

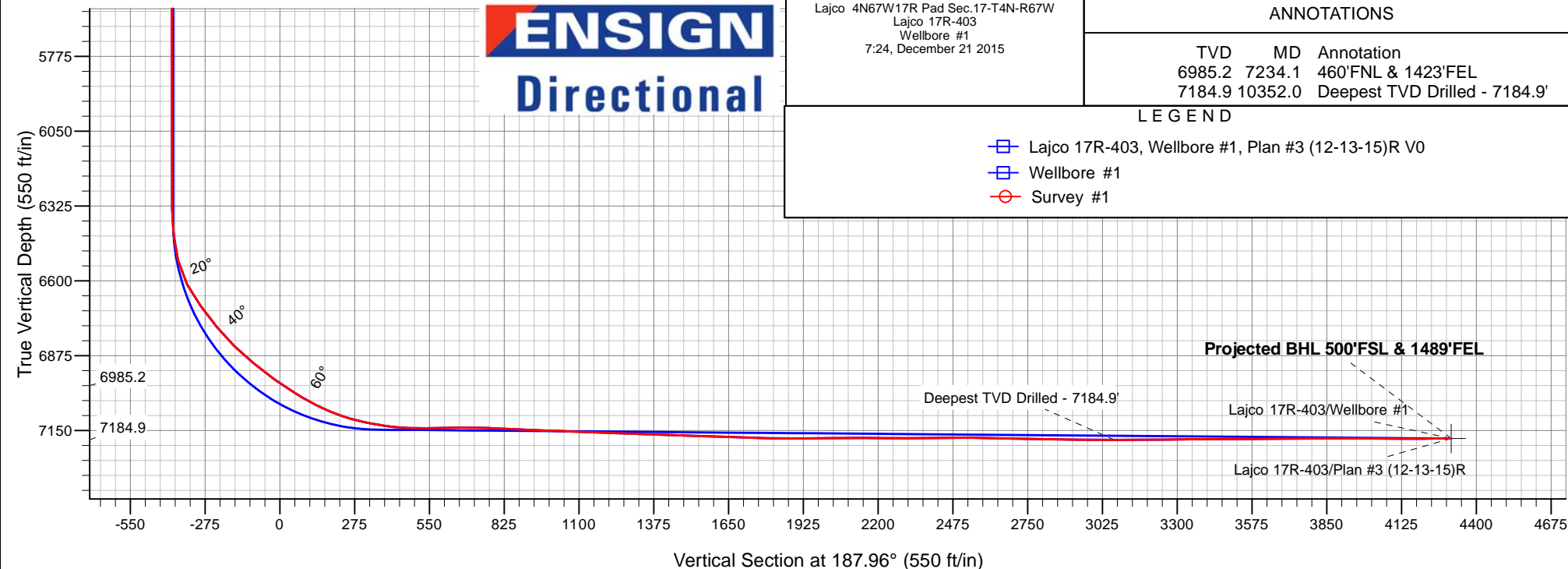
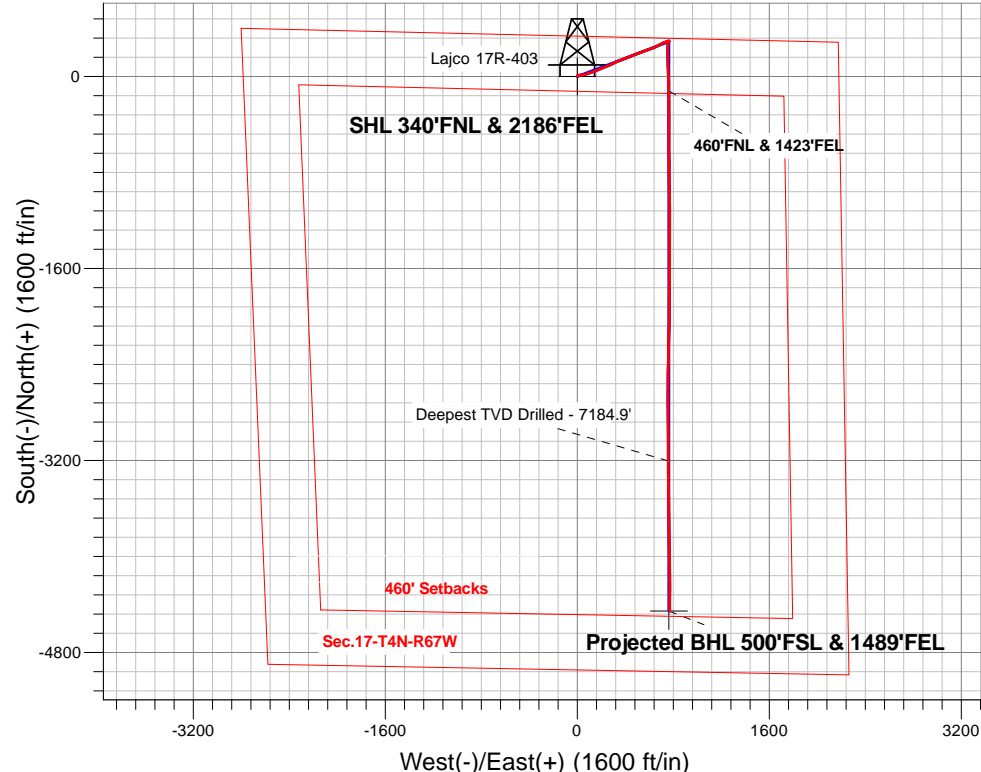
# PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Lajco 17R-403**

