

PDC ENERGY

WELD COUNTY, COLORADO

SW SW SEC. 29 T5N R63W 6th P.M.

R&R FARMS 29L-301

JOB #2015-074-135

27 July, 2015

Survey: FINAL SURVEYS





Project: WELD COUNTY, COLORADO
Site: SW SW SEC. 29 T5N R63W 6th P.M.
Well: R&R FARMS 29L-301
Wellbore: JOB #2015-074-135
Design: FINAL SURVEYS

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Dep	Annotation
953.9	954.0	2.03	177.04	-8.0	-2.6	-8.3	18.4	SURFACE CASING
5686.2	5790.0	5.24	54.54	-601.8	727.2	-465.5	969.1	KOP
6471.7	7023.0	87.72	0.27	186.6	720.8	309.7	1761.7	ICP
6445.2	10903.0	92.50	356.30	4065.2	717.4	4128.0	5641.1	LAST SURVEY - JULY 27, 2015
6442.8	10957.0	92.50	356.30	4119.1	713.9	4180.4	5695.0	EXTRAPOLATION TO TD

AS DRILLED: LOCAL COORDINATES:

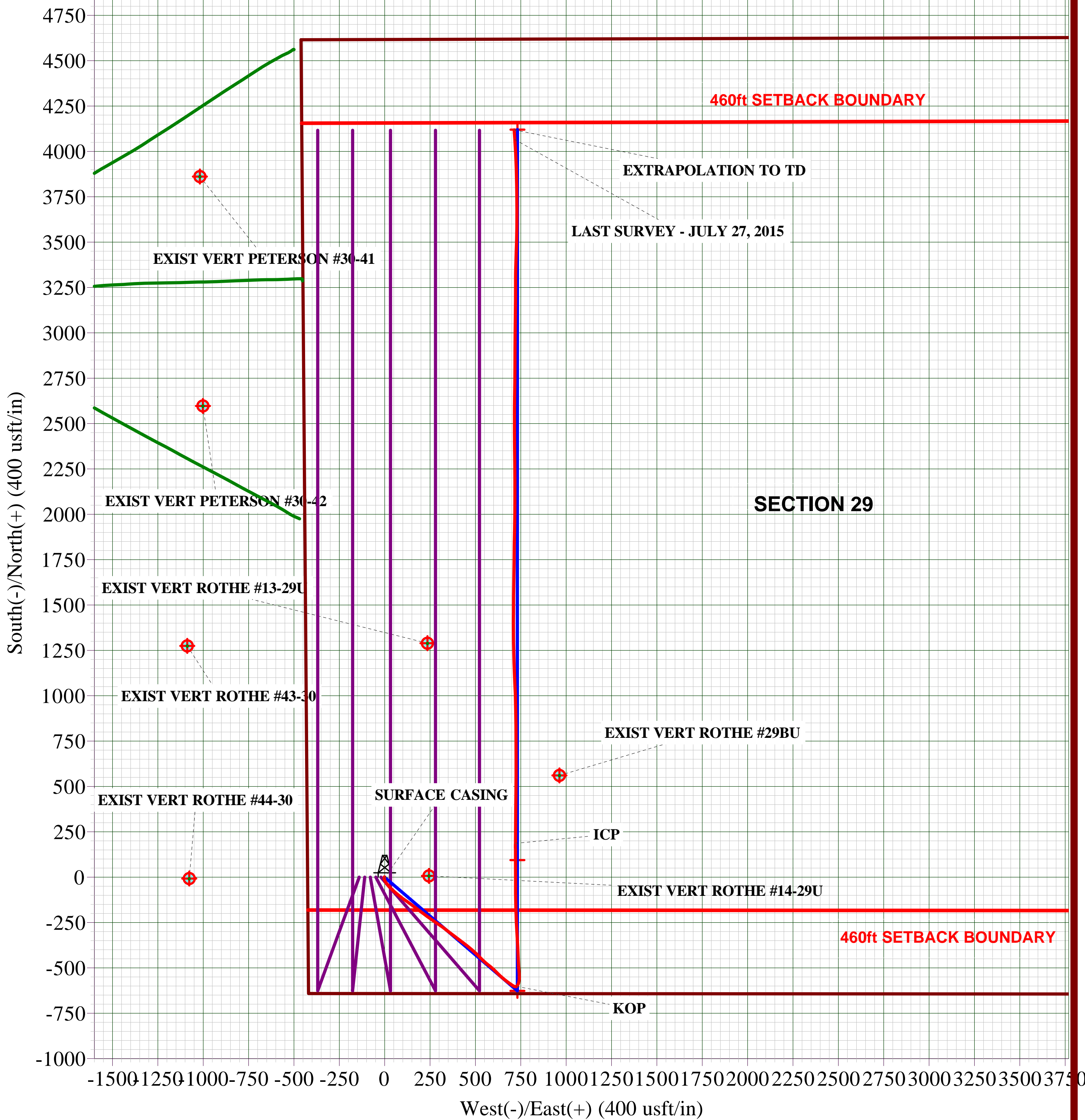
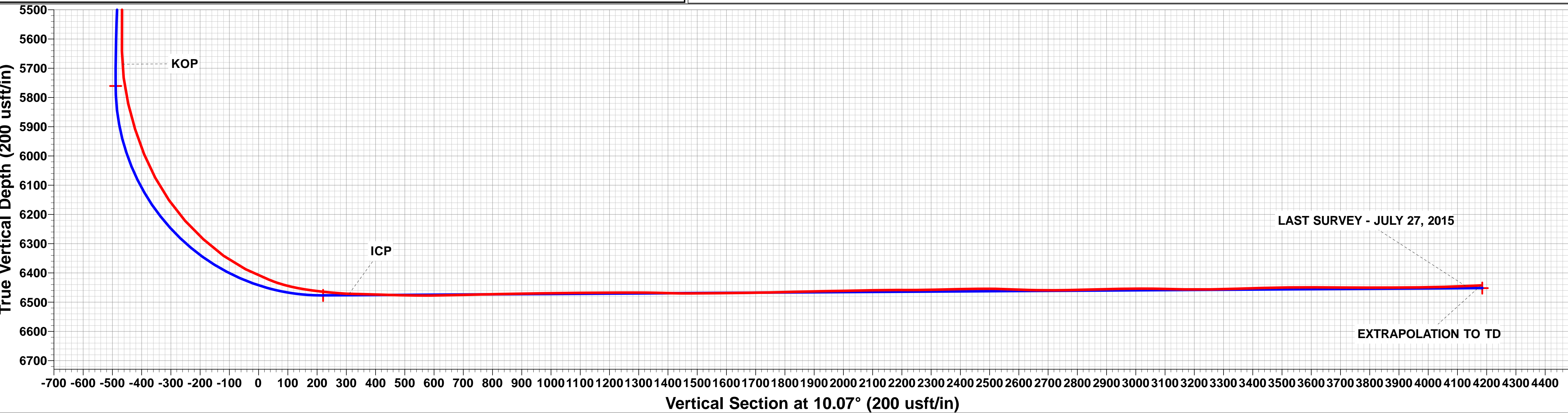
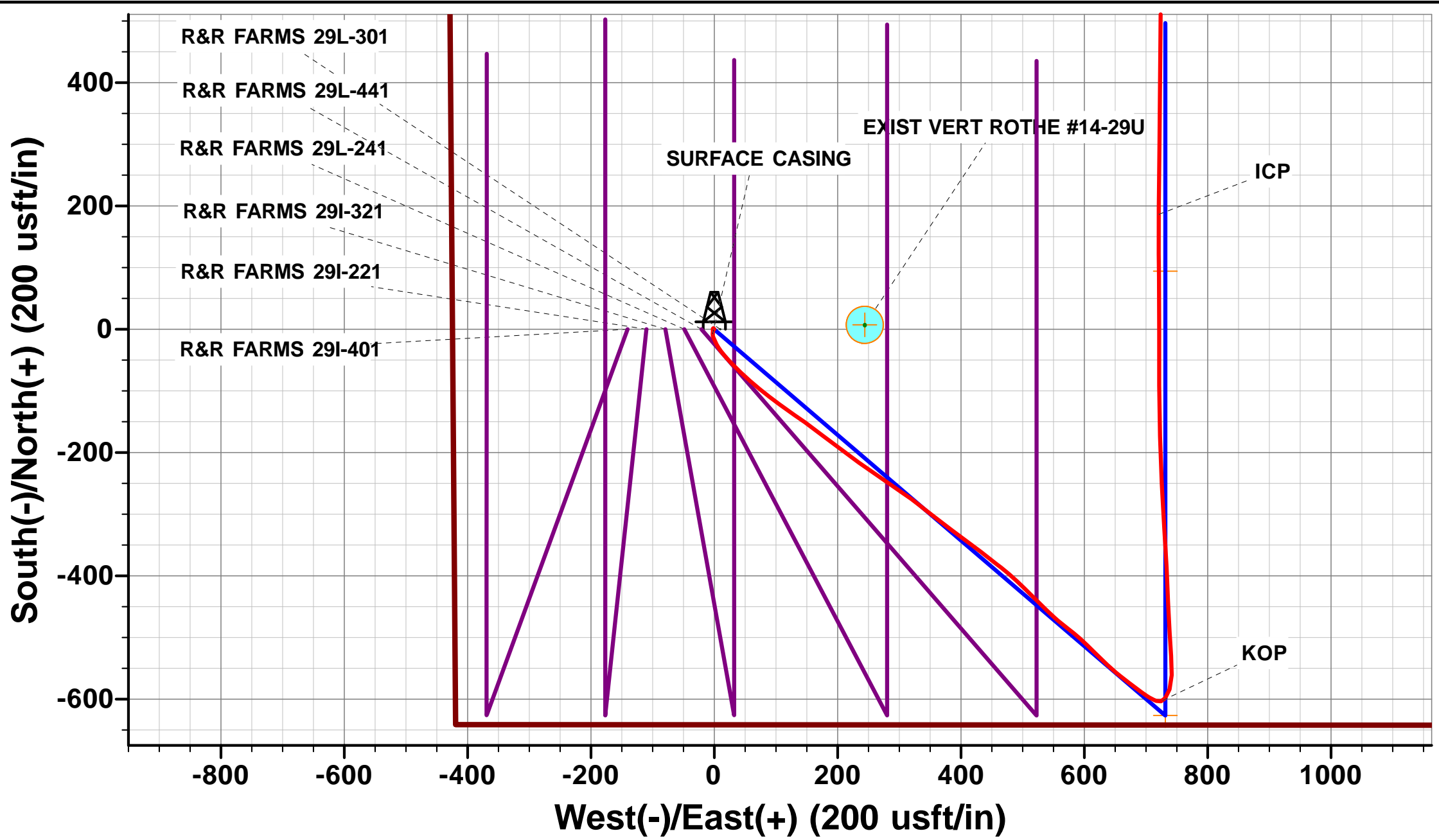
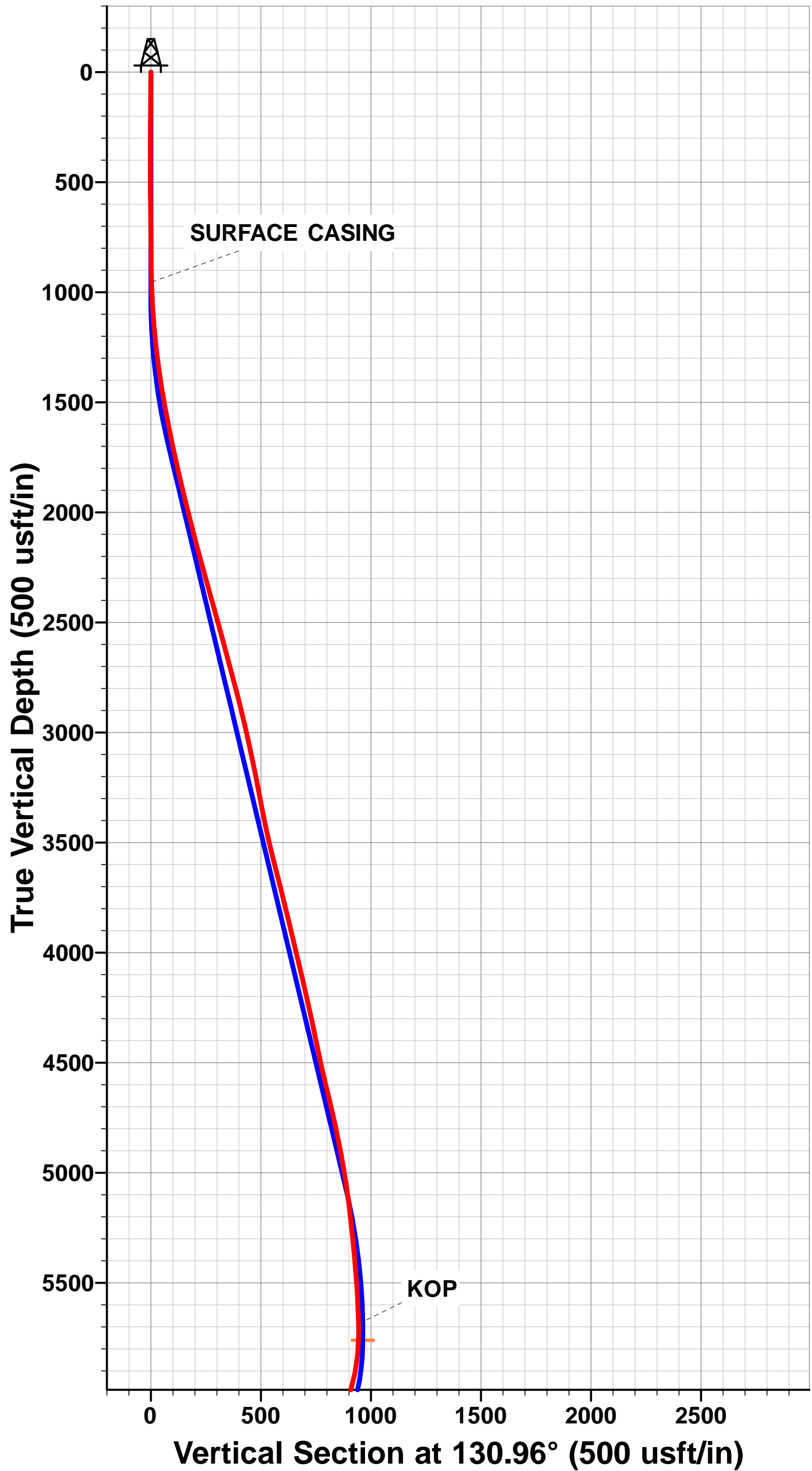
SHL: 641ft FSL & 424ft FWL Sec 29

