

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: Alm 33W-404

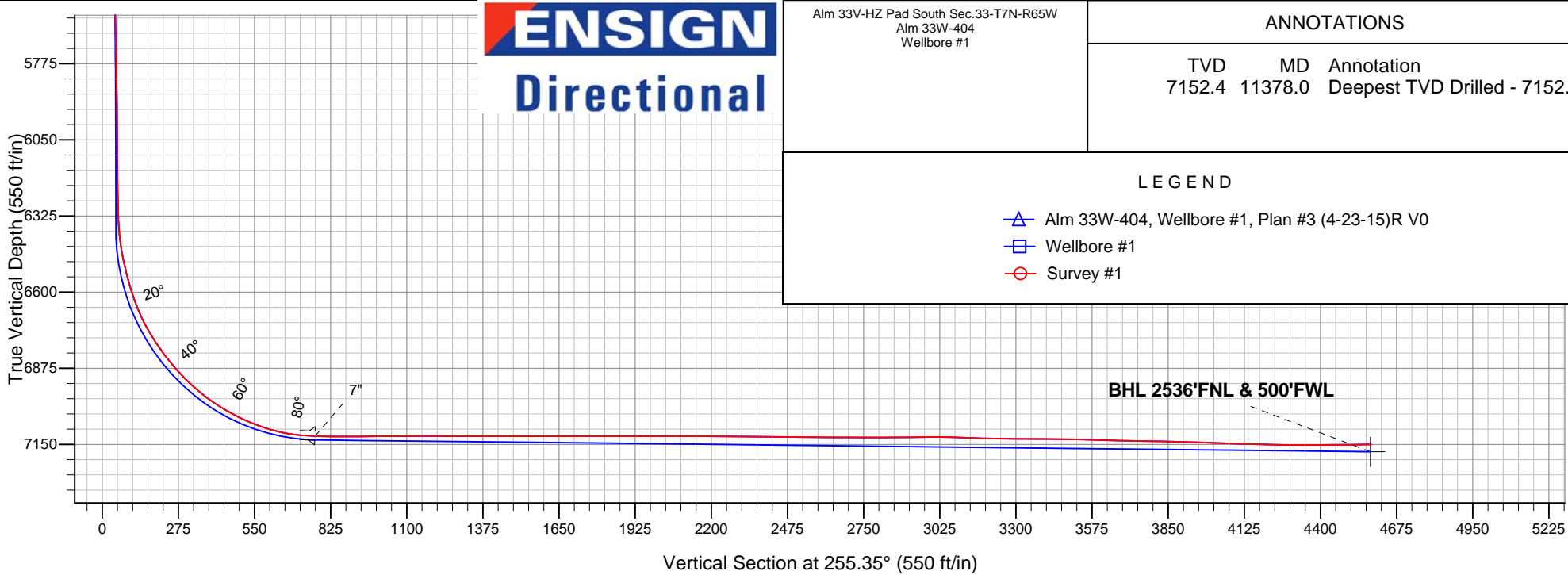
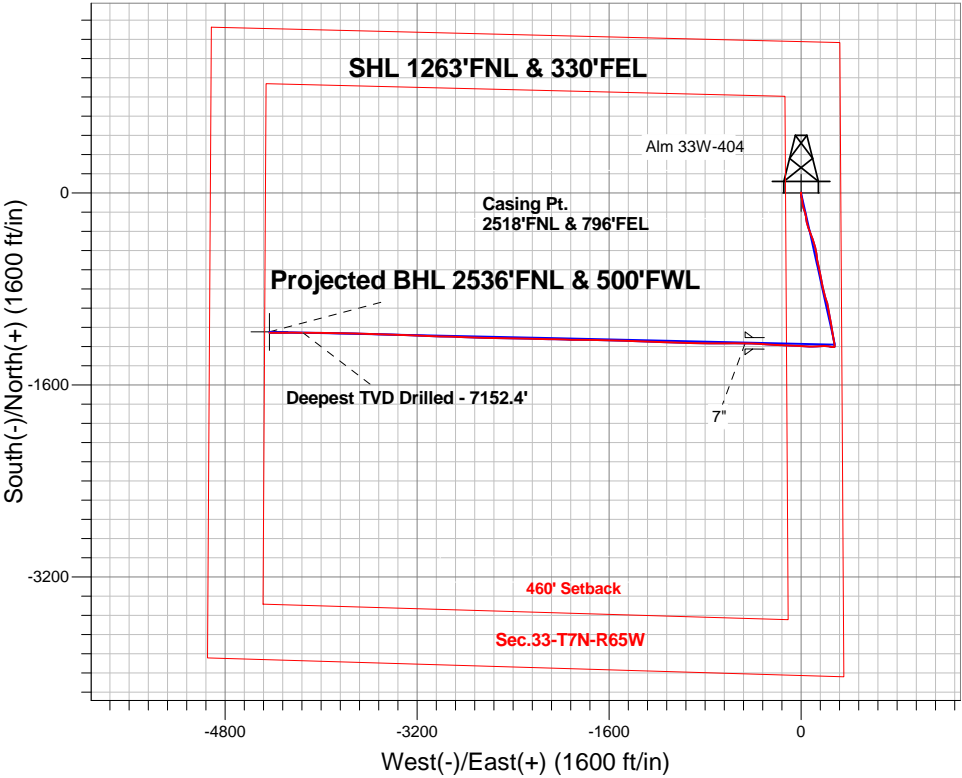
Surface Location: Alm 33V-HZ Pad South Sec.33-T7N-R65W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4790.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1438664.88	3233475.49	40.534500	-104.660020	
Ensign Rig #134 RKB - 13' WELL @ 4803.0ft (Ensign Rig #134 RKB - 13')						