Surface Location: Lajco 4N67W17R Pad Sec.17-T4N-R67W  
 North American Datum 1983 , US State Plane 1983, Colorado Northern Zone  
 Ground Elevation: 4794.0  
 +N/-S+E/-W Northing Easting Latitude Longitude Slot  
 0.0 0.0359713.08 3163455.85 40.319330 -104.913800  
 RKB - 13' WELL @ 4807.0ft (RKB - 13')

## FINAL SURVEY

**Projected Bottom Hole Location**  
**11603'MD 7179'TVD 4455'S & 770'E of SHL**  
**90.7 degree Incl @ 180.3 degree AZM**





# **PETROLEUM DEVELOPMENT CORP DJ Basin**

**SEC.17-T4N-R67W**

**Lajco 4N67W17R Pad Sec.17-T4N-R67W**

**Lajco 17R-403**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**21 December, 2015**

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Lajco 17R-403
<b>Project:</b>	SEC.17-T4N-R67W	<b>TVD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Site:</b>	Lajco 4N67W17R Pad Sec.17-T4N-R67W	<b>MD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Well:</b>	Lajco 17R-403	<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>	US_EDM

<b>Project</b>	SEC.17-T4N-R67W, 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	Lajco 4N67W17R Pad Sec.17-T4N-R67W				
Site Position:		Northing:	1,359,711.77 usft	Latitude:	40.319300
From:	Lat/Long	Easting:	3,164,903.08 usft	Longitude:	-104.908610
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.38 °

Well	Lajco 17R-403					
Well Position	+N/-S	0.0 ft	Northing:	1,359,713.08 usft	Latitude:	40.319330
	+E/-W	0.0 ft	Easting:	3,163,455.85 usft	Longitude:	-104.913800
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,794.0 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	11/19/2015	8.34	66.81	52,607

