

PDC ENERGY

WELD COUNTY, COLORADO

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

R&R FARMS 29I-221

JOB # 2015-078-135

25 August, 2015

Survey: FINAL SURVEYS





Project: WELD COUNTY, COLORADO
Site: SW SW SEC. 29 T5N R63W 6th P.M.
Well: R&R FARMS 29I-221
Wellbore: JOB # 2015-078-135
Design: FINAL SURVEYS

ANNOTATIONS									
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation	
907.0	907.0	1.09	211.74	3.0	-7.4	3.1	10.1	SURFACE CASING	
5639.4	5703.0	2.27	12.18	-641.7	-73.6	-640.4	668.4	KOP	
6393.9	6855.0	90.25	358.57	80.5	-67.8	81.6	1390.9	ICP	
6375.8	10835.0	90.50	358.50	4059.7	-63.2	4060.2	5370.5	LAST SURVEY - AUG 24, 2015	
6375.4	10890.0	90.50	358.50	4114.7	-64.6	4115.2	5425.5	EXTRAPOLATION TO TD	

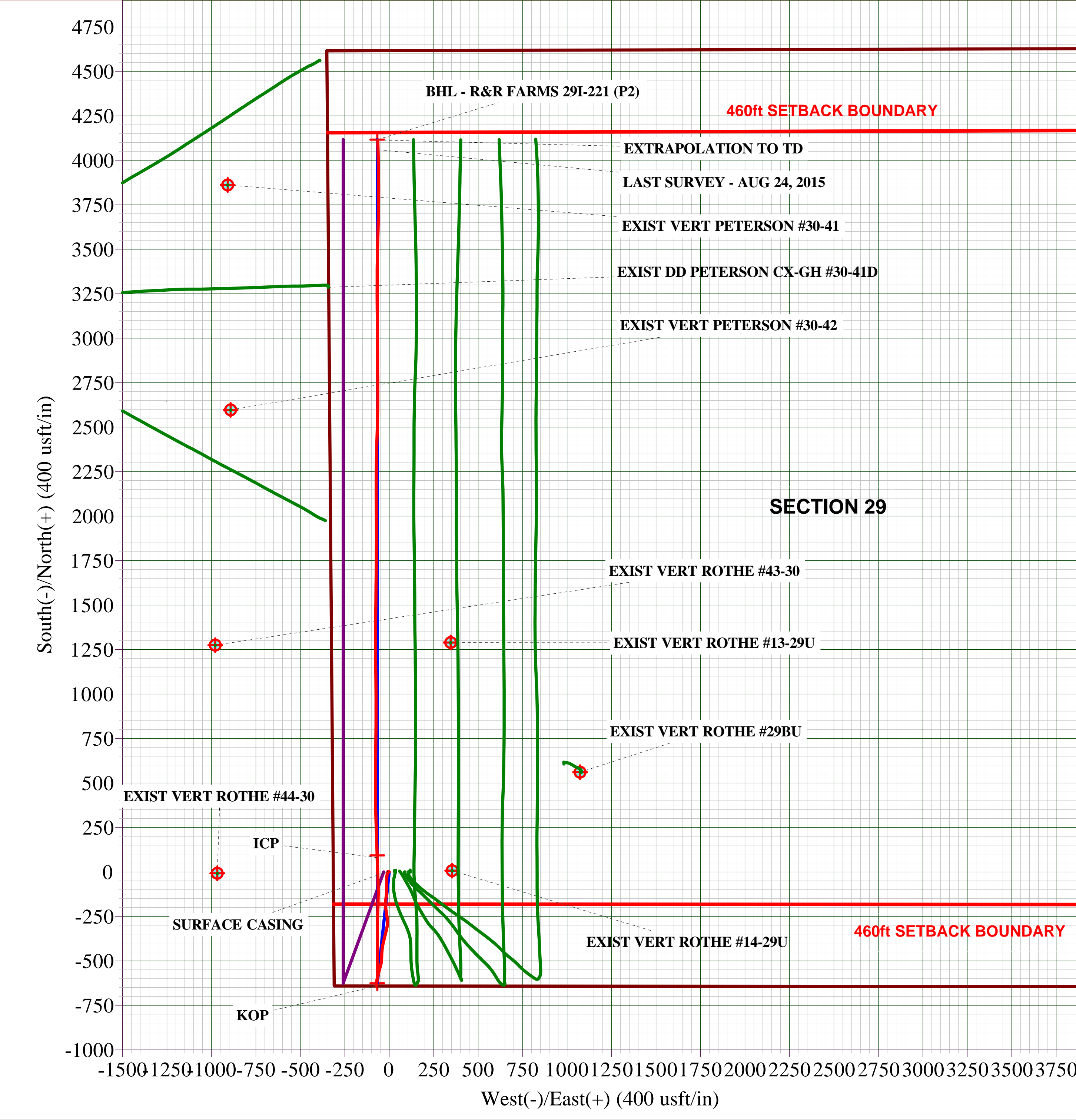
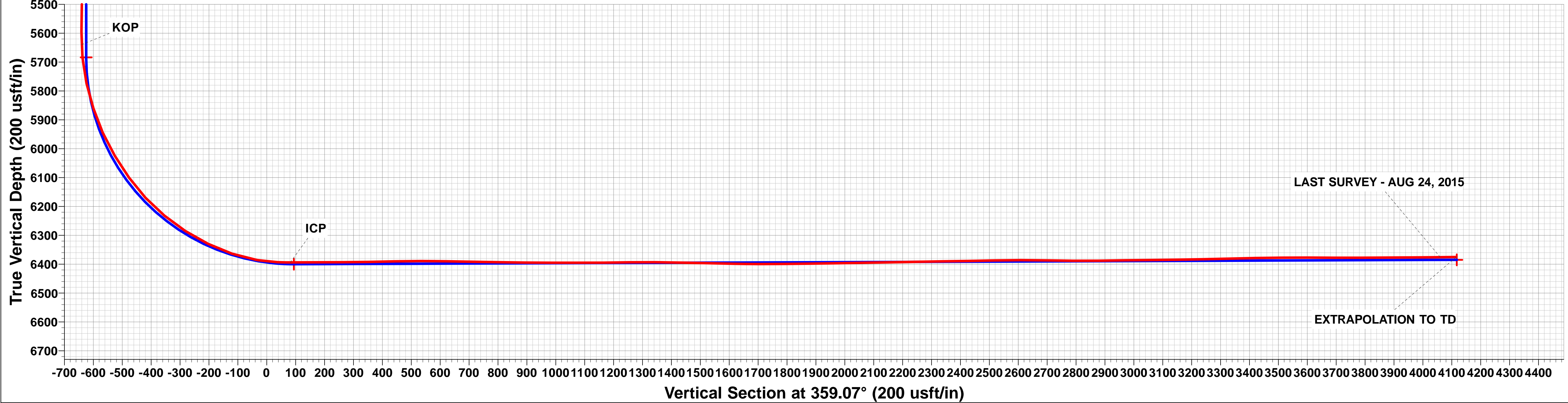
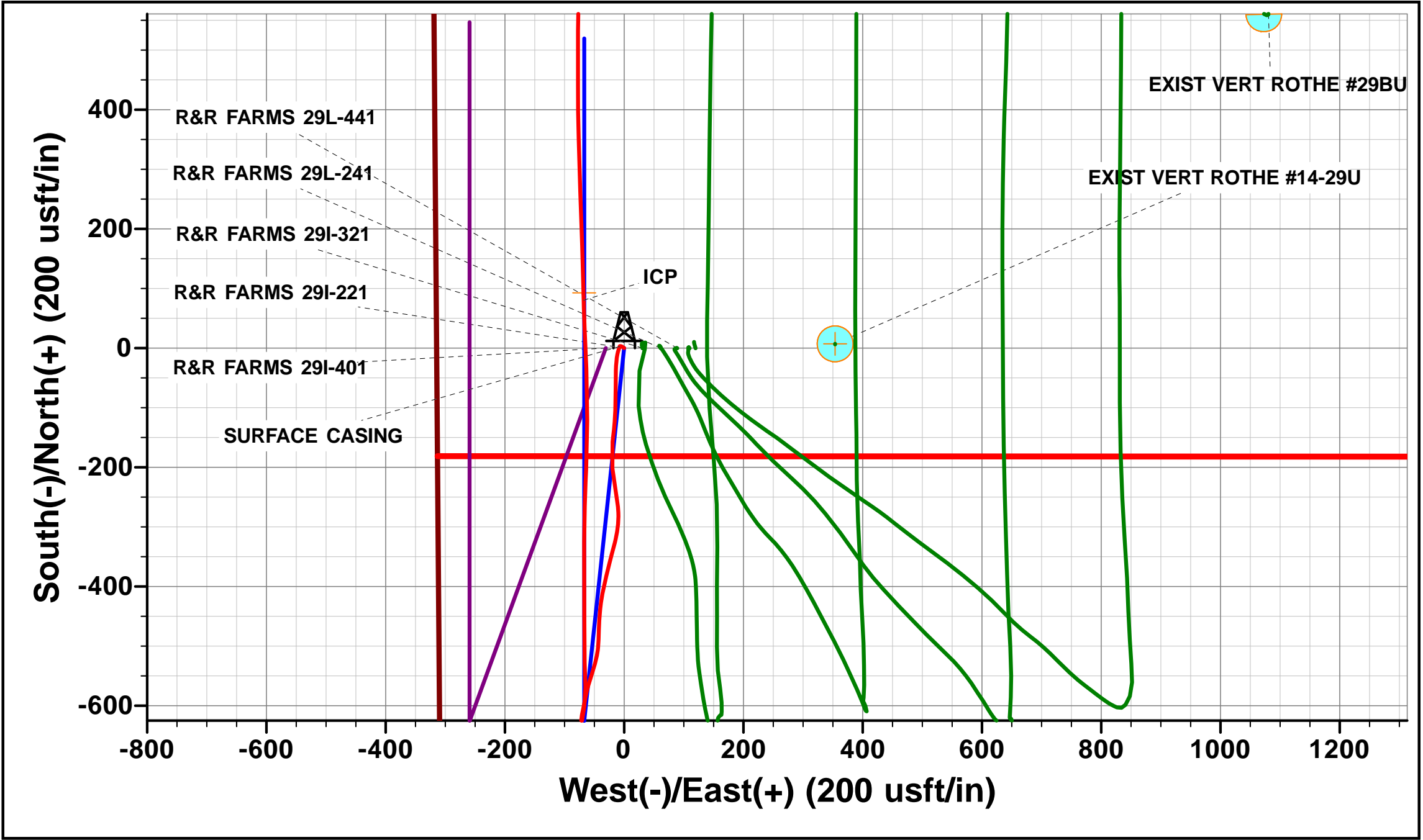
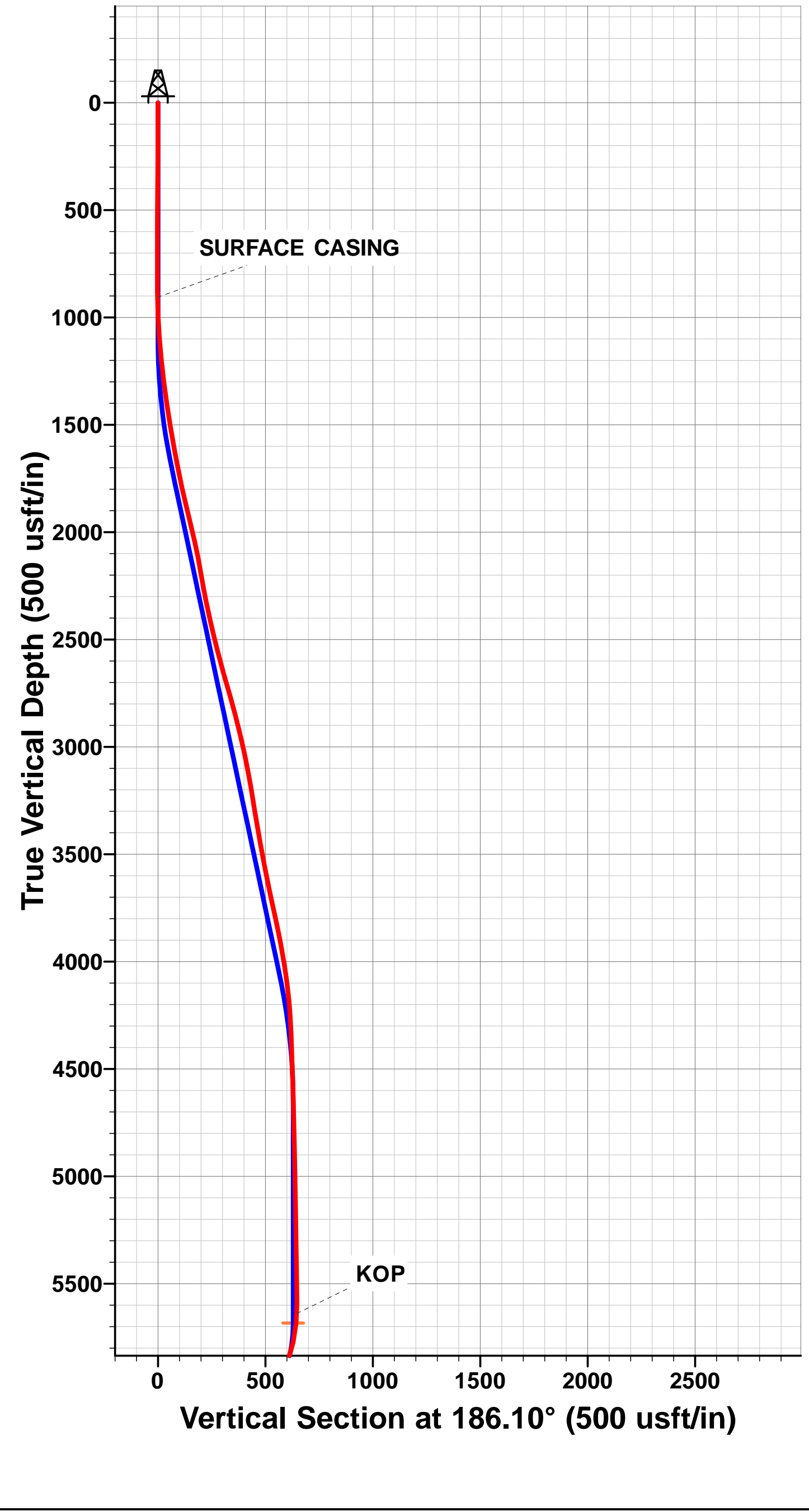
AS DRILLED LOCAL COORDINATES:

