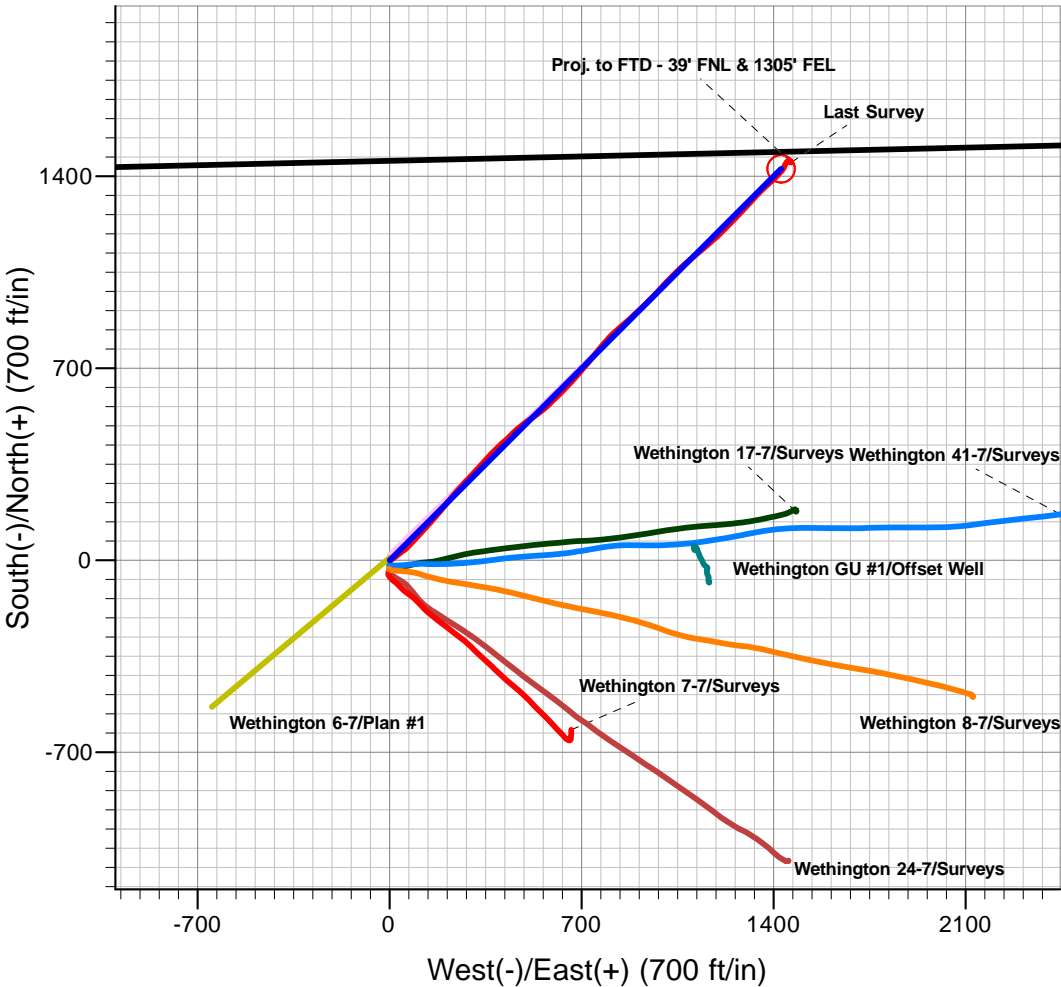
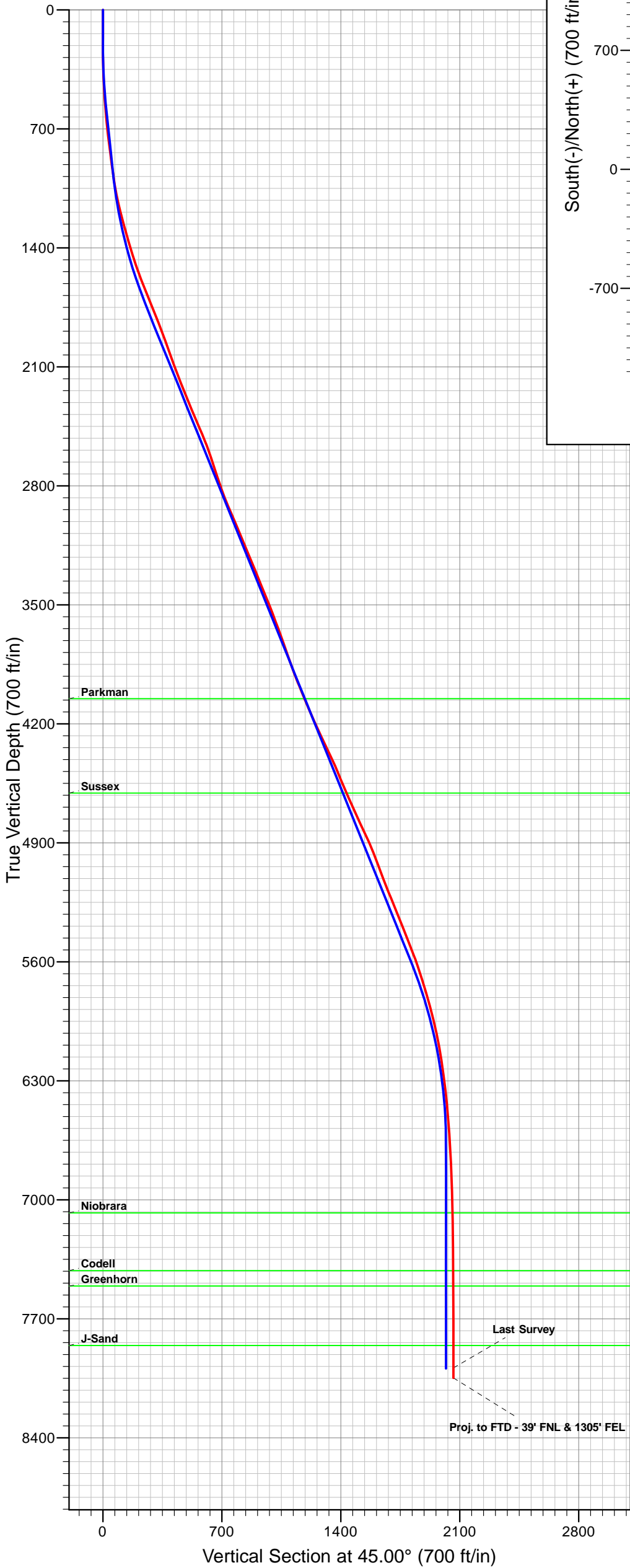
Departure
Energy Services (US) L.P

