

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Bernhardt 6G-403**

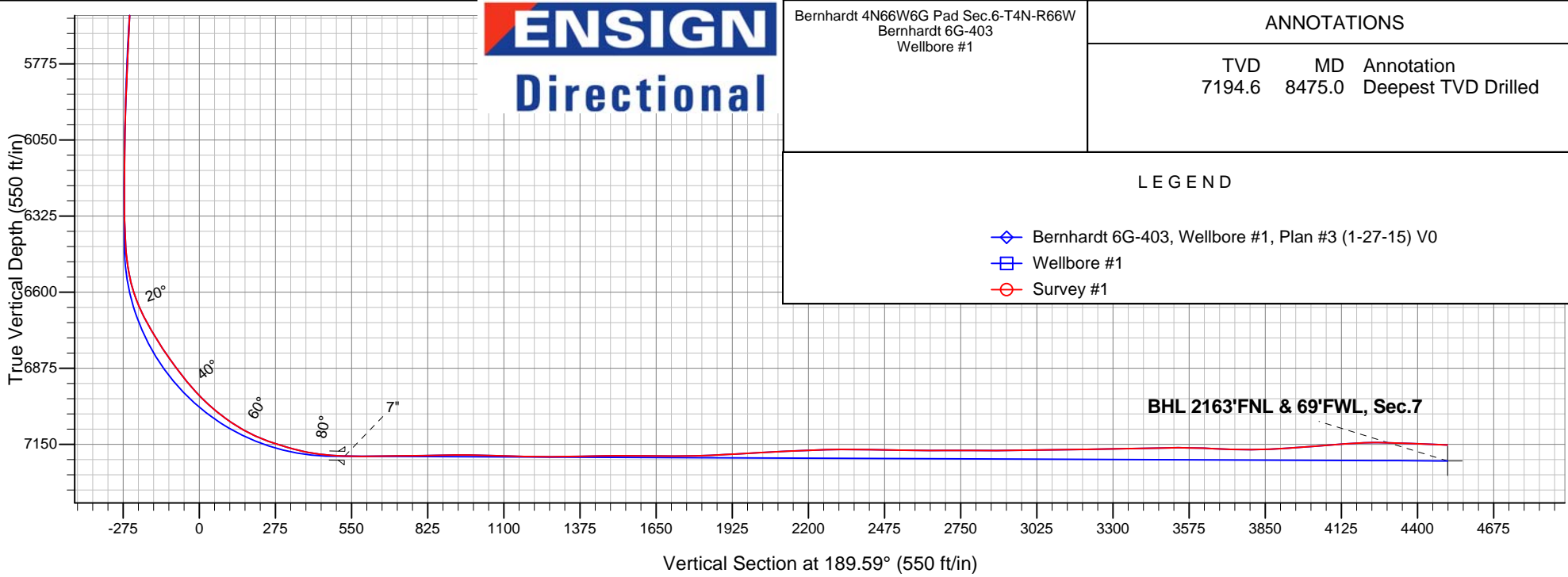
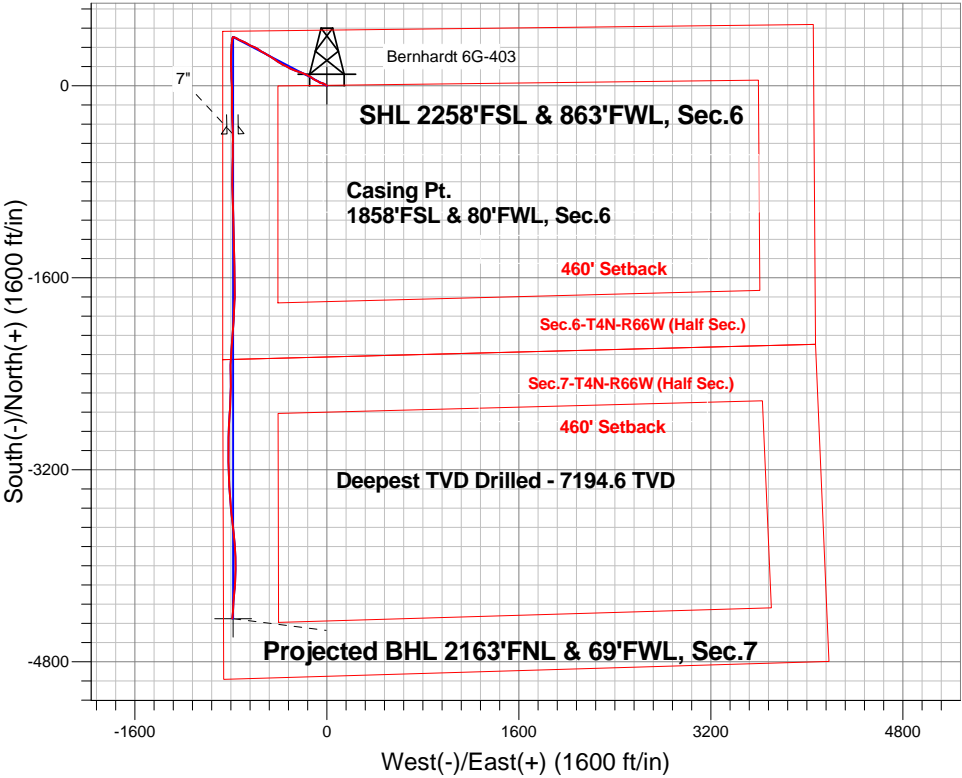
Surface Location: Bernhardt 4N66W6G Pad Sec.6-T4N-R66W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4722.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1367444.40	3187687.75	40.340080	-104.826690	
Ensign Rig #121 RKB - 13.5' WELL @ 4735.5ft (Ensign Rig #121 RKB - 13.5')						

