

# PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Waste Management 2T-401**

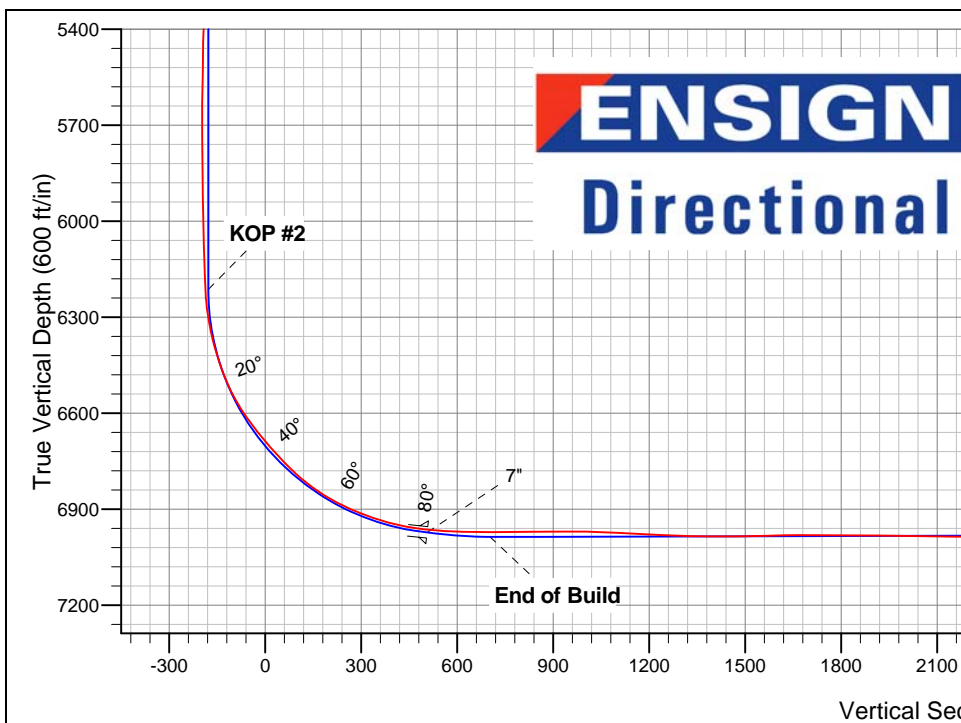
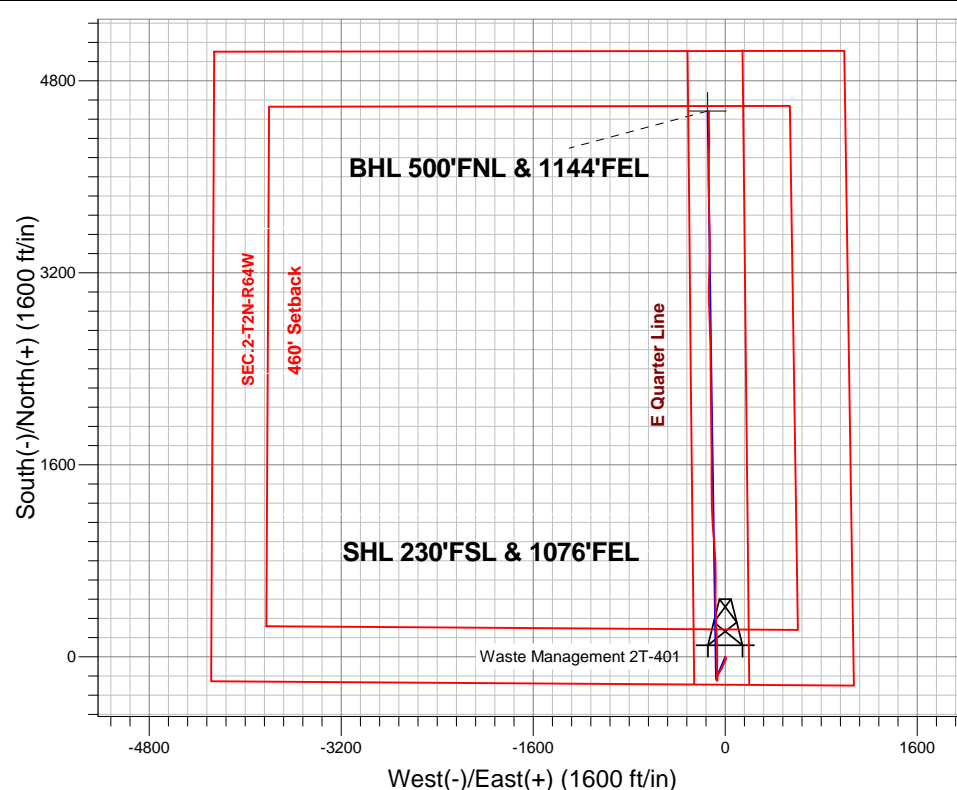
Surface Location: Waste Management 2T-HZ1 Pad Sec.2-T2N-R64W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone  
Ground Elevation: 4892.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1302950.62	3275862.38	40.160780	-104.512970	

