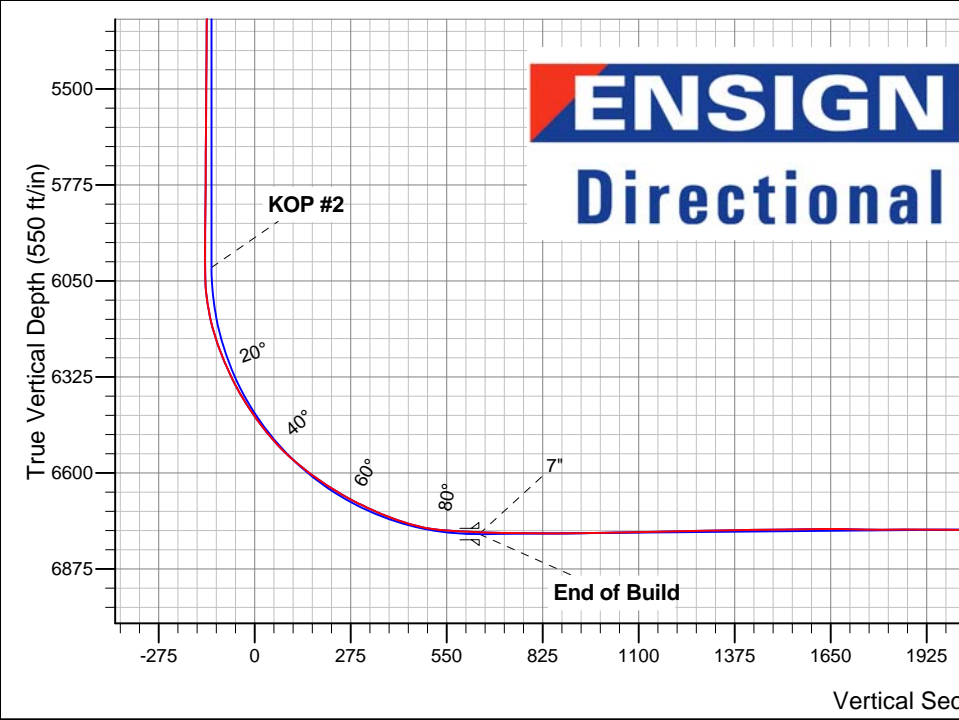
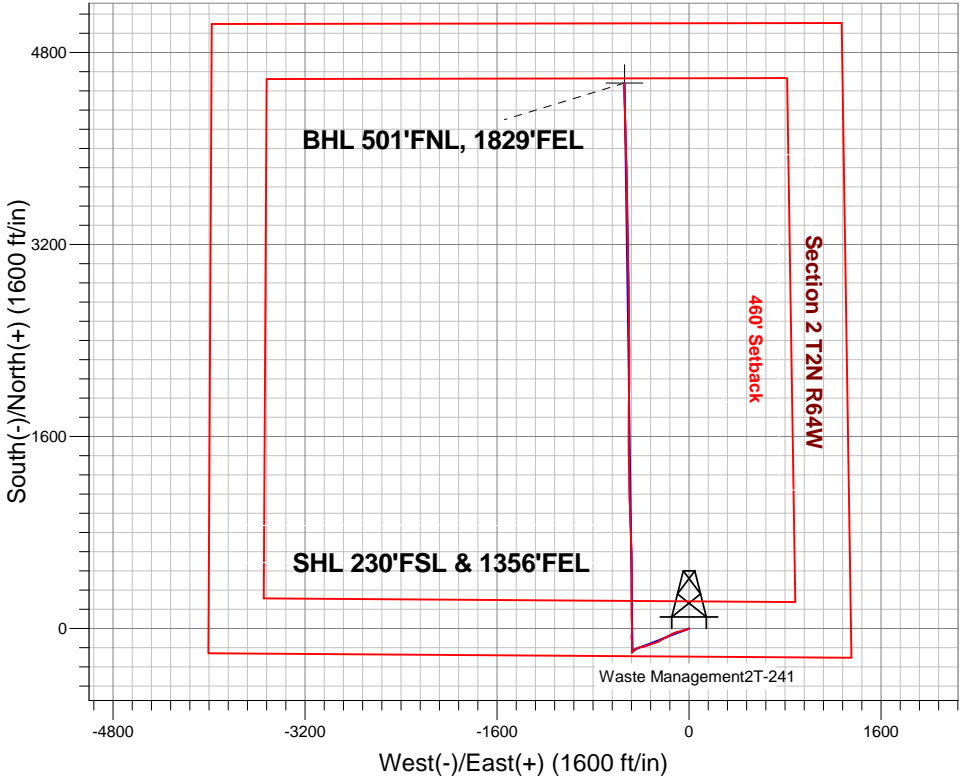


