



Project: WELD COUNTY, COLORADO (TRUE)
Site: SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)
Well: CRAWFORD 2N
Vellbore: ORIGINAL WELLBORE
Design: PROPOSAL #3

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: 329ft FSL & 230ft FWL of Sec 33			
500.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)			
1095.62	1100.00	12.00	140.68	-48.43	39.66	-47.57	62.60	EOB TO 12° INC			
2389.75	2423.04	12.00	140.68	-261.25	213.95	-256.59	337.68	END OF TANGENT			
2985.37	3023.04	0.00	140.68	-309.69	253.61	-304.16	400.28	EOD TO VERTICAL			
6329.81	6367.48	0.00	0.00	-309.69	253.61	-304.16	400.28	KOP (8°/100ft BUR)			
6950.05	7117.47	60.00	359.79	48.41	252.31	53.83	758.57	60° INC			
7046.00	7492.46	90.00	359.79	406.49	251.01	411.80	1116.47	EP: 737ft FSL & 480ft FWL of Sec 33			
7046.00	13724.44	90.00	359.79	6638.43	228.34	6641.81	7348.45	END OF TANGENT			
7046.00	13948.05	90.00	6.50	6861.58	240.60	6865.17	7572.06	EOD TO 6.5° AZ			
7046.00	13958.05	90.00	6.50	6871.51	241.73	6875.13	7582.06	END OF TANGENT			
7046.00	14181.72	90.00	359.79	7094.72	254.00	7098.54	7805.73	EOT TO 359.79° AZ			
7046.00	14403.05	90.00	353.15	7315.51	240.38	7318.99	8027.06	EOT TO 353.15° AZ			
7046.00	14413.05	90.00	353.15	7325.43	239.18	7328.89	8037.06	END OF TANGENT			
7046.00	14634.28	90.00	359.79	7546.12	225.56	7549.23	8258.29	EOT TO 359.79° AZ			
7046.00	17134.62	90.00	359.79	10046.44	216.26	10048.77	10758.63	BHL: 200ft FNL & 480ft FWL of Sec 28			