RKB - 15' WELL @ 4915.0ft (RKB - 23)

## FINAL SURVEY

Projected Bottom Hole Location  
11385' MD 6987' TVD 4550' N & 137' W of SHL  
90.7 degree Incl @ 359.5 degree AZM



Waste Management 2T-HZ1 Pad Sec.2-T2N-R64W  
Waste Management 2T-401  
Wellbore #1  
9:29, August 21 2013

### ANNOTATIONS

No annotation data is available.

### LEGEND

- Waste Management 2T-401, Wellbore #1, Plan #1 (01-29-13) V0
- Wellbore #1

BHL 500'FNL & 1144'FEL

Vertical Section at 358.14° (600 ft/in)



# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.2-T2N-R64W**

**Waste Management 2T-HZ1 Pad Sec.2-T2N-R64W**

**Waste Management 2T-401**

**Wellbore #1**

**Design: Wellbore #1**

## **Standard Survey Report**

**21 August, 2013**

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Waste Management 2T-401
<b>Project:</b>	SEC.2-T2N-R64W	<b>TVD Reference:</b>	WELL @ 4915.0ft (RKB - 23')
<b>Site:</b>	Waste Management 2T-HZ1 Pad Sec.2-T2N-R64W	<b>MD Reference:</b>	WELL @ 4915.0ft (RKB - 23')
<b>Well:</b>	Waste Management 2T-401	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

<b>Project</b>	SEC.2-T2N-R64W, Weld County, Colorado		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site		Waste Management 2T-HZ1 Pad Sec.2-T2N-R64W			
Site Position:		Northing:	1,302,951.63 ft	Latitude:	40.160780
From:	Lat/Long	Easting:	3,275,951.82 ft	Longitude:	-104.512650
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.64 °

Well	Waste Management 2T-401					
Well Position	+N-S	0.0 ft	Northing:	1,302,950.62 ft	Latitude:	40.160780
	+E-W	0.0 ft	Easting:	3,275,862.38 ft	Longitude:	-104.512970
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,892.0 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	7/28/2013	8.42	66.83	52,809

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N-S (ft)</b>	<b>+E-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	358.14	

<b>Survey Program</b>	<b>Date</b>	8/20/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
170.0	11,385.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>									
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N-S (ft)</b>	<b>+E-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
170.0	0.20	87.90	170.0	0.0	0.3	0.0	0.12	0.12	0.00
262.0	0.40	148.50	262.0	-0.3	0.6	-0.3	0.38	0.22	65.87
352.0	0.80	142.50	352.0	-1.0	1.2	-1.1	0.45	0.44	-6.67
442.0	0.80	147.30	442.0	-2.1	1.9	-2.1	0.07	0.00	5.33
534.0	1.70	140.30	534.0	-3.6	3.1	-3.7	0.99	0.98	-7.61
625.0	0.60	145.90	624.9	-5.1	4.2	-5.2	1.21	-1.21	6.15
714.0	0.70	164.70	713.9	-6.0	4.6	-6.1	0.26	0.11	21.12
805.0	0.80	189.80	804.9	-7.1	4.7	-7.3	0.37	0.11	27.58
894.0	0.80	212.90	893.9	-8.3	4.2	-8.4	0.36	0.00	25.96
982.0	0.70	206.89	981.9	-9.3	3.7	-9.4	0.14	-0.11	-6.83