FINAL SURVEY

Projected Bottom Hole Location
11658'MD 7150'TVD 1167'S & 4431'W of
SHL 90.9 degree Incl @ 269.3 degree AZM





PETROLEUM DEVELOPMENT CORP Weld County CO

Sec.33-T7N-R65W

Alm 33V-HZ Pad South Sec.33-T7N-R65W

Alm 33W-404

Wellbore #1

Survey: Survey #1

Standard Survey Report

04 May, 2015

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alm 33W-404
Project:	Sec.33-T7N-R65W	TVD Reference:	WELL @ 4803.0ft (Ensign Rig #134 RKB - 13')
Site:	Alm 33V-HZ Pad South Sec.33-T7N-R65W	MD Reference:	WELL @ 4803.0ft (Ensign Rig #134 RKB - 13')
Well:	Alm 33W-404	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	Sec.33-T7N-R65W, 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		Alm 33V-HZ Pad South Sec.33-T7N-R65W			
Site Position:		Northing:	1,438,694.05 ft	Latitude:	40.534580
From:	Lat/Long	Easting:	3,233,475.22 ft	Longitude:	-104.660020
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.54 °

Well	Alm 33W-404					
Well Position	+N-S	0.0 ft	Northing:	1,438,664.88 ft	Latitude:	40.534500
	+E-W	0.0 ft	Easting:	3,233,475.49 ft	Longitude:	-104.660020
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,790.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/23/2015	8.30	67.04	52,806

