

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Ledford 22Y-401**

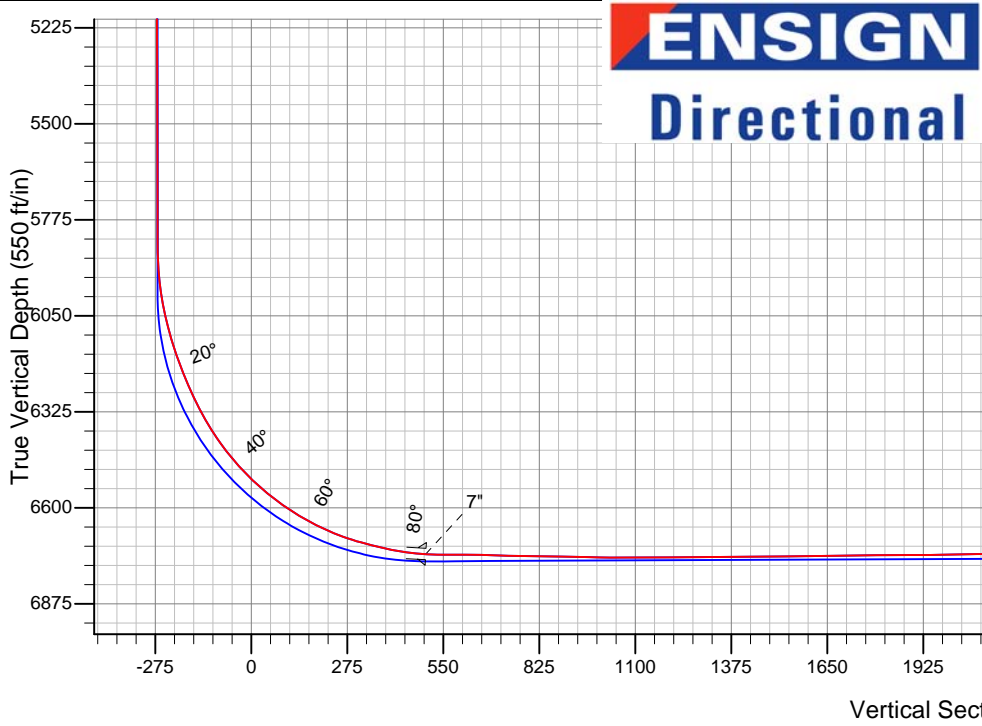
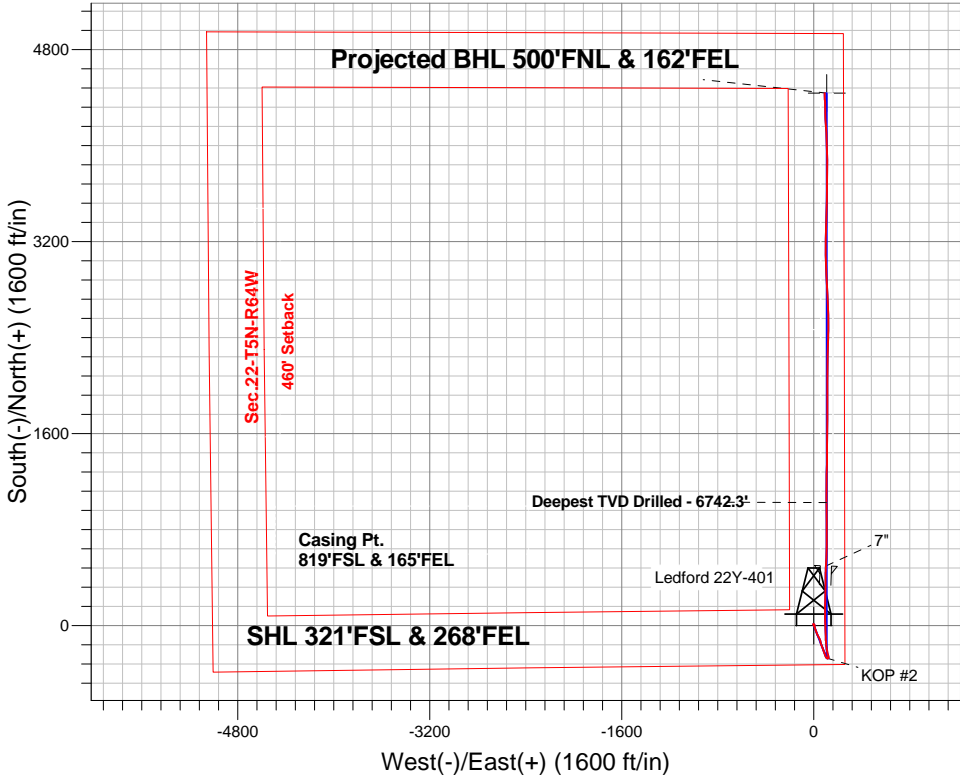
Surface Location: Ledford 22Y-HZ Pad Sec.22-T5N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4598.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1382221.49	3270979.07	40.378520	-104.527330	
Ensign 121 RKB - 13' WELL @ 4611ft (Ensign 121 RKB - 13')						