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Waste Management 2T-401
<b>Project:</b>	SEC.2-T2N-R64W	<b>TVD Reference:</b>	WELL @ 4915.0ft (RKB - 23')
<b>Site:</b>	Waste Management 2T-HZ1 Pad Sec.2-T2N-R64W	<b>MD Reference:</b>	WELL @ 4915.0ft (RKB - 23')
<b>Well:</b>	Waste Management 2T-401	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
1,074.0	0.97	197.80	1,073.9	-10.5	3.2	-10.6	0.33	0.29	-9.88
1,165.0	0.97	200.70	1,164.9	-12.0	2.7	-12.1	0.05	0.00	3.19
1,263.0	0.88	200.40	1,262.9	-13.5	2.1	-13.5	0.09	-0.09	-0.31
1,359.0	0.70	190.50	1,358.9	-14.7	1.7	-14.8	0.23	-0.19	-10.31
1,454.0	0.79	216.90	1,453.9	-15.8	1.2	-15.8	0.37	0.09	27.79
1,549.0	0.70	203.00	1,548.9	-16.9	0.6	-16.9	0.21	-0.09	-14.63
1,644.0	0.70	228.10	1,643.8	-17.8	0.0	-17.8	0.32	0.00	26.42
1,740.0	0.88	228.50	1,739.8	-18.7	-1.0	-18.6	0.19	0.19	0.42
1,835.0	0.79	245.40	1,834.8	-19.4	-2.2	-19.4	0.27	-0.09	17.79
1,930.0	0.70	253.50	1,929.8	-19.9	-3.3	-19.8	0.15	-0.09	8.53
2,025.0	0.35	267.90	2,024.8	-20.0	-4.2	-19.9	0.39	-0.37	15.16
2,120.0	0.10	117.10	2,119.8	-20.1	-4.4	-19.9	0.46	-0.26	-158.74
2,215.0	0.40	17.70	2,214.8	-19.8	-4.2	-19.7	0.45	0.32	-104.63
2,311.0	0.40	19.00	2,310.8	-19.2	-4.0	-19.0	0.01	0.00	1.35
2,406.0	0.40	42.90	2,405.8	-18.6	-3.7	-18.5	0.17	0.00	25.16
2,501.0	0.90	71.00	2,500.8	-18.1	-2.7	-18.0	0.61	0.53	29.58
2,596.0	0.80	77.90	2,595.8	-17.8	-1.4	-17.7	0.15	-0.11	7.26
2,692.0	1.10	97.20	2,691.8	-17.7	0.2	-17.7	0.45	0.31	20.10
2,787.0	1.40	88.10	2,786.8	-17.8	2.3	-17.9	0.38	0.32	-9.58
2,882.0	1.30	182.60	2,881.7	-18.8	3.4	-18.9	2.09	-0.11	99.47
2,977.0	3.40	206.90	2,976.7	-22.4	2.0	-22.5	2.40	2.21	25.58
3,073.0	5.10	206.50	3,072.4	-28.8	-1.1	-28.7	1.77	1.77	-0.42
3,168.0	6.90	204.60	3,166.9	-37.8	-5.4	-37.6	1.91	1.89	-2.00
3,263.0	7.20	199.90	3,261.1	-48.5	-9.8	-48.2	0.68	0.32	-4.95
