

# PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Lajco 17M-323**

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

0.0 0.01359680.29 3163456.07 40.319240 -104.913800

Longitude

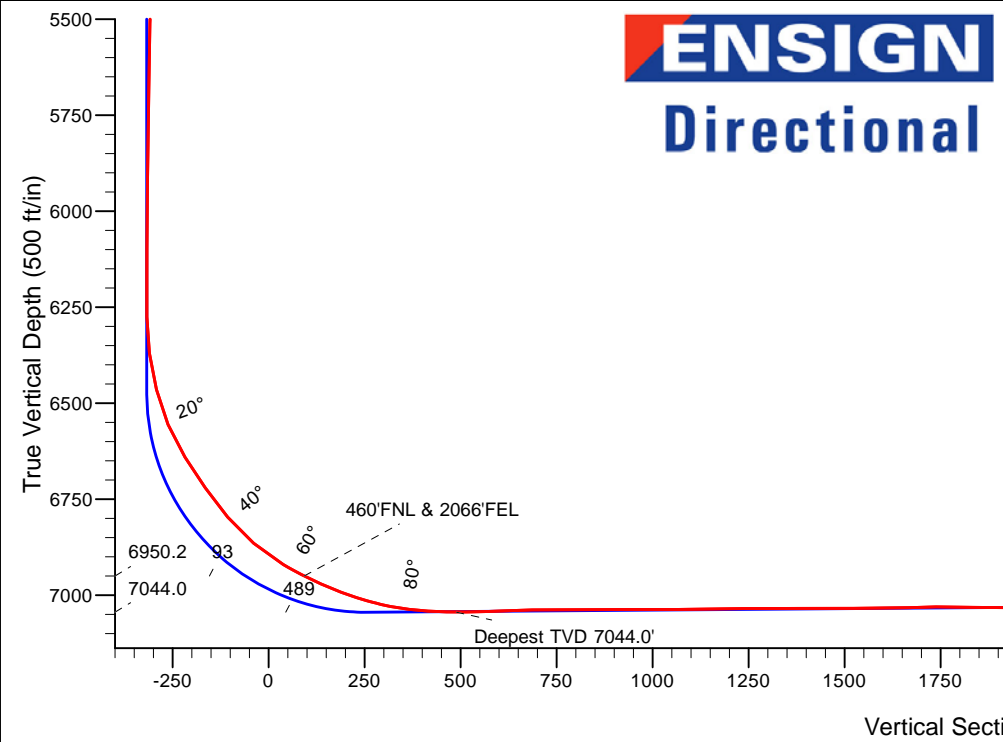
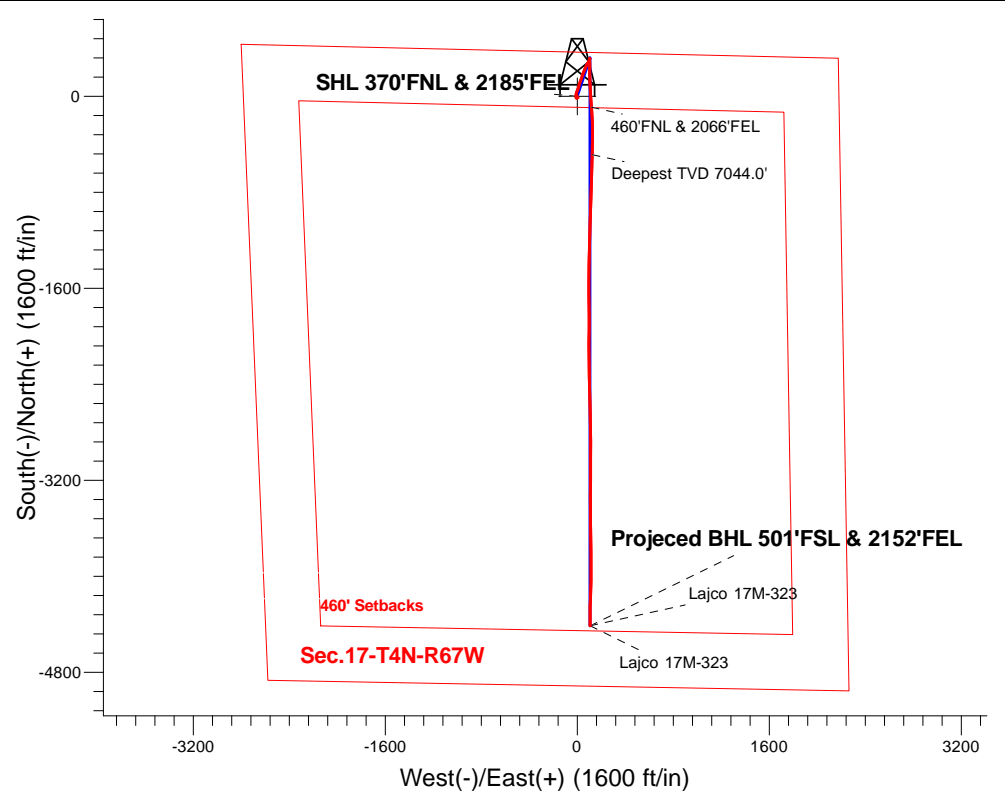
-104.913800