<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	187.96	

<b>Survey Program</b>	<b>Date</b>	12/21/2015			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
106.0	11,603.0	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 (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
1.0	0.01	6.60	1.0	0.0	0.0	0.0	0.85	0.85	0.00	
<b>SHL 340°FNL &amp; 2186°FEL</b>										
106.0	0.90	6.60	106.0	0.8	0.1	-0.8	0.85	0.85	0.00	
169.0	0.80	353.10	169.0	1.8	0.1	-1.8	0.35	-0.16	-21.43	
265.0	0.90	16.30	265.0	3.1	0.2	-3.1	0.37	0.10	24.17	
361.0	1.50	41.90	361.0	4.8	1.3	-4.9	0.82	0.63	26.67	
457.0	2.70	68.30	456.9	6.6	4.2	-7.1	1.57	1.25	27.50	
553.0	3.90	70.20	552.7	8.5	9.4	-9.7	1.26	1.25	1.98	
648.0	4.80	81.30	647.5	10.2	16.4	-12.4	1.29	0.95	11.68	
744.0	4.90	81.30	743.1	11.4	24.4	-14.7	0.10	0.10	0.00	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Lajco 17R-403
<b>Project:</b>	SEC.17-T4N-R67W	<b>TVD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Site:</b>	Lajco 4N67W17R Pad Sec.17-T4N-R67W	<b>MD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Well:</b>	Lajco 17R-403	<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>	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
840.0	6.50	84.30	838.6	12.6	33.8	-17.2	1.69	1.67	3.13
936.0	6.40	84.80	934.0	13.6	44.6	-19.7	0.12	-0.10	0.52
1,032.0	6.50	80.20	1,029.4	15.0	55.3	-22.5	0.55	0.10	-4.79
1,128.0	6.10	74.80	1,124.8	17.3	65.5	-26.2	0.74	-0.42	-5.63
1,187.0	5.50	69.90	1,183.5	19.1	71.2	-28.8	1.32	-1.02	-8.31
1,320.0	5.60	69.70	1,315.9	23.5	83.3	-34.8	0.08	0.08	-0.15
1,416.0	6.30	75.50	1,411.4	26.5	92.8	-39.1	0.96	0.73	6.04
1,511.0	8.50	73.70	1,505.6	29.8	104.6	-43.9	2.33	2.32	-1.89
1,607.0	9.90	70.20	1,600.4	34.5	119.1	-50.7	1.57	1.46	-3.65
1,703.0	12.10	67.90	1,694.6	41.1	136.2	-59.6	2.34	2.29	-2.40
1,799.0	14.00	69.30	1,788.1	49.0	156.4	-70.2	2.01	1.98	1.46
1,895.0	15.10	70.40	1,881.0	57.3	179.1	-81.6	1.18	1.15	1.15
