

PDC ENERGY

**WELD COUNTY, COLORADO
SE SE SEC. 18 T4N R64W 6th P.M.
COLLINS 18T-201
2015-119-123**

25 October, 2015

Survey: SURVEYS





Project: WELD COUNTY, COLORADO
Site: SE SE SEC. 18 T4N R64W 6th P.M.
Well: COLLINS 18T-201
Wellbore: 2015-119-123
Design: SURVEYS

ANNOTATIONS

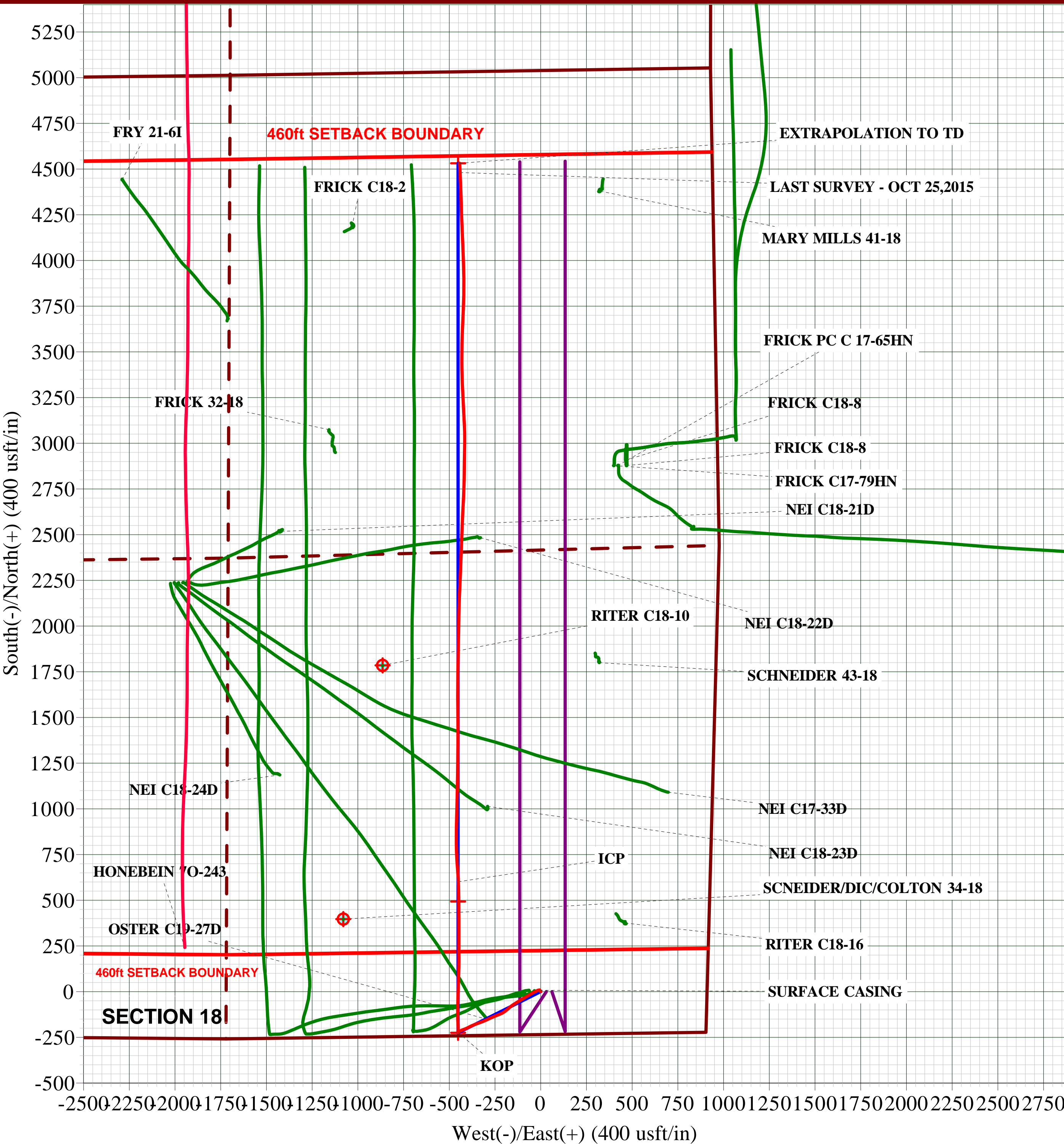
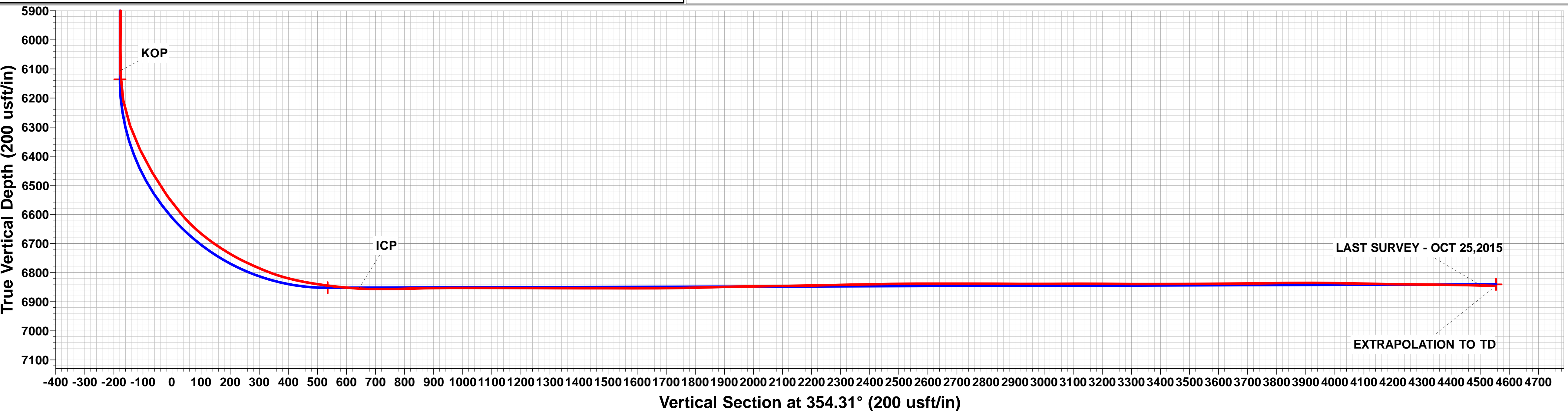
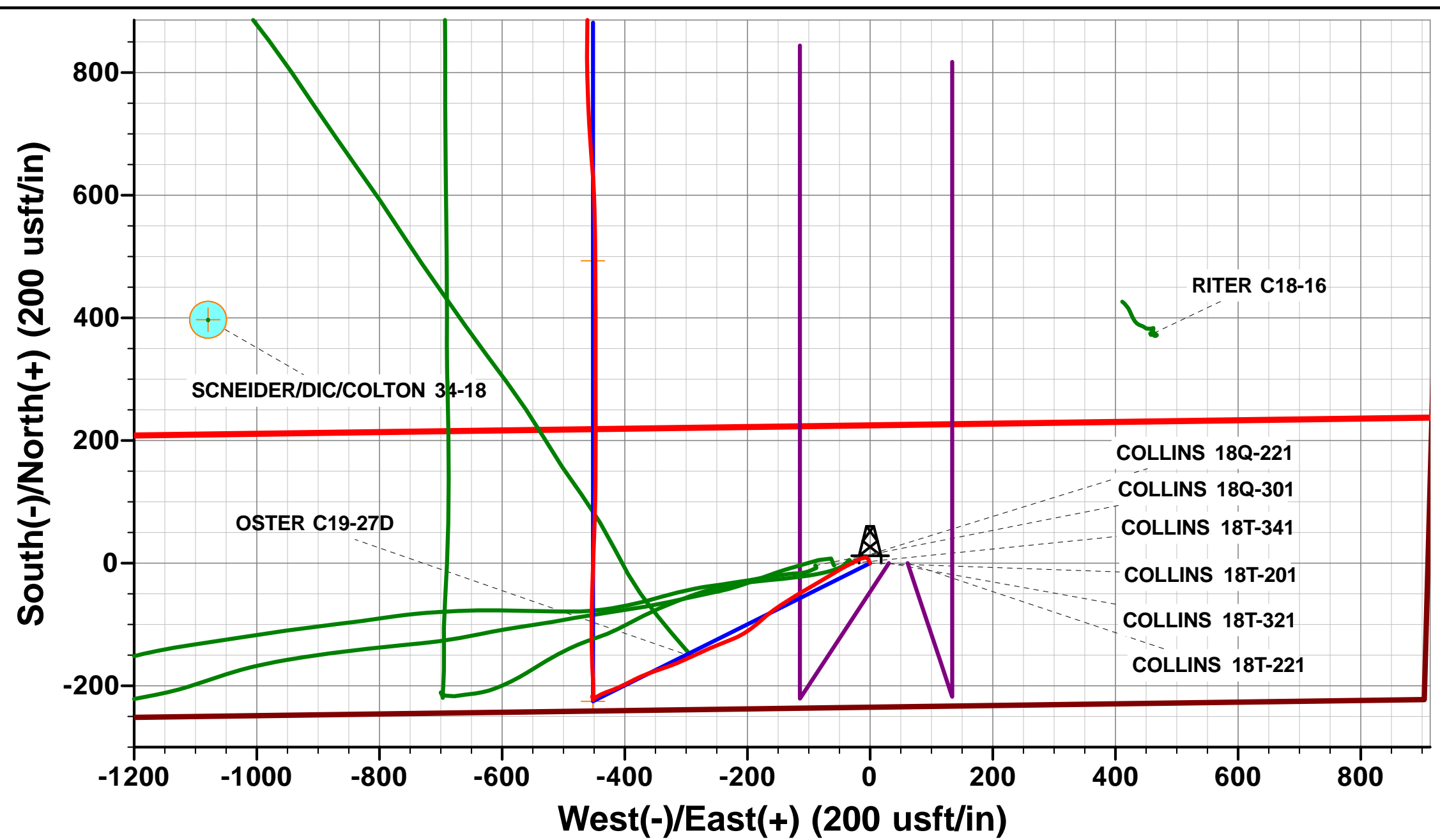
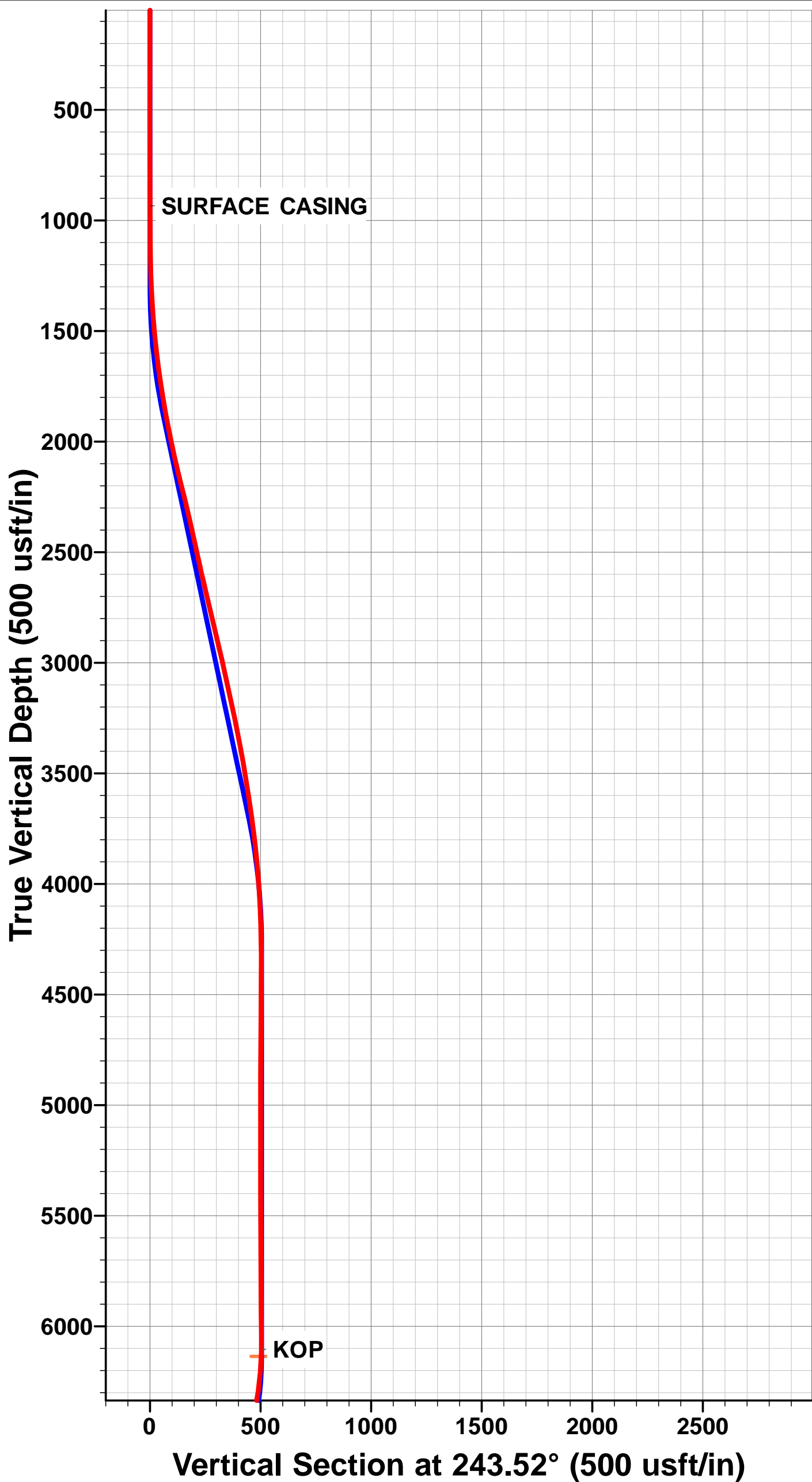
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation
934.9	935.0	0.67	309.52	7.8	-4.7	8.2	9.6	SURFACE CASING
6105.5	6154.0	0.98	0.53	-222.9	-451.7	-177.0	540.1	KOP
6854.8	7385.0	86.76	357.35	601.5	-450.2	643.2	1364.8	ICP
6844.2	11267.0	88.40	357.20	4481.1	-440.8	4502.7	5246.4	LAST SURVEY - OCT 25,2015
6845.6	11318.0	88.40	357.20	4532.0	-443.2	4553.6	5297.4	EXTRAPOLATION TO TD

