

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Rieder 18T-301**

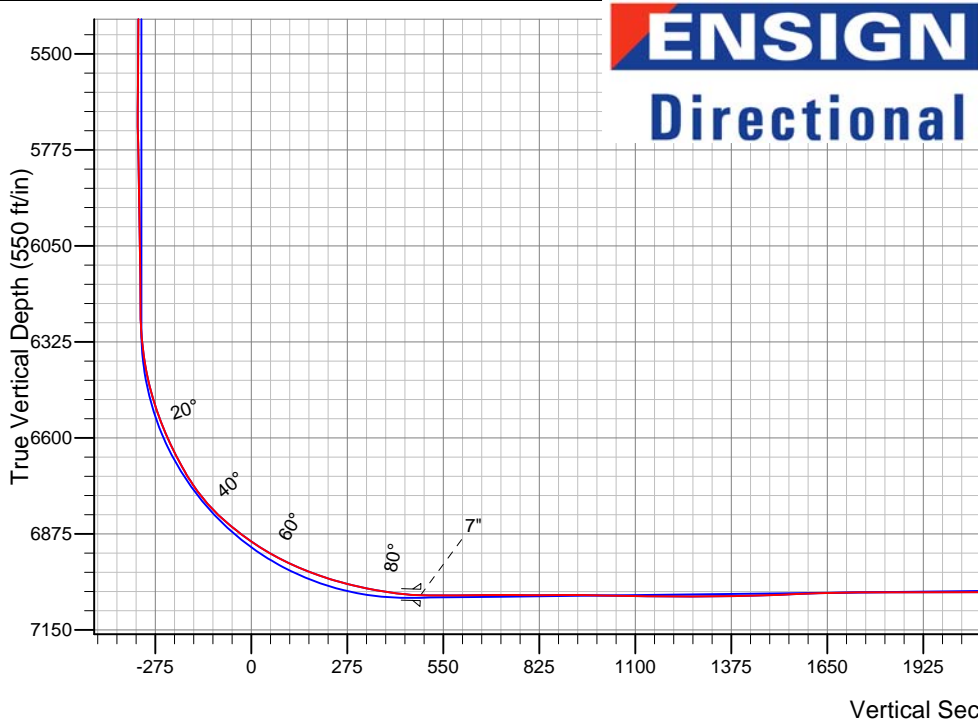
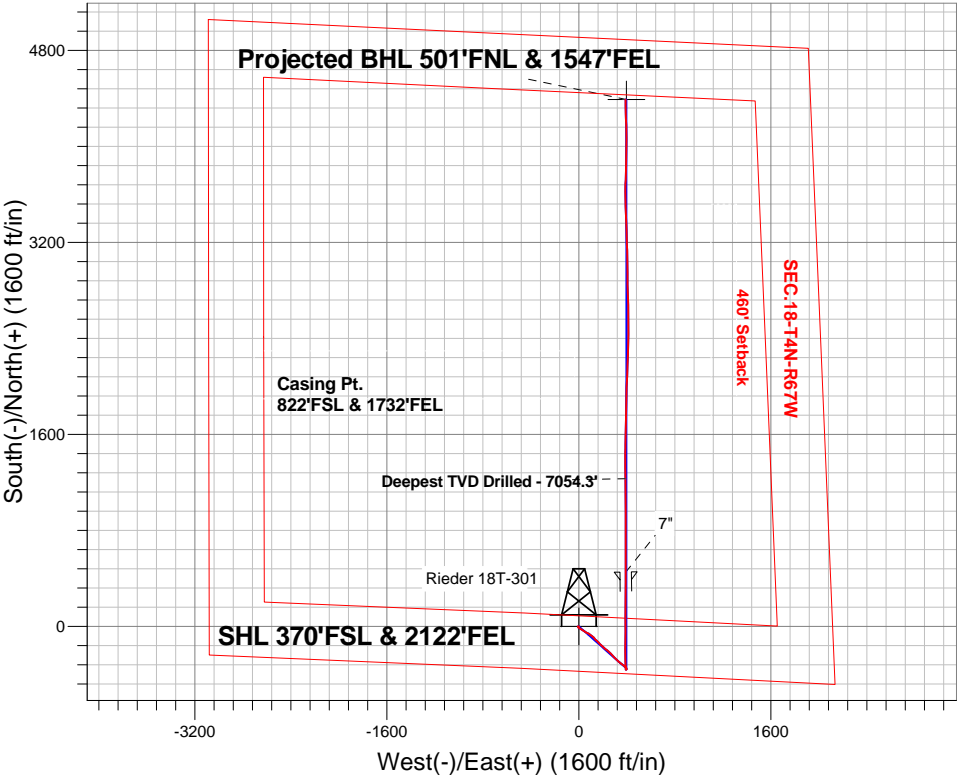
Surface Location: Rieder 4N67W18Q Pad Sec.18-T4N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4811.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1355267.25	3158771.87	40.307210	-104.930700	
Ensign #Rig #134 RKB - 13' WELL @ 4824.0ft (Ensign #Rig #134 RKB - 13')						