Slot

RKB - 13' WELL @ 4807.0ft (RKB - 13')

## FINAL SURVEY

Projected Bottom Hole Location  
 11465'MD 7010'TVD 4411'S & 108'E of SHL  
 91.6 degree Incl @ 179.4 degree AZM



Lajco 4N67W17R Pad Sec.17-T4N-R67W Lajco 17M-323 Wellbore #1 16:58, December 08 2015	ANNOTATIONS		
	TVD	MD	Annotation
	6950.2	7127.4	460'FNL & 2066'FEL
	7044.0	7539.1	Deepest TVD 7044.0'

### LEGEND

- Lajco 17M-323, Wellbore #1, Plan #3 (10-27-15) V0
- Wellbore #1
- Survey #1

Projected BHL 501'FSL & 2152'FEL

Vertical Section at 178.62° (500 ft/in)



# Directional

## PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.17-T4N-R67W

Lajco 4N67W17R Pad Sec.17-T4N-R67W

Lajco 17M-323

Wellbore #1

Survey: Survey #1

## Standard Survey Report

08 December, 2015

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Lajco 17M-323
<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 17M-323	<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 17M-323					
Well Position	+N/-S	0.0 ft	Northing:	1,359,680.29 usft	Latitude:	40.319240
	+E/-W	0.0 ft	Easting:	3,163,456.07 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	178.62	