SHL: 641ft FSL & 314t FWL Sec 29

7" ICP : 721.5ft FSL & 246.2ft FWL Sec 29

BHL: 502ft FNL & 283.3ft FWL Sec 29

WELLBORE TARGET DETAILS (LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
7" ICP *NEW* - R&R FARMS 29I-221 (P2)	6400.0	92.9	-66.9	40.365295	-104.468730	Point
BHL - R&R FARMS 29I-221 (P2)	6385.0	4116.7	-66.9	40.376340	-104.468730	Point
KOP - R&R FARMS 29I-221 (P2)	5683.8	-625.9	-66.9	40.363322	-104.468730	Point



Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29I-221
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Well:	R&R FARMS 29I-221	North Reference:	True
Wellbore:	JOB # 2015-078-135	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:	1.10000ft	Grid Convergence:	0.67 °

Well	R&R FARMS 29I-221					
Well Position	+N-S	0.0 usft	Northing:	1,377,496.38 usft	Latitude:	40.365040
	+E-W	0.0 usft	Easting:	3,287,427.88 usft	Longitude:	-104.468490
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,574.0 usft

Wellbore	JOB # 2015-078-135				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	15/07/2015	8.25	66.92	52,627

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	359.07	

Survey Program	Date	25/08/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
264.0	10,890.0	FINAL SURVEYS (JOB # 2015-078-135)	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
264.0	0.80	307.00	264.0	4,323.0	1.1	-1.5	1.1	0.30	0.30	0.00
545.0	0.60	302.80	545.0	4,042.0	3.1	-4.3	3.2	0.07	-0.07	-1.49
824.0	0.50	253.60	824.0	3,763.0	3.5	-6.7	3.6	0.17	-0.04	-17.63
865.0	0.50	246.40	865.0	3,722.0	3.4	-7.0	3.5	0.15	0.00	-17.56
SURFACE CASING										
907.0	1.09	211.74	907.0	3,680.0	3.0	-7.4	3.1	1.75	1.41	-82.53
1,105.0	4.50	194.40	1,104.7	3,482.3	-6.1	-10.3	-6.0	1.75	1.72	-8.76
1,386.0	8.30	182.60	1,383.9	3,203.1	-37.1	-14.0	-36.8	1.42	1.35	-4.20
1,667.0	10.80	178.90	1,661.0	2,926.0	-83.7	-14.4	-83.4	0.92	0.89	-1.32
1,947.0	14.10	186.80	1,934.4	2,652.6	-143.8	-17.9	-143.5	1.32	1.18	2.82
2,224.0	9.90	174.50	2,205.3	2,381.7	-201.0	-19.6	-200.7	1.77	-1.52	-4.44
2,495.0	14.10	170.00	2,470.3	2,116.7	-256.8	-11.7	-256.5	1.59	1.55	-1.66