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	255.35	

Survey Program	Date 5/4/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
73.0	11,658.0	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	0.01	2.00	1.0	0.0	0.0	0.0	0.96	0.96	0.00	
SHL 1263'FNL & 330'FEL										
73.0	0.70	2.00	73.0	0.4	0.0	-0.1	0.96	0.96	0.00	
165.0	0.00	141.70	165.0	1.0	0.0	-0.3	0.76	-0.76	0.00	
258.0	0.40	198.00	258.0	0.7	-0.1	-0.1	0.43	0.43	0.00	
350.0	1.10	192.00	350.0	-0.5	-0.3	0.5	0.76	0.76	-6.52	
443.0	2.40	183.70	442.9	-3.3	-0.7	1.5	1.42	1.40	-8.92	
535.0	3.80	182.00	534.8	-8.3	-0.9	2.9	1.52	1.52	-1.85	
624.0	5.10	179.70	623.5	-15.2	-1.0	4.8	1.47	1.46	-2.58	
720.0	5.80	169.00	719.1	-24.2	0.0	6.1	1.28	0.73	-11.15	
812.0	7.30	163.90	810.5	-34.4	2.5	6.3	1.75	1.63	-5.54	

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Site:	Alm 33V-HZ Pad South Sec.33-T7N-R65W	MD Reference:	WELL @ 4803.0ft (Ensign Rig #134 RKB - 13')
Well:	Alm 33W-404	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
877.0	7.40	164.90	875.0	-42.4	4.7	6.1	0.25	0.15	1.54
1,014.0	7.50	172.80	1,010.8	-59.8	8.1	7.2	0.75	0.07	5.77
1,107.0	9.40	174.80	1,102.8	-73.4	9.6	9.3	2.07	2.04	2.15
1,199.0	12.00	171.10	1,193.2	-90.3	11.7	11.5	2.92	2.83	-4.02
1,291.0	13.70	164.60	1,282.9	-110.2	16.1	12.3	2.42	1.85	-7.07
1,384.0	13.40	163.10	1,373.3	-131.2	22.2	11.7	0.50	-0.32	-1.61
1,476.0	12.50	161.60	1,463.0	-150.8	28.4	10.6	1.04	-0.98	-1.63
1,569.0	14.10	166.50	1,553.5	-171.4	34.2	10.2	2.10	1.72	5.27
1,661.0	15.20	171.80	1,642.5	-194.2	38.6	11.8	1.88	1.20	5.76
1,754.0	14.20	172.00	1,732.4	-217.6	41.9	14.5	1.08	-1.08	0.22
1,846.0	15.00	167.20	1,821.5	-240.4	46.1	16.2	1.58	0.87	-5.22
1,938.0	14.30	165.10	1,910.5	-263.0	51.7	16.5	0.95	-0.76	-2.28
2,031.0	16.40	161.20	2,000.2	-286.5	58.9	15.5	2.51	2.26	-4.19
2,124.0	15.60	161.80	2,089.6	-310.8	67.0	13.8	0.88	-0.86	0.65
2,216.0	14.50	156.70	2,178.4	-333.1	75.4	11.3	1.87	-1.20	-5.54
2,308.0	15.30	158.90	2,267.3	-355.0	84.3	8.2	1.06	0.87	2.39
2,401.0	14.00	158.20	2,357.3	-376.9	92.9	5.4	1.41	-1.40	-0.75
2,493.0	14.60	163.90	2,446.4	-398.4	100.3	3.7	1.66	0.65	6.20
2,586.0	13.50	161.20	2,536.6	-419.9	107.0	2.6	1.38	-1.18	-2.90
2,681.0	14.40	166.20	2,628.9	-441.9	113.4	2.0	1.58	0.95	5.26
