



Project: WELD COUNTY, COLORADO (TRUE)  
Site: SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)  
Well: CRAWFORD 1N  
Vellbore: ORIGINAL WELLBORE  
Design: PROPOSAL #2

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 344ft FSL & 230ft FWL of Sec 33
600.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1195.62	1200.00	12.00	188.17	-61.97	-8.89	-61.89	62.60	EOB TO 12° INC
2142.58	2168.11	12.00	188.17	-261.21	-37.48	-260.89	263.88	END OF TANGENT
2738.20	2768.11	0.00	0.00	-323.18	-46.37	-322.78	326.49	EOD TO VERTICAL
6423.80	6453.71	0.00	0.00	-323.18	-46.37	-322.78	326.49	KOP (8°/100ft BUR)
7044.05	7203.71	60.00	359.79	34.92	-47.67	35.32	684.64	60° INC
7140.00	7578.71	90.00	359.79	393.02	-48.98	393.41	1042.68	EP: 737ft FSL & 180ft FWL of Sec 33
7140.00	17217.92	90.00	359.80	10032.16	-83.75	10032.51	10681.89	BHL: 200ft FNL & 180ft FWL of Sec 28

PROPOSED LOCAL COORDINATES:

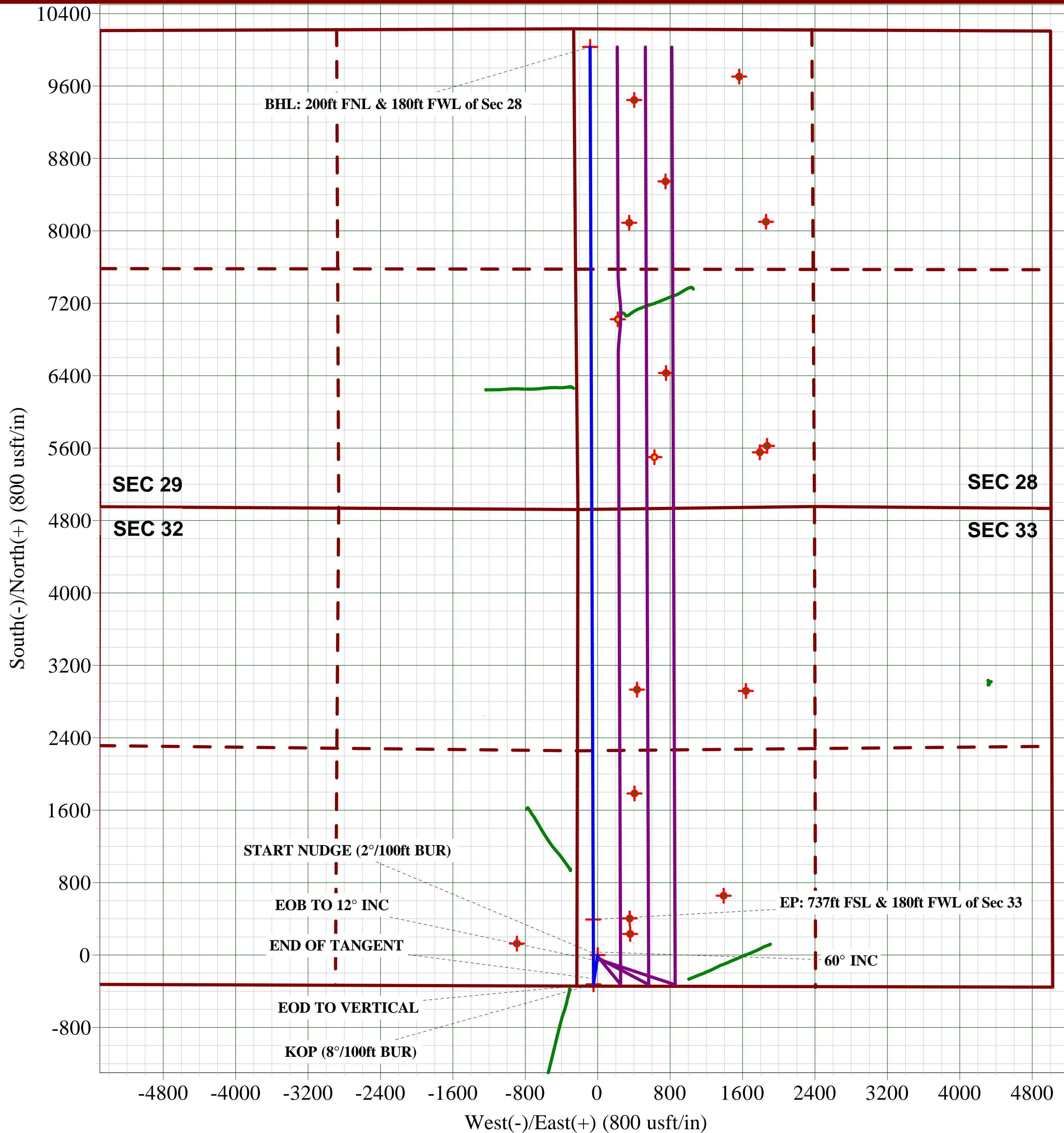
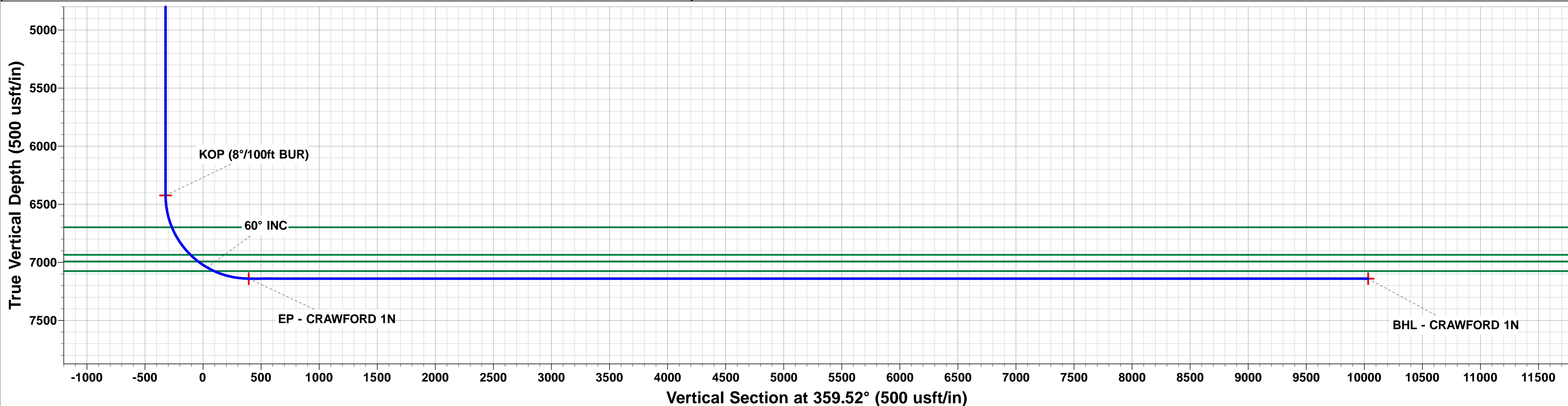
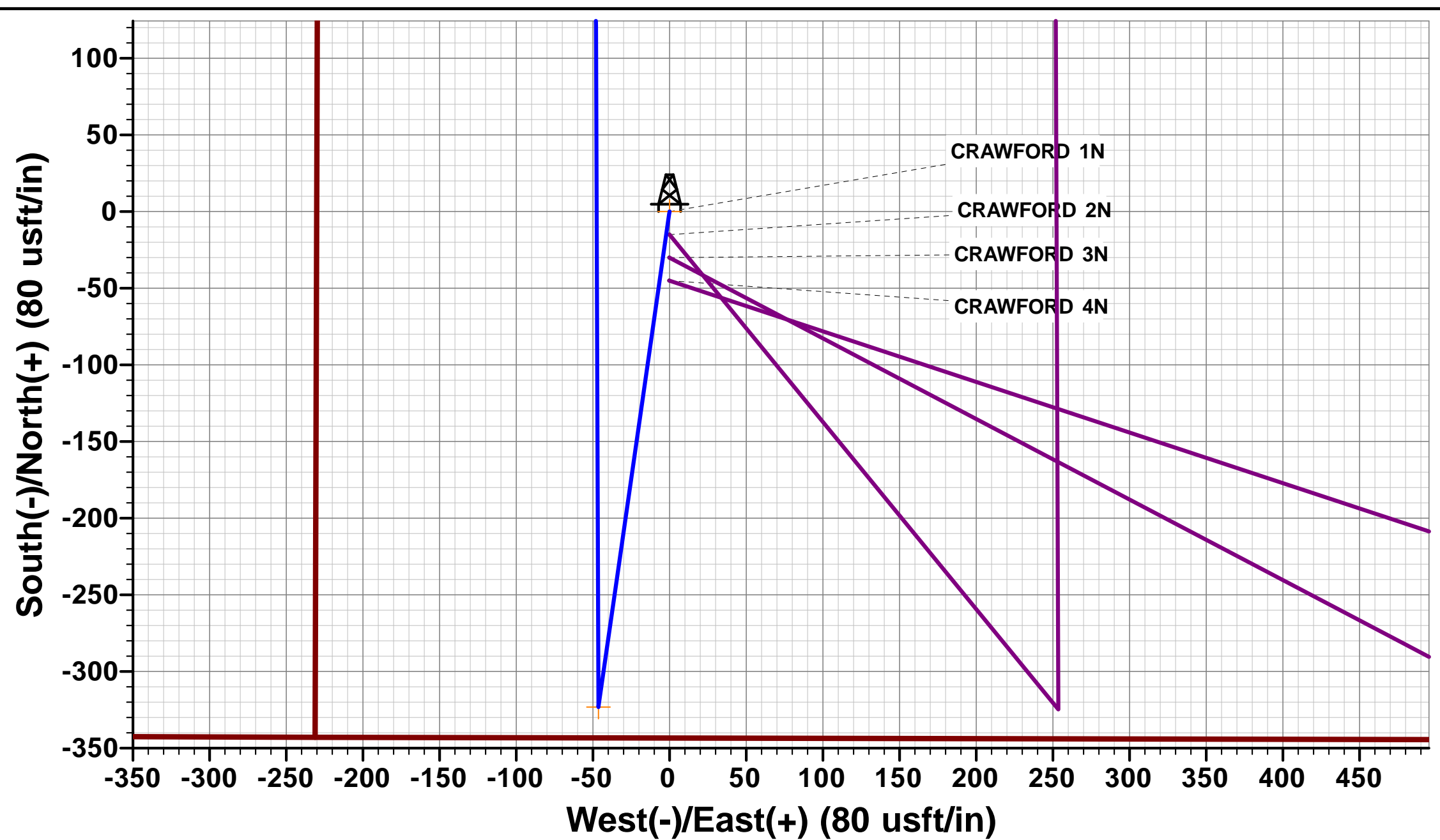
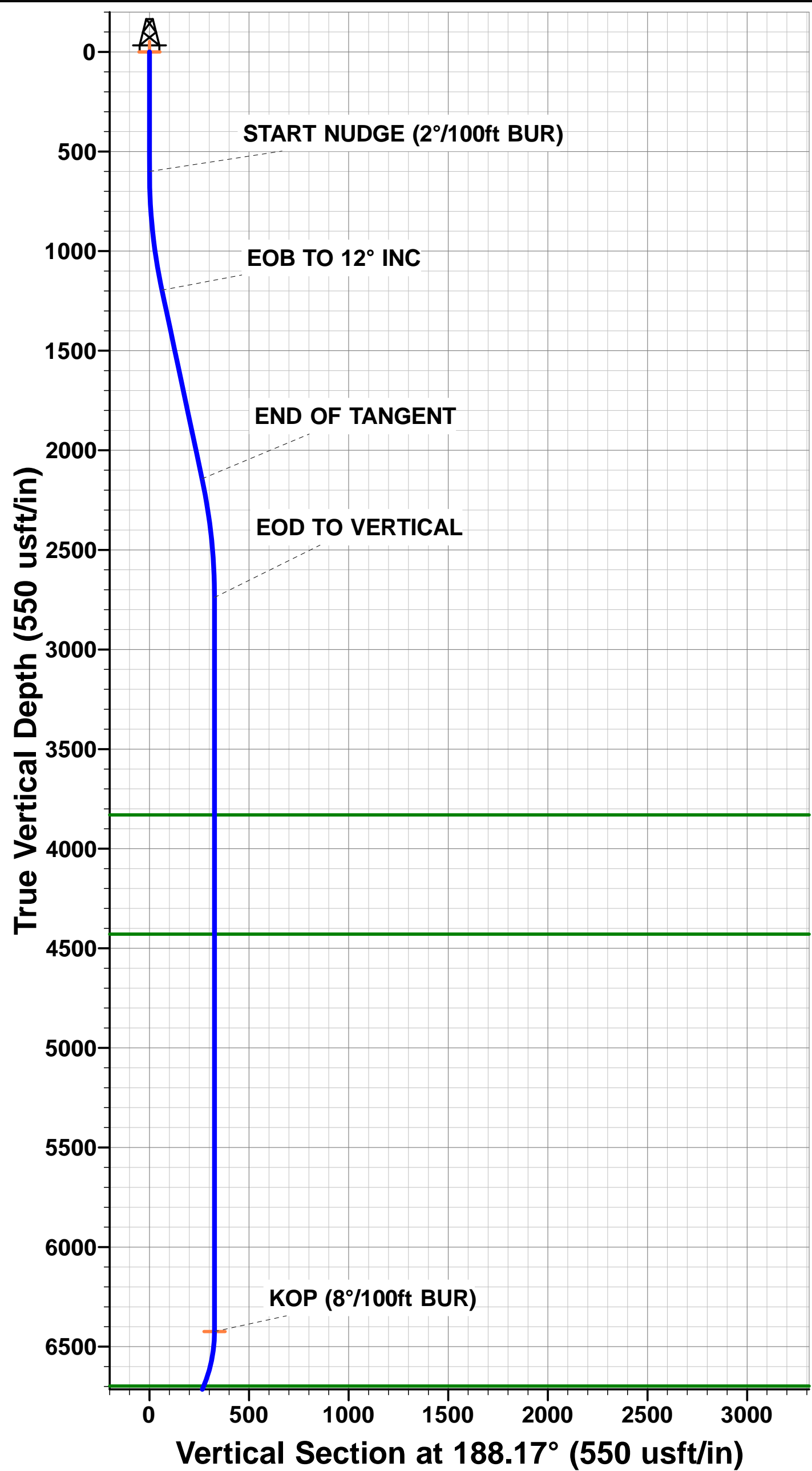
SHL: 344ft FSL & 230ft FWL Sec 33

