

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: Carmichael 26M-223

Surface Location: Carmichael 26M-223 Pad Sec.26-T7N-R63W
North American Datum 1983 , US State Plane 1983 Colorado Northern Zone

Ground Elevation: 4769.0

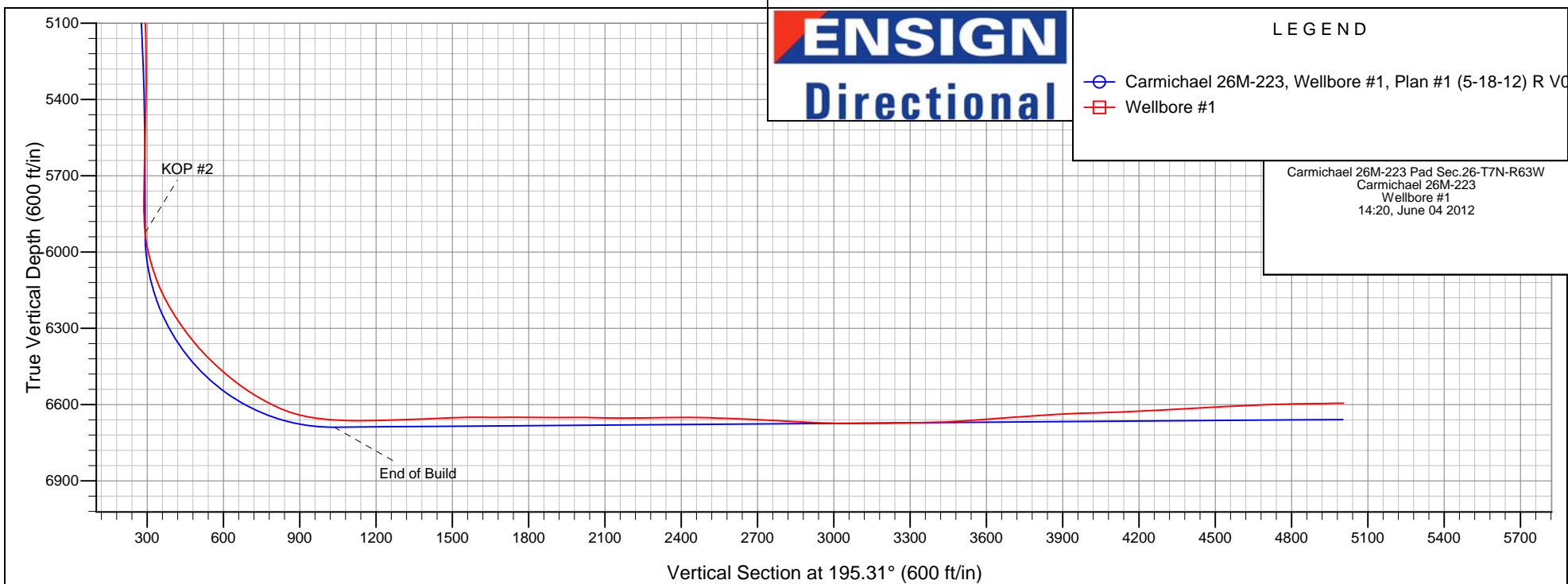
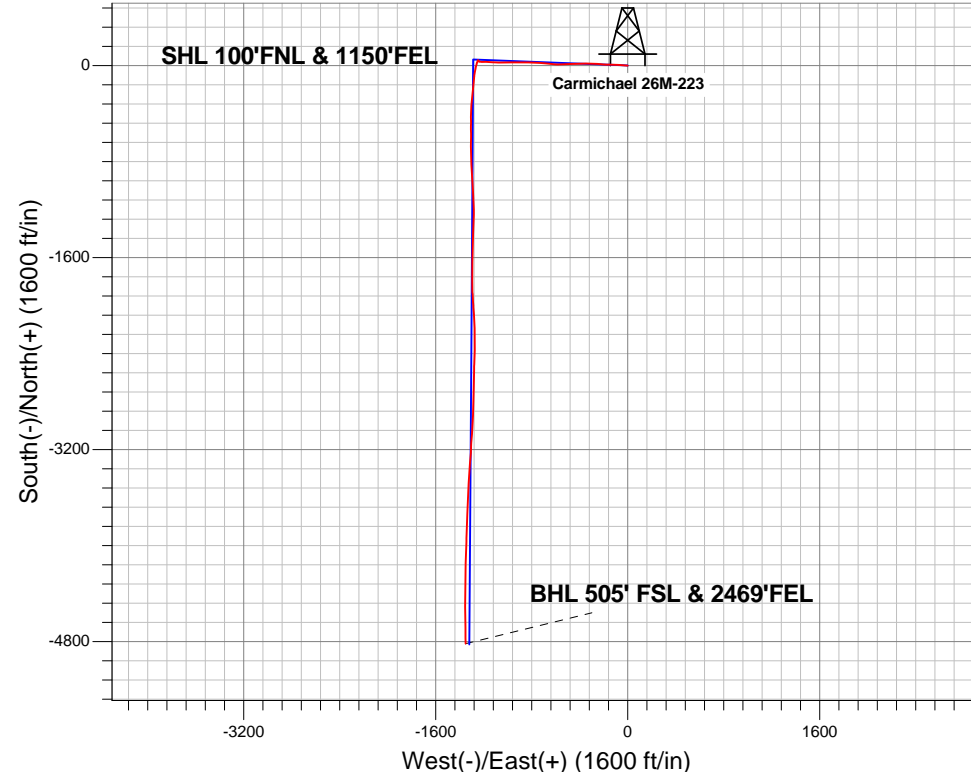
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1445815.50	3306228.20	40.551940	-104.397980	