Denver, Colorado
Phone: 303.542.2000

Casper, Wyoming
Phone: 307.265.2231
Fax: 307.472.5064
www.departureus.com

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	45.00	11.10	11.10	15.69	15.69	End of Build - Hold at 6° Inc.
963.17	966.00	6.00	45.00	41.84	41.84	59.18	59.18	Build at 2°/100'
1736.98	1766.10	22.00	45.00	178.28	178.28	252.12	252.12	End of Build - Hold at 22° Inc.
5592.07	5924.00	22.00	45.00	1279.76	1279.73	1809.83	1809.83	Drop at 2°/100'
6665.33	7024.10	0.00	0.00	1427.29	1427.26	2018.47	2018.47	End of Drop
7992.00	8350.77	0.00	0.00	1427.29	1427.26	2018.47	2018.47	PBHL - 50' FNL & 1355' FEL



FORMATION TOP DETAILS

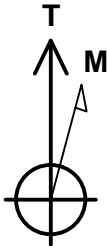
TVDPath	MDPath	Formation
4052.00	4262.96	Parkman
4607.00	4861.56	Sussex
7077.00	7435.77	Niobrara
7417.00	7775.77	Codell
7507.00	7865.77	Greenhorn
7857.00	8215.77	J-Sand

CASING DETAILS

TVD	MD	Name	Size
880.00	882.37	8 5/8"	8.625

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
Wethington 27-7 PBHL	7992.00	1427.29	1427.26	1270103.92	3191608.04



Azimuths to True North
Magnetic North: 8.83°

Magnetic Field
Strength: 52926.4snT
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 27-7

S-Well

Final Surveys

Job Number: 311034

Surface location

NAD 83

Lat: 40.068870°N

Long: 104.820446°W

Final Survey Report

September 30, 2011

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Wethington 27-7
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 27-7	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
From:	Lat/Long	Easting:	3,190,193.28 ft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	40° 4' 8.130 N
		Longitude:	104° 49' 13.584 W
		Grid Convergence:	0.44 °