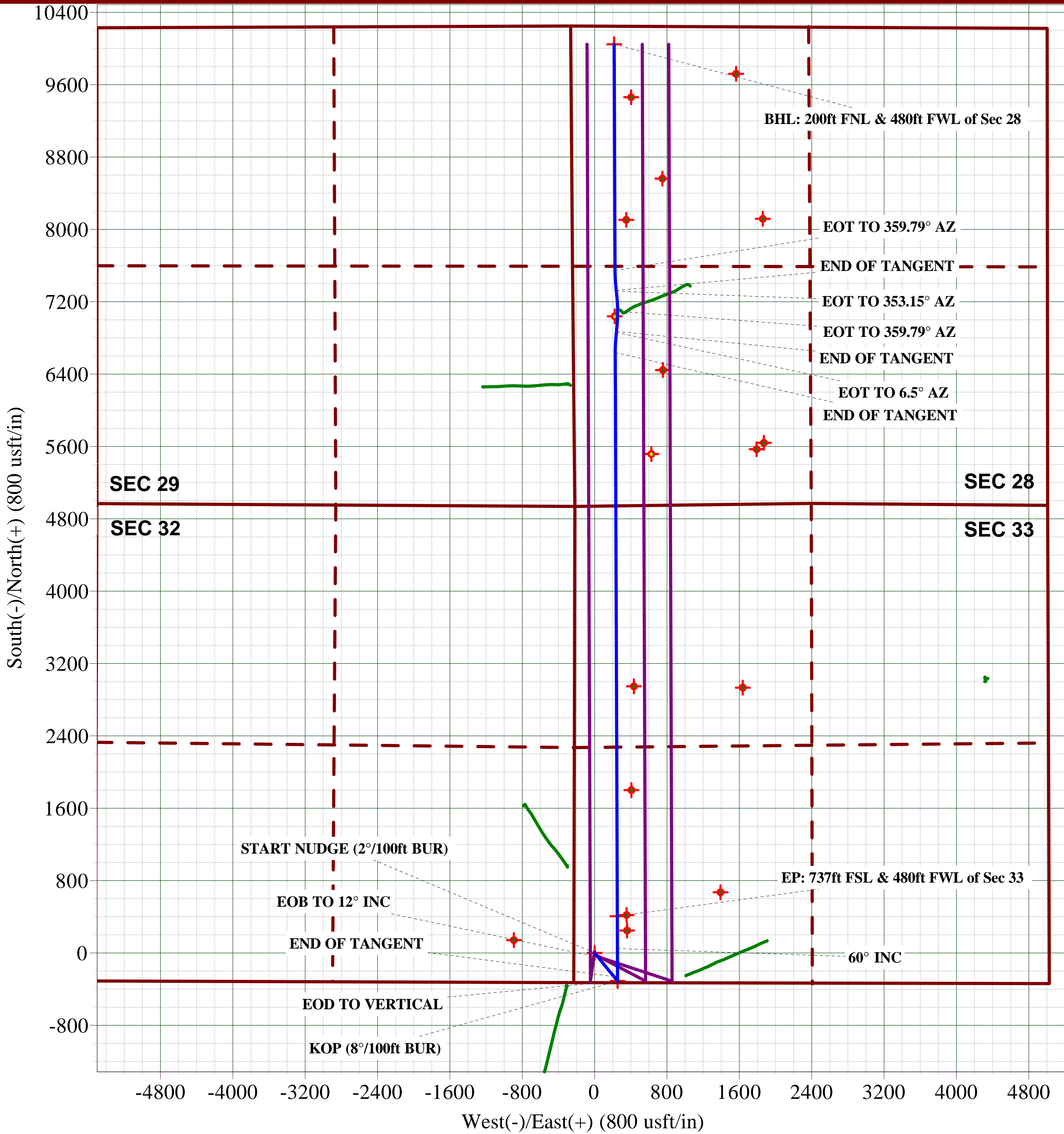
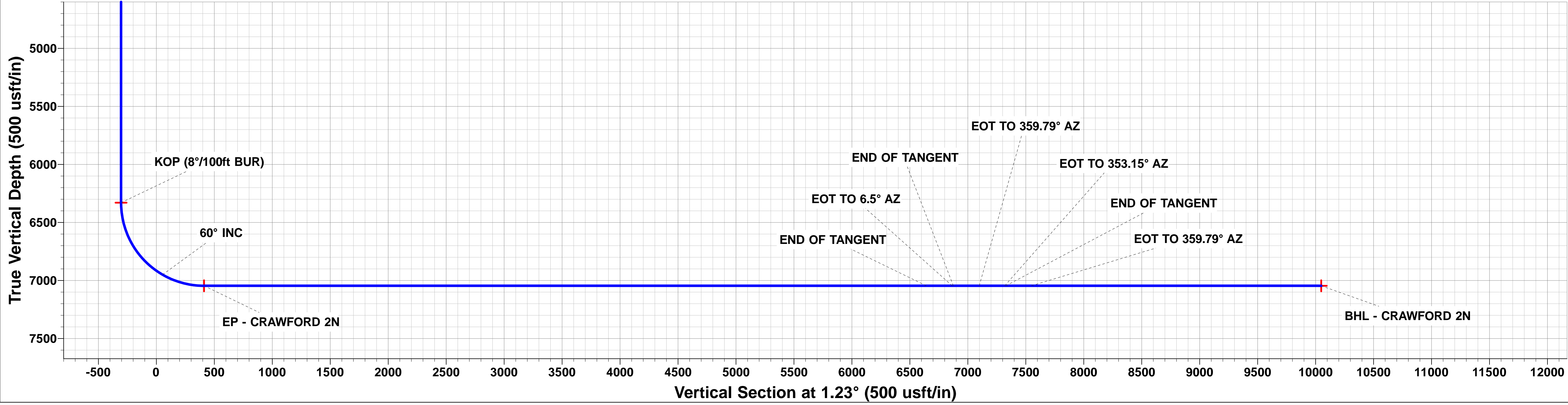
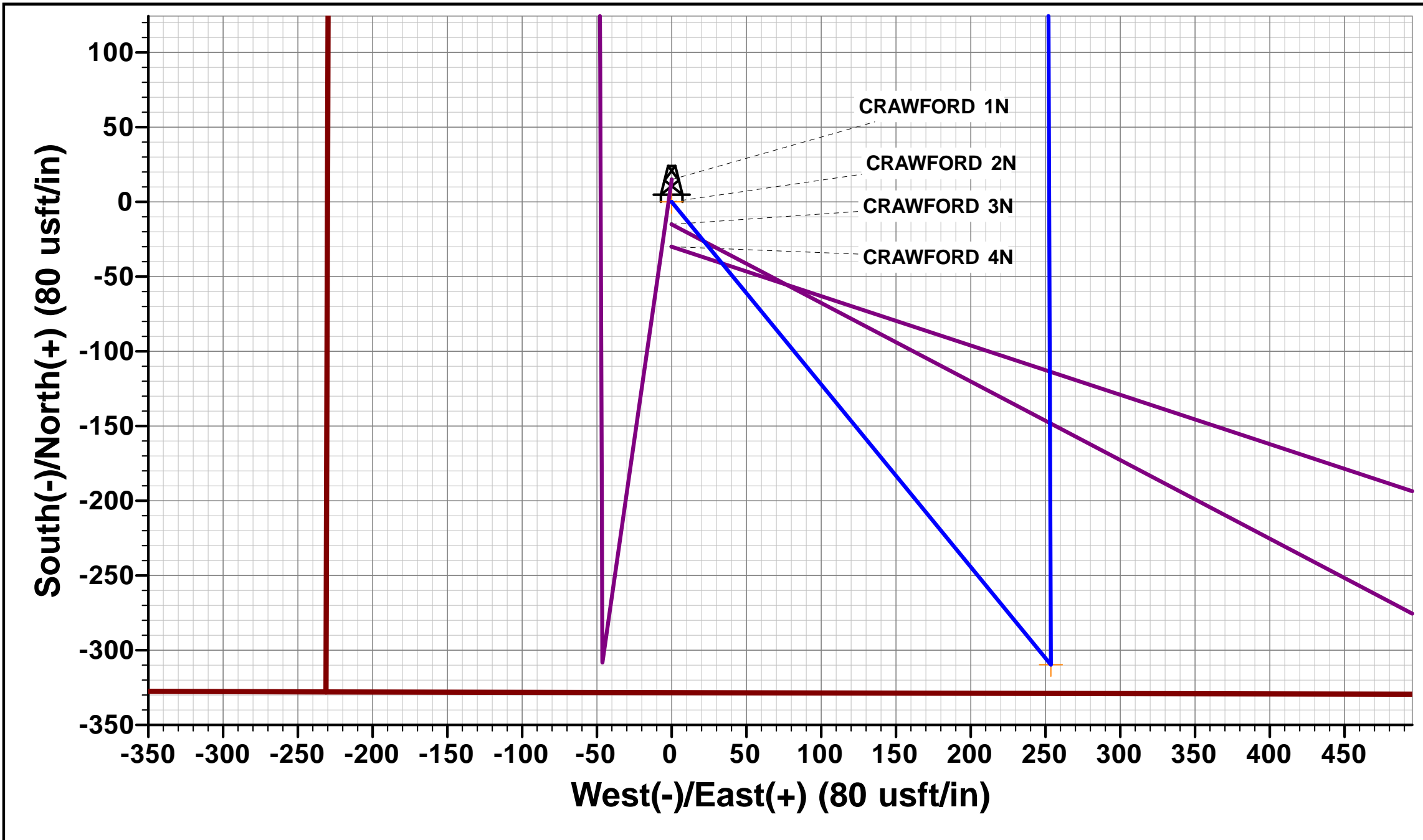
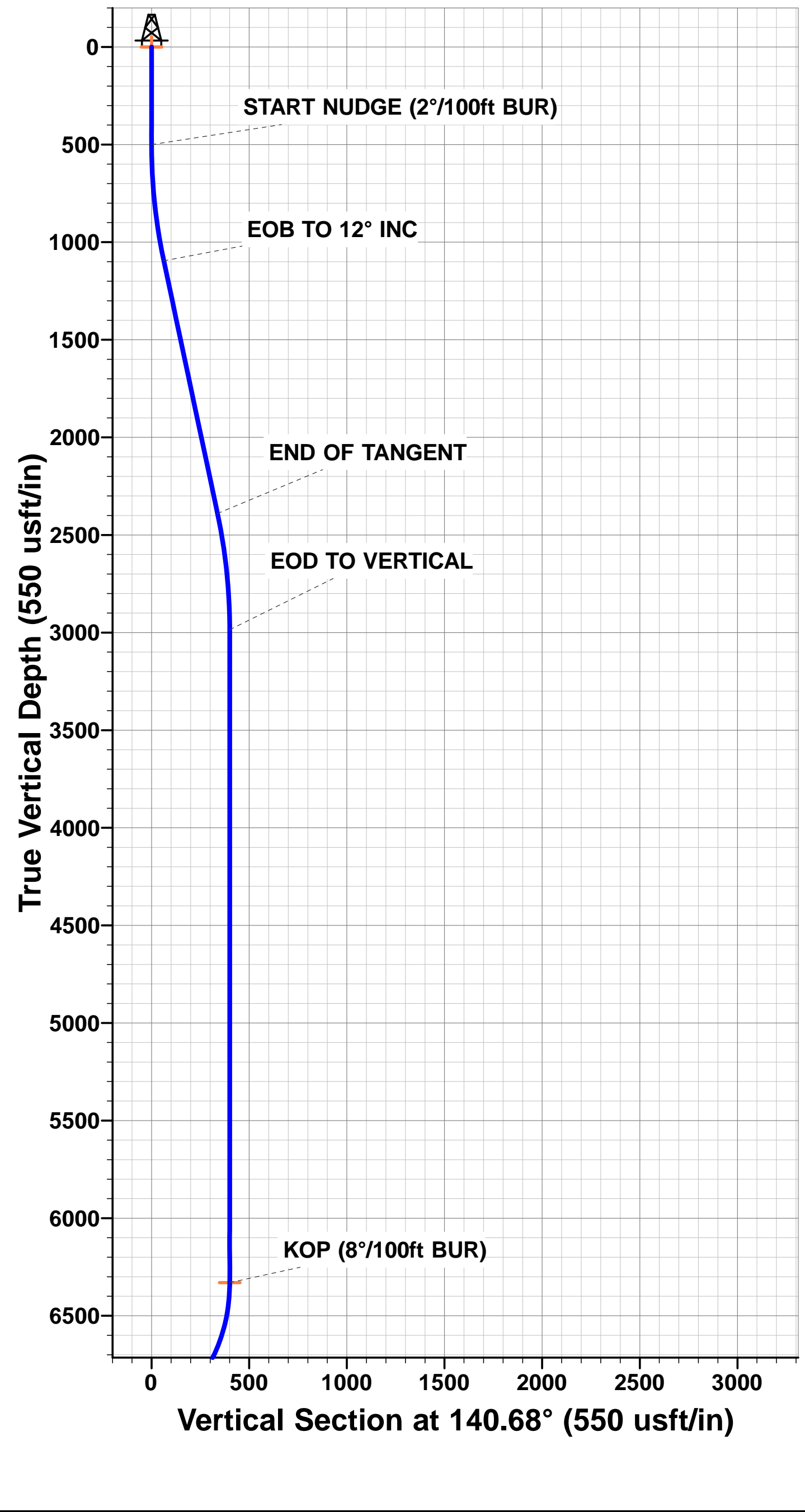
WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - CRAWFORD 2N	6329.81	-309.69	253.61	40.261699	-104.675977
EP - CRAWFORD 2N	7046.00	406.50	251.01	40.263665	-104.675987
BHL - CRAWFORD 2N	7046.00	10046.45	216.26	40.290126	-104.676111
SHL - CRAWFORD 2N	0.00	0.00	0.00	40.262549	-104.676886