2,776.0	14.10	166.20	2,720.9	-464.6	119.0	2.4	0.32	-0.32	0.00
2,871.0	14.40	171.10	2,813.0	-487.5	123.6	3.7	1.31	0.32	5.16
2,966.0	13.70	171.60	2,905.2	-510.3	127.1	6.1	0.75	-0.74	0.53
3,061.0	15.60	172.10	2,997.1	-534.1	130.5	8.8	2.00	2.00	0.53
3,157.0	14.60	170.50	3,089.8	-558.8	134.2	11.4	1.13	-1.04	-1.67
3,252.0	15.70	170.40	3,181.5	-583.3	138.4	13.6	1.16	1.16	-0.11
3,347.0	14.90	168.10	3,273.1	-607.9	143.0	15.4	1.06	-0.84	-2.42
3,442.0	15.70	167.70	3,364.7	-632.4	148.3	16.5	0.85	0.84	-0.42
3,537.0	13.80	165.40	3,456.6	-656.0	153.9	17.0	2.09	-2.00	-2.42
3,632.0	14.70	169.50	3,548.7	-678.8	158.9	17.9	1.42	0.95	4.32
3,727.0	13.30	166.50	3,640.8	-701.3	163.7	19.0	1.66	-1.47	-3.16
3,822.0	13.90	172.50	3,733.2	-723.2	167.7	20.6	1.61	0.63	6.32
3,918.0	15.90	169.50	3,825.9	-747.6	171.6	23.0	2.23	2.08	-3.13
4,013.0	16.80	169.00	3,917.1	-773.8	176.6	24.8	0.96	0.95	-0.53
4,108.0	17.40	167.40	4,007.9	-801.2	182.3	26.2	0.80	0.63	-1.68
4,203.0	18.00	164.90	4,098.4	-829.2	189.2	26.6	1.02	0.63	-2.63
4,298.0	17.50	162.80	4,188.9	-857.0	197.3	25.8	0.86	-0.53	-2.21
4,393.0	16.30	160.20	4,279.8	-883.2	206.0	24.0	1.49	-1.26	-2.74
4,489.0	16.80	164.90	4,371.8	-909.3	214.2	22.7	1.49	0.52	4.90
4,584.0	17.20	172.00	4,462.7	-936.5	219.7	24.2	2.22	0.42	7.47
4,679.0	15.90	169.50	4,553.7	-963.2	224.1	26.8	1.56	-1.37	-2.63
4,774.0	15.30	169.30	4,645.2	-988.3	228.8	28.6	0.63	-0.63	-0.21
4,869.0	16.00	166.30	4,736.7	-1,013.3	234.2	29.7	1.13	0.74	-3.16
4,964.0	17.10	168.60	4,827.8	-1,039.7	240.1	30.7	1.35	1.16	2.42
5,060.0	15.70	168.30	4,919.9	-1,066.3	245.5	32.1	1.46	-1.46	-0.31
5,155.0	15.20	171.80	5,011.4	-1,091.2	249.9	34.2	1.11	-0.53	3.68
5,250.0	16.60	171.10	5,102.8	-1,116.9	253.7	37.0	1.49	1.47	-0.74
5,345.0	15.20	171.40	5,194.2	-1,142.7	257.7	39.6	1.48	-1.47	0.32
5,440.0	12.70	172.60	5,286.4	-1,165.3	260.9	42.3	2.65	-2.63	1.26
5,535.0	12.80	167.70	5,379.0	-1,186.0	264.5	44.0	1.14	0.11	-5.16
5,630.0	11.60	169.10	5,471.9	-1,205.6	268.5	45.1	1.30	-1.26	1.47
5,725.0	9.50	169.00	5,565.3	-1,222.7	271.8	46.2	2.21	-2.21	-0.11
5,820.0	9.40	174.10	5,659.0	-1,238.1	274.1	47.9	0.89	-0.11	5.37
5,916.0	7.70	172.70	5,753.9	-1,252.3	275.8	49.9	1.78	-1.77	-1.46