PETROLEUM DEVELOPMENT CORP Weld County CO

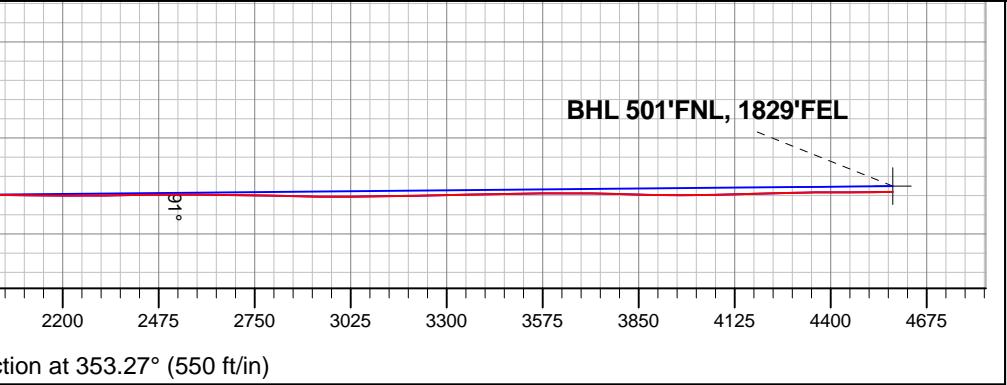
Well Name: **Waste Management 2T-241**
Surface Location: Waste Management 2T-HZ2 Pad Sec.2-T2N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4895.0
+N/-S +E/-W Northing Easting Latitude Longitude Slot
0.0 0.0 1302951.12 3275580.07 40.160790 -104.513980
Ensign 119 RKB - 23' WELL @ 4918.0ft (Ensign 119 RKB - 23')

FINAL SURVEY

Projected Bottom Hole Location
11213' MD 6755' TVD 4546' N & 540' W of SHL
90.7 degree Incl @ 358.2 degree AZM



Waste Management 2T-HZ2 Pad Sec.2-T2N-R64W WasteManagement 2T-241 Wellbore #1 10:44, July 15 2013	ANNOTATIONS
	No annotation data is available.
LEGEND	
Waste Management 2T-241, Wellbore #1, Plan #1 (6-28-13) R V0	
Wellbore #1	
Survey #1	





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.2-T2N-R64W

Waste Management 2T-HZ2 Pad Sec.2-T2N-R64W

Waste Management 2T-241

Wellbore #1

Survey: Survey #1

Standard Survey Report

15 July, 2013

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Waste Management 2T-241
Project:	SEC.2-T2N-R64W	TVD Reference:	WELL @ 4918.0ft (Ensign 119 RKB - 23')
Site:	Waste Management 2T-HZ2 Pad Sec.2-T2N-R64W	MD Reference:	WELL @ 4918.0ft (Ensign 119 RKB - 23')
Well:	Waste Management 2T-241	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.2-T2N-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	Waste Management 2T-HZ2 Pad Sec.2-T2N-R64W				
Site Position:		Northing:	1,302,950.82 ft	Latitude:	40.160790
From:	Lat/Long	Easting:	3,275,552.12 ft	Longitude:	-104.514080
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.64 °

Well	Waste Management 2T-241					
Well Position	+N/-S	0.0 ft	Northing:	1,302,951.12 ft	Latitude:	40.160790
	+E/-W	0.0 ft	Easting:	3,275,580.07 ft	Longitude:	-104.513980
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,895.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/28/2013	8.43	66.83	52,817