RKB Ensign 32 - 15' WELL @ 4784.0ft (RKB Ensign 32 - 15')

FINAL SURVEY

Projected Bottom Hole Location
11345' MD 6595' TVD 4819' S & 1351' W of SHL

90.50 degree Incl @ 178.90 degree AZM





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.26-T7N-R63W

Carmichael 26M-223 Pad Sec.26-T7N-R63W

Carmichael 26M-223

Wellbore #1

Design: Wellbore #1

Standard Survey Report

04 June, 2012

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Carmichael 26M-223
Project:	SEC.26-T7N-R63W	TVD Reference:	WELL @ 4784.0ft (RKB Ensign 32 - 15')
Site:	Carmichael 26M-223 Pad Sec.26-T7N-R63W	MD Reference:	WELL @ 4784.0ft (RKB Ensign 32 - 15')
Well:	Carmichael 26M-223	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.26-T7N-R63W, 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	Carmichael 26M-223 Pad Sec.26-T7N-R63W				
Site Position:		Northing:	1,445,815.52 ft	Latitude:	40.551940
From:	Lat/Long	Easting:	3,306,228.20 ft	Longitude:	-104.397980
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.71 °

Well	Carmichael 26M-223					
Well Position	+N-S	0.0 ft	Northing:	1,445,815.50 ft	Latitude:	40.551940
	+E-W	0.0 ft	Easting:	3,306,228.20 ft	Longitude:	-104.397980
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,769.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/18/2012	8.55	67.20	53,152

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 (°)	
	6,659.0	0.0	0.0	195.31	

Survey Program	Date 6/4/2012				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
151.0	11,345.0	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	
1.1	0.01	265.70	1.1	0.0	0.0	0.0	0.73	0.73	0.00	
SECTION LINE 1505'W OF SHL										
1.3	0.01	265.70	1.3	0.0	0.0	0.0	0.73	0.73	0.00	
HARD LINE BHL 460'FSL										
2.5	0.02	265.70	2.5	0.0	0.0	0.0	0.73	0.73	0.00	
HARD LINE SHL 460'FNL										
15.3	0.11	265.70	15.3	0.0	0.0	0.0	0.73	0.73	0.00	
SECTIONLINE 100'N OF SHL										
151.0	1.10	265.70	151.0	-0.1	-1.4	0.5	0.73	0.73	0.00	
243.0	1.30	263.00	243.0	-0.3	-3.4	1.2	0.23	0.22	-2.93	
335.0	1.90	270.30	334.9	-0.4	-5.9	2.0	0.69	0.65	7.93	