EP : 737ft FSL & 180ft FWL Sec 33

BHL: 200ft FNL & 180ft FWL Sec 28

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - CRAWFORD 1N	6423.80	-323.18	-46.37	40.261703	-104.677052
EP - CRAWFORD 1N	7140.00	393.02	-48.98	40.263669	-104.677061
BHL - CRAWFORD 1N	7140.00	10032.16	-83.75	40.290128	-104.677186
SHL - CRAWFORD 1N	0.00	0.00	0.00	40.262590	-104.676886



# **PDC ENERGY**

**WELD COUNTY, COLORADO (TRUE)**

**SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)**

**CRAWFORD 1N**

**ORIGINAL WELLBORE**

**PROPOSAL #2**

## **Anticollision Report**

**01 September, 2018**



## Anticollision Report



<b>Company:</b>	PDC ENERGY	<b>Local Co-ordinate Reference:</b>	Well CRAWFORD 1N
<b>Project:</b>	WELD COUNTY, COLORADO (TRUE)	<b>TVD Reference:</b>	KB-EST @ 4885.00usft
<b>Reference Site:</b>	SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)	<b>MD Reference:</b>	KB-EST @ 4885.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	CRAWFORD 1N	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	ORIGINAL WELLBORE	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	PROPOSAL #2	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	PROPOSAL #2		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD + Stations Interval 100.00usft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 10,000.00 usft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	<b>Date</b>	01/09/2018		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.00	17,217.92	PROPOSAL #2 (ORIGINAL WELLBORE)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
SW SE SEC. 33 T4N R65W 6th P.M.						
ABDN VERT BOHLENDER 33-2 - GYRO - Wellbore #1 -	10,154.60	7,050.00	4,370.64	4,308.73	70.591	CC
ABDN VERT BOHLENDER 33-2 - GYRO - Wellbore #1 -	10,200.00	7,050.00	4,370.88	4,308.12	69.646	ES
ABDN VERT BOHLENDER 33-2 - GYRO - Wellbore #1 -	16,100.00	7,050.00	7,378.97	7,204.13	42.205	SF
ABDN VERT KRAUSE 1 - Wellbore #1 - Design #1	12,733.26	4,662.00	3,062.55	2,981.22	37.654	CC
ABDN VERT KRAUSE 1 - Wellbore #1 - Design #1	12,800.00	4,662.00	3,063.28	2,981.08	37.268	ES
ABDN VERT KRAUSE 1 - Wellbore #1 - Design #1	14,200.00	4,662.00	3,395.66	3,295.36	33.855	SF
EXIST DD ANDERSEN 35-33 - Wellbore #1 - Wellbore #	6,747.37	6,778.09	1,054.66	1,023.39	33.729	CC
EXIST DD ANDERSEN 35-33 - Wellbore #1 - Wellbore #	6,750.00	6,780.43	1,054.66	1,023.38	33.719	ES
EXIST DD ANDERSEN 35-33 - Wellbore #1 - Wellbore #	6,800.00	6,820.00	1,054.96	1,023.52	33.558	SF
EXIST DD KRAUSE 22-28 - Wellbore #1 - Wellbore #1	14,556.18	7,111.65	1,117.10	958.33	7.036	CC, ES
EXIST DD KRAUSE 22-28 - Wellbore #1 - Wellbore #1	14,700.00	7,109.16	1,126.32	964.83	6.974	SF
EXIST VERT BOHLENDER 33-5 - Wellbore #1 - Design	10,116.56	7,096.00	492.41	417.40	6.565	CC, ES
EXIST VERT BOHLENDER 33-5 - Wellbore #1 - Design	10,200.00	7,096.00	499.43	422.87	6.523	SF