3,358.0	6.90	198.30	3,355.4	-59.6	-13.6	-59.1	0.38	-0.32	-1.68
3,453.0	7.00	203.40	3,449.7	-70.3	-17.7	-69.7	0.66	0.11	5.37
3,548.0	6.20	212.90	3,544.1	-79.9	-22.8	-79.1	1.42	-0.84	10.00
3,644.0	6.00	209.30	3,639.6	-88.6	-28.1	-87.7	0.45	-0.21	-3.75
3,739.0	6.00	206.70	3,734.0	-97.4	-32.7	-96.3	0.29	0.00	-2.74
3,834.0	5.50	205.80	3,828.6	-105.9	-36.9	-104.7	0.53	-0.53	-0.95
3,929.0	6.00	210.80	3,923.1	-114.3	-41.5	-112.9	0.74	0.53	5.26
4,024.0	6.10	210.40	4,017.6	-122.9	-46.6	-121.3	0.11	0.11	-0.42
4,119.0	5.90	210.90	4,112.0	-131.5	-51.6	-129.7	0.22	-0.21	0.53
4,215.0	6.00	207.60	4,207.5	-140.1	-56.5	-138.2	0.37	0.10	-3.44
4,310.0	6.20	206.50	4,302.0	-149.1	-61.1	-147.1	0.24	0.21	-1.16
4,405.0	6.20	202.80	4,396.4	-158.5	-65.4	-156.2	0.42	0.00	-3.89
4,500.0	5.80	210.10	4,490.9	-167.3	-69.7	-165.0	0.91	-0.42	7.68
4,596.0	4.50	211.80	4,586.5	-174.7	-74.2	-172.2	1.36	-1.35	1.77
4,691.0	2.90	197.00	4,681.3	-180.2	-76.8	-177.6	1.95	-1.68	-15.58
4,786.0	1.50	147.30	4,776.3	-183.5	-76.9	-180.9	2.36	-1.47	-52.32
4,881.0	1.30	154.90	4,871.2	-185.6	-75.7	-183.0	0.29	-0.21	8.00
4,977.0	1.20	161.50	4,967.2	-187.5	-75.0	-185.0	0.18	-0.10	6.88
5,072.0	1.00	166.10	5,062.2	-189.3	-74.4	-186.7	0.23	-0.21	4.84
5,167.0	1.10	158.50	5,157.2	-190.9	-73.9	-188.4	0.18	0.11	-8.00
5,262.0	1.30	148.50	5,252.1	-192.7	-73.0	-190.2	0.30	0.21	-10.53
5,357.0	1.10	145.00	5,347.1	-194.3	-71.9	-191.9	0.22	-0.21	-3.68
5,453.0	1.00	157.80	5,443.1	-195.9	-71.1	-193.5	0.26	-0.10	13.33
5,548.0	0.90	151.00	5,538.1	-197.3	-70.4	-194.9	0.16	-0.11	-7.16
5,643.0	1.10	142.60	5,633.1	-198.7	-69.5	-196.3	0.26	0.21	-8.84
5,739.0	1.10	54.50	5,729.1	-198.9	-68.2	-196.5	1.59	0.00	-91.77
5,834.0	1.20	62.90	5,824.1	-197.9	-66.5	-195.6	0.21	0.11	8.84
5,929.0	0.90	337.00	5,919.0	-196.7	-66.0	-194.5	1.52	-0.32	-90.42
6,024.0	1.10	350.70	6,014.0	-195.2	-66.4	-192.9	0.33	0.21	14.42