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	353.27	

Survey Program	Date 7/15/2013				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
169.0	11,213.0	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
169.0	0.20	278.80	169.0	0.0	-0.3	0.1	0.12	0.12	0.00
263.0	0.40	222.00	263.0	-0.2	-0.7	-0.1	0.36	0.21	-60.43
355.0	0.40	198.30	355.0	-0.7	-1.0	-0.6	0.18	0.00	-25.76
446.0	0.40	194.40	446.0	-1.3	-1.2	-1.2	0.03	0.00	-4.29
538.0	0.50	168.40	538.0	-2.0	-1.2	-1.9	0.24	0.11	-28.26
629.0	1.20	251.70	629.0	-2.7	-2.0	-2.5	1.37	0.77	91.54
721.0	2.60	252.80	720.9	-3.6	-4.9	-3.0	1.52	1.52	1.20
812.0	4.60	254.30	811.7	-5.2	-10.4	-4.0	2.20	2.20	1.65
896.0	5.90	254.70	895.4	-7.3	-17.8	-5.2	1.55	1.55	0.48
993.0	7.00	254.00	991.8	-10.2	-28.3	-6.8	1.14	1.13	-0.72

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Waste Management 2T-241
Project:	SEC.2-T2N-R64W	TVD Reference:	WELL @ 4918.0ft (Ensign 119 RKB - 23')
Site:	Waste Management 2T-HZ2 Pad Sec.2-T2N-R64W	MD Reference:	WELL @ 4918.0ft (Ensign 119 RKB - 23')
Well:	Waste Management 2T-241	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)
1,084.0	7.10	255.40	1,082.1	-13.2	-39.1	-8.5	0.22	0.11	1.54
1,176.0	7.10	254.30	1,173.4	-16.1	-50.0	-10.2	0.15	0.00	-1.20
1,268.0	7.00	255.20	1,264.7	-19.1	-60.9	-11.8	0.16	-0.11	0.98
1,360.0	7.10	255.40	1,356.0	-22.0	-71.8	-13.4	0.11	0.11	0.22
1,452.0	7.00	255.20	1,447.3	-24.9	-82.8	-15.0	0.11	-0.11	-0.22
1,544.0	9.50	256.80	1,538.3	-28.0	-95.6	-16.6	2.73	2.72	1.74
1,636.0	10.10	246.60	1,629.0	-33.0	-110.4	-19.8	1.99	0.65	-11.09
1,728.0	9.80	246.30	1,719.6	-39.3	-125.0	-24.4	0.33	-0.33	-0.33
1,820.0	9.30	243.60	1,810.3	-45.8	-138.8	-29.2	0.73	-0.54	-2.93
1,911.0	8.40	241.70	1,900.3	-52.2	-151.2	-34.1	1.04	-0.99	-2.09
2,005.0	7.80	247.70	1,993.3	-57.9	-163.2	-38.3	1.10	-0.64	6.38
2,100.0	7.10	243.80	2,087.5	-62.9	-174.4	-42.0	0.91	-0.74	-4.11
2,195.0	7.60	246.60	2,181.7	-68.0	-185.4	-45.8	0.65	0.53	2.95
2,290.0	7.50	239.60	2,275.9	-73.6	-196.5	-50.1	0.97	-0.11	-7.37
2,386.0	8.40	239.80	2,371.0	-80.3	-208.0	-55.4	0.94	0.94	0.21
2,481.0	7.80	248.00	2,465.0	-86.2	-220.0	-59.8	1.37	-0.63	8.63
2,576.0	7.90	235.70	2,559.2	-92.3	-231.4	-64.6	1.77	0.11	-12.95
2,671.0	7.60	237.60	2,653.3	-99.4	-242.1	-70.3	0.42	-0.32	2.00