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Well:	Carmichael 26M-223	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)
427.0	3.50	278.70	426.8	0.0	-10.2	2.7	1.79	1.74	9.13
519.0	5.30	278.90	518.6	1.1	-17.2	3.5	1.96	1.96	0.22
611.0	7.50	275.00	610.0	2.3	-27.4	5.0	2.44	2.39	-4.24
703.0	9.90	270.80	700.9	2.9	-41.3	8.1	2.70	2.61	-4.57
795.0	11.10	270.90	791.4	3.2	-58.0	12.3	1.30	1.30	0.11
870.0	10.80	274.00	865.0	3.8	-72.3	15.4	0.88	-0.40	4.13
945.0	10.90	273.90	938.7	4.7	-86.3	18.2	0.14	0.13	-0.13
1,038.0	13.60	271.80	1,029.5	5.7	-106.1	22.5	2.94	2.90	-2.26
1,131.0	14.90	271.40	1,119.7	6.3	-128.9	28.0	1.40	1.40	-0.43
1,224.0	15.60	271.50	1,209.4	6.9	-153.4	33.8	0.75	0.75	0.11
1,318.0	16.30	271.70	1,299.8	7.7	-179.2	39.9	0.75	0.74	0.21
1,410.0	17.20	272.20	1,387.9	8.6	-205.7	46.1	0.99	0.98	0.54
1,503.0	18.10	272.80	1,476.5	9.8	-233.9	52.3	0.99	0.97	0.65
1,596.0	18.40	273.30	1,564.8	11.3	-263.0	58.5	0.36	0.32	0.54
1,689.0	18.90	273.50	1,652.9	13.1	-292.6	64.6	0.54	0.54	0.22
1,783.0	18.30	274.00	1,742.0	15.1	-322.6	70.6	0.66	-0.64	0.53
1,876.0	17.50	272.20	1,830.5	16.6	-351.1	76.7	1.05	-0.86	-1.94
1,969.0	17.30	271.20	1,919.3	17.4	-378.9	83.2	0.39	-0.22	-1.08
2,062.0	16.80	269.50	2,008.2	17.6	-406.2	90.2	0.76	-0.54	-1.83
2,155.0	16.00	267.60	2,097.4	17.0	-432.4	97.8	1.04	-0.86	-2.04
2,248.0	16.10	264.70	2,186.8	15.2	-458.1	106.2	0.87	0.11	-3.12
2,341.0	16.00	263.10	2,276.1	12.5	-483.6	115.6	0.49	-0.11	-1.72
2,434.0	15.50	268.10	2,365.7	10.6	-508.8	124.1	1.55	-0.54	5.38
2,527.0	14.50	266.10	2,455.5	9.4	-532.8	131.6	1.21	-1.08	-2.15
2,621.0	15.60	268.90	2,546.3	8.3	-557.2	139.1	1.40	1.17	2.98
2,714.0	16.20	273.20	2,635.7	8.8	-582.6	145.3	1.42	0.65	4.62
2,807.0	15.90	273.10	2,725.1	10.2	-608.3	150.8	0.32	-0.32	-0.11
2,900.0	16.30	276.40	2,814.4	12.3	-634.0	155.5	1.07	0.43	3.55
2,993.0	16.60	275.80	2,903.6	15.1	-660.2	159.7	0.37	0.32	-0.65
3,086.0	17.50	274.90	2,992.5	17.7	-687.3	164.4	1.01	0.97	-0.97
3,179.0	18.40	274.40	3,081.0	20.0	-715.9	169.7	0.98	0.97	-0.54
3,272.0	18.40	273.10	3,169.3	21.9	-745.2	175.6	0.44	0.00	-1.40
3,365.0	18.40	272.60	3,257.5	23.4	-774.5	181.9	0.17	0.00	-0.54
3,458.0	16.70	273.00	3,346.2	24.7	-802.5	188.0	1.83	-1.83	0.43
3,550.0	14.90	273.20	3,434.7	26.1	-827.5	193.3	1.96	-1.96	0.22
3,644.0	13.70	268.80	3,525.8	26.5	-850.7	199.0	1.72	-1.28	-4.68
3,737.0	15.00	270.80	3,615.9	26.5	-873.8	205.1	1.50	1.40	2.15
3,830.0	16.70	270.80	3,705.3	26.8	-899.2	211.5	1.83	1.83	0.00
3,924.0	18.60	270.30	3,794.9	27.1	-927.7	218.8	2.03	2.02	-0.53
4,018.0	20.10	268.60	3,883.6	26.8	-958.8	227.3	1.70	1.60	-1.81
4,109.0	21.50	268.00	3,968.7	25.8	-991.1	236.7	1.56	1.54	-0.66
4,202.0	20.10	268.80	4,055.6	24.9	-1,024.1	246.4	1.54	-1.51	0.86
4,296.0	16.70	269.50	4,144.8	24.4	-1,053.8	254.6	3.62	-3.62	0.74
4,389.0	14.70	272.70	4,234.3	24.9	-1,078.9	260.8	2.34	-2.15	3.44
4,482.0	13.50	272.90	4,324.5	26.0	-1,101.6	265.8	1.29	-1.29	0.22
4,575.0	13.40	273.10	4,415.0	27.1	-1,123.2	270.4	0.12	-0.11	0.22
4,668.0	12.00	272.90	4,505.7	28.2	-1,143.6	274.7	1.51	-1.51	-0.22
4,762.0	10.40	272.30	4,597.9	29.0	-1,161.8	278.7	1.71	-1.70	-0.64
4,854.0	8.40	272.10	4,688.7	29.6	-1,176.8	282.1	2.17	-2.17	-0.22
4,948.0	7.60	270.00	4,781.7	29.8	-1,189.9	285.3	0.91	-0.85	-2.23
5,041.0	6.50	270.80	4,874.0	29.9	-1,201.3	288.3	1.19	-1.18	0.86
5,134.0	5.70	271.00	4,966.5	30.1	-1,211.2	290.7	0.86	-0.86	0.22
5,227.0	5.40	272.30	5,059.1	30.3	-1,220.2	292.9	0.35	-0.32	1.40