EXIST VERT BOHLENDER 33-7 - Wellbore #1 - Design	10,097.69	7,096.00	1,695.07	1,620.41	22.704	CC
EXIST VERT BOHLENDER 33-7 - Wellbore #1 - Design	10,100.00	7,096.00	1,695.07	1,620.37	22.691	ES
EXIST VERT BOHLENDER 33-7 - Wellbore #1 - Design	10,800.00	7,096.00	1,834.80	1,747.03	20.903	SF
EXIST VERT HSR KRAUSE 14-28A - Wellbore #1 - Des	12,803.65	7,096.00	1,939.05	1,813.35	15.426	CC, ES
EXIST VERT HSR KRAUSE 14-28A - Wellbore #1 - Des	13,400.00	7,096.00	2,028.68	1,891.63	14.802	SF
EXIST VERT HSR MONTALI 14-33 - Wellbore #1 - Desig	7,836.23	7,096.00	1,441.42	1,405.20	39.805	CC, ES
EXIST VERT HSR MONTALI 14-33 - Wellbore #1 - Desig	8,900.00	7,096.00	1,791.44	1,738.52	33.849	SF
EXIST VERT HSR-HART 12-33 - Wellbore #1 - Design #	8,969.11	7,096.00	460.36	406.22	8.503	CC, ES
EXIST VERT HSR-HART 12-33 - Wellbore #1 - Design #	9,000.00	7,096.00	461.39	406.71	8.438	SF
EXIST VERT HSR-LEE 13-33 - Wellbore #1 - Design #1	7,588.60	7,096.00	402.34	368.76	11.984	CC, ES
EXIST VERT HSR-LEE 13-33 - Wellbore #1 - Design #1	7,600.00	7,096.00	402.50	368.82	11.950	SF
EXIST VERT KRAUSE 1-J - Wellbore #1 - Design #1	13,612.72	7,096.00	825.84	684.73	5.852	CC, ES
EXIST VERT KRAUSE 1-J - Wellbore #1 - Design #1	13,700.00	7,096.00	830.44	687.66	5.816	SF
EXIST VERT OGG 21-28 - Wellbore #1 - Design #1	16,884.96	7,096.00	1,646.52	1,442.85	8.084	CC
EXIST VERT OGG 21-28 - Wellbore #1 - Design #1	16,900.00	7,096.00	1,646.58	1,442.63	8.073	ES
EXIST VERT OGG 21-28 - Wellbore #1 - Design #1	17,100.00	7,096.00	1,660.50	1,452.71	7.991	SF
EXIST VERT OGG 22-28 - Wellbore #1 - Design #1	15,280.25	7,096.00	1,936.05	1,763.09	11.194	CC
EXIST VERT OGG 22-28 - Wellbore #1 - Design #1	15,300.00	7,096.00	1,936.15	1,762.81	11.170	ES
EXIST VERT OGG 22-28 - Wellbore #1 - Design #1	15,700.00	7,096.00	1,981.03	1,800.04	10.946	SF
EXIST VERT PEARSON 1 - Wellbore #1 - Design #1	15,729.34	7,096.00	827.80	646.25	4.560	CC, ES
EXIST VERT PEARSON 1 - Wellbore #1 - Design #1	15,800.00	7,096.00	830.81	647.90	4.542	SF
EXIST VERT UPRR 36 PAN AM C #1 - Wellbore #1 - De	600.00	556.00	427.99	425.67	184.331	CC, ES
EXIST VERT UPRR 36 PAN AM C #1 - Wellbore #1 - De	4,800.00	4,707.00	688.56	667.63	32.892	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	PDC ENERGY	<b>Local Co-ordinate Reference:</b>	Well CRAWFORD 1N
<b>Project:</b>	WELD COUNTY, COLORADO (TRUE)	<b>TVD Reference:</b>	KB-EST @ 4885.00usft
<b>Reference Site:</b>	SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)	<b>MD Reference:</b>	KB-EST @ 4885.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	CRAWFORD 1N	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	ORIGINAL WELLBORE	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	PROPOSAL #2	<b>Offset TVD Reference:</b>	Offset Datum