PROPOSED LOCAL COORDINATES:

SHL: 329ft FSL & 230ft FWL Sec 33

EP : 737ft FSL & 480ft FWL Sec 33

BHL: 200ft FNL & 480ft FWL Sec 28



PDC ENERGY

WELD COUNTY, COLORADO (TRUE)

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

CRAWFORD 2N

ORIGINAL WELLBORE

PROPOSAL #3

Anticollision Report

01 September, 2018



Anticollision Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well CRAWFORD 2N
Project:	WELD COUNTY, COLORADO (TRUE)	TVD Reference:	KB-EST @ 4886.00usft
Reference Site:	SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)	MD Reference:	KB-EST @ 4886.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	CRAWFORD 2N	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	Database:	EDM 5000.1 Single User Db
Reference Design:	PROPOSAL #3	Offset TVD Reference:	Offset Datum

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

Survey Tool Program	Date	01/09/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	17,134.59	PROPOSAL #3 (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 -	10,070.92	7,039.17	4,070.75	4,008.29	65.173	CC
ABDN VERT BOHLENDER 33-2 - GYRO - Wellbore #1 -	10,100.00	7,039.15	4,070.85	4,007.85	64.616	ES
ABDN VERT BOHLENDER 33-2 - GYRO - Wellbore #1 -	14,100.00	7,036.72	5,708.62	5,570.76	41.410	SF
ABDN VERT KRAUSE 1 - Wellbore #1 - Design #1	12,649.57	4,662.00	2,810.87	2,733.14	36.159	CC
ABDN VERT KRAUSE 1 - Wellbore #1 - Design #1	12,700.00	4,662.00	2,811.32	2,732.98	35.882	ES
ABDN VERT KRAUSE 1 - Wellbore #1 - Design #1	13,958.05	4,662.00	3,093.12	2,996.77	32.101	SF
EXIST DD ANDERSEN 35-33 - Wellbore #1 - Wellbore #	6,662.39	6,683.22	755.06	724.07	24.368	CC, ES
EXIST DD ANDERSEN 35-33 - Wellbore #1 - Wellbore #	6,800.00	6,802.90	758.03	726.53	24.065	SF
EXIST DD KRAUSE 22-28 - Wellbore #1 - Wellbore #1	14,388.49	7,028.06	800.50	646.08	5.184	CC, ES
EXIST DD KRAUSE 22-28 - Wellbore #1 - Wellbore #1	14,500.00	7,026.61	807.05	649.92	5.136	SF
EXIST VERT BOHLENDER 33-5 - Wellbore #1 - Design	10,032.88	7,001.00	192.50	117.15	2.555	CC, ES, SF
EXIST VERT BOHLENDER 33-7 - Wellbore #1 - Design	10,014.04	7,001.00	1,395.16	1,320.16	18.601	CC, ES
EXIST VERT BOHLENDER 33-7 - Wellbore #1 - Design	10,500.00	7,001.00	1,477.37	1,393.31	17.574	SF
EXIST VERT HSR KRAUSE 14-28A - Wellbore #1 - Des	12,719.96	7,001.00	1,639.21	1,513.16	13.005	CC, ES
EXIST VERT HSR KRAUSE 14-28A - Wellbore #1 - Des	13,100.00	7,001.00	1,682.69	1,549.40	12.625	SF
EXIST VERT HSR MONTALI 14-33 - Wellbore #1 - Desig	7,752.61	7,001.00	1,141.49	1,105.15	31.408	CC, ES
EXIST VERT HSR MONTALI 14-33 - Wellbore #1 - Desig	8,400.00	7,001.00	1,312.30	1,266.18	28.457	SF
EXIST VERT HSR-HART 12-33 - Wellbore #1 - Design #	8,885.48	7,001.00	160.44	105.98	2.946	CC, ES
EXIST VERT HSR-HART 12-33 - Wellbore #1 - Design #	8,900.00	7,001.00	161.09	106.38	2.944	SF
EXIST VERT HSR-LEE 13-33 - Wellbore #1 - Design #1	7,504.98	7,001.00	102.41	68.93	3.058	CC, ES, SF
EXIST VERT KRAUSE 1-J - Wellbore #1 - Design #1	13,529.06	7,001.00	526.02	384.56	3.718	CC, ES
EXIST VERT KRAUSE 1-J - Wellbore #1 - Design #1	13,600.00	7,001.00	530.79	387.97	3.717	SF
EXIST VERT OGG 21-28 - Wellbore #1 - Design #1	16,803.27	7,001.00	1,346.52	1,144.59	6.668	CC, ES
EXIST VERT OGG 21-28 - Wellbore #1 - Design #1	17,000.00	7,001.00	1,360.82	1,155.12	6.616	SF
EXIST VERT OGG 22-28 - Wellbore #1 - Design #1	15,198.53	7,001.00	1,635.83	1,464.60	9.554	CC
EXIST VERT OGG 22-28 - Wellbore #1 - Design #1	15,200.00	7,001.00	1,635.83	1,464.57	9.552	ES
EXIST VERT OGG 22-28 - Wellbore #1 - Design #1	15,500.00	7,001.00	1,663.38	1,486.39	9.398	SF
EXIST VERT PEARSON 1 - Wellbore #1 - Design #1	15,647.77	7,001.00	527.63	347.82	2.934	CC, ES
EXIST VERT PEARSON 1 - Wellbore #1 - Design #1	15,700.00	7,001.00	530.21	349.40	2.932	SF
EXIST VERT UPRR 36 PAN AM C #1 - Wellbore #1 - De	951.03	904.17	434.95	431.05	111.480	CC
EXIST VERT UPRR 36 PAN AM C #1 - Wellbore #1 - De	1,000.00	952.47	435.03	430.87	104.609	ES
EXIST VERT UPRR 36 PAN AM C #1 - Wellbore #1 - De	4,800.00	4,707.00	567.81	545.72	25.706	SF

