

# **PDC ENERGY**

**WELD COUNTY, COLORADO  
SW NW SEC. 17 T5N R64W 6th P.M.  
SCHAUMBERG 17F-334  
JOB #2016-57-135**

**01 December, 2016**

**Survey: FINAL SURVEYS**





Project: WELD COUNTY, COLORADO  
Site: SW NW SEC. 17 T5N R64W 6th P.M.  
Well: SCHAUMBERG 17F-334  
Wellbore: JOB #2016-57-135  
Design: FINAL SURVEYS

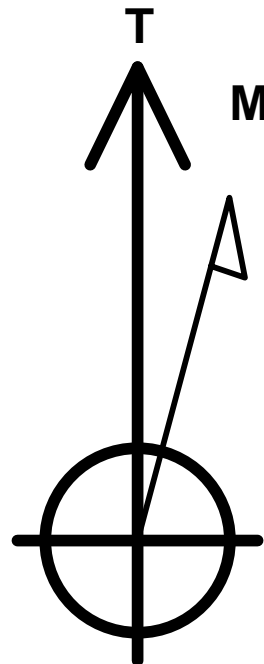
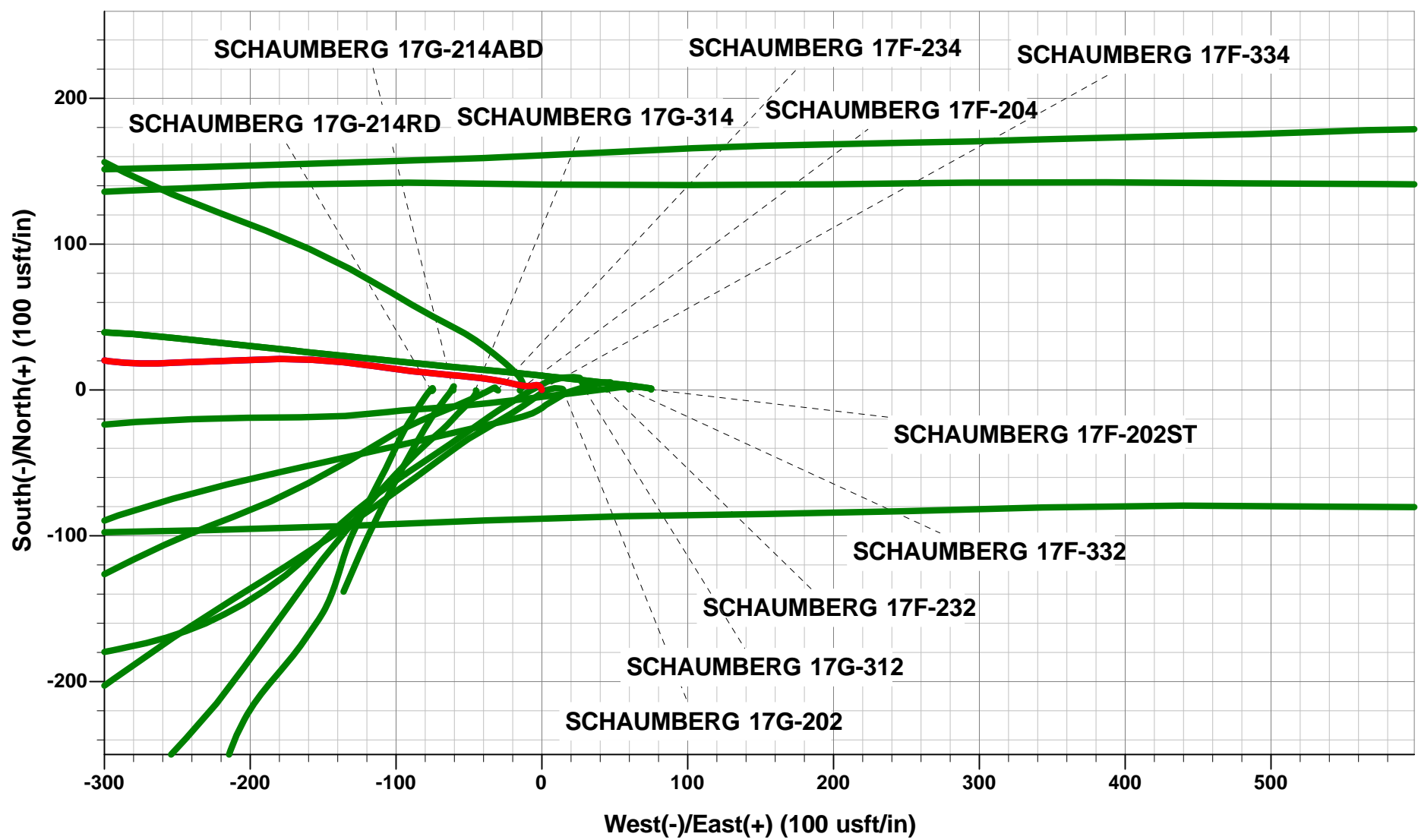


ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Vsect	Dep	Annotation
1463.2	1470.0	12.76	276.33	12.4	-85.0	85.0	87.7	9 5/8" SURFACE CASING
6163.4	6202.0	3.96	282.84	31.7	-374.9	375.1	445.1	KOP
6732.8	6964.0	72.29	269.93	20.7	-819.9	820.0	891.6	FORMATION ENTRY POINT
6753.3	7133.0	88.75	272.08	26.1	-986.8	986.9	1058.4	HZ LANDING POINT
6757.0	12061.0	91.10	270.70	39.5	-5912.0	5912.1	5985.7	LAST SURVEY - JULY 10, 2016
6755.9	12120.0	91.10	270.70	40.2	-5971.0	5971.1	6044.7	EXTRAPOLATION TO TD