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5,320.0	3.80	274.40	5,151.8	30.7	-1,227.6	294.4	1.73	-1.72	2.26
5,413.0	2.30	263.40	5,244.6	30.8	-1,232.6	295.7	1.72	-1.61	-11.83
5,506.0	1.80	292.60	5,337.6	31.1	-1,235.8	296.2	1.23	-0.54	31.40
5,600.0	2.50	318.60	5,431.5	33.2	-1,238.5	294.9	1.26	0.74	27.66
5,693.0	2.20	323.10	5,524.4	36.2	-1,240.9	292.7	0.38	-0.32	4.84
5,786.0	1.90	323.00	5,617.4	38.8	-1,242.9	290.7	0.32	-0.32	-0.11
5,879.0	1.80	321.30	5,710.3	41.2	-1,244.7	288.9	0.12	-0.11	-1.83
5,972.0	1.70	311.00	5,803.3	43.2	-1,246.7	287.4	0.35	-0.11	-11.08
6,059.0	3.60	214.50	5,890.2	41.8	-1,249.2	289.4	4.77	2.18	-110.92
6,090.0	5.60	206.50	5,921.1	39.7	-1,250.4	291.8	6.76	6.45	-25.81
6,121.0	8.20	202.50	5,951.9	36.3	-1,252.0	295.5	8.52	8.39	-12.90
6,152.0	11.20	198.90	5,982.4	31.4	-1,253.8	300.7	9.87	9.68	-11.61
6,184.0	13.80	198.90	6,013.7	24.8	-1,256.0	307.6	8.13	8.13	0.00
6,214.0	15.80	196.00	6,042.7	17.5	-1,258.3	315.3	7.11	6.67	-9.67
6,245.0	18.00	194.00	6,072.3	8.8	-1,260.6	324.3	7.34	7.10	-6.45
6,276.0	20.00	194.50	6,101.7	-1.0	-1,263.1	334.4	6.47	6.45	1.61
6,307.0	22.30	194.10	6,130.6	-11.8	-1,265.9	345.6	7.43	7.42	-1.29
6,339.0	24.90	192.30	6,159.9	-24.3	-1,268.8	358.4	8.43	8.13	-5.63
6,370.0	27.80	191.00	6,187.7	-37.7	-1,271.6	372.1	9.54	9.35	-4.19
6,401.0	30.40	190.20	6,214.7	-52.6	-1,274.3	387.1	8.48	8.39	-2.58
6,431.0	32.20	188.00	6,240.4	-67.9	-1,276.8	402.6	7.11	6.00	-7.33
6,462.0	33.50	186.40	6,266.4	-84.6	-1,278.9	419.3	5.04	4.19	-5.16
6,493.0	35.50	185.40	6,292.0	-102.1	-1,280.7	436.6	6.71	6.45	-3.23
6,524.0	37.70	184.90	6,316.9	-120.5	-1,282.4	454.8	7.16	7.10	-1.61
6,555.0	39.50	184.10	6,341.1	-139.8	-1,283.9	473.8	6.03	5.81	-2.58
6,586.0	40.50	185.40	6,364.8	-159.6	-1,285.5	493.4	4.20	3.23	4.19
6,617.0	42.20	187.40	6,388.1	-180.0	-1,287.8	513.6	6.94	5.48	6.45
6,648.0	44.20	187.00	6,410.7	-201.0	-1,290.5	534.6	6.51	6.45	-1.29
6,679.0	46.40	186.70	6,432.5	-222.9	-1,293.1	556.4	7.13	7.10	-0.97
6,710.0	48.40	186.30	6,453.5	-245.6	-1,295.7	578.9	6.52	6.45	-1.29
6,742.0	50.50	185.90	6,474.3	-269.8	-1,298.3	602.9	6.63	6.56	-1.25
6,773.0	51.30	184.70	6,493.8	-293.7	-1,300.5	626.6	3.96	2.58	-3.87
6,804.0	53.10	184.10	6,512.8	-318.1	-1,302.4	650.7	6.00	5.81	-1.94
6,835.0	55.10	183.00	6,531.0	-343.2	-1,303.9	675.3	7.06	6.45	-3.55
6,866.0	57.10	181.80	6,548.3	-368.9	-1,305.0	700.3	7.21	6.45	-3.87
6,897.0	59.30	181.10	6,564.6	-395.2	-1,305.7	725.9	7.35	7.10	-2.26
6,928.0	61.60	180.80	6,579.9	-422.2	-1,306.1	752.0	7.47	7.42	-0.97
6,959.0	63.70	180.60	6,594.2	-449.7	-1,306.4	778.7	6.80	6.77	-0.65
6,990.0	66.10	180.40	6,607.3	-477.8	-1,306.7	805.8	7.76	7.74	-0.65
7,021.0	68.50	180.40	6,619.3	-506.4	-1,306.9	833.5	7.74	7.74	0.00
7,052.0	71.20	179.70	6,630.0	-535.5	-1,306.9	861.5	8.96	8.71	-2.26
7,083.0	75.00	179.40	6,639.0	-565.2	-1,306.7	890.1	12.29	12.26	-0.97
7,114.0	79.10	180.00	6,645.9	-595.4	-1,306.5	919.2	13.36	13.23	1.94
7,182.0	84.10	180.40	6,655.8	-662.6	-1,306.8	984.1	7.38	7.35	0.59
7,214.0	85.20	179.60	6,658.8	-694.5	-1,306.8	1,014.8	4.24	3.44	-2.50
7,246.0	86.30	179.70	6,661.2	-726.4	-1,306.6	1,045.5	3.45	3.44	0.31
7,278.0	87.60	178.40	6,662.9	-758.3	-1,306.0	1,076.2	5.74	4.06	-4.06
7,309.0	89.10	177.90	6,663.8	-789.3	-1,305.0	1,105.8	5.10	4.84	-1.61
7,340.0	90.50	178.00	6,663.9	-820.3	-1,303.9	1,135.4	4.53	4.52	0.32
7,372.0	91.10	177.50	6,663.5	-852.3	-1,302.7	1,165.9	2.44	1.88	-1.56
7,404.0	91.30	175.90	6,662.8	-884.2	-1,300.8	1,196.2	5.04	0.63	-5.00
7,435.0	91.40	177.00	6,662.1	-915.1	-1,298.9	1,225.6	3.56	0.32	3.55
7,467.0	91.60	176.50	6,661.2	-947.1	-1,297.1	1,255.9	1.68	0.63	-1.56
7,499.0	91.90	175.80	6,660.2	-979.0	-1,294.9	1,286.1	2.38	0.94	-2.19