FINAL SURVEY

Projected Bottom Hole Location
11758'MD 7152'TVD 4440'S & 786'W of SHL
87.8 degree Incl @ 183.8 degree AZM





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.6-T4N-R66W

Bernhardt 4N66W6G Pad Sec.6-T4N-R66W

Bernhardt 6G-403

Wellbore #1

Survey: Survey #1

Standard Survey Report

09 March, 2015

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt 6G-403
Project:	SEC.6-T4N-R66W	TVD Reference:	WELL @ 4735.5ft (Ensign Rig #121 RKB - 13.5')
Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4735.5ft (Ensign Rig #121 RKB - 13.5')
Well:	Bernhardt 6G-403	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.6-T4N-R66W, 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	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W				
Site Position:		Northing:	1,367,654.84 ft	Latitude:	40.340660
From:	Lat/Long	Easting:	3,187,571.86 ft	Longitude:	-104.827100
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.43 °

Well	Bernhardt 6G-403					
Well Position	+N-S	0.0 ft	Northing:	1,367,444.40 ft	Latitude:	40.340080
	+E-W	0.0 ft	Easting:	3,187,687.75 ft	Longitude:	-104.826690
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,722.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/20/2015	8.40	66.86	52,706

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	189.59	

Survey Program	Date	3/9/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
167.0	11,758.0	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	319.20	1.0	0.0	0.0	0.0	0.90	0.90	0.00	
SHL 2258'FSL & 863'FWL, Sec.6										
167.0	1.50	319.20	167.0	1.7	-1.4	-1.4	0.90	0.90	0.00	
259.0	2.10	312.30	258.9	3.7	-3.5	-3.1	0.69	0.65	-7.50	
351.0	1.80	309.20	350.9	5.7	-5.8	-4.7	0.35	-0.33	-3.37	
443.0	2.60	303.00	442.8	7.8	-8.7	-6.2	0.91	0.87	-6.74	
536.0	3.00	302.80	535.7	10.3	-12.5	-8.0	0.43	0.43	-0.22	
629.0	3.80	303.40	628.5	13.3	-17.1	-10.2	0.86	0.86	0.65	
722.0	4.00	300.00	721.3	16.6	-22.5	-12.6	0.33	0.22	-3.66	
814.0	4.70	286.10	813.1	19.2	-28.9	-14.2	1.37	0.76	-15.11	
882.0	6.20	282.60	880.8	20.8	-35.2	-14.7	2.26	2.21	-5.15	