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29I-221
Project:	WELD COUNTY, COLORADO	MD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	TD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Well:	R&R FARMS 29I-221	North Reference:	True
Wellbore:	JOB # 2015-078-135	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)
2,767.0	16.50	194.80	2,733.0	1,854.0	-326.8	-15.8	-326.5	2.54	0.88	9.12
3,038.0	12.60	192.90	2,995.2	1,591.8	-392.9	-32.2	-392.3	1.45	-1.44	-0.70
3,309.0	8.90	184.80	3,261.4	1,325.6	-442.6	-40.6	-441.9	1.47	-1.37	-2.99
3,580.0	10.90	181.30	3,528.4	1,058.6	-489.1	-42.9	-488.3	0.77	0.74	-1.29
3,852.0	12.80	198.40	3,794.7	792.3	-543.4	-53.0	-542.5	1.46	0.70	6.29
4,123.0	8.30	190.30	4,061.0	526.0	-591.2	-66.0	-590.0	1.74	-1.66	-2.99
4,394.0	2.00	195.50	4,330.8	256.2	-615.0	-70.8	-613.8	2.33	-2.32	1.92
4,664.0	1.90	179.10	4,600.6	-13.6	-624.0	-71.9	-622.8	0.21	-0.04	-6.07
4,935.0	1.20	174.90	4,871.5	-284.5	-631.3	-71.6	-630.1	0.26	-0.26	-1.55
5,206.0	1.00	214.40	5,142.5	-555.5	-636.1	-72.7	-634.8	0.28	-0.07	14.58
5,477.0	0.80	178.70	5,413.5	-826.5	-639.9	-74.0	-638.7	0.22	-0.07	-13.17
5,658.0	0.70	171.90	5,594.4	-1,007.4	-642.3	-73.8	-641.0	0.07	-0.06	-3.76
KOP										
5,703.0	2.27	12.18	5,639.4	-1,052.4	-641.7	-73.6	-640.4	6.52	3.49	-354.94
5,748.0	5.20	9.50	5,684.3	-1,097.3	-638.8	-73.1	-637.6	6.52	6.51	-5.95
5,839.0	12.80	10.20	5,774.1	-1,187.1	-624.8	-70.6	-623.6	8.35	8.35	0.77
5,929.0	18.70	8.20	5,860.7	-1,273.7	-600.7	-66.8	-599.5	6.58	6.56	-2.22
6,019.0	23.60	359.10	5,944.7	-1,357.7	-568.4	-65.0	-567.3	6.54	5.44	-10.11
6,109.0	31.30	357.90	6,024.5	-1,437.5	-526.9	-66.1	-525.8	8.58	8.56	-1.33
6,199.0	34.90	0.50	6,099.9	-1,512.9	-477.8	-66.8	-476.7	4.30	4.00	2.89
6,290.0	43.40	359.70	6,170.4	-1,583.4	-420.4	-66.7	-419.3	9.36	9.34	-0.88
6,380.0	49.90	359.50	6,232.1	-1,645.1	-355.0	-67.2	-353.9	7.22	7.22	-0.22
6,470.0	57.50	1.80	6,285.4	-1,698.4	-282.5	-66.3	-281.4	8.69	8.44	2.56
6,560.0	63.80	1.90	6,329.5	-1,742.5	-204.2	-63.7	-203.1	7.00	7.00	0.11
6,650.0	71.30	0.60	6,363.8	-1,776.8	-121.1	-62.0	-120.1	8.44	8.33	-1.44
6,740.0	80.30	357.70	6,385.9	-1,798.9	-33.9	-63.3	-32.9	10.48	10.00	-3.22
6,810.0	87.80	357.40	6,393.1	-1,806.1	35.6	-66.3	36.6	10.72	10.71	-0.43
ICP										
6,855.0	90.25	358.57	6,393.9	-1,806.9	80.5	-67.8	81.6	6.03	5.43	2.61
6,856.0	90.30	358.60	6,393.9	-1,806.9	81.5	-67.9	82.6	6.03	5.44	2.61
6,946.0	90.10	358.20	6,393.6	-1,806.6	171.5	-70.4	172.6	0.50	-0.22	-0.44
7,036.0	90.20	357.90	6,393.3	-1,806.3	261.4	-73.4	262.6	0.35	0.11	-0.33
7,126.0	91.10	358.60	6,392.3	-1,805.3	351.4	-76.2	352.6	1.27	1.00	0.78
7,217.0	91.30	359.90	6,390.4	-1,803.4	442.4	-77.4	443.6	1.45	0.22	1.43
7,307.0	90.10	0.30	6,389.3	-1,802.3	532.4	-77.2	533.5	1.41	-1.33	0.44
7,397.0	89.00	0.50	6,390.0	-1,803.0	622.4	-76.6	623.5	1.24	-1.22	0.22
7,487.0	88.90	0.80	6,391.6	-1,804.6	712.3	-75.6	713.5	0.35	-0.11	0.33
7,577.0	89.10	0.30	6,393.2	-1,806.2	802.3	-74.7	803.4	0.60	0.22	-0.56
7,668.0	89.30	0.30	6,394.5	-1,807.5	893.3	-74.2	894.4	0.22	0.22	0.00
7,758.0	89.90	359.50	6,395.1	-1,808.1	983.3	-74.4	984.4	1.11	0.67	-0.89
7,848.0	90.10	359.50	6,395.1	-1,808.1	1,073.3	-75.2	1,074.4	0.22	0.22	0.00
7,938.0	90.30	359.40	6,394.8	-1,807.8	1,163.3	-76.0	1,164.4	0.25	0.22	-0.11
8,028.0	91.40	359.50	6,393.5	-1,806.5	1,253.3	-76.9	1,254.4	1.23	1.22	0.11
8,118.0	88.90	0.40	6,393.2	-1,806.2	1,343.3	-77.0	1,344.3	2.95	-2.78	1.00
8,208.0	89.20	0.70	6,394.7	-1,807.7	1,433.3	-76.1	1,434.3	0.47	0.33	0.33
8,299.0	88.60	0.70	6,396.5	-1,809.5	1,524.2	-75.0	1,525.2	0.66	-0.66	0.00
8,389.0	88.80	0.50	6,398.5	-1,811.5	1,614.2	-74.1	1,615.2	0.31	0.22	-0.22
8,479.0	90.00	0.80	6,399.5	-1,812.5	1,704.2	-73.0	1,705.1	1.37	1.33	0.33
8,570.0	90.40	0.40	6,399.1	-1,812.1	1,795.2	-72.1	1,796.1	0.62	0.44	-0.44
8,660.0	90.90	0.00	6,398.1	-1,811.1	1,885.2	-71.8	1,886.1	0.71	0.56	-0.44
8,750.0	90.90	359.50	6,396.7	-1,809.7	1,975.2	-72.2	1,976.1	0.56	0.00	-0.56
8,840.0	91.20	359.40	6,395.1	-1,808.1	2,065.1	-73.0	2,066.1	0.35	0.33	-0.11
8,931.0	90.70	0.30	6,393.5	-1,806.5	2,156.1	-73.3	2,157.0	1.13	-0.55	0.99