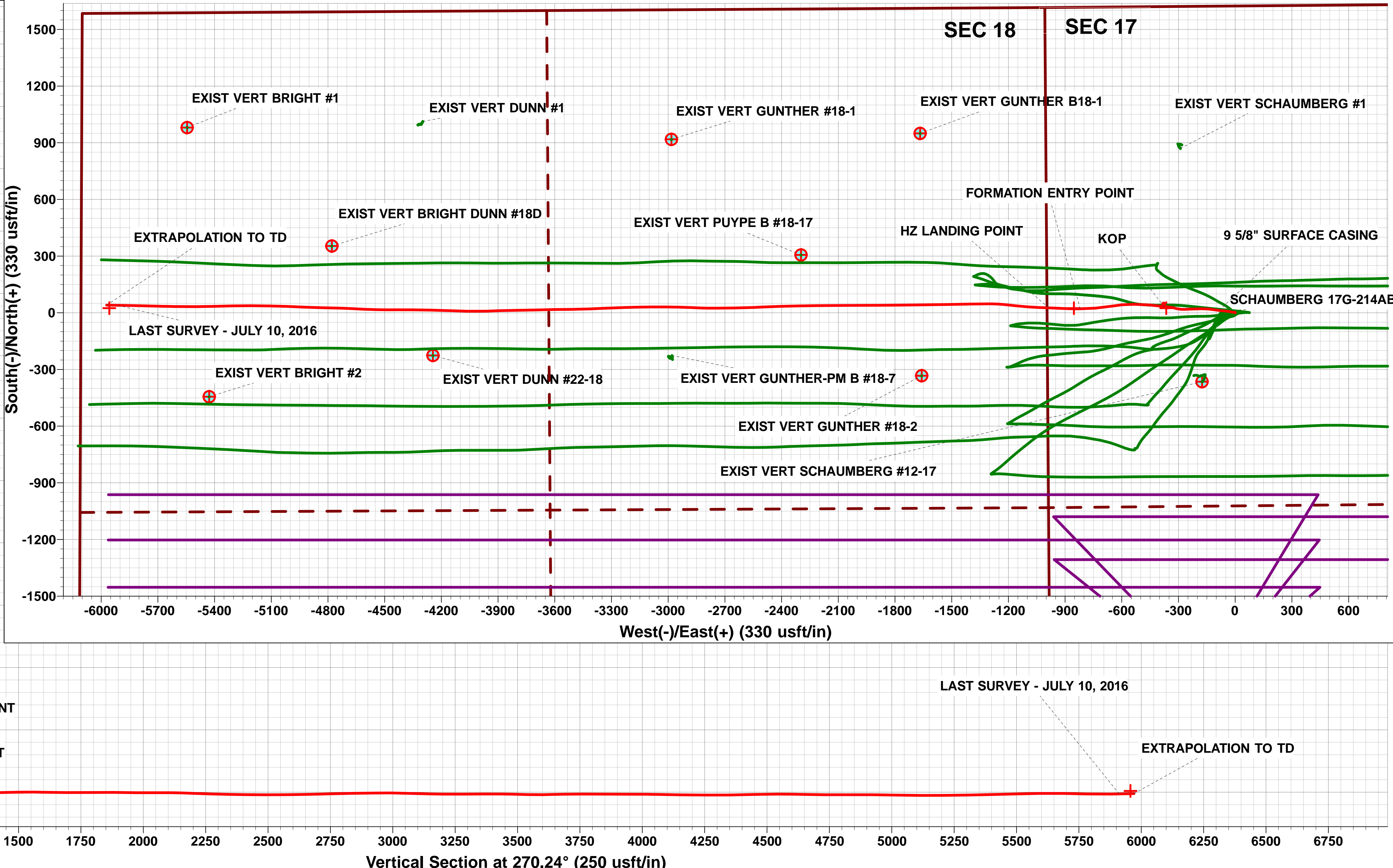
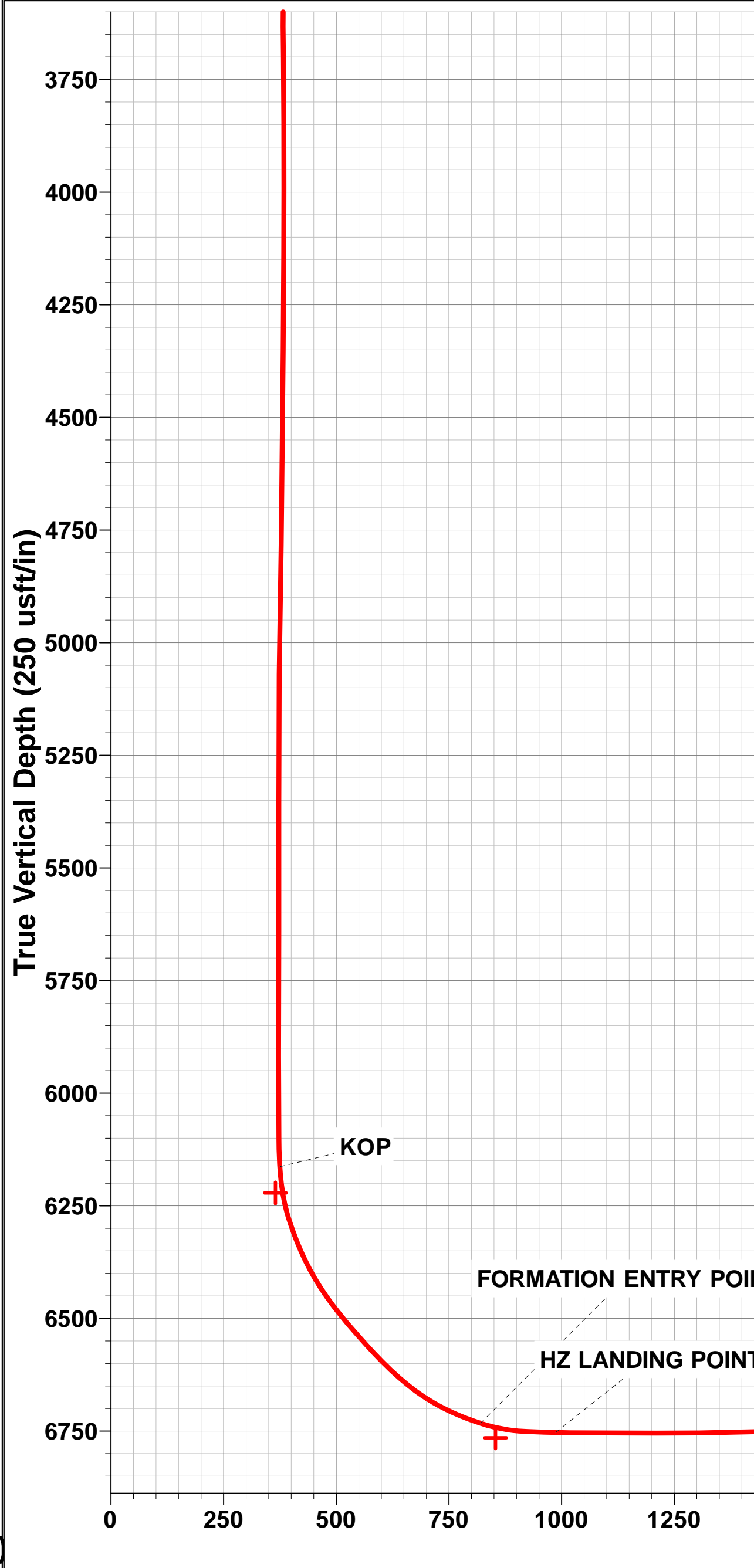
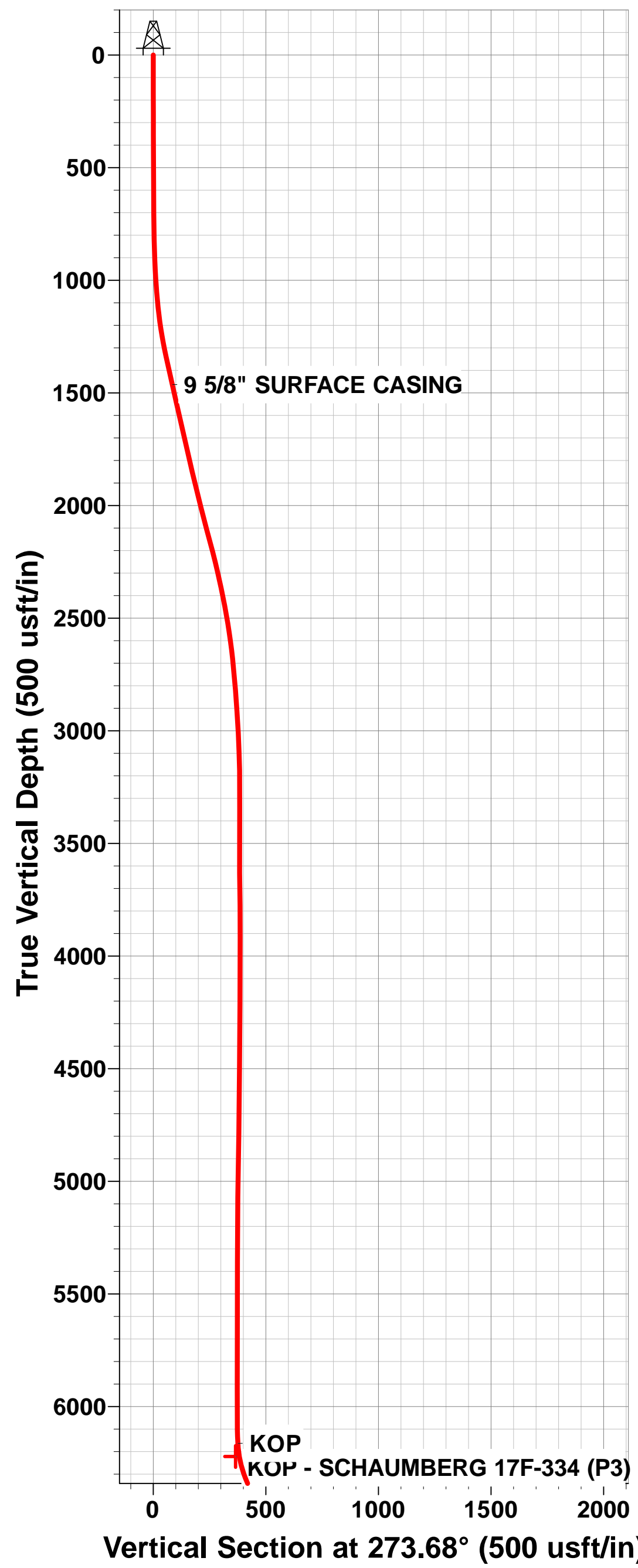
WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL - SCHAUMBERG 17F-334 (P3)	6745.0	24.4	-5956.8	40.402066	-104.601288
HZ LP *NEW* - SCHAUMBERG 17F-334 (P3)	6765.0	24.4	-853.5	40.402068	-104.582964
KOP - SCHAUMBERG 17F-334 (P3)	6221.7	24.4	-364.9	40.402068	-104.581210