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Site:	Bernhardt 4N66W6G Pad Sec.6-T4N-R66W	MD Reference:	WELL @ 4735.5ft (Ensign Rig #121 RKB - 13.5')
Well:	Bernhardt 6G-403	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)
999.0	7.40	283.30	996.9	23.9	-48.7	-15.5	1.03	1.03	0.60
1,092.0	7.30	298.10	1,089.2	28.1	-59.7	-17.8	2.03	-0.11	15.91
1,184.0	8.90	301.40	1,180.2	34.6	-70.9	-22.3	1.81	1.74	3.59
1,277.0	9.40	294.60	1,272.1	41.5	-84.0	-26.9	1.28	0.54	-7.31
1,368.0	9.10	298.10	1,361.9	47.9	-97.1	-31.1	0.70	-0.33	3.85
1,460.0	8.50	303.20	1,452.8	55.1	-109.2	-36.1	1.07	-0.65	5.54
1,552.0	10.70	308.10	1,543.5	64.1	-121.6	-42.9	2.55	2.39	5.33
1,644.0	9.30	300.40	1,634.1	73.1	-134.8	-49.7	2.10	-1.52	-8.37
1,736.0	10.00	301.60	1,724.8	81.1	-148.0	-55.3	0.79	0.76	1.30
1,828.0	10.80	293.00	1,815.3	88.6	-162.7	-60.3	1.90	0.87	-9.35
1,921.0	9.80	296.90	1,906.8	95.6	-177.8	-64.7	1.31	-1.08	4.19
2,016.0	9.00	296.20	2,000.5	102.6	-191.7	-69.2	0.85	-0.84	-0.74
2,111.0	10.20	288.60	2,094.2	108.5	-206.3	-72.6	1.83	1.26	-8.00
2,206.0	9.90	283.00	2,187.7	113.0	-222.2	-74.4	1.08	-0.32	-5.89
2,300.0	8.80	287.60	2,280.5	117.0	-237.0	-75.9	1.41	-1.17	4.89
2,396.0	9.20	287.40	2,375.3	121.5	-251.3	-78.0	0.42	0.42	-0.21
2,491.0	9.70	288.10	2,469.0	126.3	-266.1	-80.2	0.54	0.53	0.74
2,586.0	10.60	296.00	2,562.5	132.6	-281.6	-83.9	1.74	0.95	8.32
2,681.0	12.00	302.50	2,655.7	141.8	-297.8	-90.2	1.99	1.47	6.84
2,777.0	11.60	297.00	2,749.7	151.5	-314.8	-96.9	1.24	-0.42	-5.73
2,872.0	11.00	292.80	2,842.8	159.3	-331.7	-101.9	1.07	-0.63	-4.42
2,968.0	9.80	298.60	2,937.3	166.8	-347.3	-106.6	1.66	-1.25	6.04
3,063.0	9.60	293.20	3,030.9	173.8	-361.7	-111.1	0.98	-0.21	-5.68
3,159.0	9.00	299.50	3,125.6	180.7	-375.6	-115.6	1.23	-0.63	6.56
3,254.0	8.90	303.00	3,219.5	188.3	-388.2	-121.0	0.58	-0.11	3.68