1,991.0	13.90	66.90	1,974.0	66.0	201.5	-93.3	1.55	-1.25	-3.65
2,087.0	15.50	67.40	2,066.8	75.5	223.9	-105.8	1.67	1.67	0.52
2,182.0	14.70	65.10	2,158.6	85.4	246.6	-118.8	1.05	-0.84	-2.42
2,278.0	15.70	68.80	2,251.2	95.3	269.7	-131.7	1.45	1.04	3.85
2,374.0	15.70	64.10	2,343.6	105.6	293.5	-145.3	1.32	0.00	-4.90
2,470.0	15.90	61.40	2,436.0	117.6	316.7	-160.3	0.79	0.21	-2.81
2,565.0	15.80	69.90	2,527.4	128.3	340.3	-174.2	2.44	-0.11	8.95
2,661.0	14.70	67.10	2,620.0	137.5	363.8	-186.6	1.38	-1.15	-2.92
2,758.0	15.70	69.70	2,713.6	146.9	387.5	-199.1	1.25	1.03	2.68
2,853.0	14.20	67.90	2,805.4	155.7	410.3	-211.0	1.65	-1.58	-1.89
2,949.0	14.40	71.80	2,898.4	163.9	432.6	-222.2	1.02	0.21	4.06
3,045.0	13.50	67.40	2,991.6	171.9	454.2	-233.1	1.45	-0.94	-4.58
3,140.0	14.20	69.00	3,083.8	180.3	475.4	-244.4	0.84	0.74	1.68
3,236.0	12.70	69.00	3,177.2	188.3	496.2	-255.2	1.56	-1.56	0.00
3,332.0	14.50	70.40	3,270.5	196.1	517.4	-265.9	1.91	1.88	1.46
3,428.0	13.00	68.30	3,363.8	204.2	538.7	-276.8	1.65	-1.56	-2.19
3,524.0	13.60	70.90	3,457.2	211.9	559.4	-287.3	0.88	0.63	2.71
3,620.0	14.50	70.90	3,550.3	219.5	581.5	-297.9	0.94	0.94	0.00
3,715.0	15.00	70.00	3,642.2	227.6	604.3	-309.1	0.58	0.53	-0.95
3,811.0	14.80	69.30	3,734.9	236.2	627.4	-320.8	0.28	-0.21	-0.73
3,907.0	14.20	66.00	3,827.9	245.3	649.6	-332.9	1.06	-0.63	-3.44
4,002.0	13.10	63.20	3,920.2	254.9	669.9	-345.2	1.35	-1.16	-2.95
4,098.0	11.80	61.80	4,013.9	264.4	688.2	-357.2	1.39	-1.35	-1.46
4,193.0	10.90	61.10	4,107.1	273.4	704.7	-368.3	0.96	-0.95	-0.74
4,288.0	9.60	64.40	4,200.6	281.1	719.7	-378.1	1.50	-1.37	3.47
4,384.0	8.20	73.90	4,295.4	286.5	733.5	-385.3	2.11	-1.46	9.90
4,479.0	6.30	70.00	4,389.7	290.1	744.9	-390.5	2.06	-2.00	-4.11
4,575.0	4.60	85.00	4,485.2	292.3	753.7	-393.8	2.30	-1.77	15.63
4,671.0	3.60	87.30	4,581.0	292.7	760.5	-395.2	1.06	-1.04	2.40
4,767.0	1.40	74.80	4,676.9	293.2	764.7	-396.3	2.35	-2.29	-13.02
4,863.0	0.60	210.00	4,772.9	293.1	765.5	-396.3	1.95	-0.83	140.83