FINAL SURVEY

Projected Bottom Hole Location
11496'MD 7009'TVD 4389'N & 389'E of SHL
89.5 degree Incl @ 358.7 degree AZM



Rieder 4N67W18Q Pad Sec.18-T4N-R67W Rieder 18T-301 Wellbore #1	ANNOTATIONS		
	TVD	MD	Annotation
	7054.3	8335.0	Deepest TVD Drilled - 7054.3

LEGEND

- Rieder 18T-301, Wellbore #1, Plan #3 (6-25-15) V0
- Wellbore #1
- Survey #1

BHL 501'FNL & 1547'FEL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.18-T4N-R67W

Rieder 4N67W18Q Pad Sec.18-T4N-R67W

Rieder 18T-301

Wellbore #1

Survey: Survey #1

Standard Survey Report

06 July, 2015

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18T-301
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4824.0ft (Ensign #Rig #134 RKB - 13')
Site:	Rieder 4N67W18Q Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4824.0ft (Ensign #Rig #134 RKB - 13')
Well:	Rieder 18T-301	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

Project	SEC.18-T4N-R67W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Rieder 4N67W18Q Pad Sec.18-T4N-R67W				
Site Position:		Northing:	1,355,266.69ft	Latitude:	40.307210
From:	Lat/Long	Easting:	3,158,679.84ft	Longitude:	-104.931030
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.37 °

Well	Rieder 18T-301					
Well Position	+N-S	0.0 ft	Northing:	1,355,267.25 ft	Latitude:	40.307210
	+E-W	0.0 ft	Easting:	3,158,771.87 ft	Longitude:	-104.930700
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,811.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/25/2015	8.40	66.81	52,641

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	5.15	

Survey Program	Date 7/6/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
167.0	11,496.0	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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	242.00	1.0	0.0	0.0	0.0	0.24	0.24	0.00
SHL 370'FSL & 2122'FEL									
167.0	0.40	242.00	167.0	-0.3	-0.5	-0.3	0.24	0.24	0.00
260.0	0.60	218.50	260.0	-0.8	-1.1	-0.9	0.30	0.22	-25.27
352.0	0.60	284.20	352.0	-1.1	-1.9	-1.2	0.71	0.00	71.41
444.0	0.40	264.00	444.0	-1.0	-2.7	-1.2	0.29	-0.22	-21.96
536.0	0.40	300.50	536.0	-0.9	-3.3	-1.1	0.27	0.00	39.67
629.0	0.70	280.50	629.0	-0.6	-4.1	-0.9	0.38	0.32	-21.51
721.0	0.90	291.20	721.0	-0.2	-5.3	-0.7	0.27	0.22	11.63

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Site:	Rieder 4N67W18Q Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4824.0ft (Ensign #Rig #134 RKB - 13')
Well:	Rieder 18T-301	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