<b>Survey Program</b>	<b>Date</b>	12/8/2015			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
71.0	11,465.0	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	
71.0	0.50	19.40	71.0	0.3	0.1	-0.3	0.70	0.70	0.00	
164.0	0.60	268.50	164.0	0.7	-0.2	-0.7	0.98	0.11	-119.25	
254.0	2.30	231.90	254.0	-0.5	-2.1	0.4	2.06	1.89	-40.67	
345.0	3.10	228.30	344.9	-3.2	-5.4	3.1	0.90	0.88	-3.96	
435.0	3.00	204.70	434.7	-7.0	-8.2	6.8	1.39	-0.11	-26.22	
526.0	1.70	174.60	525.7	-10.5	-9.1	10.3	1.92	-1.43	-33.08	
615.0	1.60	161.10	614.6	-13.0	-8.6	12.8	0.45	-0.11	-15.17	
707.0	0.80	132.60	706.6	-14.6	-7.7	14.4	1.06	-0.87	-30.98	
797.0	0.90	86.20	796.6	-15.0	-6.5	14.9	0.75	0.11	-51.56	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Lajco 17M-323
<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 17M-323	<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)
888.0	1.30	76.60	887.6	-14.7	-4.8	14.6	0.48	0.44	-10.55
978.0	2.00	68.80	977.5	-13.9	-2.3	13.9	0.82	0.78	-8.67
1,068.0	2.80	58.10	1,067.5	-12.2	1.0	12.2	1.02	0.89	-11.89
1,177.0	1.20	71.10	1,176.4	-10.4	4.3	10.5	1.52	-1.47	11.93
1,223.0	0.40	59.90	1,222.4	-10.2	4.9	10.3	1.76	-1.74	-24.35
1,319.0	0.30	337.80	1,318.4	-9.8	5.1	9.9	0.49	-0.10	-85.52
1,415.0	0.40	347.10	1,414.4	-9.2	5.0	9.3	0.12	0.10	9.69
1,511.0	0.40	281.50	1,510.4	-8.8	4.6	8.9	0.45	0.00	-68.33
1,607.0	0.70	272.60	1,606.4	-8.7	3.6	8.8	0.32	0.31	-9.27
1,703.0	0.60	262.00	1,702.4	-8.8	2.6	8.8	0.16	-0.10	-11.04
1,799.0	0.60	253.00	1,798.4	-9.0	1.6	9.0	0.10	0.00	-9.38
1,894.0	0.60	250.20	1,893.4	-9.3	0.6	9.3	0.03	0.00	-2.95
1,990.0	0.80	252.50	1,989.4	-9.7	-0.5	9.7	0.21	0.21	2.40
2,086.0	0.80	273.80	2,085.3	-9.8	-1.8	9.8	0.31	0.00	22.19
2,182.0	1.00	286.40	2,181.3	-9.6	-3.3	9.5	0.29	0.21	13.13
2,277.0	1.00	288.20	2,276.3	-9.1	-4.8	8.9	0.03	0.00	1.89
2,373.0	1.10	275.40	2,372.3	-8.7	-6.5	8.6	0.26	0.10	-13.33
2,501.0	1.20	284.30	2,500.3	-8.3	-9.1	8.0	0.16	0.08	6.95
2,565.0	2.10	335.30	2,564.3	-7.0	-10.2	6.8	2.56	1.41	79.69
2,661.0	3.10	356.90	2,660.2	-2.8	-11.1	2.6	1.44	1.04	22.50
2,757.0	4.80	1.80	2,755.9	3.8	-11.1	-4.0	1.80	1.77	5.10
2,853.0	5.80	4.80	2,851.5	12.6	-10.6	-12.9	1.08	1.04	3.13
2,949.0	6.30	11.30	2,947.0	22.6	-9.1	-22.8	0.88	0.52	6.77
3,044.0	6.20	22.20	3,041.4	32.5	-6.2	-32.6	1.25	-0.11	11.47
3,140.0	6.70	20.70	3,136.8	42.5	-2.2	-42.6	0.55	0.52	-1.56
3,236.0	6.20	18.50	3,232.2	52.7	1.4	-52.6	0.58	-0.52	-2.29
3,332.0	6.90	25.80	3,327.6	62.8	5.5	-62.6	1.13	0.73	7.60
3,428.0	7.30	14.00	3,422.8	73.9	9.5	-73.6	1.57	0.42	-12.29
3,523.0	8.40	13.80	3,517.0	86.5	12.6	-86.1	1.16	1.16	-0.21
3,619.0	10.40	19.80	3,611.7	101.4	17.3	-101.0	2.32	2.08	6.25
3,714.0	11.30	19.10	3,705.0	118.3	23.2	-117.7	0.96	0.95	-0.74
3,811.0	11.50	22.80	3,800.1	136.2	30.1	-135.4	0.78	0.21	3.81
3,906.0	9.50	19.20	3,893.5	152.3	36.3	-151.4	2.21	-2.11	-3.79
4,002.0	7.70	14.20	3,988.4	166.1	40.5	-165.0	2.03	-1.88	-5.21
4,097.0	8.50	20.10	4,082.4	178.8	44.5	-177.7	1.21	0.84	6.21
4,193.0	8.20	22.20	4,177.4	191.8	49.5	-190.6	0.45	-0.31	2.19
4,288.0	7.40	17.50	4,271.5	203.9	53.9	-202.6	1.08	-0.84	-4.95
4,383.0	7.20	24.00	4,365.8	215.2	58.2	-213.7	0.89	-0.21	6.84
4,479.0	6.30	19.10	4,461.1	225.7	62.3	-224.1	1.11	-0.94	-5.10
4,575.0	6.50	24.90	4,556.5	235.6	66.3	-233.9	0.70	0.21	6.04
4,671.0	8.70	26.30	4,651.7	247.0	71.8	-245.2	2.30	2.29	1.46
4,767.0	7.60	24.50	4,746.7	259.3	77.7	-257.4	1.18	-1.15	-1.88
4,863.0	7.30	31.40	4,841.9	270.3	83.5	-268.2	0.98	-0.31	7.19
4,958.0	7.40	30.50	4,936.1	280.7	89.8	-278.5	0.16	0.11	-0.95