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29I-221
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Well:	R&R FARMS 29I-221	North Reference:	True
Wellbore:	JOB # 2015-078-135	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)
9,021.0	91.40	0.10	6,391.9	-1,804.9	2,246.1	-73.0	2,247.0	0.81	0.78	-0.22
9,112.0	90.70	1.50	6,390.2	-1,803.2	2,337.1	-71.7	2,337.9	1.72	-0.77	1.54
9,202.0	90.90	1.70	6,389.0	-1,802.0	2,427.0	-69.2	2,427.8	0.31	0.22	0.22
9,292.0	91.50	1.40	6,387.1	-1,800.1	2,517.0	-66.7	2,517.7	0.75	0.67	-0.33
9,383.0	89.80	0.90	6,386.1	-1,799.1	2,608.0	-64.9	2,608.7	1.95	-1.87	-0.55
9,473.0	89.20	359.70	6,386.8	-1,799.8	2,698.0	-64.4	2,698.6	1.49	-0.67	-1.33
9,564.0	88.90	359.40	6,388.4	-1,801.4	2,788.9	-65.2	2,789.6	0.47	-0.33	-0.33
9,654.0	91.50	0.10	6,388.0	-1,801.0	2,878.9	-65.6	2,879.6	2.99	2.89	0.78
9,745.0	90.40	359.70	6,386.5	-1,799.5	2,969.9	-65.7	2,970.6	1.29	-1.21	-0.44
9,835.0	90.70	359.50	6,385.7	-1,798.7	3,059.9	-66.3	3,060.6	0.40	0.33	-0.22
9,925.0	90.90	359.10	6,384.4	-1,797.4	3,149.9	-67.4	3,150.6	0.50	0.22	-0.44
10,016.0	90.90	0.10	6,383.0	-1,796.0	3,240.9	-68.1	3,241.6	1.10	0.00	1.10
10,106.0	91.80	0.00	6,380.9	-1,793.9	3,330.9	-68.0	3,331.5	1.01	1.00	-0.11
10,196.0	91.00	1.00	6,378.7	-1,791.7	3,420.8	-67.2	3,421.5	1.42	-0.89	1.11
10,287.0	90.50	1.40	6,377.5	-1,790.5	3,511.8	-65.3	3,512.4	0.70	-0.55	0.44
10,377.0	89.70	1.40	6,377.3	-1,790.3	3,601.8	-63.1	3,602.3	0.89	-0.89	0.00
10,468.0	89.80	1.10	6,377.7	-1,790.7	3,692.7	-61.1	3,693.2	0.35	0.11	-0.33
10,558.0	90.20	1.00	6,377.7	-1,790.7	3,782.7	-59.5	3,783.2	0.46	0.44	-0.11
10,648.0	90.40	359.00	6,377.2	-1,790.2	3,872.7	-59.5	3,873.2	2.23	0.22	-2.22
10,738.0	90.40	359.00	6,376.6	-1,789.6	3,962.7	-61.0	3,963.2	0.00	0.00	0.00
LAST SURVEY - AUG 24, 2015										
10,835.0	90.50	358.50	6,375.8	-1,788.8	4,059.7	-63.2	4,060.2	0.53	0.10	-0.52
EXTRAPOLATION TO TD										
10,890.0	90.50	358.50	6,375.4	-1,788.4	4,114.7	-64.6	4,115.2	0.00	0.00	0.00

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29I-221
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Well:	R&R FARMS 29I-221	North Reference:	True
Wellbore:	JOB # 2015-078-135	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	
- Shape		(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	Latitude Longitude
EXIST VERT ROTHE		0.00	0.00	6,722.0	561.1	1,072.8	1,378,069.86	3,288,494.08	40.366580 -104.464640
- survey misses target center by 1197.0usft at 7346.3usft MD (6389.4 TVD, 571.7 N, -77.0 E)									
- Circle (radius 30.0)									
BHL - R&R FARMS 2I		0.00	0.00	6,385.0	4,116.7	-66.9	1,381,611.86	3,287,313.14	40.376340 -104.468730
- survey misses target center by 10.1usft at 10890.0usft MD (6375.4 TVD, 4114.7 N, -64.6 E)									
- Point									
EXIST VERT ROTHE		0.00	0.00	6,764.0	-7.3	-967.0	1,377,477.87	3,286,461.10	40.365020 -104.471960
- survey misses target center by 975.0usft at 6810.0usft MD (6393.1 TVD, 35.6 N, -66.3 E)									
- Circle (radius 30.0)									
KOP - R&R FARMS 2		0.00	0.00	5,683.8	-625.9	-66.9	1,376,869.77	3,287,368.27	40.363322 -104.468730
- survey misses target center by 14.3usft at 5749.6usft MD (5686.0 TVD, -638.7 N, -73.0 E)									
- Point									
7" ICP *NEW* - R&R I		0.00	0.00	6,417.0	94.5	-66.9	1,377,590.09	3,287,359.89	40.365299 -104.468730
- survey misses target center by 23.2usft at 6868.9usft MD (6393.8 TVD, 94.4 N, -68.2 E)									
- Point									
EXIST VERT ROTHE		0.00	0.00	6,733.0	1,289.7	345.5	1,378,789.92	3,287,758.37	40.368580 -104.467250
- survey misses target center by 542.5usft at 8063.1usft MD (6392.9 TVD, 1288.4 N, -77.1 E)									
- Circle (radius 30.0)									
EXIST VERT PETERI		0.00	0.00	6,741.0	3,861.7	-908.3	1,381,347.10	3,286,474.76	40.375640 -104.471750
- survey misses target center by 923.6usft at 10635.1usft MD (6377.3 TVD, 3859.8 N, -59.3 E)									
- Circle (radius 30.0)									
EXIST VERT ROTHE		0.00	0.00	6,747.0	1,275.1	-978.1	1,378,759.97	3,286,435.09	40.368540 -104.472000
- survey misses target center by 968.0usft at 8049.7usft MD (6393.1 TVD, 1275.0 N, -77.1 E)									
- Circle (radius 30.0)									
7" ICP *NEW* - R&R I		0.00	0.00	6,400.0	92.9	-66.9	1,377,588.50	3,287,359.91	40.365295 -104.468730
- survey misses target center by 6.3usft at 6867.3usft MD (6393.8 TVD, 92.8 N, -68.2 E)									
- Point									
KOP - R&R FARMS 2		0.00	0.00	5,700.8	-625.9	-66.9	1,376,869.77	3,287,368.27	40.363322 -104.468730
- survey misses target center by 12.6usft at 5766.4usft MD (5702.7 TVD, -636.9 N, -72.7 E)									
- Point									
EXIST VERT PETERI		0.00	0.00	6,785.0	2,597.5	-891.6	1,380,083.27	3,286,506.13	40.372170 -104.471690
- survey misses target center by 917.7usft at 9351.5usft MD (6386.1 TVD, 2576.4 N, -65.5 E)									
- Circle (radius 30.0)									
BHL - R&R FARMS 2I		0.00	0.00	6,393.0	4,116.7	-66.9	1,381,611.86	3,287,313.14	40.376340 -104.468730
- survey misses target center by 17.9usft at 10890.0usft MD (6375.4 TVD, 4114.7 N, -64.6 E)									
- Point									
EXIST VERT ROTHE		0.00	0.00	6,721.0	7.3	353.9	1,377,507.79	3,287,781.67	40.365060 -104.467220
- survey misses target center by 533.2usft at 6798.0usft MD (6392.5 TVD, 23.6 N, -65.7 E)									
- Circle (radius 30.0)									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
907.0	907.0	3.0	-7.4	SURFACE CASING
5,703.0	5,639.4	-641.7	-73.6	KOP
6,855.0	6,393.9	80.5	-67.8	ICP
10,835.0	6,375.8	4,059.7	-63.2	LAST SURVEY - AUG 24, 2015
10,890.0	6,375.4	4,114.7	-64.6	EXTRAPOLATION TO TD

