



Project: WELD COUNTY, COLORADO (TRUE)
Site: SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)
Well: HARVEY 6N
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #4

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: 745ft FSL & 2434ft FEL of Sec 32
1200.00	1200.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2"/100ft BUR)
2026.20	2038.10	16.76	235.49	-68.95	-100.31	-57.91	121.72	EOB TO 16.76° INC
5441.60	5605.06	16.76	235.49	-651.70	-948.04	-547.36	1150.43	END OF TANGENT
6267.80	6443.17	0.00	0.00	-720.65	-1048.35	-605.28	1272.15	EOD TO VERTICAL
6467.80	6643.17	0.00	0.00	-720.65	-1048.35	-605.28	1272.15	KOP (8"/100ft BUR)
7088.05	7393.17	60.00	0.00	-362.55	-1047.79	-249.26	1630.36	60° INC
7184.00	7768.17	90.00	0.00	-4.45	-1047.23	106.76	1988.35	EP: 737ft FSL & 1810ft FWL of Sec 32
7183.96	16478.01	90.00	0.00	8705.37	-1033.64	8765.91	10698.19	END OF TANGENT
7183.96	16625.03	90.00	4.50	8852.24	-1027.76	8911.32	10845.21	EOT TO 4.5° AZ
7183.96	16635.03	90.00	4.50	8862.21	-1026.97	8921.15	10855.21	END OF TANGENT
7183.96	16782.03	90.00	0.00	9009.06	-1021.09	9066.55	11002.21	EOT TO 0.09° AZ
7183.96	16924.37	90.00	355.82	9151.27	-1026.16	9208.50	11144.55	EOT TO 355.82° AZ
7183.96	16934.37	90.00	355.82	9161.25	-1026.89	9218.49	11154.55	END OF TANGENT
7183.97	17076.78	89.99	0.00	9303.53	-1031.97	9360.51	11296.96	EOT TO 0.09° AZ
7184.00	17432.88	89.99	0.00	9659.63	-1031.40	9714.53	11653.06	BHL: 150ft FNL & 1810ft FWL of Sec 29

PROPOSED LOCAL COORDINATES:

