

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Becker Ranch 5U-243**

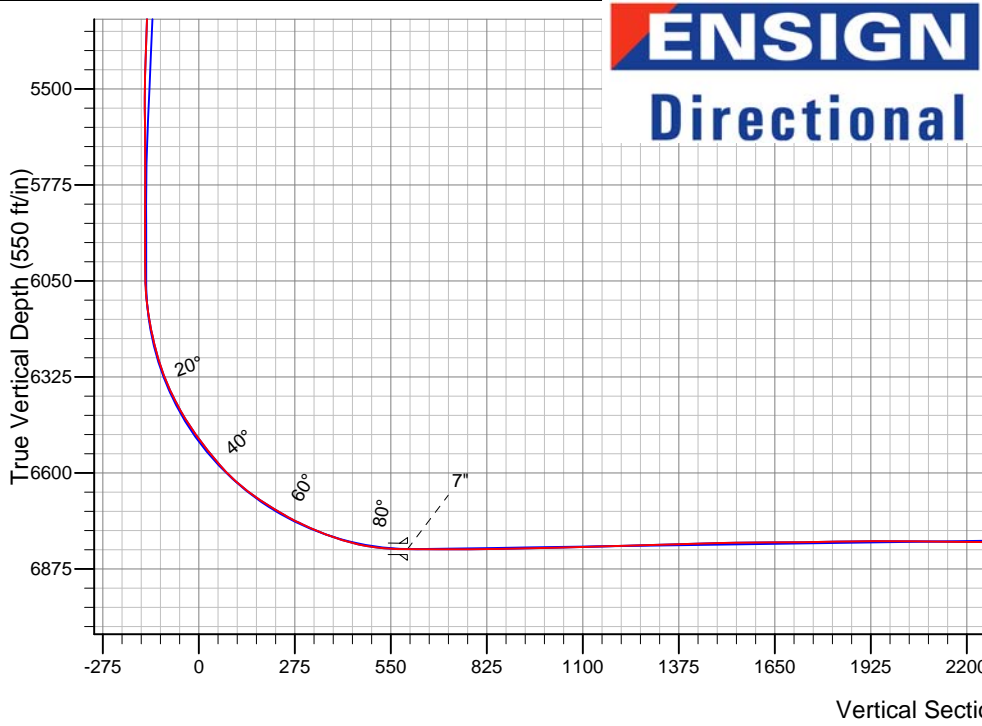
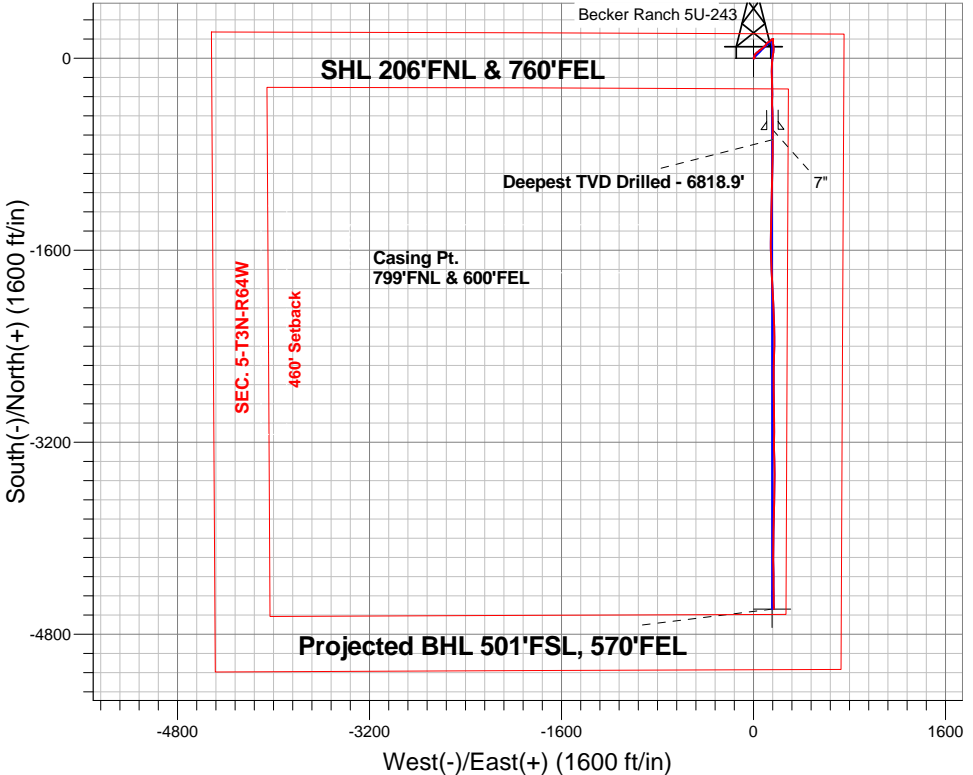
Surface Location: Becker Ranch 5RU-HZ Pad Sec.5-T3N-R64W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4784.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1339355.99	3260073.26	40.261180	-104.568090	
Ensign Rig #121 RKB - 13.5' WELL @ 4797 ft (Ensign Rig #121 RKB - 13')						