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Lajco 17R-403
<b>Project:</b>	SEC.17-T4N-R67W	<b>TVD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Site:</b>	Lajco 4N67W17R Pad Sec.17-T4N-R67W	<b>MD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Well:</b>	Lajco 17R-403	<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>	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,959.0	0.60	236.30	4,868.9	292.4	764.9	-395.5	0.28	0.00	27.40
5,055.0	0.20	271.80	4,964.9	292.1	764.3	-395.1	0.47	-0.42	36.98
5,151.0	0.40	257.10	5,060.9	292.0	763.8	-395.0	0.22	0.21	-15.31
5,246.0	0.60	40.00	5,155.9	292.3	763.8	-395.3	1.00	0.21	150.42
5,342.0	0.40	45.40	5,251.9	292.9	764.3	-396.0	0.21	-0.21	5.63
5,438.0	0.20	210.10	5,347.9	293.0	764.5	-396.1	0.62	-0.21	171.56
5,534.0	0.50	340.70	5,443.9	293.3	764.3	-396.3	0.68	0.31	136.04
5,630.0	0.50	356.40	5,539.9	294.1	764.1	-397.1	0.14	0.00	16.35
5,725.0	0.70	302.80	5,634.8	294.8	763.6	-397.7	0.60	0.21	-56.42
5,821.0	0.90	278.90	5,730.8	295.3	762.4	-398.0	0.40	0.21	-24.90
5,916.0	0.70	253.70	5,825.8	295.2	761.1	-397.8	0.42	-0.21	-26.53
6,012.0	0.40	273.80	5,921.8	295.1	760.2	-397.5	0.37	-0.31	20.94
6,108.0	0.50	249.20	6,017.8	294.9	759.4	-397.3	0.22	0.10	-25.63
6,203.0	0.50	249.30	6,112.8	294.6	758.7	-396.9	0.00	0.00	0.11
6,329.0	0.50	276.80	6,238.8	294.5	757.6	-396.6	0.19	0.00	21.83
6,424.0	0.70	274.50	6,333.8	294.6	756.6	-396.6	0.21	0.21	-2.42
6,520.0	6.20	186.90	6,429.6	289.5	755.4	-391.3	6.47	5.73	-91.25
6,616.0	12.90	181.10	6,524.2	273.6	754.6	-375.5	7.04	6.98	-6.04
6,712.0	28.90	181.10	6,613.6	239.5	753.9	-341.6	16.67	16.67	0.00
6,807.0	36.10	180.40	6,693.7	188.5	753.3	-291.0	7.59	7.58	-0.74
6,904.0	39.60	177.80	6,770.3	129.0	754.3	-232.2	3.96	3.61	-2.68
7,000.0	46.80	177.10	6,840.2	63.4	757.2	-167.6	7.52	7.50	-0.73
7,095.0	50.90	177.60	6,902.7	-8.0	760.5	-97.4	4.33	4.32	0.53
7,191.0	54.70	179.00	6,960.8	-84.5	762.8	-22.0	4.13	3.96	1.46
7,234.1	56.23	179.41	6,985.2	-120.0	763.3	13.1	3.63	3.54	0.96
460'FNL & 1423'FEL									
7,287.0	58.10	179.90	7,013.9	-164.4	763.5	57.1	3.63	3.54	0.92
7,383.0	63.90	179.70	7,060.4	-248.3	763.8	140.2	6.04	6.04	-0.21
7,479.0	71.50	180.30	7,096.8	-337.1	763.8	228.1	7.94	7.92	0.63
7,575.0	78.30	180.10	7,121.8	-429.7	763.5	319.8	7.09	7.08	-0.21
7,671.0	83.80	179.70	7,136.7	-524.5	763.6	413.7	5.74	5.73	-0.42
7,766.0	90.10	179.40	7,141.8	-619.3	764.4	507.5	6.64	6.63	-0.32
7,862.0	90.90	180.10	7,140.9	-715.3	764.8	602.5	1.11	0.83	0.73
7,957.0	90.10	179.90	7,140.1	-810.3	764.8	696.6	0.87	-0.84	-0.21
8,053.0	86.90	179.60	7,142.6	-906.3	765.2	791.6	3.35	-3.33	-0.31
8,149.0	87.70	178.70	7,147.1	-1,002.1	766.7	886.3	1.25	0.83	-0.94
8,245.0	87.90	179.20	7,150.8	-1,098.1	768.4	981.1	0.56	0.21	0.52
8,340.0	88.30	178.50	7,154.0	-1,193.0	770.3	1,074.8	0.85	0.42	-0.74
8,436.0	87.40	179.70	7,157.6	-1,288.9	771.8	1,169.6	1.56	-0.94	1.25
8,532.0	88.50	180.40	7,161.0	-1,384.8	771.7	1,264.6	1.36	1.15	0.73
8,628.0	87.70	180.60	7,164.2	-1,480.8	770.9	1,359.8	0.86	-0.83	0.21
8,724.0	88.20	181.10	7,167.6	-1,576.7	769.5	1,455.0	0.74	0.52	0.52
8,820.0	88.00	180.60	7,170.8	-1,672.7	768.1	1,550.2	0.56	-0.21	-0.52