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<b>Well:</b>	Waste Management 2T-401	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
6,119.0	1.90	355.90	6,109.0	-192.7	-66.7	-190.4	0.85	0.84	5.47
6,166.0	1.80	358.60	6,156.0	-191.2	-66.7	-188.9	0.28	-0.21	5.74
6,215.0	2.40	1.90	6,204.9	-189.4	-66.7	-187.1	1.25	1.22	6.73
6,262.0	5.50	359.10	6,251.8	-186.1	-66.7	-183.9	6.61	6.60	-5.96
6,310.0	9.00	0.00	6,299.4	-180.1	-66.7	-177.8	7.30	7.29	1.88
6,357.0	12.00	359.10	6,345.6	-171.5	-66.8	-169.3	6.39	6.38	-1.91
6,405.0	15.10	358.90	6,392.3	-160.3	-67.0	-158.0	6.46	6.46	-0.42
6,452.0	18.20	358.20	6,437.3	-146.8	-67.4	-144.5	6.61	6.60	-1.49
6,500.0	21.60	357.70	6,482.4	-130.5	-68.0	-128.2	7.09	7.08	-1.04
6,547.0	25.90	358.40	6,525.5	-111.6	-68.6	-109.3	9.17	9.15	1.49
6,595.0	30.00	359.80	6,567.8	-89.1	-68.9	-86.8	8.65	8.54	2.92
6,642.0	34.60	2.30	6,607.6	-64.0	-68.4	-61.7	10.19	9.79	5.32
6,693.0	38.10	1.60	6,648.6	-33.8	-67.4	-31.6	6.91	6.86	-1.37
6,740.0	40.00	0.50	6,685.1	-4.2	-66.9	-2.0	4.30	4.04	-2.34
6,788.0	41.90	358.20	6,721.4	27.3	-67.2	29.4	5.05	3.96	-4.79
6,835.0	44.10	357.20	6,755.8	59.3	-68.5	61.5	4.90	4.68	-2.13
6,883.0	47.70	358.40	6,789.2	93.7	-69.9	96.0	7.71	7.50	2.50
6,930.0	51.80	358.90	6,819.5	129.6	-70.7	131.8	8.76	8.72	1.06
6,979.0	56.30	358.10	6,848.3	169.2	-71.7	171.5	9.28	9.18	-1.63
7,026.0	61.40	357.70	6,872.6	209.4	-73.2	211.7	10.88	10.85	-0.85
7,074.0	65.00	357.50	6,894.2	252.2	-75.0	254.5	7.51	7.50	-0.42
7,121.0	68.80	357.90	6,912.7	295.4	-76.7	297.7	8.12	8.09	0.85
7,169.0	71.20	358.20	6,929.1	340.5	-78.3	342.8	5.03	5.00	0.63
7,216.0	75.10	358.20	6,942.7	385.4	-79.7	387.8	8.30	8.30	0.00
7,264.0	78.50	358.40	6,953.7	432.1	-81.1	434.5	7.09	7.08	0.42
7,281.0	80.50	359.10	6,956.8	448.8	-81.4	451.3	12.44	11.76	4.12
7,330.0	84.10	0.30	6,963.3	497.4	-81.7	499.8	7.74	7.35	2.45
7,391.0	86.10	0.20	6,968.5	558.2	-81.4	560.5	3.28	3.28	-0.16
7,452.0	89.30	0.90	6,971.0	619.1	-80.8	621.4	5.37	5.25	1.15
7,547.0	89.90	358.90	6,971.6	714.1	-81.0	716.4	2.20	0.63	-2.11
7,642.0	90.50	357.40	6,971.3	809.0	-84.1	811.3	1.70	0.63	-1.58
7,738.0	90.50	356.30	6,970.5	904.9	-89.3	907.3	1.15	0.00	-1.15
7,832.0	89.10	354.70	6,970.8	998.6	-96.7	1,001.2	2.26	-1.49	-1.70
7,928.0	87.00	356.30	6,974.1	1,094.2	-104.3	1,097.0	2.75	-2.19	1.67
8,023.0	87.20	356.70	6,978.9	1,188.9	-110.0	1,191.9	0.47	0.21	0.42
8,118.0	87.80	358.60	6,983.0	1,283.8	-113.9	1,286.8	2.10	0.63	2.00
8,214.0	89.30	359.80	6,985.4	1,379.7	-115.3	1,382.7	2.00	1.56	1.25
8,309.0	90.90	1.00	6,985.3	1,474.7	-114.6	1,477.7	2.11	1.68	1.26
8,404.0	91.60	0.50	6,983.2	1,569.7	-113.4	1,572.5	0.91	0.74	-0.53
8,499.0	90.40	359.50	6,981.5	1,664.7	-113.4	1,667.5	1.64	-1.26	-1.05
8,594.0	89.50	358.60	6,981.6	1,759.6	-114.9	1,762.5	1.34	-0.95	-0.95
8,690.0	89.70	358.60	6,982.3	1,855.6	-117.3	1,858.4	0.21	0.21	0.00
8,785.0	89.50	359.80	6,983.0	1,950.6	-118.6	1,953.4	1.28	-0.21	1.26
8,880.0	88.70	359.30	6,984.5	2,045.6	-119.4	2,048.4	0.99	-0.84	-0.53
8,975.0	89.30	359.10	6,986.1	2,140.6	-120.7	2,143.4	0.67	0.63	-0.21
9,070.0	90.00	0.30	6,986.7	2,235.6	-121.2	2,238.3	1.46	0.74	1.26
9,166.0	89.70	358.90	6,986.9	2,331.6	-121.9	2,334.3	1.49	-0.31	-1.46
9,261.0	91.40	0.30	6,986.0	2,426.5	-122.5	2,429.2	2.32	1.79	1.47
9,356.0	90.50	358.60	6,984.5	2,521.5	-123.4	2,524.2	2.02	-0.95	-1.79
9,451.0	91.90	359.10	6,982.5	2,616.5	-125.3	2,619.2	1.56	1.47	0.53
9,547.0	91.70	358.10	6,979.5	2,712.4	-127.7	2,715.1	1.06	-0.21	-1.04
9,642.0	91.00	357.50	6,977.2	2,807.3	-131.3	2,810.1	0.97	-0.74	-0.63