FINAL SURVEY

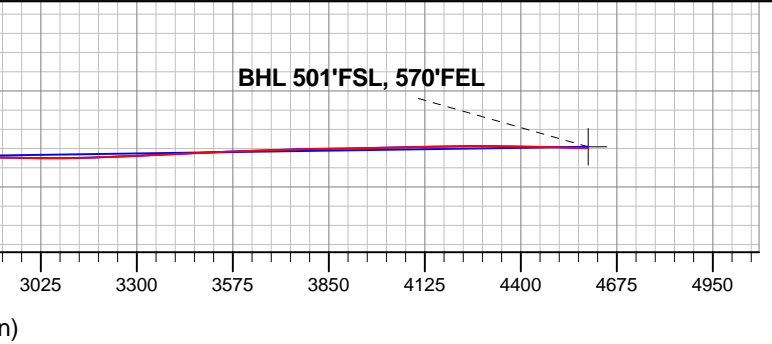
Projected Bottom Hole Location  
11244'MD 6764'TVD 4590'S & 170'E of SHL  
88.2 degree Incl @ 178.7 degree AZM



Becker Ranch 5RU-HZ Pad Sec.5-T3N-R64W Becker Ranch 5U-243 Wellbore #1	ANNOTATIONS		
	TVD	MD	Annotation
	6818.9	7330.0	Deepest TVD Drilled - 6818.9

LEGEND

- Becker Ranch 5U-243, Wellbore #1, Plan #2 (5-18-15)R V0
- Wellbore #1
- Survey #1





# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.5-T3N-R64W**

**Becker Ranch 5RU-HZ Pad Sec.5-T3N-R64W**

**Becker Ranch 5U-243**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**27 May, 2015**

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Becker Ranch 5U-243
<b>Project:</b>	SEC.5-T3N-R64W	<b>TVD Reference:</b>	WELL @ 4797.5ft (Ensign Rig #121 RKB - 13.5')
<b>Site:</b>	Becker Ranch 5RU-HZ Pad Sec.5-T3N-R64W	<b>MD Reference:</b>	WELL @ 4797.5ft (Ensign Rig #121 RKB - 13.5')
<b>Well:</b>	Becker Ranch 5U-243	<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.5-T3N-R64W, Weld County, CO		
<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	Becker Ranch 5RU-HZ Pad Sec.5-T3N-R64W				
Site Position:		Northing:	1,339,355.73ft	Latitude:	40.261180
From:	Lat/Long	Easting:	3,260,045.36ft	Longitude:	-104.568190
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.60 °

Well	Becker Ranch 5U-243					
Well Position	+N-S	0.0 ft	Northing:	1,339,355.99 ft	Latitude:	40.261180
	+E-W	0.0 ft	Easting:	3,260,073.26 ft	Longitude:	-104.568090
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,784.0 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	5/18/2015	8.22	66.83	52,666