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<b>Site:</b>	Lajco 4N67W17R Pad Sec.17-T4N-R67W	<b>MD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Well:</b>	Lajco 17R-403	<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>	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,915.0	88.40	180.40	7,173.8	-1,767.6	767.2	1,644.3	0.47	0.42	-0.21
9,011.0	87.70	179.20	7,177.1	-1,863.5	767.6	1,739.3	1.45	-0.73	-1.25
9,107.0	89.30	180.60	7,179.6	-1,959.5	767.7	1,834.3	2.21	1.67	1.46
9,203.0	90.70	181.10	7,179.6	-2,055.5	766.3	1,929.6	1.55	1.46	0.52
9,299.0	91.00	182.20	7,178.1	-2,151.4	763.5	2,025.0	1.19	0.31	1.15
9,395.0	89.40	180.60	7,177.8	-2,247.4	761.2	2,120.3	2.36	-1.67	-1.67
9,490.0	89.80	180.60	7,178.5	-2,342.4	760.2	2,214.6	0.42	0.42	0.00
9,586.0	90.00	180.60	7,178.6	-2,438.4	759.2	2,309.8	0.21	0.21	0.00
9,682.0	90.90	181.10	7,177.9	-2,534.4	757.8	2,405.0	1.07	0.94	0.52
9,778.0	90.30	180.80	7,176.9	-2,630.4	756.2	2,500.3	0.70	-0.63	-0.31
9,874.0	88.80	180.40	7,177.6	-2,726.3	755.2	2,595.5	1.62	-1.56	-0.42
9,969.0	88.60	179.70	7,179.8	-2,821.3	755.1	2,689.6	0.77	-0.21	-0.74
10,065.0	88.80	177.60	7,182.0	-2,917.3	757.4	2,784.3	2.20	0.21	-2.19
10,161.0	89.40	180.30	7,183.5	-3,013.2	759.1	2,879.1	2.88	0.63	2.81
10,257.0	89.40	179.90	7,184.5	-3,109.2	758.9	2,974.2	0.42	0.00	-0.42
10,352.0	90.10	180.30	7,184.9	-3,204.2	758.8	3,068.3	0.85	0.74	0.42
Deepest TVD Drilled - 7184.9'									
10,448.0	90.70	178.80	7,184.2	-3,300.2	759.5	3,163.2	1.68	0.63	-1.56
10,544.0	90.20	179.60	7,183.5	-3,396.2	760.9	3,258.1	0.98	-0.52	0.83
10,640.0	90.70	180.60	7,182.7	-3,492.2	760.7	3,353.2	1.16	0.52	1.04
10,735.0	90.20	178.70	7,182.0	-3,587.2	761.3	3,447.2	2.07	-0.53	-2.00
10,831.0	90.10	178.70	7,181.7	-3,683.2	763.5	3,541.9	0.10	-0.10	0.00
10,926.0	90.90	178.30	7,180.9	-3,778.1	766.0	3,635.6	0.94	0.84	-0.42
11,022.0	90.00	179.90	7,180.1	-3,874.1	767.5	3,730.5	1.91	-0.94	1.67
11,117.0	90.40	180.30	7,179.8	-3,969.1	767.3	3,824.6	0.60	0.42	0.42
11,213.0	89.70	178.80	7,179.7	-4,065.1	768.0	3,919.6	1.72	-0.73	-1.56
11,309.0	89.90	178.30	7,180.1	-4,161.1	770.5	4,014.3	0.56	0.21	-0.52
11,405.0	89.40	180.30	7,180.6	-4,257.0	771.6	4,109.2	2.15	-0.52	2.08
11,501.0	90.70	180.60	7,180.6	-4,353.0	770.9	4,204.3	1.39	1.35	0.31
11,546.0	90.70	180.30	7,180.0	-4,398.0	770.5	4,249.0	0.67	0.00	-0.67
11,603.0	90.70	180.30	7,179.3	-4,455.0	770.2	4,305.4	0.00	0.00	0.00
BHL 500'FSL & 1495'FEL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL 340'FNL & 2186'FE - hit/miss target - Shape - Point	0.00	0.00	1.0	0.0	0.0	1,359,713.09	3,163,455.85	40.319330	-104.913800
BHL 500'FSL & 1495'FE - survey misses target center by 6.1ft at 11603.0ft MD (7179.3 TVD, -4455.0 N, 770.2 E) - Point	0.00	0.00	7,180.0	-4,455.4	764.2	1,355,262.98	3,164,249.45	40.307100	-104.911060

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Lajco 17R-403
<b>Project:</b>	SEC.17-T4N-R67W	<b>TVD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Site:</b>	Lajco 4N67W17R Pad Sec.17-T4N-R67W	<b>MD Reference:</b>	WELL @ 4807.0ft (RKB - 13')
<b>Well:</b>	Lajco 17R-403	<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>	US_EDM

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
7,234.1	6,985.2	-120.0	763.3	460'FNL & 1423'FEL
10,352.0	7,184.9	-3,204.2	758.8	Deepest TVD Drilled - 7184.9'

Checked By: _____	Approved By: _____	Date: _____
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