Well	Wethington 27-7		
Well Position	+N/-S	0.00 ft	Northing: 1,268,665.73 ft
	+E/-W	0.00 ft	Easting: 3,190,191.76 ft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	40° 4' 7.932 N
		Longitude:	104° 49' 13.606 W
		Ground Level:	4,902.00 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2010	09/06/11	8.83
			Dip Angle (°)
			66.77
			Field Strength (nT)
			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)
	0.00	0.00	0.00
			Direction (°)
			45.00

Survey Program	Date	09/30/11		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
104.00	8,414.00	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
104.00	0.50	167.70	104.00	-0.44	0.10	-0.25	0.48	0.48	0.00
136.00	0.50	159.30	136.00	-0.71	0.18	-0.38	0.23	0.00	-26.25
167.00	0.50	159.30	167.00	-0.96	0.27	-0.49	0.00	0.00	0.00
198.00	0.50	131.10	198.00	-1.18	0.42	-0.54	0.79	0.00	-90.97
228.00	0.50	118.50	227.99	-1.33	0.63	-0.49	0.37	0.00	-42.00
259.00	0.50	75.90	258.99	-1.36	0.88	-0.34	1.17	0.00	-137.42
290.00	0.90	59.40	289.99	-1.20	1.23	0.02	1.43	1.29	-53.23
322.00	1.20	51.30	321.99	-0.86	1.70	0.59	1.04	0.94	-25.31
353.00	1.40	54.90	352.98	-0.44	2.27	1.29	0.70	0.65	11.61

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Well:	Wethington 27-7	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)	
399.00	2.30	58.40	398.95	0.36	3.51	2.74	1.97	1.96	7.61	
444.00	3.00	57.70	443.90	1.47	5.28	4.77	1.56	1.56	-1.56	
490.00	3.90	57.70	489.82	2.94	7.62	7.47	1.96	1.96	0.00	
535.00	4.40	56.60	534.70	4.71	10.35	10.65	1.13	1.11	-2.44	
580.00	5.30	54.50	579.54	6.87	13.48	14.39	2.04	2.00	-4.67	
625.00	4.00	52.00	624.39	9.04	16.41	18.00	2.92	-2.89	-5.56	
671.00	6.30	51.70	670.20	11.60	19.66	22.10	5.00	5.00	-0.65	
716.00	6.70	51.30	714.91	14.77	23.65	27.16	0.89	0.89	-0.89	
742.00	7.00	51.30	740.73	16.71	26.07	30.24	1.15	1.15	0.00	
807.00	7.20	51.70	805.23	21.71	32.35	38.23	0.32	0.31	0.62	
852.00	7.00	53.40	849.88	25.09	36.77	43.74	0.64	-0.44	3.78	
913.00	7.40	53.10	910.40	29.66	42.89	51.31	0.66	0.66	-0.49	
1,004.00	9.00	53.80	1,000.47	37.39	53.32	64.14	1.76	1.76	0.77	
1,094.00	11.30	45.40	1,089.06	47.74	65.29	79.92	3.03	2.56	-9.33	
1,183.00	13.90	42.20	1,175.91	61.78	78.68	99.32	3.02	2.92	-3.60	
1,276.00	15.50	40.10	1,265.86	79.56	94.19	122.86	1.81	1.72	-2.26	
1,367.00	15.80	46.10	1,353.50	97.46	110.95	147.36	1.81	0.33	6.59	
1,457.00	17.60	44.70	1,439.70	115.63	129.35	173.22	2.05	2.00	-1.56	
1,548.00	19.50	39.40	1,525.97	137.14	148.67	202.10	2.79	2.09	-5.82	
1,639.00	21.80	39.40	1,611.12	161.94	169.04	234.04	2.53	2.53	0.00	
1,730.00	22.50	41.10	1,695.40	188.12	191.21	268.23	1.04	0.77	1.87	
1,821.00	21.30	39.40	1,779.84	214.01	213.15	302.05	1.49	-1.32	-1.87	
1,911.00	21.80	41.10	1,863.55	239.24	234.51	334.99	0.89	0.56	1.89	
2,002.00	19.70	41.50	1,948.64	263.46	255.78	367.16	2.31	-2.31	0.44	
2,093.00	19.70	43.60	2,034.31	286.06	276.52	397.80	0.78	0.00	2.31	
2,184.00	20.80	45.00	2,119.69	308.59	298.52	429.30	1.32	1.21	1.54	
2,274.00	21.50	39.00	2,203.63	332.71	320.21	461.68	2.53	0.78	-6.67	
2,365.00	22.30	42.20	2,288.07	358.46	342.30	495.51	1.58	0.88	3.52	
2,456.00	23.00	44.30	2,372.05	383.98	366.31	530.54	1.18	0.77	2.31	
2,547.00	23.40	47.10	2,455.70	409.00	391.97	566.37	1.29	0.44	3.08	
2,638.00	21.80	47.80	2,539.71	432.65	417.73	601.31	1.78	-1.76	0.77	
2,728.00	18.50	43.30	2,624.19	454.28	439.91	632.28	4.05	-3.67	-5.00	
2,819.00	17.90	47.10	2,710.64	474.31	460.05	660.69	1.46	-0.66	4.18	
2,911.00	19.20	54.20	2,797.87	492.78	482.68	689.76	2.83	1.41	7.72	
3,001.00	22.30	55.60	2,882.02	511.09	508.78	721.16	3.49	3.44	1.56	
3,092.00	23.80	52.40	2,965.76	532.05	537.58	756.34	2.15	1.65	-3.52	
3,182.00	22.50	48.50	3,048.52	554.54	564.87	791.54	2.23	-1.44	-4.33	
3,273.00	22.50	46.40	3,132.59	578.09	590.52	826.33	0.88	0.00	-2.31	
3,364.00	22.90	45.70	3,216.54	602.46	615.80	861.44	0.53	0.44	-0.77	
3,455.00	22.50	43.30	3,300.49	627.50	640.41	896.55	1.11	-0.44	-2.64	
3,546.00	22.20	42.90	3,384.66	652.77	664.05	931.13	0.37	-0.33	-0.44	
3,636.00	22.20	41.80	3,467.99	677.90	686.96	965.10	0.46	0.00	-1.22	
3,729.00	21.10	39.70	3,554.43	703.88	709.37	999.31	1.45	-1.18	-2.26	
3,818.00	19.70	40.40	3,637.84	727.63	729.32	1,030.22	1.60	-1.57	0.79	