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
6,011.0	6.20	172.10	5,848.2	-1,263.7	277.3	51.3	1.58	-1.58	-0.63
6,105.0	5.40	174.80	5,941.7	-1,273.1	278.4	52.6	0.90	-0.85	2.87
6,200.0	2.00	160.50	6,036.5	-1,279.1	279.3	53.2	3.68	-3.58	-15.05
6,296.0	1.30	214.70	6,132.5	-1,281.6	279.3	53.9	1.69	-0.73	56.46
6,390.0	1.10	218.40	6,226.5	-1,283.2	278.1	55.4	0.23	-0.21	3.94
6,485.0	1.50	237.90	6,321.4	-1,284.6	276.5	57.3	0.62	0.42	20.53
6,581.0	7.60	270.60	6,417.1	-1,285.2	269.1	64.7	6.66	6.35	34.06
6,676.0	14.70	280.80	6,510.2	-1,282.9	250.9	81.6	7.73	7.47	10.74
6,771.0	18.80	278.10	6,601.2	-1,278.4	223.9	106.6	4.39	4.32	-2.84
6,866.0	25.10	267.90	6,689.3	-1,277.0	188.6	140.5	7.73	6.63	-10.74
6,961.0	34.00	267.20	6,771.9	-1,279.1	141.8	186.2	9.38	9.37	-0.74
7,056.0	39.30	270.40	6,848.1	-1,280.1	85.2	241.3	5.93	5.58	3.37
7,151.0	46.30	272.10	6,917.7	-1,278.7	20.7	303.3	7.47	7.37	1.79
7,246.0	55.00	275.00	6,977.9	-1,274.0	-52.6	373.0	9.46	9.16	3.05
7,341.0	60.60	271.30	7,028.5	-1,269.7	-132.8	449.5	6.75	5.89	-3.89
7,436.0	68.00	272.00	7,069.7	-1,267.2	-218.3	531.6	7.82	7.79	0.74
7,531.0	75.40	275.30	7,099.5	-1,261.4	-308.2	617.2	8.46	7.79	3.47
7,650.0	86.60	270.90	7,118.1	-1,255.1	-425.4	728.9	10.09	9.41	-3.70
7,691.0	87.57	270.38	7,120.2	-1,254.7	-466.3	768.4	2.68	2.36	-1.27
7"									
7,760.0	89.20	269.50	7,122.1	-1,254.8	-535.3	835.2	2.68	2.36	-1.27
7,855.0	90.80	270.20	7,122.1	-1,255.0	-630.3	927.1	1.84	1.68	0.74
7,950.0	90.70	270.40	7,120.9	-1,254.5	-725.3	1,018.9	0.24	-0.11	0.21
8,045.0	90.60	271.60	7,119.8	-1,252.8	-820.2	1,110.4	1.27	-0.11	1.26
8,141.0	89.40	271.10	7,119.8	-1,250.6	-916.2	1,202.7	1.35	-1.25	-0.52
8,236.0	89.90	271.30	7,120.4	-1,248.6	-1,011.2	1,294.1	0.57	0.53	0.21
8,331.0	89.70	271.10	7,120.7	-1,246.6	-1,106.2	1,385.5	0.30	-0.21	-0.21
8,426.0	89.80	272.90	7,121.1	-1,243.3	-1,201.1	1,476.5	1.90	0.11	1.89
8,521.0	90.60	273.00	7,120.8	-1,238.4	-1,296.0	1,567.0	0.85	0.84	0.11
8,616.0	90.00	272.10	7,120.3	-1,234.2	-1,390.9	1,657.8	1.14	-0.63	-0.95
8,711.0	89.90	270.90	7,120.4	-1,231.7	-1,485.9	1,749.0	1.27	-0.11	-1.26
8,807.0	89.80	271.80	7,120.6	-1,229.4	-1,581.8	1,841.3	0.94	-0.10	0.94
8,902.0	90.30	271.10	7,120.6	-1,227.0	-1,676.8	1,932.6	0.91	0.53	-0.74
8,997.0	89.70	270.90	7,120.6	-1,225.4	-1,771.8	2,024.1	0.67	-0.63	-0.21
9,092.0	89.90	270.20	7,120.9	-1,224.5	-1,866.8	2,115.7	0.77	0.21	-0.74
9,187.0	90.10	271.40	7,120.9	-1,223.1	-1,961.8	2,207.3	1.28	0.21	1.26
9,282.0	89.10	272.10	7,121.6	-1,220.2	-2,056.7	2,298.4	1.28	-1.05	0.74
9,377.0	89.40	270.90	7,122.8	-1,217.7	-2,151.7	2,389.7	1.30	0.32	-1.26
9,473.0	89.70	272.00	7,123.5	-1,215.3	-2,247.6	2,481.9	1.19	0.31	1.15
9,568.0	88.70	269.50	7,124.9	-1,214.1	-2,342.6	2,573.5	2.83	-1.05	-2.63
9,663.0	90.50	271.40	7,125.5	-1,213.3	-2,437.6	2,665.2	2.75	1.89	2.00
9,758.0	90.30	271.80	7,124.9	-1,210.7	-2,532.6	2,756.4	0.47	-0.21	0.42
9,853.0	89.80	272.00	7,124.8	-1,207.5	-2,627.5	2,847.5	0.57	-0.53	0.21
9,948.0	91.00	272.00	7,124.1	-1,204.2	-2,722.4	2,938.5	1.26	1.26	0.00
10,044.0	89.30	271.30	7,123.9	-1,201.4	-2,818.4	3,030.6	1.92	-1.77	-0.73
10,139.0	87.50	271.40	7,126.5	-1,199.2	-2,913.3	3,121.9	1.90	-1.89	0.11
10,234.0	89.10	272.00	7,129.3	-1,196.4	-3,008.2	3,213.0	1.80	1.68	0.63
10,329.0	89.80	272.10	7,130.3	-1,193.0	-3,103.2	3,304.0	0.74	0.74	0.11
10,424.0	89.60	271.60	7,130.8	-1,189.9	-3,198.1	3,395.1	0.57	-0.21	-0.53
10,519.0	89.30	272.00	7,131.7	-1,186.9	-3,293.1	3,486.2	0.53	-0.32	0.42
10,614.0	88.50	273.70	7,133.5	-1,182.2	-3,387.9	3,576.8	1.98	-0.84	1.79
10,710.0	88.30	272.00	7,136.2	-1,177.4	-3,483.8	3,668.3	1.78	-0.21	-1.77
10,805.0	88.70	271.10	7,138.7	-1,174.9	-3,578.7	3,759.5	1.04	0.42	-0.95