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7,531.0	92.40	175.60	6,659.0	-1,010.9	-1,292.5	1,316.2	1.68	1.56	-0.63
7,563.0	92.10	176.70	6,657.8	-1,042.8	-1,290.4	1,346.4	3.56	-0.94	3.44
7,594.0	91.30	176.70	6,656.9	-1,073.7	-1,288.6	1,375.8	2.58	-2.58	0.00
7,627.0	91.40	177.10	6,656.1	-1,106.6	-1,286.8	1,407.1	1.25	0.30	1.21
7,659.0	92.00	177.80	6,655.1	-1,138.6	-1,285.4	1,437.5	2.88	1.88	2.19
7,691.0	92.30	178.90	6,653.9	-1,170.6	-1,284.5	1,468.1	3.56	0.94	3.44
7,723.0	92.90	180.00	6,652.5	-1,202.5	-1,284.2	1,498.9	3.91	1.88	3.44
7,754.0	92.70	179.70	6,651.0	-1,233.5	-1,284.1	1,528.7	1.16	-0.65	-0.97
7,787.0	90.80	181.40	6,650.0	-1,266.5	-1,284.4	1,560.6	7.72	-5.76	5.15
7,819.0	89.30	181.50	6,649.9	-1,298.5	-1,285.2	1,591.7	4.70	-4.69	0.31
7,851.0	89.40	182.10	6,650.3	-1,330.4	-1,286.2	1,622.8	1.90	0.31	1.88
7,882.0	89.60	181.90	6,650.6	-1,361.4	-1,287.3	1,653.0	0.91	0.65	-0.65
7,915.0	89.80	181.90	6,650.7	-1,394.4	-1,288.4	1,685.1	0.61	0.61	0.00
7,947.0	90.70	182.00	6,650.6	-1,426.4	-1,289.5	1,716.2	2.83	2.81	0.31
7,979.0	90.70	182.90	6,650.2	-1,458.3	-1,290.9	1,747.4	2.81	0.00	2.81
8,011.0	90.20	180.70	6,650.0	-1,490.3	-1,291.9	1,778.5	7.05	-1.56	-6.88
8,043.0	88.90	181.70	6,650.2	-1,522.3	-1,292.5	1,809.5	5.13	-4.06	3.13
8,075.0	89.00	181.50	6,650.8	-1,554.3	-1,293.4	1,840.6	0.70	0.31	-0.63
8,106.0	89.40	181.10	6,651.2	-1,585.3	-1,294.1	1,870.7	1.82	1.29	-1.29
8,138.0	89.90	180.40	6,651.4	-1,617.3	-1,294.5	1,901.7	2.69	1.56	-2.19
8,170.0	90.50	180.00	6,651.3	-1,649.3	-1,294.7	1,932.6	2.25	1.88	-1.25
8,202.0	91.10	180.90	6,650.9	-1,681.3	-1,294.9	1,963.5	3.38	1.88	2.81
8,234.0	90.00	180.90	6,650.6	-1,713.3	-1,295.4	1,994.5	3.44	-3.44	0.00
8,265.0	88.50	180.00	6,651.0	-1,744.3	-1,295.7	2,024.4	5.64	-4.84	-2.90
8,297.0	88.70	179.80	6,651.7	-1,776.3	-1,295.6	2,055.3	0.88	0.63	-0.63
8,328.0	89.10	180.20	6,652.3	-1,807.3	-1,295.6	2,085.2	1.82	1.29	1.29
8,360.0	89.30	178.70	6,652.8	-1,839.2	-1,295.3	2,116.0	4.73	0.63	-4.69
8,393.0	89.50	178.60	6,653.1	-1,872.2	-1,294.5	2,147.6	0.68	0.61	-0.30
8,425.0	89.80	177.00	6,653.3	-1,904.2	-1,293.3	2,178.1	5.09	0.94	-5.00
8,456.0	90.20	176.50	6,653.3	-1,935.2	-1,291.5	2,207.5	2.07	1.29	-1.61
8,488.0	90.50	176.60	6,653.1	-1,967.1	-1,289.6	2,237.8	0.99	0.94	0.31
8,520.0	90.90	175.90	6,652.7	-1,999.0	-1,287.5	2,268.0	2.52	1.25	-2.19
8,550.0	91.40	174.90	6,652.1	-2,028.9	-1,285.1	2,296.2	3.73	1.67	-3.33
8,582.0	91.00	175.30	6,651.5	-2,060.8	-1,282.4	2,326.2	1.77	-1.25	1.25
8,614.0	90.40	176.00	6,651.1	-2,092.7	-1,279.9	2,356.4	2.88	-1.88	2.19
8,646.0	90.10	177.80	6,650.9	-2,124.7	-1,278.2	2,386.7	5.70	-0.94	5.63
8,678.0	90.00	178.20	6,650.9	-2,156.6	-1,277.1	2,417.3	1.29	-0.31	1.25
8,709.0	89.50	180.00	6,651.0	-2,187.6	-1,276.6	2,447.1	6.03	-1.61	5.81
8,741.0	88.80	180.70	6,651.5	-2,219.6	-1,276.8	2,478.0	3.09	-2.19	2.19
8,773.0	88.80	180.00	6,652.2	-2,251.6	-1,277.0	2,508.9	2.19	0.00	-2.19
8,805.0	88.40	178.60	6,653.0	-2,283.6	-1,276.6	2,539.6	4.55	-1.25	-4.38
8,837.0	88.10	179.50	6,653.9	-2,315.6	-1,276.1	2,570.3	2.96	-0.94	2.81
8,870.0	87.60	178.30	6,655.2	-2,348.6	-1,275.5	2,602.0	3.94	-1.52	-3.64
8,902.0	87.80	180.90	6,656.5	-2,380.5	-1,275.2	2,632.7	8.14	0.63	8.13
8,934.0	87.30	181.90	6,657.8	-2,412.5	-1,276.0	2,663.8	3.49	-1.56	3.13
8,965.0	87.00	182.90	6,659.4	-2,443.4	-1,277.3	2,693.9	3.36	-0.97	3.23
8,997.0	87.20	182.40	6,661.0	-2,475.4	-1,278.8	2,725.1	1.68	0.63	-1.56
9,028.0	87.30	181.40	6,662.5	-2,506.3	-1,279.8	2,755.3	3.24	0.32	-3.23
9,060.0	87.40	181.40	6,664.0	-2,538.3	-1,280.6	2,786.3	0.31	0.31	0.00
9,092.0	87.30	181.80	6,665.4	-2,570.2	-1,281.5	2,817.3	1.29	-0.31	1.25
9,124.0	87.00	181.50	6,667.0	-2,602.2	-1,282.4	2,848.4	1.33	-0.94	-0.94
9,156.0	87.10	181.80	6,668.7	-2,634.1	-1,283.3	2,879.4	0.99	0.31	0.94
9,188.0	86.80	180.60	6,670.4	-2,666.0	-1,284.0	2,910.4	3.86	-0.94	-3.75