Azimuths to True North  
Magnetic North: 8.21°

Magnetic Field  
Strength: 52523.1snT  
Dip Angle: 66.91°  
Date: 04/07/2016  
Model: IGRF2015



## Survey Report



<b>Company:</b>	PDC ENERGY	<b>Local Co-ordinate Reference:</b>	Well SCHAUMBERG 17F-334
<b>Project:</b>	WELD COUNTY, COLORADO	<b>TVD Reference:</b>	KB @ 4633.0usft (ENS 135)
<b>Site:</b>	SW NW SEC. 17 T5N R64W 6th P.M.	<b>MD Reference:</b>	KB @ 4633.0usft (ENS 135)
<b>Well:</b>	SCHAUMBERG 17F-334	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB #2016-57-135	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	EDM 5000.1 Single User Db

<b>Project</b>	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		
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site		SW NW SEC. 17 T5N R64W 6th P.M.				
Site Position:		Northing:	1,390,619.91 usft	Latitude:	40.402002	
From:	Lat/Long	Easting:	3,256,319.57 usft	Longitude:	-104.579633	
Position Uncertainty:		0.0 usft	Slot Radius:	1.10000ft	Grid Convergence:	0.59 °

Well	SCHAUMBERG 17F-334					
Well Position	+N-S	0.0 usft	Northing:	1,390,618.73 usft	Latitude:	40.402001
	+E-W	0.0 usft	Easting:	3,256,245.22 usft	Longitude:	-104.579900
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,620.0 usft

<b>Wellbore</b>	JOB #2016-57-135				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	04/07/2016	8.21	66.91	52,523

<b>Design</b>	FINAL SURVEYS				
<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	270.24	

<b>Survey Program</b>	<b>Date</b>	06/09/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
80.0	12,120.0	FINAL SURVEYS (JOB #2016-57-135)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>Subsea Depth (usft)</b>	<b>+N-S (usft)</b>	<b>+E-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>
0.0	0.00	0.00	0.0	4,633.0	0.0	0.0	0.0	0.00	0.00	0.00
80.0	0.10	304.80	80.0	4,553.0	0.0	-0.1	0.1	0.12	0.12	0.00
172.0	0.50	330.20	172.0	4,461.0	0.4	-0.3	0.3	0.45	0.43	27.61
264.0	0.40	8.80	264.0	4,369.0	1.1	-0.5	0.5	0.34	-0.11	41.96
357.0	0.40	320.00	357.0	4,276.0	1.7	-0.6	0.6	0.36	0.00	-52.47
449.0	0.40	330.20	449.0	4,184.0	2.2	-1.0	1.0	0.08	0.00	11.09
541.0	0.40	290.30	541.0	4,092.0	2.6	-1.5	1.5	0.30	0.00	-43.37
633.0	0.40	290.30	633.0	4,000.0	2.8	-2.1	2.1	0.00	0.00	0.00
726.0	0.50	327.20	726.0	3,907.0	3.3	-2.6	2.6	0.32	0.11	39.68
818.0	1.50	260.00	818.0	3,815.0	3.4	-4.0	4.0	1.51	1.09	-73.04
910.0	2.20	258.10	909.9	3,723.1	2.8	-6.9	6.9	0.76	0.76	-2.07
1,094.0	5.40	283.40	1,093.5	3,539.5	4.1	-18.8	18.8	1.92	1.74	13.75
1,187.0	8.00	280.60	1,185.9	3,447.1	6.3	-29.4	29.4	2.82	2.80	-3.01

## Survey Report



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<b>Project:</b>	WELD COUNTY, COLORADO	<b>TVD Reference:</b>	KB @ 4633.0usft (ENS 135)
<b>Site:</b>	SW NW SEC. 17 T5N R64W 6th P.M.	<b>MD Reference:</b>	KB @ 4633.0usft (ENS 135)
<b>Well:</b>	SCHAUMBERG 17F-334	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB #2016-57-135	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	EDM 5000.1 Single User Db

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,279.0	10.60	276.60	1,276.6	3,356.4	8.4	-44.1	44.1	2.91	2.83	-4.35
1,371.0	13.10	274.70	1,366.7	3,266.3	10.3	-62.9	62.9	2.75	2.72	-2.07
<b>9 5/8" SURFACE CASING</b>										
<b>1,470.0</b>	<b>12.76</b>	<b>276.33</b>	<b>1,463.2</b>	<b>3,169.8</b>	<b>12.4</b>	<b>-85.0</b>	<b>85.0</b>	<b>0.50</b>	<b>-0.34</b>	<b>1.65</b>
1,611.0	12.30	278.80	1,600.8	3,032.2	16.4	-115.3	115.3	0.50	-0.33	1.75
1,898.0	13.70	270.20	1,880.5	2,752.5	21.2	-179.5	179.6	0.83	0.49	-3.00
2,186.0	15.20	266.10	2,159.4	2,473.6	18.8	-251.3	251.3	0.63	0.52	-1.42
2,473.0	11.10	285.10	2,438.9	2,194.1	23.4	-315.5	315.6	2.06	-1.43	6.62
2,761.0	5.30	272.50	2,723.9	1,909.1	31.2	-355.6	355.7	2.10	-2.01	-4.37
3,048.0	3.20	291.70	3,010.1	1,622.9	34.8	-376.3	376.4	0.87	-0.73	6.69
3,383.0	1.10	55.10	3,344.9	1,288.1	40.1	-382.4	382.5	1.17	-0.63	36.84
3,670.0	1.50	332.20	3,631.9	1,001.1	45.0	-381.9	382.0	0.61	0.14	-28.89
3,958.0	0.20	236.90	3,919.8	713.2	48.0	-384.0	384.2	0.53	-0.45	-33.09
4,246.0	0.60	79.00	4,207.8	425.2	48.0	-383.0	383.2	0.27	0.14	-54.83
4,534.0	0.80	17.30	4,495.8	137.2	50.2	-380.9	381.1	0.26	0.07	-21.42
4,822.0	1.10	97.00	4,783.8	-150.8	51.8	-377.6	377.8	0.43	0.10	27.67
5,109.0	1.60	160.60	5,070.7	-437.7	47.7	-373.5	373.7	0.52	0.17	22.16
5,396.0	1.70	184.80	5,357.6	-724.6	39.7	-372.5	372.7	0.24	0.03	8.43
5,680.0	0.80	168.00	5,641.5	-1,008.5	33.5	-372.5	372.6	0.34	-0.32	-5.92
5,956.0	0.30	171.60	5,917.5	-1,284.5	30.9	-371.9	372.1	0.18	-0.18	1.30
6,141.0	0.60	308.80	6,102.5	-1,469.5	31.1	-372.6	372.8	0.46	0.16	74.16
<b>KOP</b>										
<b>6,202.0</b>	<b>3.96</b>	<b>282.84</b>	<b>6,163.4</b>	<b>-1,530.4</b>	<b>31.7</b>	<b>-374.9</b>	<b>375.1</b>	<b>5.62</b>	<b>5.51</b>	<b>-42.55</b>
6,233.0	5.70	281.50	6,194.3	-1,561.3	32.3	-377.5	377.6	5.62	5.61	-4.34
6,325.0	18.10	276.50	6,284.2	-1,651.2	34.8	-396.2	396.4	13.51	13.48	-5.43
6,417.0	25.60	277.20	6,369.5	-1,736.5	38.9	-430.2	430.4	8.16	8.15	0.76
6,509.0	35.20	271.90	6,448.8	-1,815.8	42.3	-476.5	476.7	10.83	10.43	-5.76
6,602.0	41.00	272.90	6,521.9	-1,888.9	44.8	-533.8	534.0	6.27	6.24	1.08
6,694.0	44.00	263.40	6,589.8	-1,956.8	42.6	-595.8	596.0	7.69	3.26	-10.33
6,786.0	51.70	261.40	6,651.5	-2,018.5	33.5	-663.4	663.5	8.52	8.37	-2.17
6,878.0	63.70	264.70	6,700.6	-2,067.6	24.3	-740.4	740.5	13.39	13.04	3.59
<b>FORMATION ENTRY POINT</b>										
<b>6,964.0</b>	<b>72.29</b>	<b>269.93</b>	<b>6,732.8</b>	<b>-2,099.8</b>	<b>20.7</b>	<b>-819.9</b>	<b>820.0</b>	<b>11.47</b>	<b>9.99</b>	<b>6.08</b>
6,974.0	73.30	270.50	6,735.8	-2,102.8	20.7	-829.5	829.6	11.47	10.09	5.71
7,070.0	87.90	272.80	6,751.4	-2,118.4	23.5	-923.9	924.0	15.39	15.21	2.40
<b>HZ LANDING POINT</b>										
<b>7,133.0</b>	<b>88.75</b>	<b>272.08</b>	<b>6,753.3</b>	<b>-2,120.3</b>	<b>26.1</b>	<b>-986.8</b>	<b>986.9</b>	<b>1.77</b>	<b>1.35</b>	<b>-1.15</b>
7,166.0	89.20	271.70	6,753.8	-2,120.8	27.2	-1,019.8	1,019.9	1.77	1.35	-1.15
7,262.0	89.80	275.10	6,754.7	-2,121.7	32.9	-1,115.6	1,115.7	3.60	0.62	3.54
7,357.0	90.10	276.30	6,754.8	-2,121.8	42.3	-1,210.1	1,210.3	1.30	0.32	1.26
7,453.0	90.30	269.60	6,754.4	-2,121.4	47.3	-1,306.0	1,306.1	6.98	0.21	-6.98
7,549.0	92.10	269.00	6,752.4	-2,119.4	46.1	-1,401.9	1,402.1	1.98	1.87	-0.62
7,644.0	90.80	268.80	6,750.0	-2,117.0	44.3	-1,496.9	1,497.0	1.38	-1.37	-0.21
7,740.0	88.90	269.50	6,750.3	-2,117.3	42.9	-1,592.9	1,593.0	2.11	-1.98	0.73
7,836.0	89.50	269.10	6,751.6	-2,118.6	41.7	-1,688.8	1,689.0	0.75	0.62	-0.42
7,931.0	90.90	269.00	6,751.3	-2,118.3	40.1	-1,783.8	1,784.0	1.48	1.47	-0.11
8,027.0	89.30	270.30	6,751.1	-2,118.1	39.5	-1,879.8	1,880.0	2.15	-1.67	1.35
8,123.0	89.30	269.90	6,752.3	-2,119.3	39.7	-1,975.8	1,976.0	0.42	0.00	-0.42
8,219.0	90.50	269.20	6,752.4	-2,119.4	38.9	-2,071.8	2,071.9	1.45	1.25	-0.73
8,314.0	88.20	269.50	6,753.5	-2,120.5	37.9	-2,166.8	2,166.9	2.44	-2.42	0.32
8,410.0	88.00	269.40	6,756.7	-2,123.7	36.9	-2,262.7	2,262.9	0.23	-0.21	-0.10
8,506.0	88.80	268.50	6,759.4	-2,126.4	35.2	-2,358.7	2,358.8	1.25	0.83	-0.94
8,602.0	89.90	268.10	6,760.5	-2,127.5	32.3	-2,454.6	2,454.7	1.22	1.15	-0.42

## Survey Report



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<b>Wellbore:</b>	JOB #2016-57-135	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	EDM 5000.1 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,698.0	90.60	266.90	6,760.1	-2,127.1	28.2	-2,550.5	2,550.6	1.45	0.73	-1.25
8,794.0	90.60	269.70	6,759.1	-2,126.1	25.3	-2,646.5	2,646.6	2.92	0.00	2.92
8,890.0	92.00	269.40	6,756.9	-2,123.9	24.5	-2,742.4	2,742.5	1.49	1.46	-0.31
8,986.0	90.40	272.00	6,754.9	-2,121.9	25.7	-2,838.4	2,838.5	3.18	-1.67	2.71
9,082.0	91.00	272.00	6,753.7	-2,120.7	29.1	-2,934.3	2,934.4	0.62	0.62	0.00
9,178.0	88.60	270.40	6,754.0	-2,121.0	31.1	-3,030.3	3,030.4	3.00	-2.50	-1.67
9,273.0	88.50	268.80	6,756.4	-2,123.4	30.4	-3,125.3	3,125.4	1.69	-0.11	-1.68
9,368.0	89.50	268.50	6,758.1	-2,125.1	28.2	-3,220.2	3,220.3	1.10	1.05	-0.32
9,464.0	90.70	267.30	6,757.9	-2,124.9	24.7	-3,316.2	3,316.2	1.77	1.25	-1.25
9,560.0	90.00	267.80	6,757.3	-2,124.3	20.6	-3,412.1	3,412.1	0.90	-0.73	0.52
9,656.0	88.10	269.50	6,758.9	-2,125.9	18.3	-3,508.0	3,508.1	2.66	-1.98	1.77
9,752.0	90.60	269.10	6,760.0	-2,127.0	17.1	-3,604.0	3,604.0	2.64	2.60	-0.42
9,848.0	91.60	268.30	6,758.2	-2,125.2	14.9	-3,700.0	3,700.0	1.33	1.04	-0.83
9,942.0	89.20	269.60	6,757.5	-2,124.5	13.2	-3,793.9	3,794.0	2.90	-2.55	1.38
10,039.0	89.80	268.00	6,758.4	-2,125.4	11.2	-3,890.9	3,890.9	1.76	0.62	-1.65
10,114.0	90.10	267.80	6,758.4	-2,125.4	8.4	-3,965.8	3,965.8	0.48	0.40	-0.27
10,210.0	89.00	271.90	6,759.2	-2,126.2	8.2	-4,061.8	4,061.8	4.42	-1.15	4.27
10,305.0	89.10	271.90	6,760.8	-2,127.8	11.3	-4,156.8	4,156.8	0.11	0.11	0.00
10,401.0	89.80	271.20	6,761.7	-2,128.7	13.9	-4,252.7	4,252.7	1.03	0.73	-0.73
10,497.0	90.70	270.60	6,761.3	-2,128.3	15.4	-4,348.7	4,348.7	1.13	0.94	-0.62
10,593.0	91.60	269.70	6,759.3	-2,126.3	15.7	-4,444.7	4,444.7	1.33	0.94	-0.94
10,689.0	90.00	271.30	6,758.0	-2,125.0	16.5	-4,540.7	4,540.7	2.36	-1.67	1.67
10,784.0	88.80	273.10	6,759.0	-2,126.0	20.2	-4,635.6	4,635.6	2.28	-1.26	1.89
10,880.0	89.40	271.80	6,760.5	-2,127.5	24.3	-4,731.5	4,731.5	1.49	0.62	-1.35
10,975.0	90.70	271.20	6,760.4	-2,127.4	26.8	-4,826.4	4,826.5	1.51	1.37	-0.63
11,071.0	89.30	272.50	6,760.4	-2,127.4	29.9	-4,922.4	4,922.5	1.99	-1.46	1.35
11,167.0	88.90	272.10	6,761.9	-2,128.9	33.7	-5,018.3	5,018.4	0.59	-0.42	-0.42
11,262.0	89.70	271.10	6,763.1	-2,130.1	36.4	-5,113.3	5,113.4	1.35	0.84	-1.05
11,358.0	90.60	270.10	6,762.8	-2,129.8	37.4	-5,209.2	5,209.4	1.40	0.94	-1.04
11,454.0	90.90	269.00	6,761.6	-2,128.6	36.6	-5,305.2	5,305.3	1.19	0.31	-1.15
11,549.0	91.50	267.90	6,759.6	-2,126.6	34.1	-5,400.2	5,400.3	1.32	0.63	-1.16
11,645.0	91.10	270.10	6,757.4	-2,124.4	32.4	-5,496.1	5,496.2	2.33	-0.42	2.29
11,740.0	91.70	270.50	6,755.1	-2,122.1	32.9	-5,591.1	5,591.2	0.76	0.63	0.42
11,835.0	88.30	271.70	6,755.1	-2,122.1	34.7	-5,686.1	5,686.2	3.80	-3.58	1.26
11,931.0	89.10	271.20	6,757.3	-2,124.3	37.1	-5,782.0	5,782.1	0.98	0.83	-0.52
12,027.0	90.60	271.00	6,757.5	-2,124.5	39.0	-5,878.0	5,878.1	1.58	1.56	-0.21
LAST SURVEY - JULY 10, 2016										
12,061.0	91.10	270.70	6,757.0	-2,124.0	39.5	-5,912.0	5,912.1	1.71	1.47	-0.88
EXTRAPOLATION TO TD										
12,120.0	91.10	270.70	6,755.9	-2,122.9	40.2	-5,971.0	5,971.1	0.00	0.00	0.00



# Survey Report



<b>Company:</b>	PDC ENERGY	<b>Local Co-ordinate Reference:</b>	Well SCHAUMBERG 17F-334
<b>Project:</b>	WELD COUNTY, COLORADO	<b>TVD Reference:</b>	KB @ 4633.0usft (ENS 135)
<b>Site:</b>	SW NW SEC. 17 T5N R64W 6th P.M.	<b>MD Reference:</b>	KB @ 4633.0usft (ENS 135)
<b>Well:</b>	SCHAUMBERG 17F-334	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB #2016-57-135	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	EDM 5000.1 Single User Db

Targets									
Target Name	- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	
- Shape		(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	
									Latitude Longitude
EXIST VERT B&H #1		0.00	0.00	7,091.0	-1,942.6	-5,598.6	1,388,618.26	3,250,667.34	40.396667 -104.600000
- survey misses target center by 2003.7usft at 11728.9usft MD (6755.4 TVD, 32.8 N, -5580.0 E)									
- Circle (radius 30.0)									
EXIST VERT BRIGHT		0.00	0.00	7,071.0	-444.2	-5,428.3	1,390,118.26	3,250,822.01	40.400780 -104.599390
- survey misses target center by 570.4usft at 11578.4usft MD (6758.8 TVD, 33.2 N, -5429.6 E)									
- Circle (radius 30.0)									
EXIST VERT SCHAU		0.00	0.00	7,106.0	-364.6	-175.5	1,390,252.31	3,256,073.55	40.401000 -104.580530
- survey misses target center by 775.9usft at 6771.9usft MD (6642.7 TVD, 35.1 N, -652.5 E)									
- Circle (radius 30.0)									
EXIST VERT SOLIS #		0.00	0.00	7,065.0	-1,810.7	3,640.4	1,388,845.99	3,259,904.10	40.397030 -104.566830
- survey misses target center by 4505.4usft at 6233.0usft MD (6194.3 TVD, 32.3 N, -377.5 E)									
- Circle (radius 30.0)									
EXIST VERT DUNN/M		0.00	0.00	7,051.0	-1,548.6	986.0	1,389,080.48	3,257,247.19	40.397750 -104.576360
- survey misses target center by 2233.9usft at 6417.0usft MD (6369.5 TVD, 38.9 N, -430.2 E)									
- Circle (radius 30.0)									
EXIST VERT BRIGHT		0.00	0.00	7,108.0	353.5	-4,779.2	1,390,922.63	3,251,462.78	40.402970 -104.597060
- survey misses target center by 477.5usft at 10936.0usft MD (6760.7 TVD, 25.9 N, -4787.5 E)									
- Circle (radius 30.0)									
KOP - SCHAUMBERG		0.00	0.00	6,073.8	24.4	-134.6	1,390,641.77	3,256,110.40	40.402068 -104.580383
- survey misses target center by 237.9usft at 6111.4usft MD (6072.9 TVD, 30.9 N, -372.4 E)									
- Point									
HZ LP *NEW* - SCHA		0.00	0.00	6,790.0	24.4	-853.5	1,390,634.31	3,255,391.57	40.402068 -104.582964
- survey misses target center by 46.9usft at 7006.7usft MD (6743.8 TVD, 21.2 N, -861.2 E)									
- Point									
EXIST VERT GUNTH		0.00	0.00	7,049.0	949.5	-1,667.1	1,391,550.83	3,254,568.41	40.404607 -104.585886
- survey misses target center by 955.0usft at 7807.3usft MD (6751.3 TVD, 42.1 N, -1660.2 E)									
- Circle (radius 30.0)									
EXIST VERT HOSHIA		0.00	0.00	7,110.0	888.8	3,545.3	1,391,544.28	3,259,781.01	40.404440 -104.567170
- survey misses target center by 4116.7usft at 6325.0usft MD (6284.2 TVD, 34.8 N, -396.2 E)									
- Circle (radius 30.0)									
BHL - SCHAUMBERG		0.00	0.00	6,745.0	24.4	-5,956.8	1,390,581.37	3,250,288.69	40.402066 -104.601288
- survey misses target center by 19.2usft at 12105.9usft MD (6756.1 TVD, 40.0 N, -5956.9 E)									
- Point									
EXIST VERT HETTIN		0.00	0.00	6,968.0	-1,661.5	-1,646.1	1,388,940.27	3,254,616.49	40.397440 -104.585810
- survey misses target center by 1717.4usft at 7817.1usft MD (6751.4 TVD, 42.0 N, -1670.0 E)									
- Circle (radius 30.0)									
EXIST VERT PUYPE		0.00	0.00	7,054.0	306.2	-2,297.1	1,390,901.03	3,253,945.11	40.402841 -104.588148
- survey misses target center by 400.5usft at 8447.8usft MD (6757.9 TVD, 36.4 N, -2300.5 E)									
- Circle (radius 30.0)									
EXIST VERT STEINW		0.00	0.00	6,979.0	-346.0	986.2	1,390,282.96	3,257,234.94	40.401051 -104.576359
- survey misses target center by 1589.3usft at 6417.0usft MD (6369.5 TVD, 38.9 N, -430.2 E)									
- Circle (radius 30.0)									
EXIST VERT GUNTH		0.00	0.00	6,982.0	917.9	-2,982.8	1,391,505.62	3,253,253.21	40.404520 -104.590610
- survey misses target center by 916.3usft at 9149.8usft MD (6753.5 TVD, 30.8 N, -3002.1 E)									
- Circle (radius 30.0)									
BHL - SCHAUMBERG		0.00	0.00	6,770.0	24.4	-5,956.8	1,390,581.37	3,250,288.69	40.402066 -104.601288
- survey misses target center by 20.8usft at 12105.4usft MD (6756.2 TVD, 40.0 N, -5956.4 E)									
- Point									
EXIST VERT DUNN #		0.00	0.00	7,105.0	-225.8	-4,244.6	1,390,348.88	3,252,003.38	40.401380 -104.595140
- survey misses target center by 418.7usft at 10389.7usft MD (6761.6 TVD, 13.7 N, -4241.4 E)									
- Circle (radius 30.0)									

# Survey Report



<b>Company:</b>	PDC ENERGY	<b>Local Co-ordinate Reference:</b>	Well SCHAUMBERG 17F-334
<b>Project:</b>	WELD COUNTY, COLORADO	<b>TVD Reference:</b>	KB @ 4633.0usft (ENS 135)
<b>Site:</b>	SW NW SEC. 17 T5N R64W 6th P.M.	<b>MD Reference:</b>	KB @ 4633.0usft (ENS 135)
<b>Well:</b>	SCHAUMBERG 17F-334	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB #2016-57-135	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	EDM 5000.1 Single User Db

HZ LP *NEW* - SCHA	0.00	0.00	6,765.0	24.4	-853.5	1,390,634.31	3,255,391.57	40.402068	-104.582964
- survey misses target center by 22.6usft at 7002.6usft MD (6743.0 TVD, 21.1 N, -857.2 E)									
- Point									
EXIST VERT HOSHIK	0.00	0.00	7,110.0	888.7	2,417.4	1,391,532.44	3,258,653.18	40.404440	-104.571220
- survey misses target center by 3054.1usft at 6325.0usft MD (6284.2 TVD, 34.8 N, -396.2 E)									
- Circle (radius 30.0)									
KOP - SCHAUMBERG	0.00	0.00	6,221.7	24.4	-364.9	1,390,639.38	3,255,880.08	40.402068	-104.581210
- survey misses target center by 18.0usft at 6257.0usft MD (6218.2 TVD, 32.8 N, -380.5 E)									
- Point									
EXIST VERT BRIGHT	0.00	0.00	7,083.0	980.3	-5,545.0	1,391,541.40	3,250,690.59	40.404690	-104.599810
- survey misses target center by 1002.4usft at 11690.8usft MD (6756.4 TVD, 32.5 N, -5542.0 E)									
- Circle (radius 30.0)									
EXIST VERT HETTIN	0.00	0.00	7,062.0	-1,779.4	-2,970.6	1,388,808.63	3,253,293.40	40.397116	-104.590565
- survey misses target center by 1834.7usft at 9051.3usft MD (6754.2 TVD, 28.0 N, -2903.7 E)									
- Circle (radius 30.0)									
EXIST VERT GUNTH	0.00	0.00	6,973.0	-332.9	-1,658.6	1,390,268.67	3,254,590.26	40.401087	-104.585855
- survey misses target center by 435.6usft at 7813.4usft MD (6751.4 TVD, 42.0 N, -1666.2 E)									
- Circle (radius 30.0)									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,470.0	1,463.2	12.4	-85.0	9 5/8" SURFACE CASING
6,202.0	6,163.4	31.7	-374.9	KOP
6,964.0	6,732.8	20.7	-819.9	FORMATION ENTRY POINT
7,133.0	6,753.3	26.1	-986.8	HZ LANDING POINT
12,061.0	6,757.0	39.5	-5,912.0	LAST SURVEY - JULY 10, 2016
12,120.0	6,755.9	40.2	-5,971.0	EXTRAPOLATION TO TD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_