ICP: 827.6ft FSL & 1144.8ft FWL Sec 29

BHL: 501.3ft FNL & 1170.3ft FWL Sec 29

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
7" ICP *NEW* - R&R FARMS 29L-301	6477.0	94.2	731.6	40.365299	-104.465471
BHL - R&R FARMS 29L-301	6452.0	4120.4	731.6	40.376350	-104.465470
KOP - R&R FARMS 29L-301	5760.8	-626.4	731.6	40.363321	-104.465471



Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29L-301
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB @ 4587.0usft (ENS 135)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB @ 4587.0usft (ENS 135)
Well:	R&R FARMS 29L-301	North Reference:	True
Wellbore:	JOB #2015-074-135	Survey Calculation Method:	Minimum Curvature
Design:	FINAL 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	SW SW SEC. 29 T5N R63W 6th P.M.				
Site Position:		Northing:	1,377,496.04 usft	Latitude:	40.365040
From:	Lat/Long	Easting:	3,287,397.23 usft	Longitude:	-104.468600
Position Uncertainty:	0.0 usft	Slot Radius:	1.10000 ft	Grid Convergence:	0.67 °

Well	R&R FARMS 29L-301					
Well Position	+N/-S	0.0 usft	Northing:	1,377,497.65 usft	Latitude:	40.365040
	+E/-W	0.0 usft	Easting:	3,287,537.72 usft	Longitude:	-104.468096
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,574.0 usft