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

Company:	PDC ENERGY	Local Co-ordinate Reference:	Well CRAWFORD 2N
Project:	WELD COUNTY, COLORADO (TRUE)	TVD Reference:	KB-EST @ 4886.00usft
Reference Site:	SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)	MD Reference:	KB-EST @ 4886.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	CRAWFORD 2N	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	Database:	EDM 5000.1 Single User Db
Reference Design:	PROPOSAL #3	Offset TVD Reference:	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 1N - ORIGINAL WELLBORE - PROPOSAL	500.00	499.00	15.01	13.04	7.623	CC
CRAWFORD 1N - ORIGINAL WELLBORE - PROPOSAL	17,134.62	17,216.12	314.63	-57.27	0.846	Level 1, ES, SF
CRAWFORD 3N - ORIGINAL WELLBORE - PROPOSAL	366.33	367.33	15.01	13.64	10.935	CC
CRAWFORD 3N - ORIGINAL WELLBORE - PROPOSAL	17,134.62	17,254.16	324.44	-46.00	0.876	Level 1, ES, SF
CRAWFORD 4N - ORIGINAL WELLBORE - PROPOSAL	265.99	267.99	29.98	29.06	32.458	CC
CRAWFORD 4N - ORIGINAL WELLBORE - PROPOSAL	300.00	301.99	29.98	28.91	27.857	ES
CRAWFORD 4N - ORIGINAL WELLBORE - PROPOSAL	17,134.62	17,188.89	602.92	216.51	1.560	SF
EXIST DD RAY 39-32 - Wellbore #1 - Wellbore #1	8,051.22	7,154.95	553.11	509.38	12.649	CC, ES
EXIST DD RAY 39-32 - Wellbore #1 - Wellbore #1	8,200.00	7,155.78	572.77	526.74	12.442	SF
EXIST DD REI 26-5 - Wellbore #1 - Wellbore #1	5,837.50	6,200.49	565.43	516.29	11.507	CC, ES
EXIST DD REI 26-5 - Wellbore #1 - Wellbore #1	6,450.00	6,813.27	569.09	518.36	11.218	SF
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	13,380.53	7,168.64	522.92	383.82	3.759	CC
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	13,400.00	7,168.55	523.28	383.81	3.752	ES, SF
EXIST VERT HSR-KOCH 16-32 - Wellbore #1 - Design #	500.00	505.00	903.93	901.94	454.681	CC, ES
EXIST VERT HSR-KOCH 16-32 - Wellbore #1 - Design #	7,900.00	7,051.00	1,325.39	1,286.94	34.470	SF
EXIST VERT KRAUSE 12-28 - Wellbore #1 - Design #1	14,124.96	7,051.00	31.23	-120.79	0.205	Level 1, CC, ES, SF
EXIST VERT KRAUSE 2-28 - WELL - Design #1	12,600.56	7,051.00	394.32	270.43	3.183	CC, ES, SF
EXIST VERT OGG 11-28 - Wellbore #1 - Design #1	16,548.89	7,051.00	185.02	-12.16	0.938	Level 1, CC, ES, SF
EXIST VERT OGG 5-28 - Wellbore #1 - Design #1	15,192.79	7,051.00	125.32	-45.92	0.732	Level 1, CC, ES, 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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +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	55.07	3,035.46	4,346.58	5,301.77					