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<b>Well:</b>	Lajco 17M-323	<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)	
5,054.0	6.20	29.10	5,031.4	290.6	95.4	-288.2	1.26	-1.25	-1.46	
5,150.0	4.20	24.70	5,127.0	298.3	99.4	-295.8	2.12	-2.08	-4.58	
5,246.0	3.00	21.40	5,222.8	303.8	101.8	-301.3	1.27	-1.25	-3.44	
5,342.0	1.80	16.60	5,318.7	307.6	103.1	-305.0	1.27	-1.25	-5.00	
5,438.0	1.10	351.70	5,414.7	310.0	103.4	-307.4	0.96	-0.73	-25.94	
5,534.0	0.70	14.00	5,510.7	311.4	103.4	-308.9	0.55	-0.42	23.23	
5,630.0	1.20	22.10	5,606.7	312.9	104.0	-310.4	0.54	0.52	8.44	
5,725.0	1.00	14.30	5,701.7	314.7	104.5	-312.1	0.26	-0.21	-8.21	
5,820.0	0.70	7.30	5,796.7	316.0	104.8	-313.4	0.33	-0.32	-7.37	
5,916.0	0.70	347.60	5,892.6	317.2	104.8	-314.6	0.25	0.00	-20.52	
6,011.0	0.50	329.50	5,987.6	318.1	104.4	-315.5	0.29	-0.21	-19.05	
6,107.0	0.50	325.10	6,083.6	318.8	104.0	-316.2	0.04	0.00	-4.58	
6,203.0	0.40	311.60	6,179.6	319.4	103.5	-316.8	0.15	-0.10	-14.06	
6,299.0	0.40	230.00	6,275.6	319.4	103.0	-316.8	0.54	0.00	-85.00	
6,394.0	8.00	180.40	6,370.3	312.6	102.7	-310.0	8.15	8.00	-52.21	
6,490.0	14.00	179.60	6,464.5	294.3	102.7	-291.7	6.25	6.25	-0.83	
6,586.0	22.70	176.90	6,555.5	264.1	103.8	-261.5	9.10	9.06	-2.81	
6,682.0	31.50	176.60	6,640.9	220.5	106.3	-217.9	9.17	9.17	-0.31	
6,778.0	35.50	182.50	6,721.0	167.6	106.6	-164.9	5.37	4.17	6.15	
6,874.0	40.30	181.00	6,796.7	108.6	104.8	-106.1	5.09	5.00	-1.56	
6,970.0	49.10	175.20	6,864.9	41.3	107.3	-38.7	10.10	9.17	-6.04	
7,065.0	59.50	174.30	6,920.3	-35.4	114.4	38.2	10.97	10.95	-0.95	
7,127.4	63.20	176.15	6,950.2	-90.0	118.9	92.8	6.47	5.93	2.97	
460'FNL & 2066'FEL										
7,161.0	65.20	177.10	6,964.8	-120.2	120.7	123.1	6.47	5.96	2.82	
7,257.0	70.80	177.80	7,000.8	-209.1	124.7	212.0	5.87	5.83	0.73	
7,353.0	77.90	178.70	7,026.6	-301.4	127.5	304.4	7.45	7.40	0.94	
7,449.0	85.60	181.10	7,040.4	-396.3	127.6	399.3	8.39	8.02	2.50	
7,539.1	89.82	181.94	7,044.0	-486.3	125.2	489.2	4.78	4.69	0.94	
Deepest TVD 7044.0'										
7,545.0	90.10	182.00	7,044.0	-492.2	125.0	495.1	4.78	4.69	0.94	
7,641.0	92.30	182.20	7,042.0	-588.1	121.5	590.9	2.30	2.29	0.21	
7,737.0	91.50	181.70	7,038.8	-684.0	118.2	686.7	0.98	-0.83	-0.52	
7,832.0	89.40	182.40	7,038.1	-778.9	114.8	781.5	2.33	-2.21	0.74	
7,928.0	91.20	180.80	7,037.6	-874.9	112.2	877.3	2.51	1.88	-1.67	
8,023.0	89.00	181.50	7,037.4	-969.9	110.3	972.2	2.43	-2.32	0.74	
8,119.0	91.20	181.30	7,037.2	-1,065.8	107.9	1,068.1	2.30	2.29	-0.21	
8,215.0	90.00	182.40	7,036.2	-1,161.8	104.8	1,164.0	1.70	-1.25	1.15	
8,311.0	91.30	181.50	7,035.1	-1,257.7	101.5	1,259.8	1.65	1.35	-0.94	
8,406.0	90.00	181.50	7,034.1	-1,352.7	99.1	1,354.7	1.37	-1.37	0.00	
8,503.0	89.70	181.10	7,034.3	-1,449.6	96.9	1,451.6	0.52	-0.31	-0.41	
8,598.0	90.00	179.70	7,034.6	-1,544.6	96.2	1,546.5	1.51	0.32	-1.47	
8,694.0	92.20	179.40	7,032.7	-1,640.6	97.0	1,642.5	2.31	2.29	-0.31	