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29I-221
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Well:	R&R FARMS 29I-221	North Reference:	True
Wellbore:	JOB # 2015-078-135	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	
- Shape		(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	
EXIST VERT ROTHE		0.00	0.00	6,722.0	561.1	1,072.8	1,378,069.86	3,288,494.08	40.366580
- survey misses target center by 1197.0usft at 7346.3usft MD (6389.4 TVD, 571.7 N, -77.0 E)									-104.464640
- Circle (radius 30.0)									
BHL - R&R FARMS 2I		0.00	0.00	6,385.0	4,116.7	-66.9	1,381,611.86	3,287,313.14	40.376340
- survey misses target center by 10.1usft at 10890.0usft MD (6375.4 TVD, 4114.7 N, -64.6 E)									-104.468730
- Point									
EXIST VERT ROTHE		0.00	0.00	6,764.0	-7.3	-967.0	1,377,477.87	3,286,461.10	40.365020
- survey misses target center by 975.0usft at 6810.0usft MD (6393.1 TVD, 35.6 N, -66.3 E)									-104.471960
- Circle (radius 30.0)									
KOP - R&R FARMS 2		0.00	0.00	5,683.8	-625.9	-66.9	1,376,869.77	3,287,368.27	40.363322
- survey misses target center by 14.3usft at 5749.6usft MD (5686.0 TVD, -638.7 N, -73.0 E)									-104.468730
- Point									
7" ICP *NEW* - R&R I		0.00	0.00	6,417.0	94.5	-66.9	1,377,590.09	3,287,359.89	40.365299
- survey misses target center by 23.2usft at 6868.9usft MD (6393.8 TVD, 94.4 N, -68.2 E)									-104.468730
- Point									
EXIST VERT ROTHE		0.00	0.00	6,733.0	1,289.7	345.5	1,378,789.92	3,287,758.37	40.368580
- survey misses target center by 542.5usft at 8063.1usft MD (6392.9 TVD, 1288.4 N, -77.1 E)									-104.467250
- Circle (radius 30.0)									
EXIST VERT PETERI		0.00	0.00	6,741.0	3,861.7	-908.3	1,381,347.10	3,286,474.76	40.375640
- survey misses target center by 923.6usft at 10635.1usft MD (6377.3 TVD, 3859.8 N, -59.3 E)									-104.471750
- Circle (radius 30.0)									
EXIST VERT ROTHE		0.00	0.00	6,747.0	1,275.1	-978.1	1,378,759.97	3,286,435.09	40.368540
- survey misses target center by 968.0usft at 8049.7usft MD (6393.1 TVD, 1275.0 N, -77.1 E)									-104.472000
- Circle (radius 30.0)									
7" ICP *NEW* - R&R I		0.00	0.00	6,400.0	92.9	-66.9	1,377,588.50	3,287,359.91	40.365295
- survey misses target center by 6.3usft at 6867.3usft MD (6393.8 TVD, 92.8 N, -68.2 E)									-104.468730
- Point									
KOP - R&R FARMS 2		0.00	0.00	5,700.8	-625.9	-66.9	1,376,869.77	3,287,368.27	40.363322
- survey misses target center by 12.6usft at 5766.4usft MD (5702.7 TVD, -636.9 N, -72.7 E)									-104.468730
- Point									
EXIST VERT PETERI		0.00	0.00	6,785.0	2,597.5	-891.6	1,380,083.27	3,286,506.13	40.372170
- survey misses target center by 917.7usft at 9351.5usft MD (6386.1 TVD, 2576.4 N, -65.5 E)									-104.471690
- Circle (radius 30.0)									
BHL - R&R FARMS 2I		0.00	0.00	6,393.0	4,116.7	-66.9	1,381,611.86	3,287,313.14	40.376340
- survey misses target center by 17.9usft at 10890.0usft MD (6375.4 TVD, 4114.7 N, -64.6 E)									-104.468730
- Point									
EXIST VERT ROTHE		0.00	0.00	6,721.0	7.3	353.9	1,377,507.79	3,287,781.67	40.365060
- survey misses target center by 533.2usft at 6798.0usft MD (6392.5 TVD, 23.6 N, -65.7 E)									-104.467220
- Circle (radius 30.0)									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
907.0	907.0	3.0	-7.4	SURFACE CASING
5,703.0	5,639.4	-641.7	-73.6	KOP
6,855.0	6,393.9	80.5	-67.8	ICP
10,835.0	6,375.8	4,059.7	-63.2	LAST SURVEY - AUG 24, 2015
10,890.0	6,375.4	4,114.7	-64.6	EXTRAPOLATION TO TD