100.00	100.00	50.89	50.89	0.09	0.04	55.07	3,035.54	4,346.55	5,301.61	5,301.48	0.13	N/A		
200.00	200.00	152.26	152.26	0.31	0.16	55.06	3,036.01	4,346.35	5,301.71	5,301.25	0.47	N/A		
300.00	300.00	267.00	267.00	0.54	0.25	55.06	3,036.15	4,346.15	5,301.64	5,300.85	0.79	6,737.337		
400.00	400.00	408.26	408.26	0.76	0.35	55.06	3,035.57	4,345.53	5,301.05	5,299.94	1.11	4,787.588		
500.00	500.00	500.00	499.99	0.99	0.41	55.06	3,035.05	4,344.89	5,300.15	5,298.76	1.39	3,810.661		
600.00	599.98	594.66	594.65	1.19	0.46	-85.66	3,034.75	4,344.21	5,299.25	5,297.61	1.64	3,226.999		
700.00	699.84	714.27	714.25	1.38	0.52	-85.75	3,034.27	4,343.17	5,297.91	5,296.01	1.90	2,791.237		
800.00	799.45	815.35	815.33	1.60	0.57	-85.89	3,033.65	4,342.20	5,296.13	5,293.96	2.17	2,441.323		
900.00	898.70	912.93	912.90	1.86	0.62	-86.06	3,033.09	4,341.23	5,294.11	5,291.64	2.47	2,141.975		
1,000.00	997.47	1,000.00	999.97	2.16	0.66	-86.24	3,032.57	4,340.49	5,292.01	5,289.20	2.81	1,882.001		
1,100.00	1,095.62	1,089.62	1,089.58	2.51	0.70	-86.47	3,032.18	4,339.85	5,289.93	5,286.72	3.20	1,650.943		
1,200.00	1,193.44	1,194.05	1,194.01	2.90	0.74	-86.71	3,032.06	4,338.94	5,287.86	5,284.22	3.64	1,451.874		
1,300.00	1,291.25	1,291.57	1,291.52	3.32	0.78	-86.94	3,032.11	4,337.86	5,285.80	5,281.71	4.09	1,291.060		
1,400.00	1,389.07	1,400.00	1,399.94	3.74	0.83	-87.19	3,031.96	4,336.61	5,283.68	5,279.12	4.56	1,158.188		
1,500.00	1,486.88	1,472.98	1,472.92	4.18	0.85	-87.36	3,031.87	4,335.87	5,281.78	5,276.76	5.02	1,052.107		
1,600.00	1,584.70	1,585.33	1,585.27	4.62	0.90	-87.62	3,032.09	4,334.89	5,280.27	5,274.77	5.50	960.422		
1,700.00	1,682.51	1,689.00	1,688.93	5.06	0.94	-87.86	3,031.97	4,333.75	5,278.45	5,272.47	5.98	882.506		
1,800.00	1,780.33	1,800.00	1,799.92	5.51	0.98	-88.12	3,031.87	4,332.23	5,276.53	5,270.06	6.47	815.560		
1,900.00	1,878.14	1,878.78	1,878.69	5.96	1.01	-88.31	3,032.17	4,330.91	5,274.75	5,267.81	6.95	759.469		
2,000.00	1,975.96	1,976.18	1,976.07	6.42	1.04	-88.54	3,032.99	4,329.30	5,273.35	5,265.93	7.43	710.065		
2,100.00	2,073.77	2,070.93	2,070.80	6.87	1.08	-88.78	3,034.01	4,327.48	5,271.99	5,264.08	7.91	666.714		
2,200.00	2,171.59	2,162.82	2,162.67	7.33	1.11	-89.01	3,035.13	4,325.75	5,270.82	5,262.43	8.39	628.417		

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