3,350.0	8.80	305.10	3,314.3	196.6	-400.4	-127.1	0.35	-0.10	2.19
3,445.0	7.70	300.00	3,408.4	203.9	-411.9	-132.5	1.39	-1.16	-5.37
3,540.0	8.90	308.10	3,502.4	211.7	-423.2	-138.2	1.76	1.26	8.53
3,635.0	9.10	303.20	3,596.2	220.3	-435.2	-144.7	0.83	0.21	-5.16
3,731.0	11.30	304.60	3,690.7	229.8	-449.3	-151.7	2.31	2.29	1.46
3,826.0	11.90	303.70	3,783.7	240.5	-465.2	-159.7	0.66	0.63	-0.95
3,921.0	11.60	300.40	3,876.7	250.8	-481.5	-167.1	0.77	-0.32	-3.47
4,016.0	10.20	299.90	3,970.0	259.8	-497.1	-173.4	1.48	-1.47	-0.53
4,112.0	8.90	299.30	4,064.7	267.7	-510.9	-178.8	1.36	-1.35	-0.63
4,207.0	9.70	300.00	4,158.4	275.3	-524.3	-184.1	0.85	0.84	0.74
4,303.0	8.40	298.10	4,253.3	282.6	-537.4	-189.1	1.39	-1.35	-1.98
4,398.0	8.40	299.00	4,347.2	289.3	-549.6	-193.7	0.14	0.00	0.95
4,493.0	7.70	305.10	4,441.3	296.3	-560.9	-198.7	1.16	-0.74	6.42
4,589.0	7.60	306.40	4,536.4	303.8	-571.3	-204.3	0.21	-0.10	1.35
4,684.0	8.10	299.50	4,630.6	310.8	-582.2	-209.5	1.12	0.53	-7.26
4,779.0	7.30	297.60	4,724.7	316.9	-593.3	-213.6	0.88	-0.84	-2.00
4,874.0	7.90	292.50	4,818.9	322.2	-604.7	-216.9	0.95	0.63	-5.37
4,970.0	8.70	293.90	4,913.9	327.6	-617.5	-220.2	0.86	0.83	1.46
5,065.0	7.60	291.90	5,007.9	332.9	-629.9	-223.3	1.20	-1.16	-2.11
5,160.0	8.60	300.70	5,102.0	338.9	-641.8	-227.2	1.67	1.05	9.26
5,256.0	9.20	303.00	5,196.8	346.7	-654.4	-232.8	0.73	0.63	2.40
5,351.0	9.70	298.30	5,290.5	354.6	-667.8	-238.4	0.97	0.53	-4.95
5,447.0	9.90	297.70	5,385.1	362.3	-682.2	-243.6	0.23	0.21	-0.63
5,542.0	9.10	288.40	5,478.8	368.5	-696.6	-247.3	1.82	-0.84	-9.79
5,638.0	9.10	293.70	5,573.6	373.9	-710.8	-250.3	0.87	0.00	5.52
5,733.0	8.20	300.20	5,667.5	380.3	-723.5	-254.5	1.40	-0.95	6.84
5,828.0	7.30	297.60	5,761.7	386.6	-734.7	-258.8	1.02	-0.95	-2.74
5,924.0	7.80	300.40	5,856.8	392.7	-745.7	-263.0	0.65	0.52	2.92
6,019.0	6.60	293.90	5,951.1	398.1	-756.3	-266.6	1.52	-1.26	-6.84