2,766.0	6.30	242.40	2,747.6	-105.1	-252.0	-74.9	1.50	-1.37	5.05
2,861.0	7.40	245.40	2,841.9	-110.1	-262.2	-78.6	1.22	1.16	3.16
3,009.0	7.30	252.40	2,988.7	-116.9	-279.8	-83.3	0.61	-0.07	4.73
3,052.0	7.30	248.70	3,031.4	-118.7	-284.9	-84.5	1.09	0.00	-8.60
3,147.0	7.60	253.30	3,125.6	-122.7	-296.6	-87.1	0.70	0.32	4.84
3,242.0	7.70	248.50	3,219.7	-126.9	-308.5	-89.8	0.68	0.11	-5.05
3,337.0	8.30	254.30	3,313.8	-131.1	-321.0	-92.5	1.06	0.63	6.11
3,432.0	8.00	247.30	3,407.8	-135.5	-333.7	-95.4	1.09	-0.32	-7.37
3,528.0	7.50	250.30	3,503.0	-140.1	-345.8	-98.7	0.67	-0.52	3.13
3,623.0	7.10	254.50	3,597.2	-143.8	-357.3	-100.9	0.70	-0.42	4.42
3,718.0	7.20	250.70	3,691.4	-147.3	-368.6	-103.1	0.51	0.11	-4.00
3,813.0	6.60	262.60	3,785.8	-150.0	-379.6	-104.5	1.63	-0.63	12.53
3,909.0	6.80	260.10	3,881.1	-151.7	-390.7	-104.9	0.37	0.21	-2.60
4,004.0	6.70	259.60	3,975.4	-153.7	-401.7	-105.5	0.12	-0.11	-0.53
4,099.0	7.00	248.20	4,069.8	-156.8	-412.5	-107.4	1.46	0.32	-12.00
4,194.0	7.00	248.70	4,164.1	-161.1	-423.3	-110.4	0.06	0.00	0.53
4,290.0	7.00	246.40	4,259.4	-165.5	-434.1	-113.5	0.29	0.00	-2.40
4,385.0	5.60	233.10	4,353.8	-170.6	-443.1	-117.5	2.12	-1.47	-14.00
4,480.0	5.30	227.50	4,448.4	-176.4	-450.0	-122.4	0.64	-0.32	-5.89
4,575.0	5.30	232.60	4,542.9	-182.0	-456.7	-127.2	0.50	0.00	5.37
4,670.0	4.40	227.10	4,637.6	-187.2	-462.9	-131.6	1.07	-0.95	-5.79
4,766.0	2.20	238.00	4,733.4	-190.6	-467.2	-134.6	2.37	-2.29	11.35
4,861.0	0.40	286.00	4,828.4	-191.5	-469.0	-135.2	2.06	-1.89	50.53
4,956.0	0.60	250.80	4,923.4	-191.6	-469.8	-135.2	0.38	0.21	-37.05
5,051.0	0.80	237.80	5,018.4	-192.1	-470.8	-135.6	0.27	0.21	-13.68
5,146.0	0.80	233.10	5,113.4	-192.9	-471.9	-136.2	0.07	0.00	-4.95
5,241.0	0.50	232.70	5,208.4	-193.5	-472.8	-136.8	0.32	-0.32	-0.42
5,337.0	0.60	216.00	5,304.4	-194.2	-473.4	-137.3	0.20	0.10	-17.40
5,432.0	0.70	221.50	5,399.4	-195.0	-474.1	-138.1	0.12	0.11	5.79
5,527.0	0.60	213.60	5,494.4	-195.9	-474.8	-138.9	0.14	-0.11	-8.32
5,622.0	0.50	232.40	5,589.4	-196.5	-475.4	-139.5	0.22	-0.11	19.79
5,717.0	0.40	196.30	5,684.4	-197.1	-475.8	-140.0	0.31	-0.11	-38.00
5,813.0	0.50	177.90	5,780.4	-197.8	-475.9	-140.7	0.18	0.10	-19.17
5,908.0	0.50	176.50	5,875.4	-198.7	-475.8	-141.5	0.01	0.00	-1.47
6,003.0	0.40	135.70	5,970.4	-199.3	-475.6	-142.2	0.34	-0.11	-42.95