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Carmichael 26M-223
Project:	SEC.26-T7N-R63W	TVD Reference:	WELL @ 4784.0ft (RKB Ensign 32 - 15')
Site:	Carmichael 26M-223 Pad Sec.26-T7N-R63W	MD Reference:	WELL @ 4784.0ft (RKB Ensign 32 - 15')
Well:	Carmichael 26M-223	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)
9,220.0	87.60	181.40	6,671.9	-2,698.0	-1,284.6	2,941.4	3.53	2.50	2.50
9,252.0	88.10	180.70	6,673.2	-2,730.0	-1,285.1	2,972.4	2.69	1.56	-2.19
9,284.0	89.50	180.40	6,673.8	-2,762.0	-1,285.4	3,003.3	4.47	4.38	-0.94
9,316.0	90.10	182.20	6,673.9	-2,794.0	-1,286.2	3,034.4	5.93	1.88	5.63
9,349.0	90.20	182.50	6,673.8	-2,826.9	-1,287.5	3,066.5	0.96	0.30	0.91
9,380.0	89.70	181.70	6,673.9	-2,857.9	-1,288.7	3,096.7	3.04	-1.61	-2.58
9,412.0	89.50	181.50	6,674.1	-2,889.9	-1,289.6	3,127.8	0.88	-0.63	-0.63
9,443.0	90.30	182.50	6,674.2	-2,920.9	-1,290.6	3,158.0	4.13	2.58	3.23
9,475.0	90.80	182.80	6,673.8	-2,952.8	-1,292.1	3,189.2	1.82	1.56	0.94
9,507.0	90.80	182.20	6,673.4	-2,984.8	-1,293.5	3,220.4	1.87	0.00	-1.88
9,539.0	90.70	183.10	6,673.0	-3,016.8	-1,295.0	3,251.6	2.83	-0.31	2.81
9,571.0	91.50	184.20	6,672.4	-3,048.7	-1,297.0	3,282.9	4.25	2.50	3.44
9,603.0	90.90	184.20	6,671.7	-3,080.6	-1,299.4	3,314.3	1.88	-1.88	0.00
9,635.0	91.10	184.40	6,671.1	-3,112.5	-1,301.8	3,345.7	0.88	0.63	0.63
9,667.0	90.70	183.10	6,670.6	-3,144.4	-1,303.9	3,377.1	4.25	-1.25	-4.06
9,699.0	91.60	183.40	6,670.0	-3,176.4	-1,305.7	3,408.4	2.96	2.81	0.94
9,731.0	92.80	182.20	6,668.8	-3,208.3	-1,307.2	3,439.6	5.30	3.75	-3.75
9,763.0	93.50	184.00	6,667.0	-3,240.2	-1,309.0	3,470.8	6.03	2.19	5.63
9,795.0	93.90	184.40	6,664.9	-3,272.1	-1,311.3	3,502.2	1.77	1.25	1.25
9,826.0	94.10	184.40	6,662.8	-3,302.9	-1,313.7	3,532.5	0.65	0.65	0.00
9,858.0	94.00	184.50	6,660.5	-3,334.7	-1,316.2	3,563.9	0.44	-0.31	0.31
9,890.0	94.00	184.30	6,658.3	-3,366.5	-1,318.6	3,595.2	0.62	0.00	-0.63
9,922.0	94.00	183.30	6,656.1	-3,398.4	-1,320.7	3,626.5	3.12	0.00	-3.13
9,954.0	93.90	184.10	6,653.8	-3,430.3	-1,322.8	3,657.8	2.51	-0.31	2.50