<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	178.05	

<b>Survey Program</b>	<b>Date</b> 5/27/2015				
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
165.0	11,244.0	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	
1.0	0.00	88.90	1.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>SHL 206°FNL &amp; 760°FEL</b>										
165.0	0.20	88.90	165.0	0.0	0.3	0.0	0.12	0.12	0.00	
259.0	0.20	94.90	259.0	0.0	0.6	0.0	0.02	0.00	6.38	
353.0	0.40	217.00	353.0	-0.3	0.6	0.3	0.57	0.21	129.89	
446.0	0.10	227.90	446.0	-0.6	0.3	0.6	0.33	-0.32	11.72	
539.0	0.30	217.20	539.0	-0.8	0.1	0.8	0.22	0.22	-11.51	
633.0	0.20	167.50	633.0	-1.2	0.0	1.2	0.24	-0.11	-52.87	
726.0	0.40	104.50	726.0	-1.4	0.4	1.5	0.38	0.22	-67.74	
820.0	0.60	72.70	820.0	-1.4	1.1	1.4	0.36	0.21	-33.83	
885.0	0.80	91.50	885.0	-1.3	1.9	1.4	0.46	0.31	28.92	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Becker Ranch 5U-243
<b>Project:</b>	SEC.5-T3N-R64W	<b>TVD Reference:</b>	WELL @ 4797.5ft (Ensign Rig #121 RKB - 13.5')
<b>Site:</b>	Becker Ranch 5RU-HZ Pad Sec.5-T3N-R64W	<b>MD Reference:</b>	WELL @ 4797.5ft (Ensign Rig #121 RKB - 13.5')
<b>Well:</b>	Becker Ranch 5U-243	<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)
1,006.0	1.40	73.40	1,006.0	-0.9	4.2	1.0	0.57	0.50	-14.96
1,100.0	1.40	81.90	1,099.9	-0.4	6.4	0.6	0.22	0.00	9.04
1,193.0	1.30	98.40	1,192.9	-0.4	8.6	0.7	0.43	-0.11	17.74
1,286.0	1.30	359.60	1,285.9	0.5	9.6	-0.2	2.12	0.00	-106.24
1,379.0	0.90	46.70	1,378.9	2.1	10.1	-1.7	1.02	-0.43	50.65
1,564.0	1.20	354.50	1,563.9	5.0	11.0	-4.6	0.52	0.16	-28.22
1,658.0	1.50	351.50	1,657.8	7.2	10.7	-6.8	0.33	0.32	-3.19
1,751.0	1.10	343.10	1,750.8	9.2	10.3	-8.9	0.48	-0.43	-9.03
1,844.0	1.20	315.70	1,843.8	10.8	9.4	-10.5	0.59	0.11	-29.46
1,937.0	1.10	296.90	1,936.8	11.9	7.9	-11.6	0.42	-0.11	-20.22
2,034.0	0.60	352.90	2,033.8	12.8	7.0	-12.6	0.94	-0.52	57.73
2,130.0	2.50	359.40	2,129.7	15.4	6.9	-15.2	1.98	1.98	6.77
2,225.0	3.30	11.70	2,224.6	20.2	7.4	-19.9	1.06	0.84	12.95
2,320.0	3.30	34.80	2,319.4	25.1	9.6	-24.7	1.39	0.00	24.32
2,416.0	3.20	21.20	2,415.3	29.9	12.1	-29.4	0.81	-0.10	-14.17
2,511.0	3.80	50.20	2,510.1	34.3	15.5	-33.8	1.94	0.63	30.53
2,607.0	3.80	40.90	2,605.9	38.8	20.0	-38.1	0.64	0.00	-9.69
2,702.0	4.00	38.10	2,700.7	43.8	24.1	-42.9	0.29	0.21	-2.95
2,797.0	4.20	60.80	2,795.5	48.1	29.2	-47.1	1.71	0.21	23.89
2,893.0	4.30	55.50	2,891.2	51.8	35.2	-50.6	0.42	0.10	-5.52
2,988.0	4.20	50.10	2,985.9	56.1	40.8	-54.7	0.43	-0.11	-5.68
3,083.0	3.80	43.70	3,080.7	60.6	45.7	-59.0	0.63	-0.42	-6.74
3,179.0	3.50	35.10	3,176.5	65.3	49.6	-63.6	0.65	-0.31	-8.96
3,274.0	3.70	63.60	3,271.3	69.0	54.0	-67.1	1.88	0.21	30.00
3,370.0	3.00	64.30	3,367.2	71.5	59.0	-69.4	0.73	-0.73	0.73
3,465.0	2.90	55.00	3,462.0	73.9	63.2	-71.7	0.51	-0.11	-9.79
3,561.0	4.70	42.10	3,557.8	78.3	67.8	-75.9	2.06	1.88	-13.44
3,656.0	4.30	37.60	3,652.5	84.0	72.6	-81.4	0.56	-0.42	-4.74
3,751.0	4.30	57.60	3,747.3	88.7	77.8	-86.0	1.57	0.00	21.05
3,847.0	4.00	53.00	3,843.0	92.6	83.5	-89.7	0.47	-0.31	-4.79
3,942.0	3.90	52.00	3,937.8	96.6	88.7	-93.5	0.13	-0.11	-1.05
4,038.0	3.40	47.90	4,033.6	100.5	93.4	-97.3	0.59	-0.52	-4.27
4,133.0	2.90	41.40	4,128.4	104.2	97.1	-100.9	0.65	-0.53	-6.84
4,228.0	4.10	37.00	4,223.3	108.7	100.7	-105.3	1.29	1.26	-4.63
4,323.0	3.90	24.90	4,318.0	114.4	104.1	-110.8	0.91	-0.21	-12.74
4,419.0	4.00	38.60	4,413.8	120.0	107.6	-116.2	0.99	0.10	14.27
4,514.0	3.60	46.70	4,508.6	124.6	111.8	-120.7	0.70	-0.42	8.53
4,609.0	4.60	47.90	4,603.4	129.2	116.8	-125.1	1.06	1.05	1.26
4,705.0	4.10	63.40	4,699.1	133.3	122.7	-129.1	1.33	-0.52	16.15
4,800.0	3.30	61.30	4,793.9	136.2	128.2	-131.7	0.85	-0.84	-2.21
4,896.0	2.90	58.30	4,889.7	138.8	132.7	-134.2	0.45	-0.42	-3.13
4,991.0	3.50	50.20	4,984.6	141.9	136.9	-137.1	0.79	0.63	-8.53
5,087.0	3.30	47.20	5,080.4	145.6	141.2	-140.7	0.28	-0.21	-3.13
5,182.0	3.40	47.80	5,175.3	149.4	145.3	-144.3	0.11	0.11	0.63
5,278.0	3.30	51.50	5,271.1	153.0	149.6	-147.8	0.25	-0.10	3.85
5,373.0	3.10	55.20	5,366.0	156.2	153.8	-150.9	0.30	-0.21	3.89
5,468.0	2.50	41.30	5,460.8	159.2	157.3	-153.8	0.95	-0.63	-14.63
5,564.0	0.80	122.50	5,556.8	160.4	159.3	-154.9	2.61	-1.77	84.58
5,659.0	0.80	121.80	5,651.8	159.7	160.4	-154.2	0.01	0.00	-0.74
5,754.0	0.80	115.10	5,746.8	159.1	161.5	-153.5	0.10	0.00	-7.05
5,850.0	0.30	12.40	5,842.8	159.0	162.2	-153.4	0.95	-0.52	-106.98
5,945.0	0.40	24.70	5,937.8	159.6	162.4	-154.0	0.13	0.11	12.95
6,040.0	0.70	152.40	6,032.8	159.4	162.8	-153.7	1.05	0.32	134.42
6,087.0	4.00	175.40	6,079.7	157.5	163.1	-151.8	7.16	7.02	48.94

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<b>Well:</b>	Becker Ranch 5U-243	<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)
6,136.0	8.00	176.40	6,128.5	152.4	163.4	-146.7	8.17	8.16	2.04
6,183.0	10.20	179.60	6,174.9	144.9	163.7	-139.3	4.80	4.68	6.81
6,231.0	12.90	179.30	6,221.9	135.3	163.7	-129.7	5.63	5.63	-0.63
6,278.0	16.20	178.20	6,267.4	123.5	164.0	-117.9	7.05	7.02	-2.34
6,326.0	20.10	174.00	6,313.0	108.6	165.1	-102.9	8.57	8.13	-8.75
6,373.0	24.10	175.60	6,356.5	91.0	166.7	-85.3	8.61	8.51	3.40
6,422.0	28.00	182.40	6,400.5	69.5	167.0	-63.8	10.01	7.96	13.88
6,469.0	31.40	186.30	6,441.4	46.3	165.2	-40.7	8.32	7.23	8.30
6,517.0	34.90	187.90	6,481.5	20.3	161.9	-14.8	7.52	7.29	3.33
6,564.0	38.00	188.00	6,519.3	-7.3	158.0	12.7	6.60	6.60	0.21
6,612.0	39.90	184.40	6,556.7	-37.3	154.8	42.6	6.15	3.96	-7.50
6,659.0	42.70	181.70	6,592.0	-68.3	153.2	73.5	7.06	5.96	-5.74
6,708.0	48.30	178.00	6,626.3	-103.2	153.3	108.4	12.63	11.43	-7.55
6,755.0	53.20	178.40	6,656.1	-139.6	154.4	144.8	10.45	10.43	0.85
6,803.0	57.10	179.60	6,683.5	-179.0	155.1	184.1	8.38	8.13	2.50
6,850.0	59.10	180.10	6,708.3	-218.9	155.2	224.0	4.35	4.26	1.06
6,898.0	62.10	180.00	6,731.9	-260.7	155.2	265.8	6.25	6.25	-0.21
6,945.0	65.50	179.60	6,752.6	-302.8	155.3	308.0	7.27	7.23	-0.85
6,994.0	68.40	179.80	6,771.8	-347.9	155.6	353.0	5.93	5.92	0.41
7,041.0	71.40	178.60	6,788.0	-392.1	156.2	397.1	6.82	6.38	-2.55
7,089.0	75.90	178.90	6,801.5	-438.1	157.2	443.2	9.39	9.38	0.63
7,136.0	81.30	178.90	6,810.8	-484.1	158.1	489.2	11.49	11.49	0.00
7,234.0	89.70	179.40	6,818.4	-581.7	159.5	586.8	8.59	8.57	0.51
7,245.0	89.71	179.45	6,818.5	-592.7	159.6	597.8	0.43	0.10	0.42
<b>7"</b>									
7,330.0	89.80	179.80	6,818.9	-677.7	160.2	682.8	0.43	0.10	0.42
<b>Deepest TVD Drilled - 6818.9'</b>									
7,425.0	90.50	180.70	6,818.6	-772.7	159.8	777.7	1.20	0.74	0.95
7,521.0	91.00	180.70	6,817.3	-868.7	158.6	873.6	0.52	0.52	0.00
7,616.0	91.40	181.40	6,815.4	-963.7	156.9	968.5	0.85	0.42	0.74
7,711.0	91.30	181.20	6,813.1	-1,058.6	154.7	1,063.3	0.24	-0.11	-0.21
7,807.0	91.50	181.40	6,810.8	-1,154.6	152.5	1,159.1	0.29	0.21	0.21
7,902.0	91.80	181.50	6,808.0	-1,249.5	150.1	1,253.9	0.33	0.32	0.11
7,998.0	91.70	181.40	6,805.1	-1,345.4	147.7	1,349.7	0.15	-0.10	-0.10
8,093.0	91.90	181.00	6,802.1	-1,440.4	145.7	1,444.5	0.47	0.21	-0.42
8,189.0	90.60	180.10	6,800.0	-1,536.3	144.8	1,540.4	1.65	-1.35	-0.94
8,284.0	90.40	178.70	6,799.2	-1,631.3	145.8	1,635.3	1.49	-0.21	-1.47
8,380.0	90.70	177.10	6,798.3	-1,727.2	149.3	1,731.3	1.70	0.31	-1.67
8,475.0	91.10	176.80	6,796.8	-1,822.1	154.4	1,826.3	0.53	0.42	-0.32
8,570.0	90.00	177.10	6,795.9	-1,917.0	159.4	1,921.3	1.20	-1.16	0.32
8,665.0	90.10	178.00	6,795.8	-2,011.9	163.5	2,016.3	0.95	0.11	0.95
8,760.0	89.20	177.70	6,796.4	-2,106.8	167.0	2,111.3	1.00	-0.95	-0.32
8,856.0	89.20	177.50	6,797.7	-2,202.7	171.1	2,207.3	0.21	0.00	-0.21
8,951.0	90.10	179.10	6,798.3	-2,297.7	173.9	2,302.2	1.93	0.95	1.68
9,047.0	92.20	181.70	6,796.4	-2,393.6	173.2	2,398.1	3.48	2.19	2.71
9,142.0	92.20	180.70	6,792.7	-2,488.5	171.2	2,492.9	1.05	0.00	-1.05
9,237.0	91.90	180.80	6,789.3	-2,583.5	170.0	2,587.8	0.33	-0.32	0.11
9,333.0	90.30	180.80	6,787.5	-2,679.4	168.6	2,683.6	1.67	-1.67	0.00
9,428.0	88.90	179.60	6,788.1	-2,774.4	168.3	2,778.6	1.94	-1.47	-1.26
9,524.0	88.70	179.10	6,790.2	-2,870.4	169.4	2,874.5	0.56	-0.21	-0.52
9,619.0	89.10	178.90	6,792.0	-2,965.4	171.1	2,969.5	0.47	0.42	-0.21
9,714.0	90.10	179.40	6,792.6	-3,060.4	172.5	3,064.5	1.18	1.05	0.53
9,810.0	91.70	180.70	6,791.1	-3,156.3	172.4	3,160.4	2.15	1.67	1.35

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Becker Ranch 5U-243
<b>Project:</b>	SEC.5-T3N-R64W	<b>TVD Reference:</b>	WELL @ 4797.5ft (Ensign Rig #121 RKB - 13.5')
<b>Site:</b>	Becker Ranch 5RU-HZ Pad Sec.5-T3N-R64W	<b>MD Reference:</b>	WELL @ 4797.5ft (Ensign Rig #121 RKB - 13.5')
<b>Well:</b>	Becker Ranch 5U-243	<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)
9,905.0	92.20	179.40	6,787.9	-3,251.3	172.3	3,255.3	1.47	0.53	-1.37
10,001.0	92.80	179.40	6,783.7	-3,347.2	173.3	3,351.1	0.63	0.63	0.00
10,096.0	92.70	179.60	6,779.2	-3,442.1	174.1	3,446.0	0.24	-0.11	0.21
10,191.0	92.50	179.40	6,774.8	-3,537.0	175.0	3,540.9	0.30	-0.21	-0.21
10,287.0	91.60	181.50	6,771.4	-3,632.9	174.2	3,636.7	2.38	-0.94	2.19
10,383.0	92.30	181.90	6,768.1	-3,728.8	171.4	3,732.5	0.84	0.73	0.42
10,478.0	91.10	181.70	6,765.3	-3,823.7	168.4	3,827.2	1.28	-1.26	-0.21
10,574.0	90.20	181.00	6,764.2	-3,919.7	166.1	3,923.1	1.19	-0.94	-0.73
10,669.0	91.10	180.00	6,763.2	-4,014.7	165.3	4,018.0	1.42	0.95	-1.05
10,765.0	91.80	179.80	6,760.7	-4,110.6	165.5	4,113.9	0.76	0.73	-0.21
10,860.0	90.80	179.30	6,758.6	-4,205.6	166.2	4,208.8	1.18	-1.05	-0.53
10,955.0	89.70	179.60	6,758.2	-4,300.6	167.1	4,303.8	1.20	-1.16	0.32
11,050.0	89.10	180.00	6,759.2	-4,395.6	167.4	4,398.7	0.76	-0.63	0.42
11,146.0	88.70	179.30	6,761.0	-4,491.6	168.0	4,494.7	0.84	-0.42	-0.73
11,189.0	88.20	178.70	6,762.2	-4,534.5	168.8	4,537.7	1.82	-1.16	-1.40
11,244.0	88.20	178.70	6,763.9	-4,589.5	170.0	4,592.6	0.00	0.00	0.00
BHL 500'FSL, 584'FEL									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,245.0	6,818.5	7"	7	7-1/2

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
7,330.0	6,818.9	-677.7	160.2	Deepest TVD Drilled - 6818.9'

Checked By: _____	Approved By: _____	Date: _____
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