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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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)
6,115.0	5.50	291.10	6,046.5	402.0	-765.6	-268.9	1.19	-1.15	-2.92
6,210.0	3.80	278.90	6,141.2	404.2	-773.0	-269.7	2.06	-1.79	-12.84
6,306.0	1.80	304.80	6,237.1	405.5	-777.3	-270.3	2.41	-2.08	26.98
6,401.0	2.60	249.80	6,332.0	405.6	-780.6	-269.9	2.26	0.84	-57.89
6,496.0	3.50	213.20	6,426.9	402.5	-784.2	-266.2	2.21	0.95	-38.53
6,592.0	9.80	189.10	6,522.2	391.9	-787.1	-255.3	7.04	6.56	-25.10
6,687.0	19.00	187.90	6,614.2	368.6	-790.5	-231.7	9.69	9.68	-1.26
6,782.0	28.70	182.60	6,701.0	330.4	-793.7	-193.5	10.45	10.21	-5.58
6,878.0	32.50	183.10	6,783.6	281.6	-796.1	-145.0	3.97	3.96	0.52
6,973.0	36.30	182.10	6,861.9	228.0	-798.5	-91.7	4.04	4.00	-1.05
7,069.0	40.60	177.20	6,937.1	168.3	-798.1	-33.0	5.49	4.48	-5.10
7,164.0	48.50	178.60	7,004.8	101.8	-795.7	32.2	8.38	8.32	1.47
7,259.0	55.10	176.80	7,063.5	27.2	-792.6	105.2	7.10	6.95	-1.89
7,355.0	64.10	179.60	7,112.0	-55.4	-790.1	186.3	9.71	9.38	2.92
7,450.0	72.80	180.50	7,146.9	-143.7	-790.2	273.3	9.20	9.16	0.95
7,497.0	73.40	180.10	7,160.6	-188.7	-790.4	317.7	1.51	1.28	-0.85
7,545.0	76.90	178.40	7,172.9	-235.1	-789.8	363.4	8.06	7.29	-3.54
7,592.0	80.60	176.80	7,182.0	-281.1	-787.9	408.4	8.55	7.87	-3.40
7,641.0	84.80	177.70	7,188.2	-329.6	-785.6	455.9	8.76	8.57	1.84
7,673.0	86.80	178.00	7,190.6	-361.5	-784.4	487.2	6.32	6.25	0.94
7,712.0	87.93	178.95	7,192.4	-400.5	-783.3	525.4	3.80	2.91	2.44
7"									
7,759.0	89.30	180.10	7,193.5	-447.5	-783.0	571.6	3.80	2.91	2.44
7,808.0	90.80	180.90	7,193.5	-496.5	-783.4	620.0	3.47	3.06	1.63
7,903.0	90.70	180.50	7,192.2	-591.4	-784.5	713.9	0.43	-0.11	-0.42
7,998.0	90.90	180.50	7,190.9	-686.4	-785.4	807.7	0.21	0.21	0.00
8,094.0	91.20	180.70	7,189.1	-782.4	-786.4	902.5	0.38	0.31	0.21
8,189.0	88.70	178.20	7,189.2	-877.4	-785.5	996.0	3.72	-2.63	-2.63
8,284.0	88.10	178.20	7,191.9	-972.3	-782.5	1,089.1	0.63	-0.63	0.00
8,380.0	89.30	179.10	7,194.1	-1,068.2	-780.2	1,183.3	1.56	1.25	0.94
8,475.0	90.00	178.60	7,194.6	-1,163.2	-778.3	1,276.6	0.91	0.74	-0.53
Deepest TVD Drilled									
8,570.0	91.30	178.20	7,193.6	-1,258.2	-775.7	1,369.8	1.43	1.37	-0.42
8,666.0	90.60	178.90	7,192.0	-1,354.1	-773.2	1,464.0	1.03	-0.73	0.73
8,761.0	89.70	178.60	7,191.7	-1,449.1	-771.2	1,557.3	1.00	-0.95	-0.32
8,856.0	89.80	180.00	7,192.1	-1,544.1	-770.0	1,650.8	1.48	0.11	1.47
8,952.0	90.00	178.40	7,192.3	-1,640.1	-768.7	1,745.2	1.68	0.21	-1.67
9,047.0	92.40	180.70	7,190.3	-1,735.0	-767.9	1,838.7	3.50	2.53	2.42
9,143.0	93.50	182.40	7,185.4	-1,830.9	-770.5	1,933.7	2.11	1.15	1.77
9,238.0	93.10	183.30	7,179.9	-1,925.6	-775.2	2,027.8	1.04	-0.42	0.95
9,334.0	92.90	184.00	7,174.9	-2,021.3	-781.3	2,123.2	0.76	-0.21	0.73
9,429.0	92.00	184.40	7,170.8	-2,115.9	-788.3	2,217.7	1.04	-0.95	0.42
9,524.0	90.40	183.50	7,168.8	-2,210.7	-794.8	2,312.2	1.93	-1.68	-0.95
9,620.0	89.30	182.80	7,169.1	-2,306.5	-800.1	2,407.6	1.36	-1.15	-0.73
9,715.0	88.70	178.70	7,170.7	-2,401.5	-801.3	2,501.4	4.36	-0.63	-4.32
9,811.0	89.80	180.30	7,172.0	-2,497.5	-800.5	2,595.9	2.02	1.15	1.67
9,906.0	90.10	182.60	7,172.1	-2,592.4	-802.9	2,690.0	2.44	0.32	2.42
10,002.0	89.50	182.40	7,172.4	-2,688.3	-807.1	2,785.2	0.66	-0.63	-0.21
10,097.0	90.30	184.00	7,172.6	-2,783.2	-812.4	2,879.6	1.88	0.84	1.68
10,192.0	90.70	182.40	7,171.7	-2,878.0	-817.7	2,974.0	1.74	0.42	-1.68
10,288.0	91.10	180.50	7,170.2	-2,974.0	-820.1	3,069.1	2.02	0.42	-1.98
10,383.0	90.40	178.40	7,169.0	-3,069.0	-819.2	3,162.6	2.33	-0.74	-2.21
10,478.0	91.20	178.90	7,167.7	-3,163.9	-817.0	3,255.8	0.99	0.84	0.53