9,986.0	94.00	183.80	6,651.6	-3,462.1	-1,325.0	3,689.1	0.99	0.31	-0.94
10,018.0	94.00	183.80	6,649.4	-3,494.0	-1,327.1	3,720.4	0.00	0.00	0.00
10,050.0	94.30	183.50	6,647.1	-3,525.8	-1,329.1	3,751.6	1.32	0.94	-0.94
10,081.0	94.70	183.30	6,644.7	-3,556.7	-1,331.0	3,781.8	1.44	1.29	-0.65
10,113.0	94.10	181.40	6,642.2	-3,588.5	-1,332.3	3,812.9	6.21	-1.88	-5.94
10,145.0	93.00	182.20	6,640.2	-3,620.5	-1,333.3	3,844.0	4.25	-3.44	2.50
10,177.0	92.60	181.60	6,638.7	-3,652.4	-1,334.3	3,875.1	2.25	-1.25	-1.88
10,209.0	92.50	181.30	6,637.2	-3,684.4	-1,335.1	3,906.1	0.99	-0.31	-0.94
10,241.0	92.30	181.40	6,635.9	-3,716.3	-1,335.9	3,937.2	0.70	-0.63	0.31
10,273.0	92.10	182.20	6,634.7	-3,748.3	-1,336.9	3,968.2	2.58	-0.63	2.50
10,305.0	91.50	182.50	6,633.7	-3,780.2	-1,338.2	3,999.4	2.10	-1.88	0.94
10,337.0	91.10	182.80	6,632.9	-3,812.2	-1,339.7	4,030.6	1.56	-1.25	0.94
10,369.0	91.00	181.70	6,632.4	-3,844.2	-1,340.9	4,061.8	3.45	-0.31	-3.44
10,401.0	91.50	182.00	6,631.7	-3,876.1	-1,342.0	4,092.9	1.82	1.56	0.94
10,433.0	92.40	181.70	6,630.6	-3,908.1	-1,343.0	4,124.0	2.96	2.81	-0.94
10,464.0	93.20	181.80	6,629.1	-3,939.1	-1,344.0	4,154.1	2.60	2.58	0.32
10,496.0	93.60	182.30	6,627.2	-3,971.0	-1,345.1	4,185.2	2.00	1.25	1.56
10,529.0	93.20	181.80	6,625.2	-4,003.9	-1,346.3	4,217.3	1.94	-1.21	-1.52
10,562.0	93.00	182.00	6,623.4	-4,036.8	-1,347.4	4,249.3	0.86	-0.61	0.61
10,594.0	93.10	181.50	6,621.7	-4,068.8	-1,348.3	4,280.4	1.59	0.31	-1.56
10,626.0	93.30	181.80	6,619.9	-4,100.7	-1,349.3	4,311.4	1.13	0.63	0.94
10,657.0	93.20	181.50	6,618.2	-4,131.6	-1,350.2	4,341.5	1.02	-0.32	-0.97
10,689.0	92.70	181.80	6,616.5	-4,163.6	-1,351.1	4,372.6	1.82	-1.56	0.94
10,721.0	92.60	181.50	6,615.0	-4,195.5	-1,352.0	4,403.6	0.99	-0.31	-0.94
10,753.0	92.60	181.60	6,613.6	-4,227.5	-1,352.9	4,434.7	0.31	0.00	0.31
10,784.0	92.80	180.10	6,612.1	-4,258.5	-1,353.3	4,464.7	4.88	0.65	-4.84
10,815.0	92.60	180.70	6,610.7	-4,289.4	-1,353.5	4,494.6	2.04	-0.65	1.94
10,846.0	92.70	180.60	6,609.2	-4,320.4	-1,353.9	4,524.5	0.46	0.32	-0.32
10,878.0	92.90	180.20	6,607.7	-4,352.3	-1,354.1	4,555.4	1.40	0.63	-1.25