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Waste Management 2T-241
Project:	SEC.2-T2N-R64W	TVD Reference:	WELL @ 4918.0ft (Ensign 119 RKB - 23')
Site:	Waste Management 2T-HZ2 Pad Sec.2-T2N-R64W	MD Reference:	WELL @ 4918.0ft (Ensign 119 RKB - 23')
Well:	Waste Management 2T-241	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)	
6,051.0	0.50	48.00	6,018.4	-199.3	-475.3	-142.2	1.31	0.21	-182.71	
6,098.0	3.80	9.70	6,065.3	-197.6	-474.9	-140.6	7.28	7.02	-81.49	
6,146.0	8.80	0.20	6,113.0	-192.4	-474.6	-135.4	10.61	10.42	-19.79	
6,193.0	12.60	0.50	6,159.2	-183.7	-474.5	-126.8	8.09	8.09	0.64	
6,241.0	17.10	1.80	6,205.6	-171.4	-474.3	-114.6	9.40	9.38	2.71	
6,289.0	20.90	1.80	6,250.9	-155.7	-473.8	-99.1	7.92	7.92	0.00	
6,337.0	24.40	359.10	6,295.2	-137.3	-473.7	-80.8	7.60	7.29	-5.63	
6,384.0	26.70	358.10	6,337.6	-117.0	-474.2	-60.6	4.98	4.89	-2.13	
6,432.0	30.30	357.50	6,379.8	-94.1	-475.1	-37.8	7.52	7.50	-1.25	
6,479.0	34.10	359.80	6,419.6	-69.1	-475.6	-12.9	8.49	8.09	4.89	
6,527.0	37.00	1.90	6,458.6	-41.2	-475.2	14.8	6.55	6.04	4.38	
6,574.0	40.30	0.90	6,495.3	-11.9	-474.5	43.8	7.15	7.02	-2.13	
6,622.0	44.80	358.80	6,530.7	20.6	-474.6	76.1	9.83	9.38	-4.38	
6,669.0	49.20	358.20	6,562.7	54.9	-475.5	110.3	9.41	9.36	-1.28	
6,717.0	52.20	0.00	6,593.1	92.1	-476.1	147.2	6.89	6.25	3.75	
6,765.0	55.50	0.00	6,621.4	130.8	-476.1	185.7	6.88	6.88	0.00	
6,813.0	58.70	359.30	6,647.5	171.1	-476.3	225.8	6.78	6.67	-1.46	
6,860.0	61.00	359.80	6,671.1	211.8	-476.6	266.2	4.98	4.89	1.06	
6,908.0	64.40	359.60	6,693.1	254.4	-476.9	308.5	7.09	7.08	-0.42	
6,955.0	67.00	0.00	6,712.5	297.2	-477.0	351.1	5.59	5.53	0.85	
7,003.0	69.40	0.50	6,730.3	341.8	-476.8	395.3	5.09	5.00	1.04	
7,050.0	73.20	0.90	6,745.4	386.3	-476.3	439.5	8.13	8.09	0.85	
7,098.0	79.20	359.80	6,756.8	432.9	-476.0	485.7	12.70	12.50	-2.29	
7,150.0	85.60	358.80	6,763.7	484.4	-476.6	536.9	12.45	12.31	-1.92	
7,228.0	87.10	358.80	6,768.6	562.2	-478.3	614.4	1.92	1.92	0.00	
7,276.0	88.20	358.80	6,770.6	610.2	-479.3	662.2	2.29	2.29	0.00	
7,371.0	89.30	358.40	6,772.7	705.1	-481.6	756.7	1.23	1.16	-0.42	
7,466.0	90.00	358.40	6,773.3	800.1	-484.2	851.3	0.74	0.74	0.00	
7,562.0	90.80	357.70	6,772.6	896.0	-487.5	947.0	1.11	0.83	-0.73	
7,657.0	91.30	358.10	6,770.9	991.0	-491.0	1,041.7	0.67	0.53	0.42	
7,752.0	91.50	359.10	6,768.5	1,085.9	-493.3	1,136.2	1.07	0.21	1.05	
7,847.0	91.00	358.90	6,766.5	1,180.9	-495.0	1,230.7	0.57	-0.53	-0.21	
7,943.0	90.80	358.60	6,765.0	1,276.8	-497.1	1,326.3	0.38	-0.21	-0.31	
8,038.0	90.90	359.30	6,763.5	1,371.8	-498.8	1,420.8	0.74	0.11	0.74	
8,133.0	90.70	359.30	6,762.2	1,466.8	-500.0	1,515.3	0.21	-0.21	0.00	
8,228.0	90.90	359.10	6,760.9	1,561.8	-501.3	1,609.8	0.30	0.21	-0.21	
8,323.0	88.50	0.30	6,761.4	1,656.8	-501.8	1,704.1	2.82	-2.53	1.26	
8,419.0	90.00	0.50	6,762.6	1,752.7	-501.1	1,799.4	1.58	1.56	0.21	