Survey Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well R&R FARMS 29I-221
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Site:	SW SW SEC. 29 T5N R63W 6th P.M.	MD Reference:	KB-EST @ 4587.0usft (Original Well Elev)
Well:	R&R FARMS 29I-221	North Reference:	True
Wellbore:	JOB # 2015-078-135	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS	Database:	EDM 5000.1 Single User Db

Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
EXIST VERT ROTHE - survey misses target center by 1197.0usft at 7346.3usft MD (6389.4 TVD, 571.7 N, -77.0 E) - Circle (radius 30.0)	0.00	0.00	6,722.0	561.1	1,072.8	1,378,069.86	3,288,494.08	40.366580	-104.464640
BHL - R&R FARMS 2I - survey misses target center by 10.1usft at 10890.0usft MD (6375.4 TVD, 4114.7 N, -64.6 E) - Point	0.00	0.00	6,385.0	4,116.7	-66.9	1,381,611.86	3,287,313.14	40.376340	-104.468730
EXIST VERT ROTHE - survey misses target center by 975.0usft at 6810.0usft MD (6393.1 TVD, 35.6 N, -66.3 E) - Circle (radius 30.0)	0.00	0.00	6,764.0	-7.3	-967.0	1,377,477.87	3,286,461.10	40.365020	-104.471960
KOP - R&R FARMS 2 - survey misses target center by 14.3usft at 5749.6usft MD (5686.0 TVD, -638.7 N, -73.0 E) - Point	0.00	0.00	5,683.8	-625.9	-66.9	1,376,869.77	3,287,368.27	40.363322	-104.468730
7" ICP *NEW* - R&R I - survey misses target center by 23.2usft at 6868.9usft MD (6393.8 TVD, 94.4 N, -68.2 E) - Point	0.00	0.00	6,417.0	94.5	-66.9	1,377,590.09	3,287,359.89	40.365299	-104.468730
EXIST VERT ROTHE - survey misses target center by 542.5usft at 8063.1usft MD (6392.9 TVD, 1288.4 N, -77.1 E) - Circle (radius 30.0)	0.00	0.00	6,733.0	1,289.7	345.5	1,378,789.92	3,287,758.37	40.368580	-104.467250
EXIST VERT PETERI - survey misses target center by 923.6usft at 10635.1usft MD (6377.3 TVD, 3859.8 N, -59.3 E) - Circle (radius 30.0)	0.00	0.00	6,741.0	3,861.7	-908.3	1,381,347.10	3,286,474.76	40.375640	-104.471750
EXIST VERT ROTHE - survey misses target center by 968.0usft at 8049.7usft MD (6393.1 TVD, 1275.0 N, -77.1 E) - Circle (radius 30.0)	0.00	0.00	6,747.0	1,275.1	-978.1	1,378,759.97	3,286,435.09	40.368540	-104.472000
7" ICP *NEW* - R&R I - survey misses target center by 6.3usft at 6867.3usft MD (6393.8 TVD, 92.8 N, -68.2 E) - Point	0.00	0.00	6,400.0	92.9	-66.9	1,377,588.50	3,287,359.91	40.365295	-104.468730
KOP - R&R FARMS 2 - survey misses target center by 12.6usft at 5766.4usft MD (5702.7 TVD, -636.9 N, -72.7 E) - Point	0.00	0.00	5,700.8	-625.9	-66.9	1,376,869.77	3,287,368.27	40.363322	-104.468730
EXIST VERT PETERI - survey misses target center by 917.7usft at 9351.5usft MD (6386.1 TVD, 2576.4 N, -65.5 E) - Circle (radius 30.0)	0.00	0.00	6,785.0	2,597.5	-891.6	1,380,083.27	3,286,506.13	40.372170	-104.471690
BHL - R&R FARMS 2I - survey misses target center by 17.9usft at 10890.0usft MD (6375.4 TVD, 4114.7 N, -64.6 E) - Point	0.00	0.00	6,393.0	4,116.7	-66.9	1,381,611.86	3,287,313.14	40.376340	-104.468730
EXIST VERT ROTHE - survey misses target center by 533.2usft at 6798.0usft MD (6392.5 TVD, 23.6 N, -65.7 E) - Circle (radius 30.0)	0.00	0.00	6,721.0	7.3	353.9	1,377,507.79	3,287,781.67	40.365060	-104.467220

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
907.0	907.0	3.0	-7.4	SURFACE CASING
5,703.0	5,639.4	-641.7	-73.6	KOP
6,855.0	6,393.9	80.5	-67.8	ICP
10,835.0	6,375.8	4,059.7	-63.2	LAST SURVEY - AUG 24, 2015
10,890.0	6,375.4	4,114.7	-64.6	EXTRAPOLATION TO TD

Checked By: _____ Approved By: _____ Date: _____