AS DRILLED LOCAL COORDINATES:

SHL: 234ft FSL & 910t FEL Sec 18
7" ICP: 835.5ft FSL & 1363.4ft FEL Sec 18
BHL: 500ft FNL & 1399.6ft FEL Sec 18

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
7" ICP *NEW* - COLLINS 18T-201	6852.2	493.1	-451.8	40.307103	-104.588960	Point
BHL - COLLINS 18T-201	6840.5	4532.0	-451.8	40.318190	-104.588960	Point
KOP - COLLINS 18T-201	6136.0	-225.1	-451.8	40.305132	-104.588960	Point



Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well COLLINS 18T-201
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB @ 4795.5usft (ENS 123)
Site:	SE SE SEC. 18 T4N R64W 6th P.M.	MD Reference:	KB @ 4795.5usft (ENS 123)
Well:	COLLINS 18T-201	North Reference:	True
Wellbore:	2015-119-123	Survey Calculation Method:	Minimum Curvature
Design:	SURVEYS	Database:	EDM 5000.1 Single User Db

Project	WELD COUNTY, COLORADO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	SE SE SEC. 18 T4N R64W 6th P.M.				
Site Position:		Northing:	1,355,536.25 usft	Latitude:	40.305750
From:	Lat/Long	Easting:	3,254,595.50 usft	Longitude:	-104.587120
Position Uncertainty:	0.0 usft	Slot Radius:	1.10000ft	Grid Convergence:	0.59 °

Well	COLLINS 18T-201					
Well Position	+N-S	0.0 usft	Northing:	1,355,535.61 usft	Latitude:	40.305750
	+E-W	0.0 usft	Easting:	3,254,534.15 usft	Longitude:	-104.587340
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,782.0 usft

Wellbore	2015-119-123				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	02/07/2015	8.32	66.86	52,586

Design	SURVEYS				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	354.31	

Survey Program	Date	25/10/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
266.0	11,318.0	SURVEYS (2015-119-123)	MWD	MWD - Standard	

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)
0.0	0.00	0.00	0.0	4,795.5	0.0	0.0	0.0	0.00	0.00	0.00
266.0	0.60	341.70	266.0	4,529.5	1.3	-0.4	1.4	0.23	0.23	0.00
545.0	0.80	336.50	545.0	4,250.5	4.5	-1.7	4.6	0.08	0.07	-1.86
825.0	0.60	301.10	825.0	3,970.5	7.0	-3.7	7.4	0.17	-0.07	-12.64
SURFACE CASING										
935.0	0.67	309.52	934.9	3,860.6	7.8	-4.7	8.2	0.11	0.06	7.66
1,105.0	0.80	319.30	1,104.9	3,690.6	9.3	-6.2	9.9	0.11	0.08	5.75
1,385.0	3.60	247.40	1,384.7	3,410.8	7.4	-15.6	8.9	1.23	1.00	-25.68
1,663.0	7.60	240.40	1,661.3	3,134.2	-5.1	-39.7	-1.1	1.46	1.44	-2.52
1,944.0	11.10	239.00	1,938.6	2,856.9	-28.2	-79.0	-20.2	1.25	1.25	-0.50
2,213.0	14.30	239.50	2,201.0	2,594.5	-58.4	-129.9	-45.2	1.19	1.19	0.19
2,483.0	12.60	227.10	2,463.6	2,331.9	-95.4	-180.2	-77.0	1.24	-0.63	-4.59
2,753.0	13.70	249.30	2,726.7	2,068.8	-126.7	-231.7	-103.1	1.90	0.41	8.22

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well COLLINS 18T-201
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB @ 4795.5usft (ENS 123)
Site:	SE SE SEC. 18 T4N R64W 6th P.M.	MD Reference:	KB @ 4795.5usft (ENS 123)
Well:	COLLINS 18T-201	North Reference:	True
Wellbore:	2015-119-123	Survey Calculation Method:	Minimum Curvature
Design:	SURVEYS	Database:	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)
3,023.0	12.80	244.00	2,989.5	1,806.0	-151.1	-288.5	-121.8	0.56	-0.33	-1.96
3,293.0	11.90	252.00	3,253.3	1,542.2	-172.9	-341.9	-138.1	0.72	-0.33	2.96
3,562.0	9.30	242.40	3,517.7	1,277.8	-191.5	-387.5	-152.1	1.17	-0.97	-3.57
3,831.0	7.20	249.70	3,783.9	1,011.6	-207.4	-422.6	-164.5	0.87	-0.78	2.71
4,101.0	3.20	237.50	4,052.7	742.8	-217.3	-444.8	-172.2	1.53	-1.48	-4.52
4,370.0	1.10	321.20	4,321.6	473.9	-219.4	-452.8	-173.4	1.21	-0.78	31.12
4,640.0	0.70	70.50	4,591.5	204.0	-216.8	-452.8	-170.8	0.55	-0.15	40.48
4,909.0	0.20	11.50	4,860.5	-65.0	-215.8	-451.2	-170.0	0.23	-0.19	-21.93
5,180.0	0.30	304.40	5,131.5	-336.0	-214.9	-451.7	-169.1	0.11	0.04	-24.76
5,449.0	0.90	151.10	5,400.5	-605.0	-216.4	-451.3	-170.5	0.44	0.22	-56.99
5,718.0	0.80	177.10	5,669.5	-874.0	-220.1	-450.1	-174.4	0.15	-0.04	9.67
5,988.0	0.50	222.30	5,939.5	-1,144.0	-222.9	-450.8	-177.0	0.21	-0.11	16.74
6,077.0	0.50	234.80	6,028.5	-1,233.0	-223.4	-451.4	-177.5	0.12	0.00	14.04
KOP										
6,154.0	0.98	0.53	6,105.5	-1,310.0	-222.9	-451.7	-177.0	1.74	0.63	163.28
6,167.0	1.20	3.80	6,118.5	-1,323.0	-222.7	-451.7	-176.8	1.74	1.67	25.19
6,257.0	10.30	4.10	6,207.9	-1,412.4	-213.7	-451.0	-167.9	10.11	10.11	0.33
6,347.0	20.20	355.30	6,294.7	-1,499.2	-190.1	-451.7	-144.3	11.27	11.00	-9.78
6,437.0	25.30	358.80	6,377.6	-1,582.1	-155.4	-453.4	-109.6	5.86	5.67	3.89
6,526.0	30.80	359.60	6,456.1	-1,660.6	-113.5	-454.0	-67.9	6.19	6.18	0.90
6,616.0	35.10	1.30	6,531.7	-1,736.2	-64.6	-453.5	-19.3	4.89	4.78	1.89
6,706.0	40.70	2.10	6,602.6	-1,807.1	-9.4	-451.9	35.5	6.25	6.22	0.89
6,796.0	50.80	2.20	6,665.4	-1,869.9	55.0	-449.5	99.3	11.22	11.22	0.11
6,886.0	57.30	0.60	6,718.2	-1,922.7	127.8	-447.7	171.6	7.36	7.22	-1.78
6,976.0	64.20	0.00	6,762.1	-1,966.6	206.3	-447.3	249.6	7.69	7.67	-0.67
7,065.0	68.90	359.80	6,797.5	-2,002.0	287.9	-447.5	330.8	5.28	5.28	-0.22
7,155.0	77.10	0.10	6,823.8	-2,028.3	373.9	-447.5	416.4	9.12	9.11	0.33
7,245.0	81.70	359.50	6,840.4	-2,044.9	462.3	-447.9	504.5	5.15	5.11	-0.67
7,335.0	84.70	359.30	6,851.0	-2,055.5	551.7	-448.8	593.5	3.34	3.33	-0.22
7,350.0	85.30	358.90	6,852.3	-2,056.8	566.6	-449.0	608.4	4.80	4.00	-2.67
ICP										
7,385.0	86.76	357.35	6,854.8	-2,059.3	601.5	-450.2	643.2	6.08	4.17	-4.44
7,429.0	88.60	355.40	6,856.5	-2,061.0	645.4	-452.9	687.1	6.08	4.18	-4.42
7,519.0	92.00	357.10	6,856.1	-2,060.6	735.2	-458.8	777.0	4.22	3.78	1.89
7,609.0	90.90	359.40	6,853.8	-2,058.3	825.1	-461.6	866.8	2.83	-1.22	2.56
7,699.0	90.40	1.70	6,852.8	-2,057.3	915.1	-460.7	956.3	2.62	-0.56	2.56
7,789.0	89.80	1.50	6,852.6	-2,057.1	1,005.0	-458.2	1,045.5	0.70	-0.67	-0.22
7,879.0	89.90	1.10	6,852.9	-2,057.4	1,095.0	-456.2	1,134.9	0.46	0.11	-0.44
7,969.0	89.80	1.00	6,853.1	-2,057.6	1,185.0	-454.5	1,224.2	0.16	-0.11	-0.11
8,059.0	89.70	0.50	6,853.5	-2,058.0	1,275.0	-453.3	1,313.7	0.57	-0.11	-0.56
8,148.0	90.00	0.20	6,853.7	-2,058.2	1,364.0	-452.8	1,402.2	0.48	0.34	-0.34
8,239.0	89.90	359.90	6,853.8	-2,058.3	1,455.0	-452.7	1,492.7	0.35	-0.11	-0.33
8,329.0	90.00	359.60	6,853.9	-2,058.4	1,545.0	-453.1	1,582.3	0.35	0.11	-0.33
8,418.0	90.10	359.40	6,853.8	-2,058.3	1,634.0	-453.9	1,670.9	0.25	0.11	-0.22
8,508.0	91.20	1.20	6,852.8	-2,057.3	1,724.0	-453.4	1,760.4	2.34	1.22	2.00
8,598.0	91.60	1.20	6,850.6	-2,055.1	1,813.9	-451.5	1,849.8	0.44	0.44	0.00
8,688.0	91.20	0.70	6,848.4	-2,052.9	1,903.9	-450.0	1,939.1	0.71	-0.44	-0.56
8,777.0	90.80	1.20	6,846.8	-2,051.3	1,992.9	-448.6	2,027.5	0.72	-0.45	0.56
8,867.0	90.50	0.90	6,845.8	-2,050.3	2,082.8	-446.9	2,116.9	0.47	-0.33	-0.33
8,957.0	91.30	2.50	6,844.4	-2,048.9	2,172.8	-444.2	2,206.1	1.99	0.89	1.78
9,047.0	91.40	2.60	6,842.3	-2,046.8	2,262.7	-440.2	2,295.2	0.16	0.11	0.11
9,137.0	90.90	2.00	6,840.5	-2,045.0	2,352.6	-436.6	2,384.3	0.87	-0.56	-0.67
9,226.0	91.10	2.50	6,838.9	-2,043.4	2,441.5	-433.1	2,472.4	0.60	0.22	0.56

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well COLLINS 18T-201
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB @ 4795.5usft (ENS 123)
Site:	SE SE SEC. 18 T4N R64W 6th P.M.	MD Reference:	KB @ 4795.5usft (ENS 123)
Well:	COLLINS 18T-201	North Reference:	True
Wellbore:	2015-119-123	Survey Calculation Method:	Minimum Curvature
Design:	SURVEYS	Database:	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)
9,316.0	90.00	1.50	6,838.0	-2,042.5	2,531.4	-430.0	2,561.6	1.65	-1.22	-1.11
9,406.0	89.80	3.20	6,838.2	-2,042.7	2,621.3	-426.3	2,650.7	1.90	-0.22	1.89
9,496.0	90.20	3.00	6,838.2	-2,042.7	2,711.2	-421.4	2,739.6	0.50	0.44	-0.22
9,586.0	89.60	0.50	6,838.4	-2,042.9	2,801.2	-418.7	2,828.9	2.86	-0.67	-2.78
9,676.0	89.80	1.30	6,838.8	-2,043.3	2,891.2	-417.3	2,918.3	0.92	0.22	0.89
9,789.0	90.30	0.50	6,838.7	-2,043.2	3,004.1	-415.5	3,030.5	0.83	0.44	-0.71
9,878.0	90.20	357.80	6,838.3	-2,042.8	3,093.1	-416.8	3,119.2	3.04	-0.11	-3.03
9,968.0	89.50	356.20	6,838.6	-2,043.1	3,183.0	-421.5	3,209.1	1.94	-0.78	-1.78
10,058.0	89.60	357.60	6,839.3	-2,043.8	3,272.9	-426.4	3,299.0	1.56	0.11	1.56
10,148.0	90.30	358.30	6,839.4	-2,043.9	3,362.8	-429.6	3,388.8	1.10	0.78	0.78
10,239.0	90.10	359.80	6,839.0	-2,043.5	3,453.8	-431.1	3,479.5	1.66	-0.22	1.65
10,329.0	90.60	1.10	6,838.5	-2,043.0	3,543.8	-430.4	3,569.0	1.55	0.56	1.44
10,418.0	90.40	3.00	6,837.7	-2,042.2	3,632.7	-427.2	3,657.2	2.15	-0.22	2.13
10,508.0	90.70	1.90	6,836.9	-2,041.4	3,722.6	-423.4	3,746.3	1.27	0.33	-1.22
10,598.0	90.90	1.80	6,835.6	-2,040.1	3,812.6	-420.5	3,835.5	0.25	0.22	-0.11
10,687.0	89.50	358.80	6,835.3	-2,039.8	3,901.6	-420.0	3,924.0	3.72	-1.57	-3.37
10,777.0	89.20	358.00	6,836.3	-2,040.8	3,991.5	-422.5	4,013.7	0.95	-0.33	-0.89
10,867.0	88.50	357.70	6,838.1	-2,042.6	4,081.4	-425.9	4,103.5	0.85	-0.78	-0.33
10,957.0	89.40	357.60	6,839.8	-2,044.3	4,171.3	-429.6	4,193.4	1.01	1.00	-0.11
11,047.0	89.40	358.30	6,840.7	-2,045.2	4,261.3	-432.8	4,283.2	0.78	0.00	0.78
11,136.0	89.00	358.30	6,841.9	-2,046.4	4,350.2	-435.5	4,372.0	0.45	-0.45	0.00
11,226.0	89.20	357.40	6,843.4	-2,047.9	4,440.2	-438.8	4,461.8	1.02	0.22	-1.00
LAST SURVEY - OCT 25,2015										
11,267.0	88.40	357.20	6,844.2	-2,048.7	4,481.1	-440.8	4,502.7	2.01	-1.95	-0.49
EXTRAPOLATION TO TD										
11,318.0	88.40	357.20	6,845.6	-2,050.1	4,532.0	-443.2	4,553.6	0.00	0.00	0.00

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well COLLINS 18T-201
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB @ 4795.5usft (ENS 123)
Site:	SE SE SEC. 18 T4N R64W 6th P.M.	MD Reference:	KB @ 4795.5usft (ENS 123)
Well:	COLLINS 18T-201	North Reference:	True
Wellbore:	2015-119-123	Survey Calculation Method:	Minimum Curvature
Design:	SURVEYS	Database:	EDM 5000.1 Single User Db

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
KOP - COLLINS 18T-201	0.00	0.00	6,136.0	-225.1	-451.8	1,355,305.88	3,254,084.71	40.305132	-104.588960
- survey misses target center by 3.1usft at 6184.2usft MD (6135.7 TVD, -222.0 N, -451.6 E)									
- Point									
7" ICP *NEW* - COLL	0.00	0.00	6,852.2	493.1	-451.8	1,356,024.01	3,254,077.32	40.307103	-104.588960
- survey misses target center by 8.4usft at 7277.0usft MD (6844.7 TVD, 494.0 N, -448.1 E)									
- Point									
RITER C18-10	0.00	0.00	7,183.5	1,785.1	-864.6	1,357,311.66	3,253,651.30	40.310650	-104.590440
- survey misses target center by 529.3usft at 8552.4usft MD (6851.8 TVD, 1768.4 N, -452.5 E)									
- Circle (radius 30.0)									
BHL - COLLINS 18T-201	0.00	0.00	6,840.5	4,532.0	-451.8	1,360,062.51	3,254,035.80	40.318190	-104.588960
- survey misses target center by 9.9usft at 11318.0usft MD (6845.6 TVD, 4532.0 N, -443.2 E)									
- Point									
SCHNEIDER/DIC/CO	0.00	0.00	7,620.5	397.1	-1,079.4	1,355,921.58	3,253,450.80	40.306840	-104.591210
- survey misses target center by 1004.8usft at 7279.2usft MD (6845.0 TVD, 496.2 N, -448.2 E)									
- Circle (radius 30.0)									

Survey Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
935.0	934.9	7.8	-4.7	SURFACE CASING
6,154.0	6,105.5	-222.9	-451.7	KOP
7,385.0	6,854.8	601.5	-450.2	ICP
11,267.0	6,844.2	4,481.1	-440.8	LAST SURVEY - OCT 25,2015
11,318.0	6,845.6	4,532.0	-443.2	EXTRAPOLATION TO TD

Checked By: _____ Approved By: _____ Date: _____