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Carmichael 26M-223
Project:	SEC.26-T7N-R63W	TVD Reference:	WELL @ 4784.0ft (RKB Ensign 32 - 15')
Site:	Carmichael 26M-223 Pad Sec.26-T7N-R63W	MD Reference:	WELL @ 4784.0ft (RKB Ensign 32 - 15')
Well:	Carmichael 26M-223	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)
10,911.0	92.70	181.00	6,606.1	-4,385.3	-1,354.5	4,587.3	2.50	-0.61	2.42
10,943.0	92.70	180.40	6,604.6	-4,417.3	-1,354.8	4,618.2	1.87	0.00	-1.88
10,974.0	92.60	180.80	6,603.1	-4,448.2	-1,355.2	4,648.2	1.33	-0.32	1.29
11,006.0	92.50	180.00	6,601.7	-4,480.2	-1,355.4	4,679.1	2.52	-0.31	-2.50
11,038.0	92.40	180.00	6,600.3	-4,512.2	-1,355.4	4,709.9	0.31	-0.31	0.00
11,070.0	91.30	179.30	6,599.3	-4,544.2	-1,355.2	4,740.7	4.07	-3.44	-2.19
11,102.0	91.30	178.90	6,598.6	-4,576.1	-1,354.7	4,771.4	1.25	0.00	-1.25
11,135.0	91.30	178.90	6,597.8	-4,609.1	-1,354.1	4,803.1	0.00	0.00	0.00
11,166.0	90.80	179.20	6,597.2	-4,640.1	-1,353.5	4,832.8	1.88	-1.61	0.97
11,198.0	90.70	178.50	6,596.8	-4,672.1	-1,352.9	4,863.5	2.21	-0.31	-2.19
11,231.0	90.80	179.60	6,596.4	-4,705.1	-1,352.4	4,895.2	3.35	0.30	3.33
11,263.0	90.80	179.80	6,596.0	-4,737.1	-1,352.2	4,926.0	0.62	0.00	0.63
11,294.0	90.50	178.90	6,595.6	-4,768.1	-1,351.8	4,955.8	3.06	-0.97	-2.90
11,345.0	90.50	178.90	6,595.2	-4,819.1	-1,350.9	5,004.7	0.00	0.00	0.00
BHL 500'FSL, 2438'FEL									

Checked By: _____	Approved By: _____	Date: _____
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