8,514.0	90.50	1.00	6,762.2	1,847.7	-499.9	1,893.6	0.74	0.53	0.53	
8,609.0	88.90	359.80	6,762.7	1,942.7	-499.2	1,987.8	2.11	-1.68	-1.26	
8,704.0	89.20	0.50	6,764.3	2,037.7	-499.0	2,082.1	0.80	0.32	0.74	
8,799.0	90.00	0.50	6,765.0	2,132.7	-498.1	2,176.4	0.84	0.84	0.00	
8,894.0	90.00	359.50	6,765.0	2,227.7	-498.1	2,270.7	1.05	0.00	-1.05	
8,990.0	91.00	359.30	6,764.1	2,323.7	-499.1	2,366.2	1.06	1.04	-0.21	
9,085.0	90.70	359.60	6,762.7	2,418.7	-500.0	2,460.6	0.45	-0.32	0.32	
9,180.0	90.00	0.90	6,762.1	2,513.7	-499.6	2,554.9	1.55	-0.74	1.37	
9,275.0	88.90	359.50	6,763.1	2,608.7	-499.3	2,649.2	1.87	-1.16	-1.47	
9,371.0	89.20	359.60	6,764.6	2,704.6	-500.0	2,744.6	0.33	0.31	0.10	
9,466.0	88.60	359.10	6,766.5	2,799.6	-501.1	2,839.1	0.82	-0.63	-0.53	
9,561.0	89.40	358.90	6,768.1	2,894.6	-502.8	2,933.6	0.87	0.84	-0.21	
9,656.0	90.40	359.10	6,768.3	2,989.6	-504.4	3,028.1	1.07	1.05	0.21	
9,752.0	90.80	359.10	6,767.3	3,085.6	-505.9	3,123.6	0.42	0.42	0.00	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Waste Management 2T-241
Project:	SEC.2-T2N-R64W	TVD Reference:	WELL @ 4918.0ft (Ensign 119 RKB - 23')
Site:	Waste Management 2T-HZ2 Pad Sec.2-T2N-R64W	MD Reference:	WELL @ 4918.0ft (Ensign 119 RKB - 23')
Well:	Waste Management 2T-241	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)
9,847.0	91.40	358.60	6,765.5	3,180.5	-507.9	3,218.1	0.82	0.63	-0.53
9,942.0	91.40	358.10	6,763.1	3,275.5	-510.6	3,312.7	0.53	0.00	-0.53
10,097.0	90.70	359.10	6,760.3	3,430.4	-514.4	3,467.0	0.79	-0.45	0.65
10,132.0	90.70	359.10	6,759.9	3,465.4	-514.9	3,501.8	0.00	0.00	0.00
10,228.0	90.50	359.30	6,758.9	3,561.4	-516.3	3,597.3	0.29	-0.21	0.21
10,323.0	89.30	358.90	6,759.0	3,656.3	-517.8	3,691.8	1.33	-1.26	-0.42
10,418.0	88.60	358.90	6,760.8	3,751.3	-519.6	3,786.4	0.74	-0.74	0.00
10,513.0	88.70	359.10	6,763.0	3,846.3	-521.2	3,880.8	0.24	0.11	0.21
10,608.0	89.90	359.10	6,764.2	3,941.2	-522.7	3,975.3	1.26	1.26	0.00
10,704.0	91.80	359.30	6,762.8	4,037.2	-524.1	4,070.8	1.99	1.98	0.21
10,799.0	90.90	357.70	6,760.5	4,132.2	-526.6	4,165.4	1.93	-0.95	-1.68
10,894.0	92.10	357.50	6,758.0	4,227.0	-530.5	4,260.1	1.28	1.26	-0.21
10,989.0	90.00	358.60	6,756.3	4,322.0	-533.8	4,354.7	2.50	-2.21	1.16
11,085.0	90.30	358.20	6,756.0	4,417.9	-536.4	4,450.4	0.52	0.31	-0.42
11,153.0	90.70	358.20	6,755.4	4,485.9	-538.6	4,518.1	0.59	0.59	0.00
11,213.0	90.70	358.20	6,754.7	4,545.9	-540.5	4,577.9	0.00	0.00	0.00
BHL 500'FNL, 1825'FEL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
BHL 500'FNL, 1825'FEL	0.00	0.00	6,738.0	4,546.4	-536.6	1,307,491.12	3,274,993.03	40.173270	-104.515900
- survey misses target center by 17.2ft at 11213.0ft MD (6754.7 TVD, 4545.9 N, -540.5 E)									
- Point									

Checked By: _____	Approved By: _____	Date: _____
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