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)
814.0	0.40	161.90	814.0	-0.3	-5.9	-0.8	1.28	-0.54	-139.03
876.0	0.40	246.40	876.0	-0.6	-6.0	-1.1	0.87	0.00	136.29
985.0	1.00	230.10	985.0	-1.3	-7.1	-2.0	0.57	0.55	-14.95
1,077.0	1.20	187.20	1,076.9	-2.8	-7.8	-3.5	0.90	0.22	-46.63
1,170.0	1.50	145.70	1,169.9	-4.8	-7.3	-5.4	1.07	0.32	-44.62
1,262.0	2.90	145.70	1,261.8	-7.7	-5.3	-8.1	1.52	1.52	0.00
1,355.0	3.90	123.70	1,354.7	-11.4	-1.3	-11.5	1.75	1.08	-23.66
1,447.0	4.60	120.50	1,446.4	-15.0	4.4	-14.5	0.80	0.76	-3.48
1,539.0	5.30	123.20	1,538.1	-19.2	11.2	-18.1	0.80	0.76	2.93
1,632.0	7.30	123.70	1,630.5	-24.8	19.7	-22.9	2.15	2.15	0.54
1,724.0	8.40	124.60	1,721.7	-31.9	30.1	-29.0	1.20	1.20	0.98
1,817.0	10.40	122.50	1,813.4	-40.2	42.8	-36.2	2.18	2.15	-2.26
1,909.0	10.00	119.10	1,904.0	-48.6	56.7	-43.3	0.79	-0.43	-3.70
2,001.0	9.00	115.50	1,994.7	-55.6	70.2	-49.0	1.26	-1.09	-3.91
2,094.0	8.90	118.10	2,086.6	-62.1	83.1	-54.4	0.45	-0.11	2.80
2,187.0	9.10	130.90	2,178.4	-70.3	95.0	-61.5	2.16	0.22	13.76
2,279.0	8.30	129.30	2,269.4	-79.3	105.7	-69.5	0.91	-0.87	-1.74
2,372.0	8.20	126.20	2,361.4	-87.4	116.2	-76.6	0.49	-0.11	-3.33
2,465.0	9.80	139.40	2,453.3	-97.4	126.7	-85.6	2.80	1.72	14.19
2,560.0	9.10	136.40	2,547.0	-108.9	137.2	-96.2	0.90	-0.74	-3.16
2,655.0	8.40	132.50	2,640.9	-119.1	147.5	-105.3	0.97	-0.74	-4.11
2,750.0	7.70	131.80	2,734.9	-128.0	157.3	-113.4	0.74	-0.74	-0.74
2,846.0	9.00	137.80	2,829.9	-137.9	167.2	-122.3	1.63	1.35	6.25
2,941.0	8.30	134.40	2,923.8	-148.2	177.1	-131.6	0.91	-0.74	-3.58
3,036.0	9.40	135.30	3,017.7	-158.5	187.4	-141.0	1.17	1.16	0.95
3,132.0	8.90	131.40	3,112.5	-168.9	198.5	-150.4	0.83	-0.52	-4.06
3,227.0	9.80	132.50	3,206.2	-179.3	210.0	-159.7	0.97	0.95	1.16
3,322.0	9.10	128.50	3,299.9	-189.4	221.8	-168.7	1.01	-0.74	-4.21
3,417.0	7.90	127.80	3,393.9	-198.1	232.8	-176.4	1.27	-1.26	-0.74
3,513.0	8.90	132.00	3,488.9	-207.1	243.6	-184.4	1.22	1.04	4.38
3,608.0	9.10	130.70	3,582.7	-216.9	254.7	-193.2	0.30	0.21	-1.37
3,703.0	10.60	137.60	3,676.3	-228.3	266.3	-203.4	2.01	1.58	7.26
3,798.0	10.60	136.90	3,769.7	-241.1	278.2	-215.1	0.14	0.00	-0.74
3,893.0	9.90	136.70	3,863.1	-253.4	289.8	-226.4	0.74	-0.74	-0.21
3,989.0	9.10	135.80	3,957.8	-264.9	300.7	-236.8	0.85	-0.83	-0.94
4,084.0	8.40	134.10	4,051.7	-275.1	310.9	-246.0	0.79	-0.74	-1.79
4,179.0	9.00	132.30	4,145.6	-284.9	321.4	-254.9	0.69	0.63	-1.89
4,274.0	8.40	131.30	4,239.5	-294.5	332.1	-263.5	0.65	-0.63	-1.05
4,370.0	10.50	128.80	4,334.2	-304.6	344.2	-272.5	2.23	2.19	-2.60
4,465.0	9.80	126.00	4,427.7	-314.8	357.5	-281.4	0.90	-0.74	-2.95
4,560.0	9.30	123.90	4,521.4	-323.8	370.4	-289.2	0.64	-0.53	-2.21
4,655.0	8.40	134.10	4,615.3	-332.9	381.8	-297.3	1.90	-0.95	10.74
4,750.0	6.60	140.60	4,709.5	-342.0	390.2	-305.5	2.09	-1.89	6.84
4,846.0	4.70	152.00	4,805.0	-349.7	395.6	-312.8	2.29	-1.98	11.88
4,941.0	2.60	158.90	4,899.8	-355.2	398.2	-318.0	2.25	-2.21	7.26
5,036.0	0.90	241.70	4,994.8	-357.5	398.3	-320.3	2.78	-1.79	87.16
5,131.0	1.00	246.40	5,089.8	-358.2	396.9	-321.1	0.13	0.11	4.95
5,226.0	0.90	251.30	5,184.8	-358.8	395.4	-321.8	0.14	-0.11	5.16
5,322.0	0.80	246.20	5,280.7	-359.3	394.1	-322.4	0.13	-0.10	-5.31
5,417.0	0.40	217.60	5,375.7	-359.8	393.3	-323.0	0.51	-0.42	-30.11
5,512.0	0.70	214.80	5,470.7	-360.6	392.7	-323.8	0.32	0.32	-2.95

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Well:	Rieder 18T-301	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

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)	
5,608.0	0.40	242.70	5,566.7	-361.2	392.1	-324.5	0.41	-0.31	29.06	
5,703.0	0.40	234.50	5,661.7	-361.5	391.5	-324.9	0.06	0.00	-8.63	
5,798.0	1.40	356.10	5,756.7	-360.6	391.2	-324.0	1.73	1.05	128.00	
5,893.0	1.10	359.80	5,851.7	-358.5	391.1	-321.9	0.33	-0.32	3.89	
5,988.0	0.90	2.60	5,946.7	-356.9	391.1	-320.3	0.22	-0.21	2.95	
6,084.0	0.80	5.40	6,042.7	-355.4	391.2	-318.9	0.11	-0.10	2.92	
6,179.0	0.50	26.90	6,137.7	-354.4	391.5	-317.8	0.40	-0.32	22.63	
6,274.0	0.50	83.80	6,232.7	-354.0	392.1	-317.3	0.50	0.00	59.89	
6,370.0	6.40	349.80	6,328.5	-348.7	391.5	-312.1	6.72	6.15	-97.92	
6,465.0	11.90	355.60	6,422.2	-333.7	389.9	-297.3	5.86	5.79	6.11	
6,560.0	18.50	356.40	6,513.8	-308.8	388.2	-272.7	6.95	6.95	0.84	
6,656.0	24.50	359.40	6,603.1	-273.7	387.0	-237.8	6.35	6.25	3.13	
6,751.0	29.40	358.40	6,687.8	-230.7	386.1	-195.1	5.18	5.16	-1.05	
6,846.0	37.90	1.20	6,766.8	-178.1	386.1	-142.7	9.09	8.95	2.95	
6,941.0	49.20	0.50	6,835.5	-112.8	387.0	-77.5	11.91	11.89	-0.74	
7,037.0	54.80	0.00	6,894.6	-37.1	387.3	-2.2	5.85	5.83	-0.52	
7,132.0	62.70	0.00	6,943.9	44.0	387.3	78.6	8.32	8.32	0.00	
7,227.0	68.90	1.20	6,982.8	130.6	388.3	165.0	6.63	6.53	1.26	
7,323.0	74.60	1.00	7,012.8	221.7	390.0	255.9	5.94	5.94	-0.21	
7,418.0	79.30	0.10	7,034.3	314.2	390.9	348.1	5.03	4.95	-0.95	
7,517.0	84.80	359.60	7,048.0	412.3	390.6	445.7	5.58	5.56	-0.51	
7,557.0	88.04	359.25	7,050.5	452.2	390.2	485.4	8.15	8.10	-0.86	
7"										
7,575.0	89.50	359.10	7,050.9	470.2	390.0	503.3	8.15	8.10	-0.86	
7,670.0	90.80	359.60	7,050.6	565.2	388.9	597.8	1.47	1.37	0.53	
7,765.0	90.00	0.50	7,049.9	660.2	389.0	692.4	1.27	-0.84	0.95	
7,860.0	89.70	0.50	7,050.2	755.1	389.8	787.1	0.32	-0.32	0.00	
7,955.0	90.70	1.00	7,049.9	850.1	391.1	881.8	1.18	1.05	0.53	
8,050.0	88.50	359.40	7,050.5	945.1	391.4	976.5	2.86	-2.32	-1.68	
8,146.0	89.30	359.30	7,052.4	1,041.1	390.3	1,072.0	0.84	0.83	-0.10	
8,240.0	89.20	358.60	7,053.6	1,135.1	388.6	1,165.4	0.75	-0.11	-0.74	
8,335.0	90.00	359.60	7,054.3	1,230.1	387.1	1,259.9	1.35	0.84	1.05	
Deepest TVD Drilled - 7054.3'										
8,431.0	91.20	359.40	7,053.3	1,326.0	386.2	1,355.4	1.27	1.25	-0.21	
8,526.0	91.30	0.30	7,051.2	1,421.0	386.0	1,450.0	0.95	0.11	0.95	
8,621.0	92.80	2.10	7,047.8	1,515.9	388.0	1,544.7	2.47	1.58	1.89	
8,716.0	91.40	1.00	7,044.3	1,610.8	390.6	1,639.4	1.87	-1.47	-1.16	
8,811.0	90.60	0.50	7,042.7	1,705.8	391.8	1,734.1	0.99	-0.84	-0.53	
8,906.0	90.50	1.50	7,041.7	1,800.8	393.5	1,828.9	1.06	-0.11	1.05	
9,001.0	89.60	0.00	7,041.7	1,895.8	394.7	1,923.6	1.84	-0.95	-1.58	
9,097.0	90.00	2.80	7,042.0	1,991.7	397.0	2,019.4	2.95	0.42	2.92	
9,192.0	90.50	2.40	7,041.6	2,086.6	401.4	2,114.3	0.67	0.53	-0.42	
9,287.0	89.90	1.70	7,041.2	2,181.6	404.7	2,209.1	0.97	-0.63	-0.74	
9,382.0	91.50	2.80	7,040.1	2,276.5	408.5	2,304.0	2.04	1.68	1.16	
9,477.0	92.30	1.00	7,036.9	2,371.4	411.6	2,398.8	2.07	0.84	-1.89	
9,572.0	90.90	0.30	7,034.3	2,466.3	412.7	2,493.4	1.65	-1.47	-0.74	
9,668.0	90.30	359.40	7,033.3	2,562.3	412.5	2,589.0	1.13	-0.63	-0.94	
9,763.0	90.30	358.00	7,032.8	2,657.3	410.3	2,683.4	1.47	0.00	-1.47	
9,858.0	89.30	358.90	7,033.1	2,752.3	407.7	2,777.8	1.42	-1.05	0.95	
9,953.0	92.20	358.90	7,031.9	2,847.2	405.9	2,872.2	3.05	3.05	0.00	
10,048.0	92.20	359.40	7,028.2	2,942.1	404.5	2,966.6	0.53	0.00	0.53	
10,143.0	90.70	358.70	7,025.8	3,037.1	402.9	3,061.0	1.74	-1.58	-0.74	

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10,239.0	89.90	359.40	7,025.3	3,133.1	401.3	3,156.5	1.11	-0.83	0.73
10,334.0	90.60	358.20	7,024.9	3,228.1	399.3	3,250.9	1.46	0.74	-1.26
10,429.0	90.30	357.50	7,024.2	3,323.0	395.8	3,345.1	0.80	-0.32	-0.74
10,524.0	91.40	358.60	7,022.7	3,417.9	392.5	3,439.4	1.64	1.16	1.16
10,619.0	91.10	357.90	7,020.7	3,512.9	389.6	3,533.7	0.80	-0.32	-0.74
10,714.0	89.90	358.90	7,019.8	3,607.8	387.0	3,628.0	1.64	-1.26	1.05
10,809.0	91.80	3.80	7,018.4	3,702.7	389.2	3,722.7	5.53	2.00	5.16
10,905.0	89.80	0.10	7,017.1	3,798.7	392.5	3,818.6	4.38	-2.08	-3.85
11,000.0	92.00	1.00	7,015.6	3,893.6	393.4	3,913.2	2.50	2.32	0.95
11,095.0	93.10	1.50	7,011.4	3,988.5	395.5	4,007.9	1.27	1.16	0.53
11,190.0	90.90	358.40	7,008.1	4,083.4	395.4	4,102.4	4.00	-2.32	-3.26
11,285.0	89.50	359.40	7,007.7	4,178.4	393.6	4,196.9	1.81	-1.47	1.05
11,380.0	89.70	358.20	7,008.4	4,273.4	391.6	4,291.3	1.28	0.21	-1.26
11,446.0	89.50	358.70	7,008.8	4,339.4	389.8	4,356.8	0.82	-0.30	0.76
11,496.0	89.50	358.70	7,009.3	4,389.4	388.7	4,406.5	0.00	0.00	0.00
BHL 500'FNL & 1540'FEL									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,557.0	7,050.5	7"	7	7-1/2

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
8,335.0	7,054.3	1,230.1	387.1	Deepest TVD Drilled - 7054.3'

Checked By: _____	Approved By: _____	Date: _____
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