## Summary

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)						
CRAWFORD 2N - ORIGINAL WELLBORE - PROPOSAL	466.33	467.33	15.01	13.19	8.237 CC	
CRAWFORD 2N - ORIGINAL WELLBORE - PROPOSAL	17,217.92	17,134.62	314.64	-57.29	0.846	Level 1, ES, SF
CRAWFORD 3N - ORIGINAL WELLBORE - PROPOSAL	365.99	367.99	30.02	28.65	21.859 CC	
CRAWFORD 3N - ORIGINAL WELLBORE - PROPOSAL	400.00	401.99	30.02	28.49	19.674 ES	
CRAWFORD 3N - ORIGINAL WELLBORE - PROPOSAL	17,217.92	17,254.16	610.17	223.20	1.577 SF	
CRAWFORD 4N - ORIGINAL WELLBORE - PROPOSAL	265.64	268.64	44.99	44.07	48.671 CC	
CRAWFORD 4N - ORIGINAL WELLBORE - PROPOSAL	300.00	302.99	44.99	43.91	41.721 ES	
CRAWFORD 4N - ORIGINAL WELLBORE - PROPOSAL	17,217.92	17,188.89	907.86	521.43	2.349 SF	
EXIST DD RAY 39-32 - Wellbore #1 - Wellbore #1	8,135.35	7,250.15	253.13	209.73	5.832 CC, ES, SF	
EXIST DD REI 26-5 - Wellbore #1 - Wellbore #1	5,846.16	6,217.92	268.63	221.01	5.641 CC	
EXIST DD REI 26-5 - Wellbore #1 - Wellbore #1	5,900.00	6,270.43	268.84	220.97	5.617 ES	
EXIST DD REI 26-5 - Wellbore #1 - Wellbore #1	6,453.71	6,825.68	271.71	222.32	5.502 SF	
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	13,463.56	7,256.95	221.06	82.38	1.594 CC, ES, SF	
EXIST VERT HSR-KOCH 16-32 - Wellbore #1 - Design #	7,309.25	7,095.90	844.78	813.25	26.797 CC, ES	
EXIST VERT HSR-KOCH 16-32 - Wellbore #1 - Design #	7,500.00	7,141.68	864.71	831.84	26.301 SF	
EXIST VERT KRAUSE 12-28 - Wellbore #1 - Design #1	14,208.44	7,146.00	295.06	142.46	1.934 CC, ES, SF	
EXIST VERT KRAUSE 2-28 - WELL - Design #1	12,684.21	7,146.00	694.17	570.63	5.619 CC	
EXIST VERT KRAUSE 2-28 - WELL - Design #1	12,700.00	7,146.00	694.35	570.51	5.607 ES	
EXIST VERT KRAUSE 2-28 - WELL - Design #1	12,800.00	7,146.00	703.76	578.02	5.597 SF	
EXIST VERT OGG 11-28 - Wellbore #1 - Design #1	16,630.42	7,146.00	485.06	286.14	2.439 CC, ES, SF	
EXIST VERT OGG 5-28 - Wellbore #1 - Design #1	15,274.30	7,146.00	425.54	252.57	2.460 CC, ES	
EXIST VERT OGG 5-28 - Wellbore #1 - Design #1	15,300.00	7,146.00	426.31	252.86	2.458 SF	