Wellbore	JOB #2015-074-135				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	20/07/2015	8.25	66.92	52,625

Design	FINAL 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	10.07

Survey Program	Date	27/07/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
266.0	10,957.0	FINAL SURVEYS (JOB #2015-074-135)	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	-4,587.0	0.0	0.0	0.0	0.00	0.00	0.00
266.0	1.00	325.60	266.0	-4,321.0	1.9	-1.3	1.7	0.38	0.38	0.00
547.0	1.20	170.20	547.0	-4,040.0	1.0	-2.2	0.6	0.77	0.07	-55.30
826.0	1.20	188.30	825.9	-3,761.1	-4.7	-2.1	-5.0	0.14	0.00	6.49
912.0	1.50	193.90	911.9	-3,675.1	-6.7	-2.5	-7.1	0.38	0.35	6.51
SURFACE CASING										
954.0	2.03	177.04	953.9	-3,633.1	-8.0	-2.6	-8.3	1.75	1.26	-40.15
1,202.0	6.10	152.10	1,201.2	-3,385.8	-24.0	3.8	-23.0	1.75	1.64	-10.05
1,482.0	9.90	136.00	1,478.5	-3,108.5	-54.5	27.5	-48.9	1.56	1.36	-5.75
1,763.0	12.60	130.50	1,754.0	-2,833.0	-91.8	67.6	-78.6	1.03	0.96	-1.96
2,042.0	14.20	124.60	2,025.5	-2,561.5	-131.0	118.9	-108.2	0.75	0.57	-2.11
2,316.0	15.80	127.50	2,290.1	-2,296.9	-172.8	176.1	-139.3	0.64	0.58	1.06
2,587.0	15.30	125.70	2,551.2	-2,035.8	-216.1	234.5	-171.8	0.26	-0.18	-0.66

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29L-301
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB @ 4587.0usft (ENS 135)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB @ 4587.0usft (ENS 135)
Well:	R&R FARMS 29L-301	North Reference:	True
Wellbore:	JOB #2015-074-135	Survey Calculation Method:	Minimum Curvature
Design:	FINAL 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)
2,857.0	14.80	123.80	2,811.9	-1,775.1	-256.1	292.0	-201.1	0.26	-0.19	-0.70
3,128.0	12.00	128.80	3,075.5	-1,511.5	-293.0	342.8	-228.6	1.12	-1.03	1.85
3,398.0	10.70	126.40	3,340.3	-1,246.7	-325.5	384.8	-253.2	0.51	-0.48	-0.89
3,669.0	14.60	127.00	3,604.6	-982.4	-361.0	432.4	-279.8	1.44	1.44	0.22
3,940.0	13.40	130.80	3,867.6	-719.4	-402.0	483.4	-311.3	0.56	-0.44	1.40
4,210.0	13.40	136.60	4,130.2	-456.8	-445.2	528.6	-345.9	0.50	0.00	2.15
4,481.0	11.50	126.60	4,394.9	-192.1	-484.1	571.9	-376.7	1.06	-0.70	-3.69
4,752.0	13.90	135.90	4,659.3	72.3	-523.6	616.2	-407.8	1.16	0.89	3.43
5,023.0	10.50	128.00	4,924.1	337.1	-562.2	658.3	-438.5	1.39	-1.25	-2.92
5,294.0	6.50	126.70	5,192.1	605.1	-586.6	690.1	-456.9	1.48	-1.48	-0.48
5,566.0	4.70	116.90	5,462.8	875.8	-600.9	712.4	-467.1	0.75	-0.66	-3.60
5,746.0	3.40	79.80	5,642.4	1,055.4	-603.2	724.2	-467.3	1.59	-0.72	-20.61
KOP										
5,790.0	5.24	54.54	5,686.2	1,099.2	-601.8	727.2	-465.5	5.91	4.17	-57.41
5,837.0	7.70	42.90	5,732.9	1,145.9	-598.3	731.0	-461.3	5.91	5.24	-24.77
5,927.0	13.40	17.60	5,821.4	1,234.4	-583.9	738.3	-445.9	8.02	6.33	-28.11
6,017.0	17.10	2.10	5,908.3	1,321.3	-560.7	742.0	-422.4	6.08	4.11	-17.22
6,108.0	23.20	355.20	5,993.7	1,406.7	-529.5	740.9	-391.8	7.18	6.70	-7.58
6,198.0	28.80	356.70	6,074.5	1,487.5	-490.1	738.2	-353.5	6.26	6.22	1.67
6,289.0	35.50	357.60	6,151.5	1,564.5	-441.8	735.8	-306.4	7.38	7.36	0.99
6,379.0	41.90	357.80	6,221.7	1,634.7	-385.6	733.6	-251.4	7.11	7.11	0.22
6,469.0	49.00	355.30	6,284.8	1,697.8	-321.6	729.6	-189.1	8.13	7.89	-2.78
6,560.0	54.00	358.20	6,341.5	1,754.5	-250.6	725.7	-119.8	6.03	5.49	3.19
6,650.0	64.30	357.70	6,387.6	1,800.6	-173.5	722.9	-44.4	11.45	11.44	-0.56
6,740.0	68.30	0.20	6,423.7	1,836.7	-91.1	721.4	36.4	5.12	4.44	2.78
6,831.0	78.60	359.90	6,449.6	1,862.6	-4.0	721.5	122.2	11.32	11.32	-0.33
6,921.0	83.80	359.70	6,463.4	1,876.4	84.9	721.2	209.7	5.78	5.78	-0.22
6,989.0	85.60	359.70	6,469.7	1,882.7	152.6	720.8	276.3	2.65	2.65	0.00
ICP										
7,023.0	87.72	0.27	6,471.7	1,884.7	186.6	720.8	309.7	6.47	6.25	1.67
7,037.0	88.60	0.50	6,472.1	1,885.1	200.6	720.9	323.5	6.47	6.25	1.66
7,127.0	88.60	0.70	6,474.3	1,887.3	290.5	721.8	412.3	0.22	0.00	0.22
7,218.0	88.30	0.40	6,476.8	1,889.8	381.5	722.7	502.0	0.47	-0.33	-0.33
7,308.0	90.80	0.50	6,477.5	1,890.5	471.5	723.4	590.7	2.78	2.78	0.11
7,398.0	91.20	0.40	6,475.9	1,888.9	561.5	724.1	679.4	0.46	0.44	-0.11
7,488.0	91.50	359.70	6,473.8	1,886.8	651.5	724.2	768.0	0.85	0.33	-0.78
7,578.0	90.90	0.00	6,471.9	1,884.9	741.4	724.0	856.6	0.75	-0.67	0.33
7,668.0	90.90	359.50	6,470.5	1,883.5	831.4	723.6	945.1	0.56	0.00	-0.56
7,758.0	90.90	358.90	6,469.1	1,882.1	921.4	722.3	1,033.5	0.67	0.00	-0.67
7,849.0	90.30	358.30	6,468.1	1,881.1	1,012.4	720.1	1,122.7	0.93	-0.66	-0.66
7,939.0	90.20	356.80	6,467.7	1,880.7	1,102.3	716.3	1,210.5	1.67	-0.11	-1.67
8,029.0	90.10	358.80	6,467.5	1,880.5	1,192.2	712.8	1,298.5	2.22	-0.11	2.22
8,119.0	88.10	358.60	6,468.9	1,881.9	1,282.2	710.8	1,386.7	2.23	-2.22	-0.22
8,209.0	90.30	0.40	6,470.2	1,883.2	1,372.1	710.0	1,475.1	3.16	2.44	2.00
8,299.0	90.60	0.00	6,469.4	1,882.4	1,462.1	710.3	1,563.8	0.56	0.33	-0.44
8,390.0	90.60	0.50	6,468.5	1,881.5	1,553.1	710.7	1,653.5	0.55	0.00	0.55
8,480.0	91.20	0.70	6,467.1	1,880.1	1,643.1	711.6	1,742.2	0.70	0.67	0.22
8,570.0	91.60	0.90	6,464.9	1,877.9	1,733.1	712.9	1,831.0	0.50	0.44	0.22
8,661.0	91.00	1.00	6,462.8	1,875.8	1,824.1	714.4	1,920.9	0.67	-0.66	0.11
8,751.0	90.90	1.10	6,461.3	1,874.3	1,914.0	716.0	2,009.7	0.16	-0.11	0.11
8,841.0	91.30	0.80	6,459.6	1,872.6	2,004.0	717.5	2,098.6	0.56	0.44	-0.33
8,932.0	90.20	359.70	6,458.4	1,871.4	2,095.0	717.9	2,188.2	1.71	-1.21	-1.21
9,022.0	90.30	359.90	6,458.0	1,871.0	2,185.0	717.6	2,276.8	0.25	0.11	0.22

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29L-301
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB @ 4587.0usft (ENS 135)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB @ 4587.0usft (ENS 135)
Well:	R&R FARMS 29L-301	North Reference:	True
Wellbore:	JOB #2015-074-135	Survey Calculation Method:	Minimum Curvature
Design:	FINAL 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)
9,113.0	91.50	359.30	6,456.6	1,869.6	2,276.0	717.0	2,366.3	1.47	1.32	-0.66
9,203.0	91.00	359.50	6,454.6	1,867.6	2,365.9	716.0	2,454.7	0.60	-0.56	0.22
9,294.0	88.00	359.80	6,455.4	1,868.4	2,456.9	715.5	2,544.2	3.31	-3.30	0.33
9,384.0	88.20	0.00	6,458.4	1,871.4	2,546.9	715.3	2,632.7	0.31	0.22	0.22
9,474.0	90.40	1.00	6,459.5	1,872.5	2,636.9	716.1	2,721.4	2.69	2.44	1.11
9,565.0	91.50	0.70	6,458.0	1,871.0	2,727.8	717.5	2,811.3	1.25	1.21	-0.33
9,655.0	91.10	0.10	6,456.0	1,869.0	2,817.8	718.1	2,900.0	0.80	-0.44	-0.67
9,746.0	91.10	0.40	6,454.2	1,867.2	2,908.8	718.5	2,989.6	0.33	0.00	0.33
9,836.0	88.40	0.50	6,454.6	1,867.6	2,998.8	719.2	3,078.3	3.00	-3.00	0.11
9,926.0	89.10	0.70	6,456.6	1,869.6	3,088.8	720.1	3,167.1	0.81	0.78	0.22
10,016.0	90.90	0.50	6,456.6	1,869.6	3,178.7	721.1	3,255.8	2.01	2.00	-0.22
10,107.0	92.00	359.80	6,454.3	1,867.3	3,269.7	721.3	3,345.5	1.43	1.21	-0.77
10,197.0	91.30	1.70	6,451.7	1,864.7	3,359.7	722.5	3,434.2	2.25	-0.78	2.11
10,288.0	90.90	1.60	6,449.9	1,862.9	3,450.6	725.1	3,524.2	0.45	-0.44	-0.11
10,378.0	89.70	1.70	6,449.4	1,862.4	3,540.6	727.7	3,613.3	1.34	-1.33	0.11
10,469.0	89.60	0.00	6,450.0	1,863.0	3,631.6	729.1	3,703.1	1.87	-0.11	-1.87
10,559.0	89.80	359.40	6,450.5	1,863.5	3,721.5	728.6	3,791.6	0.70	0.22	-0.67
10,649.0	90.30	359.10	6,450.4	1,863.4	3,811.5	727.4	3,880.0	0.65	0.56	-0.33
10,739.0	90.60	358.50	6,449.7	1,862.7	3,901.5	725.5	3,968.3	0.75	0.33	-0.67
10,830.0	91.70	356.80	6,447.9	1,860.9	3,992.4	721.8	4,057.1	2.22	1.21	-1.87
LAST SURVEY - JULY 27, 2015										
10,903.0	92.50	356.30	6,445.2	1,858.2	4,065.2	717.4	4,128.0	1.29	1.10	-0.68
EXTRAPOLATION TO TD										
10,957.0	92.50	356.30	6,442.8	1,855.8	4,119.1	713.9	4,180.4	0.00	0.00	0.00

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29L-301
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB @ 4587.0usft (ENS 135)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB @ 4587.0usft (ENS 135)
Well:	R&R FARMS 29L-301	North Reference:	True
Wellbore:	JOB #2015-074-135	Survey Calculation Method:	Minimum Curvature
Design:	FINAL 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)		
EXIST VERT ROTHE #2	0.00	0.00	6,722.0	561.1	963.0	1,378,069.86	3,288,494.08	40.366580	-104.464640
- survey misses target center by 342.9usft at 7395.2usft MD (6476.0 TVD, 558.6 N, 724.1 E)									
- Circle (radius 30.0)									
EXIST VERT ROTHE #4	0.00	0.00	6,764.0	-7.3	-1,076.8	1,377,477.87	3,286,461.10	40.365020	-104.471960
- survey misses target center by 1824.7usft at 6882.1usft MD (6458.4 TVD, 46.4 N, 721.3 E)									
- Circle (radius 30.0)									
7" ICP *NEW* - R&R FA	0.00	0.00	6,477.0	94.2	731.6	1,377,600.36	3,288,268.12	40.365299	-104.465471
- survey misses target center by 16.3usft at 6931.4usft MD (6464.5 TVD, 95.3 N, 721.1 E)									
- Point									
EXIST VERT ROTHE #1	0.00	0.00	6,733.0	1,289.7	235.7	1,378,789.92	3,287,758.37	40.368580	-104.467250
- survey misses target center by 543.1usft at 8134.3usft MD (6469.4 TVD, 1297.5 N, 710.4 E)									
- Circle (radius 30.0)									
BHL - R&R FARMS 29L-	0.00	0.00	6,452.0	4,120.4	731.6	1,381,626.09	3,288,221.30	40.376350	-104.465470
- survey misses target center by 20.0usft at 10956.8usft MD (6442.8 TVD, 4118.8 N, 713.9 E)									
- Point									
EXIST VERT PETERSO	0.00	0.00	6,741.0	3,861.7	-1,018.1	1,381,347.10	3,286,474.76	40.375640	-104.471750
- survey misses target center by 1768.3usft at 10764.9usft MD (6449.3 TVD, 3927.4 N, 724.7 E)									
- Circle (radius 30.0)									
EXIST VERT ROTHE #4	0.00	0.00	6,747.0	1,275.1	-1,087.9	1,378,759.97	3,286,435.09	40.368540	-104.472000
- survey misses target center by 1819.8usft at 8131.5usft MD (6469.3 TVD, 1294.7 N, 710.5 E)									
- Circle (radius 30.0)									
EXIST VERT PETERSO	0.00	0.00	6,785.0	2,597.6	-1,001.5	1,380,083.27	3,286,506.13	40.372170	-104.471690
- survey misses target center by 1747.6usft at 9423.7usft MD (6459.3 TVD, 2586.5 N, 715.5 E)									
- Circle (radius 30.0)									
KOP - R&R FARMS 29L	0.00	0.00	5,760.8	-626.4	731.6	1,376,879.84	3,288,276.51	40.363321	-104.465471
- survey misses target center by 31.2usft at 5860.0usft MD (5755.7 TVD, -595.7 N, 733.1 E)									
- Point									
EXIST VERT ROTHE #1	0.00	0.00	6,721.0	7.3	244.1	1,377,507.79	3,287,781.67	40.365060	-104.467220
- survey misses target center by 546.1usft at 6885.3usft MD (6458.9 TVD, 49.5 N, 721.3 E)									
- Circle (radius 30.0)									

Survey Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
954.0	953.9	-8.0	-2.6	SURFACE CASING
5,790.0	5,686.2	-601.8	727.2	KOP
7,023.0	6,471.7	186.6	720.8	ICP
10,903.0	6,445.2	4,065.2	717.4	LAST SURVEY - JULY 27, 2015
10,957.0	6,442.8	4,119.1	713.9	EXTRAPOLATION TO TD

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------