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<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)	
8,790.0	89.90	179.00	7,031.0	-1,736.6	98.3	1,738.4	2.43	-2.40	-0.42	
8,886.0	89.10	179.00	7,031.8	-1,832.6	100.0	1,834.4	0.83	-0.83	0.00	
8,982.0	89.70	180.80	7,032.8	-1,928.6	100.1	1,930.4	1.98	0.63	1.88	
9,079.0	89.80	180.80	7,033.2	-2,025.5	98.8	2,027.3	0.10	0.10	0.00	
9,173.0	88.80	179.90	7,034.4	-2,119.5	98.2	2,121.3	1.43	-1.06	-0.96	
9,269.0	89.90	179.60	7,035.5	-2,215.5	98.6	2,217.3	1.19	1.15	-0.31	
9,365.0	90.10	179.00	7,035.5	-2,311.5	99.8	2,313.2	0.66	0.21	-0.63	
9,461.0	92.40	178.50	7,033.4	-2,407.5	101.9	2,409.2	2.45	2.40	-0.52	
9,557.0	91.90	177.80	7,029.8	-2,503.3	105.0	2,505.1	0.90	-0.52	-0.73	
9,652.0	91.90	179.20	7,026.6	-2,598.3	107.5	2,600.1	1.47	0.00	1.47	
9,778.0	90.90	178.90	7,023.5	-2,724.2	109.6	2,726.0	0.83	-0.79	-0.24	
9,874.0	91.70	179.70	7,021.4	-2,820.2	110.7	2,822.0	1.18	0.83	0.83	
9,969.0	91.70	180.10	7,018.5	-2,915.1	110.9	2,917.0	0.42	0.00	0.42	
10,065.0	90.40	179.90	7,016.8	-3,011.1	110.9	3,012.9	1.37	-1.35	-0.21	
10,161.0	90.00	179.90	7,016.4	-3,107.1	111.1	3,108.9	0.42	-0.42	0.00	
10,257.0	90.50	180.80	7,016.0	-3,203.1	110.5	3,204.8	1.07	0.52	0.94	
10,352.0	89.00	180.10	7,016.4	-3,298.1	109.7	3,299.8	1.74	-1.58	-0.74	
10,448.0	88.50	180.10	7,018.5	-3,394.1	109.6	3,395.7	0.52	-0.52	0.00	
10,544.0	89.90	179.60	7,019.9	-3,490.1	109.8	3,491.7	1.55	1.46	-0.52	
10,640.0	90.90	179.20	7,019.2	-3,586.1	110.8	3,587.7	1.12	1.04	-0.42	
10,735.0	90.60	179.00	7,018.0	-3,681.0	112.3	3,682.7	0.38	-0.32	-0.21	
10,830.0	90.30	179.70	7,017.2	-3,776.0	113.4	3,777.7	0.80	-0.32	0.74	
10,925.0	90.20	178.30	7,016.8	-3,871.0	115.1	3,872.7	1.48	-0.11	-1.47	
11,021.0	90.30	180.30	7,016.4	-3,967.0	116.2	3,968.6	2.09	0.10	2.08	
11,117.0	90.50	181.10	7,015.7	-4,063.0	115.1	4,064.6	0.86	0.21	0.83	
11,213.0	90.80	182.90	7,014.6	-4,158.9	111.7	4,160.4	1.90	0.31	1.88	
11,309.0	90.50	181.50	7,013.5	-4,254.8	108.0	4,256.2	1.49	-0.31	-1.46	
11,415.0	91.60	179.40	7,011.6	-4,360.8	107.2	4,362.1	2.24	1.04	-1.98	
11,465.0	91.60	179.40	7,010.2	-4,410.8	107.7	4,412.1	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
SHL 370'FNL & 2185'FE	0.00	0.00	1.0	0.0	0.0	1,359,680.30	3,163,456.07	40.319240	-104.913800	
- survey hits target center										
- Point										

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Lajco 17M-323
<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 17M-323	<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)	
7,127.4	6,950.2	-90.0	118.9	460'FNL & 2066'FEL
7,539.1	7,044.0	-486.3	125.2	Deepest TVD 7044.0'

Checked By: _____	Approved By: _____	Date: _____
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