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Well:	Wethington 27-7	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)	
3,908.00	20.10	39.00	3,722.47	751.20	748.89	1,060.72	0.69	0.44	-1.56	
3,999.00	19.50	40.10	3,808.09	774.97	768.51	1,091.40	0.78	-0.66	1.21	
4,090.00	20.20	39.70	3,893.68	798.67	788.33	1,122.18	0.78	0.77	-0.44	
4,181.00	22.50	46.10	3,978.44	822.84	810.92	1,155.24	3.59	2.53	7.03	
4,271.00	23.00	49.20	4,061.44	846.27	836.64	1,190.00	1.44	0.56	3.44	
4,362.00	23.00	48.90	4,145.21	869.58	863.49	1,225.46	0.13	0.00	-0.33	
4,453.00	25.70	47.10	4,228.11	894.70	891.35	1,262.93	3.08	2.97	-1.98	
4,543.00	25.00	46.40	4,309.44	921.10	919.42	1,301.44	0.85	-0.78	-0.78	
4,634.00	25.20	44.70	4,391.85	948.13	946.97	1,340.04	0.82	0.22	-1.87	
4,725.00	23.20	43.30	4,474.85	974.95	972.89	1,377.33	2.29	-2.20	-1.54	
4,815.00	22.50	42.60	4,557.78	1,000.53	996.71	1,412.26	0.83	-0.78	-0.78	
4,906.00	23.90	44.30	4,641.42	1,026.54	1,021.37	1,448.09	1.71	1.54	1.87	
4,997.00	24.50	45.70	4,724.43	1,052.91	1,047.75	1,485.39	0.91	0.66	1.54	
5,088.00	25.00	48.50	4,807.07	1,078.83	1,075.65	1,523.45	1.40	0.55	3.08	
5,178.00	25.00	49.60	4,888.64	1,103.76	1,104.38	1,561.39	0.52	0.00	1.22	
5,269.00	20.80	49.60	4,972.45	1,126.70	1,131.34	1,596.68	4.62	-4.62	0.00	
5,360.00	20.80	49.90	5,057.52	1,147.58	1,156.01	1,628.88	0.12	0.00	0.33	
5,451.00	21.50	49.20	5,142.39	1,168.89	1,180.99	1,661.61	0.82	0.77	-0.77	
5,541.00	22.20	45.40	5,225.93	1,191.60	1,205.58	1,695.07	1.75	0.78	-4.22	
5,633.00	22.20	44.30	5,311.11	1,216.25	1,230.10	1,729.82	0.45	0.00	-1.20	
5,723.00	21.80	43.60	5,394.55	1,240.52	1,253.50	1,763.53	0.53	-0.44	-0.78	
5,814.00	21.10	44.00	5,479.25	1,264.54	1,276.53	1,796.80	0.79	-0.77	0.44	
5,905.00	21.30	43.30	5,564.09	1,288.35	1,299.24	1,829.70	0.35	0.22	-0.77	
5,996.00	18.10	41.10	5,649.75	1,311.04	1,319.87	1,860.33	3.61	-3.52	-2.42	
6,087.00	16.50	45.00	5,736.64	1,330.83	1,338.31	1,887.36	2.17	-1.76	4.29	
6,177.00	15.80	46.10	5,823.09	1,348.36	1,356.17	1,912.39	0.85	-0.78	1.22	
6,268.00	15.00	47.50	5,910.82	1,364.91	1,373.78	1,936.55	0.97	-0.88	1.54	
6,358.00	12.70	46.80	5,998.20	1,379.55	1,389.58	1,958.07	2.56	-2.56	-0.78	
6,449.00	10.20	45.00	6,087.38	1,392.10	1,402.57	1,976.13	2.77	-2.75	-1.98	
6,540.00	8.80	44.70	6,177.13	1,402.74	1,413.17	1,991.15	1.54	-1.54	-0.33	
6,585.00	8.30	43.60	6,221.63	1,407.54	1,417.83	1,997.84	1.17	-1.11	-2.44	
6,631.00	7.60	42.60	6,267.19	1,412.19	1,422.18	2,004.20	1.55	-1.52	-2.17	
6,722.00	6.90	41.10	6,357.46	1,420.73	1,429.84	2,015.66	0.80	-0.77	-1.65	
6,812.00	5.50	29.20	6,446.93	1,428.57	1,435.50	2,025.21	2.10	-1.56	-13.22	
6,903.00	4.60	23.20	6,537.58	1,435.73	1,439.07	2,032.79	1.15	-0.99	-6.59	
6,994.00	3.90	27.40	6,628.33	1,441.84	1,441.93	2,039.13	0.84	-0.77	4.62	
7,085.00	3.20	28.80	6,719.15	1,446.81	1,444.58	2,044.52	0.78	-0.77	1.54	
7,175.00	2.80	34.50	6,809.03	1,450.82	1,447.03	2,049.09	0.55	-0.44	6.33	
7,266.00	1.80	67.50	6,899.96	1,453.20	1,449.61	2,052.60	1.78	-1.10	36.26	
7,357.00	1.60	82.90	6,990.92	1,453.91	1,452.19	2,054.92	0.55	-0.22	16.92	
7,447.00	1.20	81.60	7,080.89	1,454.20	1,454.37	2,056.67	0.45	-0.44	-1.44	
7,538.00	1.20	85.40	7,171.87	1,454.41	1,456.26	2,058.16	0.09	0.00	4.18	
7,629.00	1.10	91.10	7,262.85	1,454.47	1,458.09	2,059.49	0.17	-0.11	6.26	