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<b>Site:</b>	Waste Management 2T-HZ1 Pad Sec.2-T2N-R64W	<b>MD Reference:</b>	WELL @ 4915.0ft (RKB - 23')
<b>Well:</b>	Waste Management 2T-401	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
9,737.0	90.40	358.40	6,976.1	2,902.2	-134.7	2,905.1	1.14	-0.63	0.95
9,832.0	89.20	358.80	6,976.4	2,997.2	-137.0	3,000.1	1.33	-1.26	0.42
9,928.0	88.40	0.00	6,978.4	3,093.2	-138.0	3,096.0	1.50	-0.83	1.25
10,023.0	91.40	2.80	6,978.6	3,188.1	-135.7	3,190.8	4.32	3.16	2.95
10,118.0	88.60	1.40	6,978.6	3,283.0	-132.2	3,285.6	3.30	-2.95	-1.47
10,213.0	89.70	0.50	6,980.0	3,378.0	-130.7	3,380.5	1.50	1.16	-0.95
10,309.0	90.70	0.50	6,979.6	3,474.0	-129.8	3,476.4	1.04	1.04	0.00
10,404.0	90.70	357.20	6,978.5	3,569.0	-131.7	3,571.4	3.47	0.00	-3.47
10,499.0	90.70	358.60	6,977.3	3,663.9	-135.2	3,666.4	1.47	0.00	1.47
10,594.0	89.10	359.30	6,977.5	3,758.9	-137.0	3,761.3	1.84	-1.68	0.74
10,689.0	89.40	359.80	6,978.7	3,853.9	-137.7	3,856.3	0.61	0.32	0.53
10,784.0	87.60	359.50	6,981.2	3,948.8	-138.3	3,951.2	1.92	-1.89	-0.32
10,880.0	87.80	0.50	6,985.1	4,044.8	-138.3	4,047.1	1.06	0.21	1.04
10,975.0	89.50	0.70	6,987.3	4,139.7	-137.3	4,142.0	1.80	1.79	0.21
11,070.0	89.20	0.90	6,988.4	4,234.7	-136.0	4,236.9	0.38	-0.32	0.21
11,165.0	90.00	359.80	6,989.0	4,329.7	-135.4	4,331.8	1.43	0.84	-1.16
11,260.0	90.70	359.60	6,988.5	4,424.7	-135.9	4,426.8	0.77	0.74	-0.21
11,325.0	90.70	359.50	6,987.7	4,489.7	-136.4	4,491.7	0.15	0.00	-0.15
11,385.0	90.70	359.50	6,986.9	4,549.7	-136.9	4,551.7	0.00	0.00	0.00
BHL 500'FNL & 1155'FEL									

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_