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Survey									
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10,900.0	89.50	270.70	7,140.2	-1,173.4	-3,673.7	3,851.0	0.94	0.84	-0.42
10,995.0	87.80	271.30	7,142.4	-1,171.7	-3,768.6	3,942.5	1.90	-1.79	0.63
11,093.0	88.20	270.70	7,145.8	-1,170.0	-3,866.6	4,036.8	0.74	0.41	-0.61
11,188.0	88.50	270.70	7,148.5	-1,168.9	-3,961.5	4,128.3	0.32	0.32	0.00
11,283.0	88.40	271.10	7,151.1	-1,167.4	-4,056.5	4,219.8	0.43	-0.11	0.42
11,378.0	90.00	270.40	7,152.4	-1,166.1	-4,151.4	4,311.4	1.84	1.68	-0.74
Deepest TVD Drilled - 7152.4'									
11,473.0	90.10	269.90	7,152.4	-1,165.9	-4,246.4	4,403.3	0.54	0.11	-0.53
11,532.0	90.60	269.70	7,152.0	-1,166.1	-4,305.4	4,460.4	0.91	0.85	-0.34
11,600.0	90.90	269.30	7,151.1	-1,166.7	-4,373.4	4,526.3	0.74	0.44	-0.59
11,657.0	90.90	269.30	7,150.2	-1,167.4	-4,430.5	4,581.7	0.00	0.00	0.00
BHL 2527'FNL & 500'FWL									
11,658.0	90.90	269.30	7,150.2	-1,167.4	-4,431.4	4,582.6	0.00	0.00	0.00

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,691.0	7,120.2	7"	7	7-1/2

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,378.0	7,152.4	-1,166.1	-4,151.4	Deepest TVD Drilled - 7152.4'

Checked By: _____ Approved By: _____ Date: _____