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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)	
7,719.00	1.10	102.00	7,352.84	1,454.28	1,459.80	2,060.56	0.23	0.00	12.11	
7,810.00	1.10	101.60	7,443.82	1,453.92	1,461.51	2,061.52	0.01	0.00	-0.44	
7,901.00	0.50	118.50	7,534.81	1,453.55	1,462.71	2,062.11	0.70	-0.66	18.57	
7,992.00	0.40	150.80	7,625.81	1,453.09	1,463.22	2,062.14	0.29	-0.11	35.49	
8,082.00	0.50	125.90	7,715.81	1,452.58	1,463.69	2,062.11	0.24	0.11	-27.67	
8,173.00	0.40	135.40	7,806.80	1,452.12	1,464.23	2,062.17	0.14	-0.11	10.44	
8,264.00	0.50	149.40	7,897.80	1,451.56	1,464.66	2,062.07	0.16	0.11	15.38	
8,355.00	0.40	153.60	7,988.80	1,450.93	1,465.00	2,061.87	0.12	-0.11	4.62	
Last Survey										
8,414.00	0.40	153.60	8,047.80	1,450.56	1,465.18	2,061.74	0.00	0.00	0.00	
Proj. to FTD - 39' FNL & 1305' FEL										

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
8,355.00	7,988.80	1,450.93	1,465.00	Last Survey	
8,414.00	8,047.80	1,450.56	1,465.18	Proj. to FTD - 39' FNL & 1305' FEL	

Checked By: _____ Approved By: _____ Date: _____