FINAL SURVEY

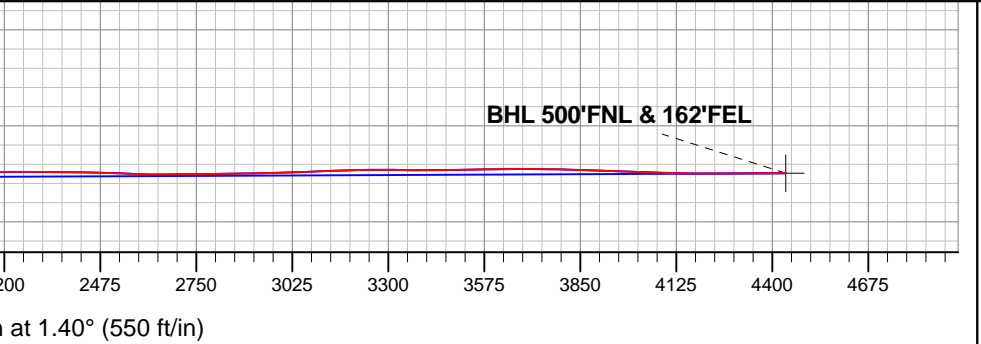
Projected Bottom Hole Location
11110'MD 6736'TVD 4438'N & 92'E of SHL
90.3 degree Incl @ 358.5 degree AZM



Ledford 22Y-HZ Pad Sec.22-T5N-R64W Ledford 22Y-401 Wellbore #1	ANNOTATIONS		
	TVD	MD	Annotation
	6742.3	7696.0	Deepest TVD Drilled - 6742.3

LEGEND

- Ledford 22Y-401, Wellbore #1, Plan #3 (6-4-15) V0
- Wellbore #1
- Survey #1





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W

Ledford 22Y-HZ Pad Sec.22-T5N-R64W

Ledford 22Y-401

Wellbore #1

Survey: Survey #1

Standard Survey Report

19 June, 2015

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-401
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4611ft (Ensign 121 RKB - 13')
Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4611ft (Ensign 121 RKB - 13')
Well:	Ledford 22Y-401	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

Project	SEC.22-T5N-R64W, Weld County, Colorado		
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		Ledford 22Y-HZ Pad Sec.22-T5N-R64W			
Site Position:		Northing:	1,382,151.62ft	Latitude:	40.378330
From:	Lat/Long	Easting:	3,270,918.54ft	Longitude:	-104.527550
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.63 °

Well	Ledford 22Y-401					
Well Position	+N-S	0.0 ft	Northing:	1,382,221.49 ft	Latitude:	40.378520
	+E-W	0.0 ft	Easting:	3,270,979.07 ft	Longitude:	-104.527330
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,598.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/8/2015	8.20	66.93	52,727

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	1.40	

Survey Program	Date 6/19/2015				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
166.0	11,110.0	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	66.60	1.0	0.0	0.0	0.0	0.30	0.30	0.00	
SHL 321'FSL & 268'FEL										
4.2	0.01	66.60	4.2	0.0	0.0	0.0	0.30	0.30	0.00	
50'E/W Hardline (22Y-401)										
166.0	0.50	66.60	166.0	0.3	0.7	0.3	0.30	0.30	0.00	
261.0	0.40	70.40	261.0	0.6	1.4	0.6	0.11	-0.11	4.00	
354.0	0.50	82.40	354.0	0.7	2.1	0.8	0.15	0.11	12.90	
447.0	0.50	61.30	447.0	1.0	2.8	1.0	0.20	0.00	-22.69	
541.0	0.70	56.90	541.0	1.5	3.7	1.6	0.22	0.21	-4.68	
634.0	0.80	57.10	634.0	2.1	4.7	2.3	0.11	0.11	0.22	
727.0	0.70	38.30	727.0	2.9	5.6	3.1	0.28	-0.11	-20.22	

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Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4611ft (Ensign 121 RKB - 13')
Well:	Ledford 22Y-401	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)
821.0	0.60	50.90	821.0	3.7	6.3	3.9	0.18	-0.11	13.40
890.0	0.60	4.70	890.0	4.3	6.6	4.5	0.68	0.00	-66.96
1,009.0	1.40	305.10	1,008.9	5.8	5.5	5.9	1.02	0.67	-50.08
1,195.0	1.10	292.30	1,194.9	7.7	2.0	7.8	0.22	-0.16	-6.88
1,382.0	1.00	282.90	1,381.9	8.8	-1.3	8.7	0.11	-0.05	-5.03
1,569.0	0.60	292.40	1,568.8	9.5	-3.8	9.4	0.22	-0.21	5.08
1,756.0	0.20	159.00	1,755.8	9.6	-4.6	9.5	0.40	-0.21	-71.34
1,943.0	1.40	1.70	1,942.8	11.6	-4.4	11.5	0.85	0.64	-84.12
2,041.0	2.00	97.50	2,040.8	12.5	-2.6	12.5	2.61	0.61	97.76
2,136.0	3.40	129.50	2,135.7	10.5	1.2	10.6	2.11	1.47	33.68
2,232.0	3.90	167.80	2,231.5	5.5	4.1	5.6	2.54	0.52	39.90
2,327.0	3.80	163.60	2,326.3	-0.6	5.6	-0.5	0.31	-0.11	-4.42
2,422.0	5.90	169.20	2,421.0	-8.5	7.4	-8.3	2.26	2.21	5.89
2,518.0	5.90	164.50	2,516.4	-18.1	9.7	-17.8	0.50	0.00	-4.90
2,613.0	7.60	161.10	2,610.8	-28.7	13.0	-28.4	1.84	1.79	-3.58
2,709.0	9.10	162.00	2,705.8	-41.9	17.4	-41.5	1.57	1.56	0.94
2,804.0	8.90	160.80	2,799.6	-56.0	22.2	-55.5	0.29	-0.21	-1.26
2,899.0	10.30	151.30	2,893.3	-70.4	28.7	-69.7	2.22	1.47	-10.00
2,995.0	10.40	154.30	2,987.7	-85.8	36.5	-84.8	0.57	0.10	3.13
3,090.0	9.80	154.40	3,081.2	-100.8	43.8	-99.7	0.63	-0.63	0.11
3,185.0	9.80	153.00	3,174.9	-115.3	50.9	-114.0	0.25	0.00	-1.47
3,281.0	9.80	170.30	3,269.5	-130.6	56.0	-129.2	3.06	0.00	18.02
3,376.0	11.90	162.20	3,362.8	-147.9	60.4	-146.4	2.73	2.21	-8.53
3,471.0	11.00	160.80	3,455.9	-165.8	66.3	-164.1	0.99	-0.95	-1.47
3,567.0	11.20	161.10	3,550.1	-183.3	72.4	-181.4	0.22	0.21	0.31
3,662.0	11.10	159.50	3,643.3	-200.6	78.6	-198.6	0.34	-0.11	-1.68
3,758.0	11.10	158.80	3,737.5	-217.8	85.1	-215.7	0.14	0.00	-0.73
3,853.0	9.10	163.60	3,831.0	-233.6	90.6	-231.3	2.28	-2.11	5.05
3,949.0	7.50	159.40	3,926.0	-246.7	94.9	-244.3	1.78	-1.67	-4.38
4,044.0	5.30	148.60	4,020.4	-256.3	99.4	-253.7	2.63	-2.32	-11.37
4,139.0	3.50	150.60	4,115.1	-262.5	103.1	-259.9	1.90	-1.89	2.11
4,235.0	1.70	138.60	4,211.0	-266.2	105.5	-263.5	1.95	-1.88	-12.50
4,330.0	1.40	147.10	4,306.0	-268.2	107.0	-265.5	0.40	-0.32	8.95
4,425.0	1.20	144.10	4,401.0	-270.0	108.2	-267.2	0.22	-0.21	-3.16
4,521.0	1.00	156.60	4,497.0	-271.5	109.2	-268.8	0.32	-0.21	13.02
4,616.0	1.00	133.50	4,591.9	-272.9	110.1	-270.1	0.42	0.00	-24.32
4,807.0	1.20	92.20	4,782.9	-274.1	113.3	-271.2	0.42	0.10	-21.62
4,998.0	1.30	74.60	4,973.9	-273.6	117.4	-270.6	0.21	0.05	-9.21
5,189.0	0.50	75.50	5,164.8	-272.8	120.3	-269.8	0.42	-0.42	0.47
5,380.0	0.70	77.30	5,355.8	-272.4	122.2	-269.3	0.11	0.10	0.94
5,571.0	0.40	72.90	5,546.8	-271.9	124.0	-268.8	0.16	-0.16	-2.30
5,761.0	0.40	71.80	5,736.8	-271.5	125.3	-268.4	0.00	0.00	-0.58
5,857.0	0.40	48.80	5,832.8	-271.2	125.8	-268.0	0.17	0.00	-23.96
5,952.0	4.00	337.10	5,927.7	-267.9	124.8	-264.8	4.10	3.79	-75.47
5,999.0	8.40	350.10	5,974.4	-263.0	123.6	-259.9	9.77	9.36	27.66
6,048.0	12.00	344.30	6,022.7	-254.6	121.6	-251.5	7.63	7.35	-11.84
6,095.0	14.30	344.10	6,068.4	-244.3	118.7	-241.3	4.89	4.89	-0.43
6,143.0	16.50	346.60	6,114.7	-232.0	115.5	-229.1	4.79	4.58	5.21
6,190.0	19.00	350.10	6,159.5	-217.9	112.6	-215.1	5.78	5.32	7.45
6,239.0	21.90	352.20	6,205.4	-201.0	110.0	-198.3	6.10	5.92	4.29
6,286.0	24.20	352.40	6,248.6	-182.8	107.5	-180.1	4.90	4.89	0.43
6,334.0	25.90	353.40	6,292.1	-162.6	105.0	-160.0	3.65	3.54	2.08
6,381.0	28.20	355.90	6,334.0	-141.3	103.0	-138.8	5.46	4.89	5.32
6,430.0	32.10	357.30	6,376.3	-116.8	101.6	-114.2	8.09	7.96	2.86

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

Survey									
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6,477.0	36.20	358.20	6,415.2	-90.4	100.6	-87.9	8.79	8.72	1.91
6,525.0	39.50	358.70	6,453.1	-61.0	99.8	-58.5	6.90	6.88	1.04
6,572.0	42.60	357.70	6,488.5	-30.1	98.8	-27.7	6.74	6.60	-2.13
6,620.0	46.40	356.40	6,522.8	3.5	97.1	5.8	8.14	7.92	-2.71
6,667.0	50.40	357.70	6,554.0	38.6	95.3	40.9	8.76	8.51	2.77
6,716.0	54.50	359.90	6,583.8	77.4	94.5	79.7	9.09	8.37	4.49
6,763.0	56.60	0.80	6,610.4	116.1	94.7	118.4	4.74	4.47	1.91
6,811.0	60.80	1.20	6,635.4	157.1	95.4	159.4	8.78	8.75	0.83
6,858.0	64.50	1.70	6,656.9	198.9	96.5	201.2	7.93	7.87	1.06
6,907.0	68.50	0.80	6,676.5	243.8	97.5	246.1	8.34	8.16	-1.84
6,954.0	72.90	0.50	6,692.0	288.1	98.0	290.4	9.38	9.36	-0.64
7,002.0	76.30	1.00	6,704.8	334.4	98.6	336.7	7.15	7.08	1.04
7,049.0	76.50	0.10	6,715.8	380.1	99.0	382.4	1.91	0.43	-1.91
7,098.0	80.50	1.90	6,725.6	428.1	99.9	430.4	8.92	8.16	3.67
7,143.0	85.80	2.90	6,730.9	472.7	101.7	475.0	11.98	11.78	2.22
7,168.0	87.00	2.65	6,732.5	497.6	102.9	500.0	4.88	4.78	-0.98
7"									
7,235.0	90.20	2.00	6,734.1	564.5	105.7	566.9	4.88	4.78	-0.98
7,328.0	88.70	1.00	6,735.0	657.5	108.1	659.9	1.94	-1.61	-1.08
7,420.0	88.10	359.90	6,737.6	749.4	108.8	751.9	1.36	-0.65	-1.20
7,512.0	90.00	359.90	6,739.1	841.4	108.7	843.8	2.07	2.07	0.00
7,604.0	88.00	359.40	6,740.7	933.4	108.1	935.8	2.24	-2.17	-0.54
7,696.0	90.00	359.60	6,742.3	1,025.4	107.3	1,027.7	2.18	2.17	0.22
Deepest TVD Drilled - 6742.3'									
7,792.0	90.60	0.30	6,741.8	1,121.4	107.2	1,123.7	0.96	0.63	0.73
7,887.0	89.80	0.30	6,741.5	1,216.4	107.7	1,218.7	0.84	-0.84	0.00
7,983.0	90.10	1.50	6,741.6	1,312.4	109.2	1,314.6	1.29	0.31	1.25
8,078.0	91.10	0.30	6,740.6	1,407.3	110.7	1,409.6	1.64	1.05	-1.26
8,174.0	90.80	0.30	6,739.0	1,503.3	111.2	1,505.6	0.31	-0.31	0.00
8,269.0	90.70	0.60	6,737.8	1,598.3	112.0	1,600.6	0.33	-0.11	0.32
8,364.0	90.50	0.30	6,736.8	1,693.3	112.7	1,695.6	0.38	-0.21	-0.32
8,460.0	90.60	0.60	6,735.8	1,789.3	113.5	1,791.5	0.33	0.10	0.31
8,555.0	89.90	0.10	6,735.4	1,884.3	114.0	1,886.5	0.91	-0.74	-0.53
8,651.0	91.30	0.60	6,734.4	1,980.3	114.6	1,982.5	1.55	1.46	0.52
8,746.0	90.70	0.50	6,732.8	2,075.3	115.5	2,077.5	0.64	-0.63	-0.11
8,841.0	89.90	359.40	6,732.3	2,170.3	115.5	2,172.4	1.43	-0.84	-1.16
8,936.0	89.90	1.20	6,732.4	2,265.3	115.9	2,267.4	1.89	0.00	1.89
9,032.0	89.90	2.40	6,732.6	2,361.2	119.0	2,363.4	1.25	0.00	1.25
9,127.0	88.20	0.60	6,734.2	2,456.2	121.5	2,458.4	2.61	-1.79	-1.89
9,223.0	87.70	359.40	6,737.6	2,552.1	121.5	2,554.3	1.35	-0.52	-1.25
9,318.0	90.30	358.40	6,739.3	2,647.1	119.6	2,649.2	2.93	2.74	-1.05
9,414.0	90.50	357.00	6,738.6	2,743.0	115.8	2,745.0	1.47	0.21	-1.46
9,509.0	91.10	357.10	6,737.3	2,837.8	110.9	2,839.7	0.64	0.63	0.11
9,605.0	90.70	356.60	6,735.8	2,933.7	105.6	2,935.4	0.67	-0.42	-0.52
9,700.0	92.30	358.50	6,733.3	3,028.6	101.6	3,030.1	2.61	1.68	2.00
9,796.0	92.30	0.10	6,729.4	3,124.5	100.4	3,126.0	1.67	0.00	1.67
9,891.0	91.40	1.30	6,726.4	3,219.4	101.5	3,220.9	1.58	-0.95	1.26
9,987.0	88.80	1.20	6,726.2	3,315.4	103.6	3,316.9	2.71	-2.71	-0.10
10,082.0	90.00	1.50	6,727.2	3,410.3	105.9	3,411.9	1.30	1.26	0.32
10,177.0	91.30	1.00	6,726.1	3,505.3	107.9	3,506.9	1.47	1.37	-0.53
10,273.0	90.70	1.30	6,724.4	3,601.3	109.9	3,602.9	0.70	-0.63	0.31
10,368.0	90.00	1.00	6,723.9	3,696.3	111.8	3,697.9	0.80	-0.74	-0.32
10,464.0	88.90	1.50	6,724.8	3,792.2	113.9	3,793.9	1.26	-1.15	0.52

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10,559.0	87.40	358.00	6,727.8	3,887.2	113.5	3,888.8	4.01	-1.58	-3.68
10,655.0	88.60	357.10	6,731.2	3,983.0	109.4	3,984.5	1.56	1.25	-0.94
10,750.0	88.00	356.60	6,734.0	4,077.8	104.1	4,079.2	0.82	-0.63	-0.53
10,845.0	89.30	357.50	6,736.3	4,172.7	99.3	4,173.8	1.66	1.37	0.95
10,941.0	90.40	359.10	6,736.5	4,268.6	96.4	4,269.7	2.02	1.15	1.67
11,036.0	90.10	358.40	6,736.1	4,363.6	94.3	4,364.6	0.80	-0.32	-0.74
11,055.0	90.30	358.50	6,736.0	4,382.6	93.8	4,383.6	1.18	1.05	0.53
11,109.3	90.30	358.50	6,735.7	4,436.9	92.4	4,437.8	0.00	0.00	0.00
BHL 500'FNL & 146'FEL									
11,110.0	90.30	358.50	6,735.7	4,437.6	92.4	4,438.5	0.00	0.00	0.00

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,168.0	6,732.5	7"	7	7-1/2

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
7,696.0	6,742.3	1,025.4	107.3	Deepest TVD Drilled - 6742.3'

Checked By: _____	Approved By: _____	Date: _____
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