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Design:	Wellbore #1	Database:	Landmark

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10,574.0	91.50	178.40	7,165.4	-3,259.9	-814.7	3,350.1	0.61	0.31	-0.52
10,669.0	91.00	177.50	7,163.3	-3,354.8	-811.3	3,443.1	1.08	-0.53	-0.95
10,764.0	90.00	175.60	7,162.5	-3,449.6	-805.6	3,535.6	2.26	-1.05	-2.00
10,860.0	88.20	173.30	7,164.0	-3,545.1	-796.3	3,628.3	3.04	-1.88	-2.40
10,955.0	87.30	173.60	7,167.7	-3,639.5	-785.5	3,719.5	1.00	-0.95	0.32
11,050.0	91.20	174.30	7,169.0	-3,733.9	-775.5	3,810.9	4.17	4.11	0.74
11,146.0	92.90	175.90	7,165.6	-3,829.5	-767.3	3,903.8	2.43	1.77	1.67
11,241.0	94.30	177.70	7,159.6	-3,924.1	-762.0	3,996.2	2.40	1.47	1.89
11,338.0	94.60	180.70	7,152.1	-4,020.8	-760.6	4,091.4	3.10	0.31	3.09
11,432.0	93.30	183.10	7,145.6	-4,114.5	-763.7	4,184.3	2.90	-1.38	2.55
11,527.0	88.50	184.40	7,144.1	-4,209.3	-770.0	4,278.7	5.23	-5.05	1.37
11,622.0	87.90	184.20	7,147.1	-4,304.0	-777.1	4,373.3	0.67	-0.63	-0.21
11,703.0	87.80	183.80	7,150.1	-4,384.7	-782.7	4,453.8	0.51	-0.12	-0.49
11,758.0	87.80	183.80	7,152.2	-4,439.6	-786.4	4,508.5	0.00	0.00	0.00
BHL 2164'FNL & 75FWL, Sec.7									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,712.0	7,192.4	7"	7	7-1/2

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
8,475.0	7,194.6	-1,163.2	-778.3	Deepest TVD Drilled

Checked By: _____	Approved By: _____	Date: _____
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