Offset Design SW SE SEC. 33 T4N R65W 6th P.M. - ABDN VERT BOHLENDER 33-2 - GYRO - Wellbore #1 - Wellbo													Offset Site Error:	0.00 usft
Survey Program: 100-GYD_CT													Offset Well Error:	0.00 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.00	0.00	0.00	0.00	0.00	0.00	55.20	3,020.45	4,346.53	5,293.14					
100.00	100.00	51.86	51.86	0.09	0.04	55.20	3,020.53	4,346.50	5,292.98	5,292.85	0.13	N/A		
200.00	200.00	153.44	153.44	0.31	0.16	55.20	3,021.01	4,346.29	5,293.09	5,292.62	0.47	N/A		
300.00	300.00	268.15	268.15	0.54	0.25	55.20	3,021.14	4,346.09	5,293.01	5,292.23	0.78	6,749.147		
400.00	400.00	409.06	409.06	0.76	0.35	55.20	3,020.56	4,345.46	5,292.41	5,291.31	1.10	4,794.403		
500.00	500.00	500.00	499.99	0.99	0.41	55.20	3,020.04	4,344.83	5,291.52	5,290.13	1.39	3,814.391		
600.00	600.00	595.64	595.63	1.21	0.46	55.20	3,019.74	4,344.15	5,290.75	5,289.09	1.66	3,179.256		
637.81	637.81	641.47	641.46	1.29	0.48	-132.98	3,019.63	4,343.77	5,290.61	5,288.85	1.76	2,998.510		
700.00	699.98	715.36	715.34	1.41	0.52	-132.98	3,019.25	4,343.10	5,290.99	5,289.06	1.93	2,747.073		
800.00	799.84	816.72	816.69	1.60	0.57	-132.99	3,018.63	4,342.13	5,293.42	5,291.26	2.16	2,446.458		
900.00	899.45	914.57	914.54	1.80	0.62	-132.99	3,018.07	4,341.16	5,298.23	5,295.81	2.42	2,190.589		
1,000.00	998.70	1,000.00	999.97	2.04	0.66	-132.96	3,017.56	4,340.44	5,305.55	5,302.86	2.69	1,971.305		
1,100.00	1,097.47	1,092.40	1,092.37	2.32	0.70	-132.93	3,017.16	4,339.78	5,315.45	5,312.45	3.00	1,774.519		
1,200.00	1,195.62	1,198.27	1,198.22	2.65	0.74	-132.92	3,017.05	4,338.83	5,327.78	5,324.44	3.34	1,596.862		
1,300.00	1,293.44	1,295.60	1,295.55	3.03	0.79	-133.08	3,017.10	4,337.76	5,341.25	5,337.57	3.68	1,449.942		
1,400.00	1,391.25	1,400.00	1,399.94	3.43	0.83	-133.26	3,016.95	4,336.55	5,354.62	5,350.57	4.05	1,323.150		
1,500.00	1,489.07	1,475.83	1,475.77	3.83	0.86	-133.39	3,016.87	4,335.79	5,368.19	5,363.78	4.41	1,217.544		
1,600.00	1,586.88	1,591.99	1,591.92	4.25	0.90	-133.59	3,017.08	4,334.76	5,382.08	5,377.29	4.79	1,123.512		
1,700.00	1,684.70	1,693.76	1,693.69	4.68	0.94	-133.76	3,016.95	4,333.64	5,395.63	5,390.46	5.17	1,043.008		
1,800.00	1,782.51	1,800.00	1,799.92	5.11	0.98	-133.94	3,016.86	4,332.17	5,409.03	5,403.47	5.56	972.778		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation