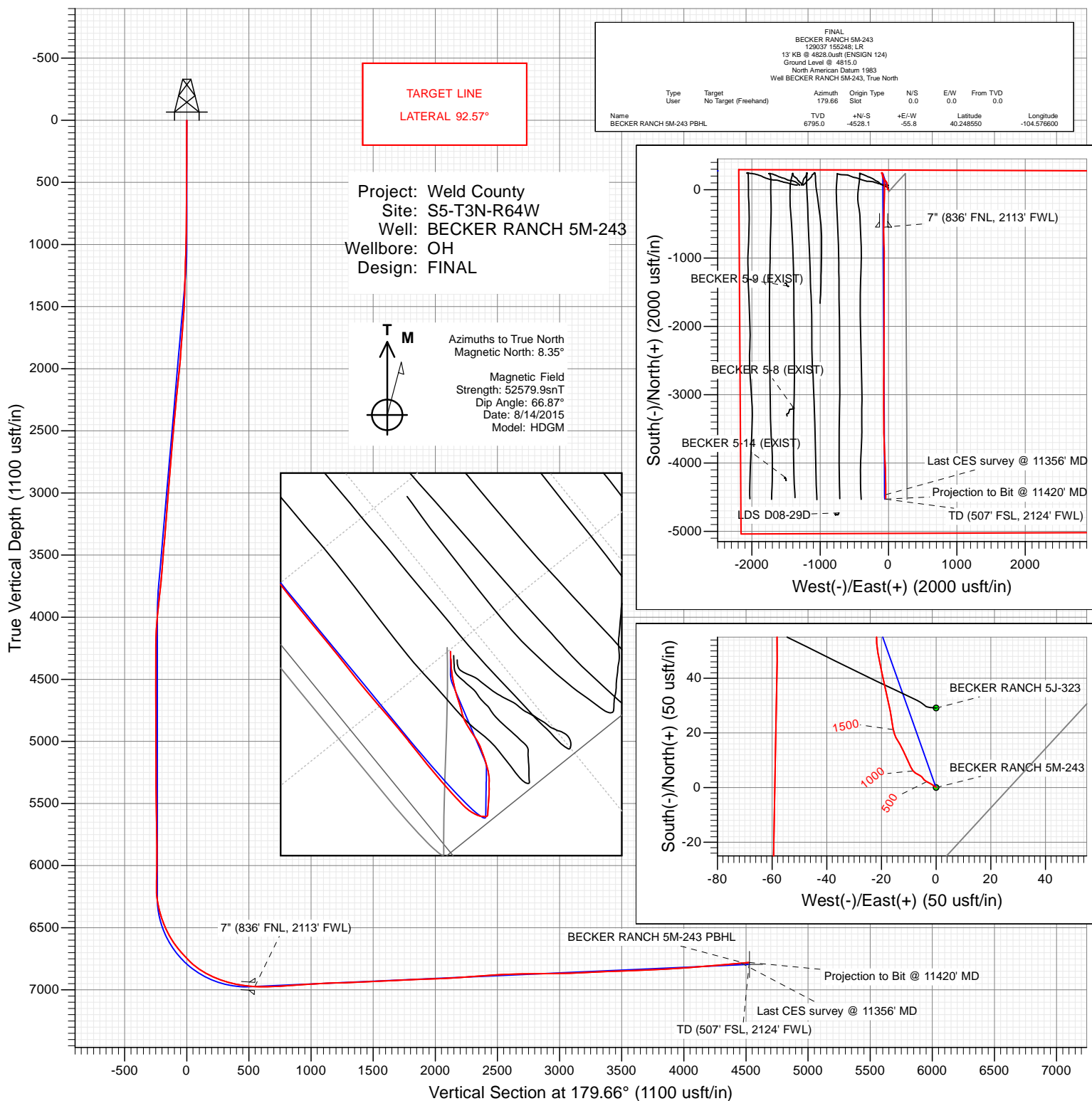




Petroleum Development Corporation



WELL DETAILS: BECKER RANCH 5M-243

Ground Level: 4815.0  
+N/-S: 0.0 +E/-W: 0.0 Northing: 1339258.90 Easting: 3257754.99 Latitude: 40.260980 Longitude: -104.576400



## Survey Report

<b>Company:</b>	Petroleum Development Corp.	<b>Local Co-ordinate Reference:</b>	Well BECKER RANCH 5M-243
<b>Project:</b>	Weld County	<b>TVD Reference:</b>	13' KB @ 4828.0usft (ENSIGN 124)
<b>Site:</b>	S5-T3N-R64W	<b>MD Reference:</b>	13' KB @ 4828.0usft (ENSIGN 124)
<b>Well:</b>	BECKER RANCH 5M-243	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

<b>Project</b>	Weld County		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		S5-T3N-R64W			
Site Position:		Northing:	1,339,314.55 usft	Latitude:	40.261170
From:	Lat/Long	Easting:	3,256,448.24 usft	Longitude:	-104.581080
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.59 °

Well	BECKER RANCH 5M-243					
Well Position	+N/-S	0.0 usft	Northing:	1,339,258.90 usft	Latitude:	40.260980
	+E/-W	0.0 usft	Easting:	3,257,754.99 usft	Longitude:	-104.576400
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,815.0 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	8/14/2015	8.35	66.87	52,580

<b>Design</b>	FINAL				
<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	179.66	

<b>Survey Program</b>	<b>Date</b>	9/22/2015			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
158.0	11,420.0	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HDGM	

<b>Survey</b>									
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usf)</b>	<b>Build Rate (°/100u)</b>	<b>Formations / Comments</b>
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
158.0	0.30	319.60	158.0	0.3	-0.3	-0.3	0.19	0.19	
250.0	0.60	296.30	250.0	0.7	-0.9	-0.7	0.38	0.33	
342.0	0.70	305.80	342.0	1.3	-1.7	-1.3	0.16	0.11	
434.0	0.70	295.00	434.0	1.8	-2.7	-1.8	0.14	0.00	
527.0	0.60	304.00	527.0	2.3	-3.6	-2.4	0.15	-0.11	
619.0	0.50	307.00	619.0	2.8	-4.3	-2.9	0.11	-0.11	
712.0	0.40	341.80	712.0	3.4	-4.8	-3.4	0.31	-0.11	
804.0	0.60	305.60	804.0	4.0	-5.3	-4.0	0.40	0.22	
861.0	1.00	304.10	861.0	4.4	-5.9	-4.5	0.70	0.70	
955.0	1.30	296.80	954.9	5.4	-7.6	-5.4	0.35	0.32	
1,050.0	2.20	335.80	1,049.9	7.5	-9.3	-7.6	1.52	0.95	
1,142.0	1.90	335.70	1,141.8	10.5	-10.6	-10.6	0.33	-0.33	

## Survey Report

<b>Company:</b>	Petroleum Development Corp.	<b>Local Co-ordinate Reference:</b>	Well BECKER RANCH 5M-243
<b>Project:</b>	Weld County	<b>TVD Reference:</b>	13' KB @ 4828.0usft (ENSIGN 124)
<b>Site:</b>	S5-T3N-R64W	<b>MD Reference:</b>	13' KB @ 4828.0usft (ENSIGN 124)
<b>Well:</b>	BECKER RANCH 5M-243	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,235.0	1.90	334.30	1,234.8	13.3	-11.9	-13.4	0.05	0.00	
1,327.0	1.80	330.10	1,326.7	15.9	-13.3	-16.0	0.18	-0.11	
1,419.0	1.60	328.50	1,418.7	18.3	-14.7	-18.4	0.22	-0.22	
1,511.0	3.00	350.60	1,510.6	21.8	-15.8	-21.9	1.77	1.52	
1,604.0	4.80	350.50	1,603.4	28.0	-16.8	-28.1	1.94	1.94	
1,696.0	4.50	345.90	1,695.1	35.3	-18.3	-35.4	0.52	-0.33	
1,788.0	4.50	348.90	1,786.8	42.3	-19.9	-42.5	0.26	0.00	
1,880.0	4.20	348.40	1,878.6	49.2	-21.3	-49.3	0.33	-0.33	
1,972.0	5.80	1.70	1,970.2	57.1	-21.8	-57.3	2.14	1.74	
2,065.0	5.10	355.50	2,062.8	65.9	-22.0	-66.1	0.98	-0.75	
2,157.0	6.00	6.00	2,154.4	74.8	-21.8	-74.9	1.47	0.98	
2,249.0	5.20	1.80	2,245.9	83.8	-21.2	-83.9	0.98	-0.87	
2,342.0	6.20	347.70	2,338.5	92.9	-22.1	-93.0	1.84	1.08	
2,434.0	5.10	342.00	2,430.0	101.6	-24.4	-101.8	1.34	-1.20	
2,526.0	6.90	328.50	2,521.5	110.2	-28.6	-110.4	2.47	1.96	
2,619.0	6.10	323.40	2,613.9	119.0	-34.4	-119.2	1.06	-0.86	
2,711.0	5.60	322.10	2,705.4	126.4	-40.1	-126.7	0.56	-0.54	
2,803.0	5.50	321.10	2,797.0	133.4	-45.6	-133.7	0.15	-0.11	
2,894.0	5.20	320.20	2,887.6	140.0	-51.0	-140.3	0.34	-0.33	
2,990.0	7.00	320.40	2,983.1	147.8	-57.5	-148.1	1.88	1.88	
3,085.0	5.70	309.40	3,077.5	155.3	-64.9	-155.6	1.87	-1.37	
3,180.0	5.10	312.40	3,172.0	161.1	-71.6	-161.5	0.70	-0.63	
3,276.0	5.80	342.30	3,267.6	168.6	-76.3	-169.1	3.01	0.73	
3,371.0	5.50	342.30	3,362.2	177.5	-79.1	-178.0	0.32	-0.32	
3,467.0	4.90	336.00	3,457.8	185.6	-82.2	-186.1	0.86	-0.63	
3,562.0	5.20	350.10	3,552.4	193.6	-84.6	-194.1	1.34	0.32	
3,658.0	4.40	344.80	3,648.1	201.4	-86.3	-201.9	0.95	-0.83	
3,753.0	6.00	358.60	3,742.7	209.9	-87.3	-210.4	2.13	1.68	
3,849.0	6.20	356.00	3,838.1	220.1	-87.8	-220.6	0.36	0.21	
3,944.0	6.00	354.60	3,932.6	230.2	-88.7	-230.7	0.26	-0.21	
4,039.0	5.20	350.00	4,027.1	239.3	-89.9	-239.9	0.96	-0.84	
4,135.0	2.60	6.30	4,122.9	245.8	-90.4	-246.3	2.92	-2.71	
4,230.0	0.70	327.70	4,217.9	248.4	-90.5	-249.0	2.21	-2.00	
4,326.0	1.10	282.70	4,313.9	249.1	-91.7	-249.7	0.81	0.42	
4,421.0	1.30	270.90	4,408.8	249.3	-93.6	-249.9	0.33	0.21	
4,517.0	1.30	271.80	4,504.8	249.4	-95.8	-250.0	0.02	0.00	
4,612.0	0.50	133.00	4,599.8	249.1	-96.6	-249.7	1.80	-0.84	
4,707.0	0.30	197.30	4,694.8	248.6	-96.4	-249.2	0.48	-0.21	
4,803.0	0.20	234.50	4,790.8	248.3	-96.6	-248.9	0.19	-0.10	
4,898.0	0.90	251.50	4,885.8	247.9	-97.4	-248.5	0.75	0.74	
4,994.0	0.70	257.30	4,981.8	247.6	-98.7	-248.2	0.22	-0.21	
5,089.0	0.40	145.50	5,076.8	247.2	-99.1	-247.8	0.98	-0.32	
5,185.0	0.20	221.70	5,172.8	246.8	-99.0	-247.4	0.42	-0.21	
5,280.0	0.40	273.70	5,267.8	246.7	-99.4	-247.3	0.34	0.21	
5,375.0	0.90	124.30	5,362.8	246.3	-99.2	-246.9	1.33	0.53	
5,471.0	0.80	166.40	5,458.8	245.2	-98.4	-245.8	0.64	-0.10	
5,566.0	0.80	217.20	5,553.8	244.0	-98.6	-244.6	0.72	0.00	
5,662.0	1.20	230.20	5,649.8	242.9	-99.8	-243.4	0.48	0.42	
5,757.0	1.00	144.70	5,744.7	241.5	-100.1	-242.1	1.58	-0.21	
5,853.0	0.80	172.40	5,840.7	240.2	-99.5	-240.8	0.49	-0.21	
5,948.0	1.30	57.90	5,935.7	240.1	-98.5	-240.7	1.88	0.53	
6,043.0	1.80	60.60	6,030.7	241.4	-96.3	-242.0	0.53	0.53	
6,139.0	1.20	33.70	6,126.7	243.0	-94.4	-243.5	0.95	-0.63	

## Survey Report

<b>Company:</b>	Petroleum Development Corp.	<b>Local Co-ordinate Reference:</b>	Well BECKER RANCH 5M-243
<b>Project:</b>	Weld County	<b>TVD Reference:</b>	13' KB @ 4828.0usft (ENSIGN 124)
<b>Site:</b>	S5-T3N-R64W	<b>MD Reference:</b>	13' KB @ 4828.0usft (ENSIGN 124)
<b>Well:</b>	BECKER RANCH 5M-243	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
6,186.0	0.80	38.20	6,173.6	243.7	-94.0	-244.2	0.87	-0.85	
6,234.0	3.70	138.30	6,221.6	242.8	-92.7	-243.3	8.17	6.04	
6,281.0	8.00	162.20	6,268.4	238.5	-90.7	-239.0	10.33	9.15	
6,330.0	12.90	164.40	6,316.5	230.0	-88.2	-230.5	10.03	10.00	
6,377.0	15.60	161.20	6,362.1	219.0	-84.7	-219.5	5.98	5.74	
6,425.0	17.80	159.80	6,408.1	206.0	-80.1	-206.4	4.66	4.58	
6,472.0	20.70	163.50	6,452.4	191.2	-75.3	-191.7	6.69	6.17	
6,520.0	24.20	168.00	6,496.8	173.5	-70.8	-173.9	8.12	7.29	
6,567.0	27.10	170.10	6,539.1	153.5	-67.0	-153.9	6.47	6.17	
6,616.0	30.70	171.10	6,582.0	130.1	-63.1	-130.5	7.41	7.35	
6,663.0	34.50	174.60	6,621.6	105.0	-60.0	-105.4	9.02	8.09	
6,711.0	38.50	178.20	6,660.2	76.6	-58.3	-76.9	9.45	8.33	
6,758.0	41.80	181.10	6,696.1	46.3	-58.1	-46.6	8.07	7.02	
6,807.0	43.30	181.20	6,732.2	13.1	-58.8	-13.5	3.06	3.06	
6,854.0	44.80	180.70	6,766.0	-19.5	-59.3	19.2	3.28	3.19	
6,902.0	49.30	181.10	6,798.7	-54.7	-59.9	54.3	9.39	9.38	
6,949.0	54.30	180.50	6,827.8	-91.6	-60.4	91.2	10.69	10.64	
6,997.0	59.40	181.60	6,854.0	-131.7	-61.1	131.4	10.80	10.63	
7,044.0	62.90	181.60	6,876.7	-172.9	-62.3	172.5	7.45	7.45	
7,093.0	67.00	180.70	6,897.4	-217.3	-63.2	216.9	8.53	8.37	
7,140.0	69.70	181.10	6,914.8	-260.9	-63.9	260.6	5.80	5.74	
7,188.0	71.30	181.50	6,930.8	-306.2	-64.9	305.8	3.42	3.33	
7,235.0	74.90	182.20	6,944.4	-351.1	-66.3	350.7	7.79	7.66	
7,283.0	79.30	182.20	6,955.2	-397.9	-68.1	397.4	9.17	9.17	
7,330.0	82.00	181.20	6,962.8	-444.2	-69.5	443.8	6.12	5.74	
7,379.0	83.70	181.10	6,968.9	-492.8	-70.5	492.4	3.48	3.47	
7,389.0	84.10	180.60	6,970.0	-502.8	-70.6	502.3	6.38	4.00	
7,490.0	89.30	180.00	6,975.8	-603.5	-71.2	603.1	5.18	5.15	
7,586.0	93.60	178.60	6,973.3	-699.5	-70.0	699.1	4.71	4.48	
7,681.0	93.00	177.50	6,967.9	-794.3	-66.8	793.9	1.32	-0.63	
7,777.0	94.40	179.00	6,961.7	-890.0	-63.8	889.6	2.13	1.46	
7,872.0	93.20	180.40	6,955.4	-984.8	-63.3	984.4	1.94	-1.26	
7,967.0	94.00	181.10	6,949.4	-1,079.6	-64.6	1,079.2	1.12	0.84	
8,063.0	91.10	180.40	6,945.1	-1,175.5	-65.8	1,175.1	3.11	-3.02	
8,158.0	91.50	179.60	6,943.0	-1,270.5	-65.8	1,270.1	0.94	0.42	
8,254.0	92.30	179.60	6,939.8	-1,366.4	-65.2	1,366.0	0.83	0.83	
8,349.0	93.40	179.20	6,935.1	-1,461.3	-64.2	1,460.9	1.23	1.16	
8,445.0	93.10	180.00	6,929.6	-1,557.1	-63.5	1,556.7	0.89	-0.31	
8,540.0	92.20	181.10	6,925.2	-1,652.0	-64.4	1,651.6	1.50	-0.95	
8,635.0	92.30	180.70	6,921.5	-1,746.9	-65.9	1,746.5	0.43	0.11	
8,731.0	92.30	180.40	6,917.7	-1,842.9	-66.8	1,842.4	0.31	0.00	
8,826.0	92.40	179.70	6,913.8	-1,937.8	-66.9	1,937.3	0.74	0.11	
8,922.0	92.50	179.80	6,909.7	-2,033.7	-66.5	2,033.3	0.15	0.10	
9,017.0	93.30	179.60	6,904.9	-2,128.6	-66.0	2,128.1	0.87	0.84	
9,113.0	94.00	179.50	6,898.7	-2,224.4	-65.2	2,223.9	0.74	0.73	
9,208.0	94.20	179.70	6,892.0	-2,319.1	-64.6	2,318.7	0.30	0.21	
9,304.0	94.00	180.20	6,885.1	-2,414.9	-64.5	2,414.4	0.56	-0.21	
9,399.0	94.10	180.40	6,878.4	-2,509.6	-65.0	2,509.2	0.23	0.11	
9,494.0	91.20	181.00	6,874.0	-2,604.5	-66.1	2,604.1	3.12	-3.05	
9,590.0	91.30	180.40	6,871.9	-2,700.5	-67.3	2,700.0	0.63	0.10	
9,685.0	90.90	180.80	6,870.1	-2,795.5	-68.3	2,795.0	0.60	-0.42	
9,781.0	89.80	180.60	6,869.5	-2,891.4	-69.5	2,891.0	1.16	-1.15	
9,876.0	91.30	179.30	6,868.6	-2,986.4	-69.4	2,986.0	2.09	1.58	

## Survey Report

<b>Company:</b>	Petroleum Development Corp.	<b>Local Co-ordinate Reference:</b>	Well BECKER RANCH 5M-243
<b>Project:</b>	Weld County	<b>TVD Reference:</b>	13' KB @ 4828.0usft (ENSIGN 124)
<b>Site:</b>	S5-T3N-R64W	<b>MD Reference:</b>	13' KB @ 4828.0usft (ENSIGN 124)
<b>Well:</b>	BECKER RANCH 5M-243	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
9,971.0	91.50	179.90	6,866.3	-3,081.4	-68.7	3,080.9	0.67	0.21	
10,067.0	93.10	179.60	6,862.4	-3,177.3	-68.3	3,176.9	1.70	1.67	
10,162.0	92.70	180.30	6,857.6	-3,272.2	-68.2	3,271.7	0.85	-0.42	
10,258.0	92.20	180.10	6,853.5	-3,368.1	-68.6	3,367.6	0.56	-0.52	
10,353.0	91.50	179.20	6,850.4	-3,463.1	-68.0	3,462.6	1.20	-0.74	
10,449.0	92.70	179.00	6,846.9	-3,559.0	-66.5	3,558.5	1.27	1.25	
10,544.0	92.60	178.40	6,842.5	-3,653.9	-64.3	3,653.4	0.64	-0.11	
10,639.0	92.80	177.90	6,838.0	-3,748.7	-61.3	3,748.3	0.57	0.21	
10,735.0	92.90	177.80	6,833.3	-3,844.5	-57.7	3,844.1	0.15	0.10	
10,830.0	93.10	177.20	6,828.3	-3,939.3	-53.5	3,938.9	0.66	0.21	
10,925.0	94.80	176.80	6,821.7	-4,033.9	-48.6	4,033.6	1.84	1.79	
11,021.0	94.20	178.90	6,814.2	-4,129.6	-45.0	4,129.2	2.27	-0.63	
11,116.0	95.20	178.70	6,806.4	-4,224.2	-43.0	4,223.9	1.07	1.05	
11,211.0	94.70	179.70	6,798.2	-4,318.9	-41.7	4,318.5	1.17	-0.53	
11,307.0	95.10	180.10	6,790.0	-4,414.5	-41.5	4,414.2	0.59	0.42	
11,356.0	95.30	179.90	6,785.6	-4,463.3	-41.5	4,463.0	0.58	0.41	Last CES survey @ 11356' MD
11,420.0	95.30	179.90	6,779.7	-4,527.0	-41.4	4,526.7	0.00	0.00	Projection to Bit @ 11420' MD - TD (507' FSL, 21

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BECKER RANCH 5M-24	0.00	0.00	6,795.0	-4,528.1	-55.8	1,334,730.49	3,257,746.33	40.248550	-104.576600
- hit/miss target									
- Shape									
- survey misses target center by 21.1usft at 11419.6usft MD (6779.7 TVD, -4526.6 N, -41.4 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name		Casing Diameter (")	Hole Diameter (")
7,434.0	6,973.7	7" (836' FNL, 2113' FWL)		0	0

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
11,356.0	6,785.6	-4,463.3	-41.5	Last CES survey @ 11356' MD	
11,420.0	6,779.7	-4,527.0	-41.4	Projection to Bit @ 11420' MD	
11,420.0	6,779.7	-4,527.0	-41.4	TD (507' FSL, 2124' FWL)	

Checked By: _____	Approved By: _____	Date: _____
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