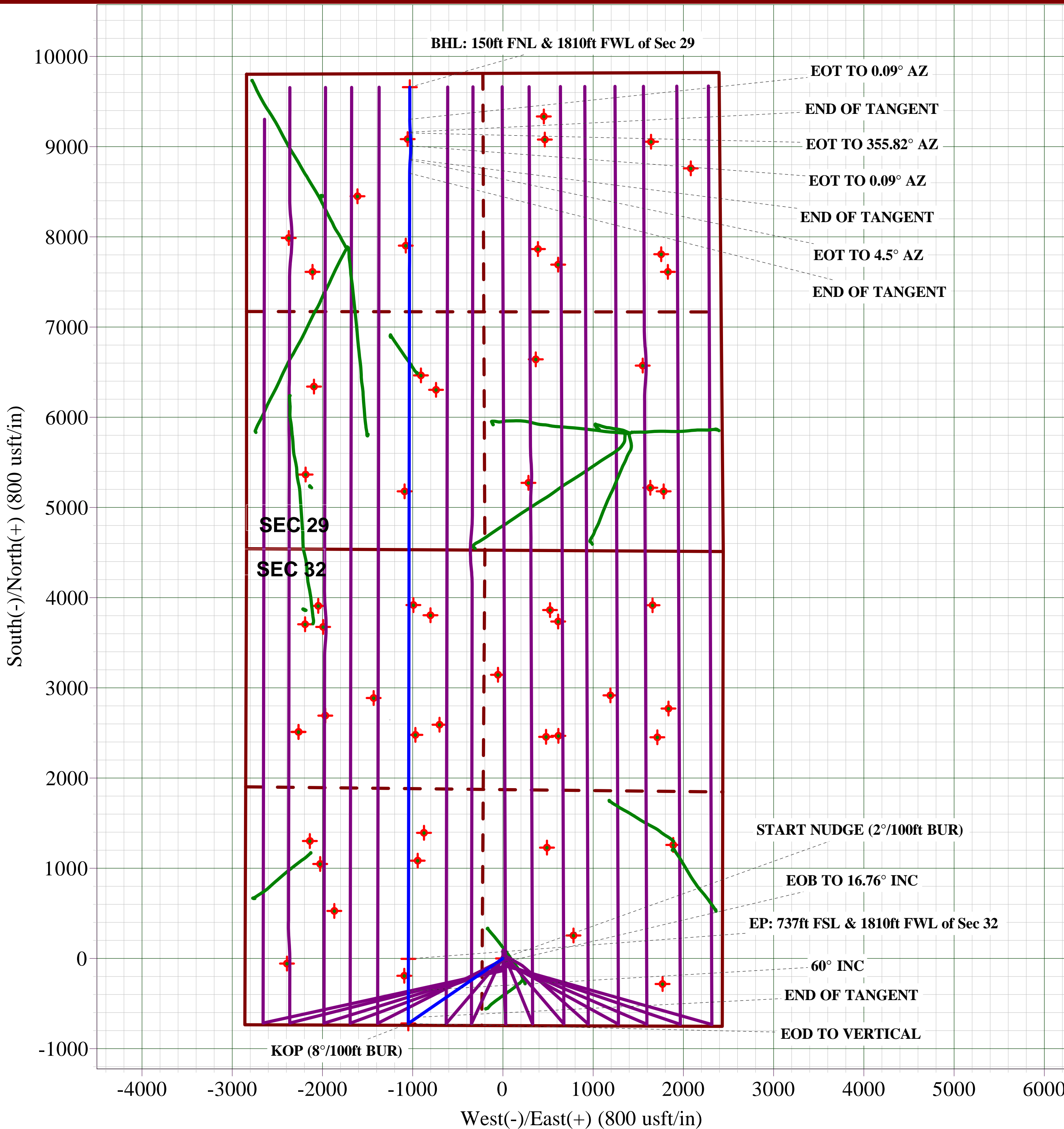
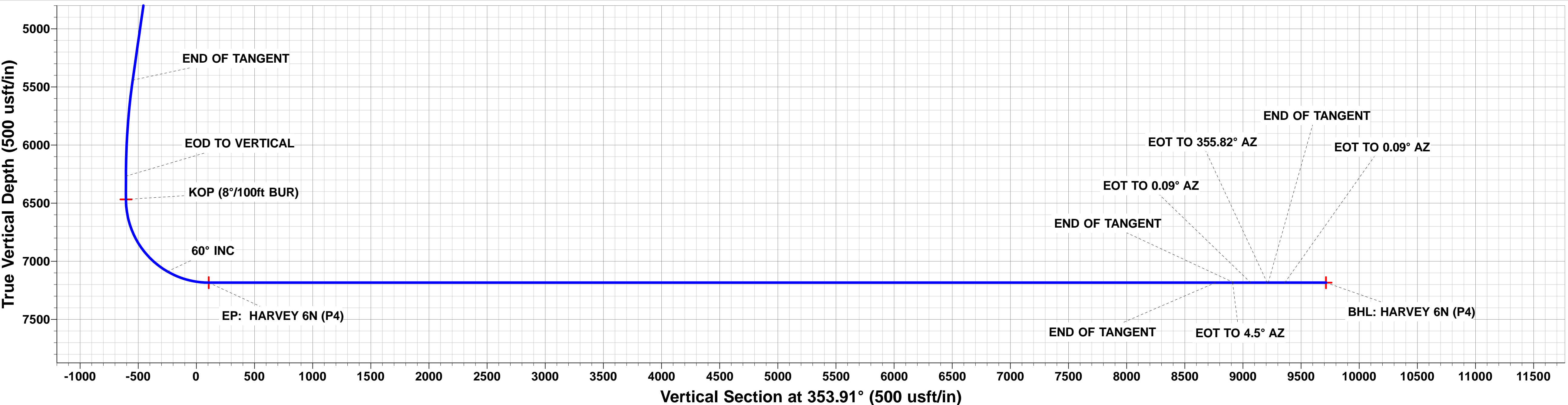
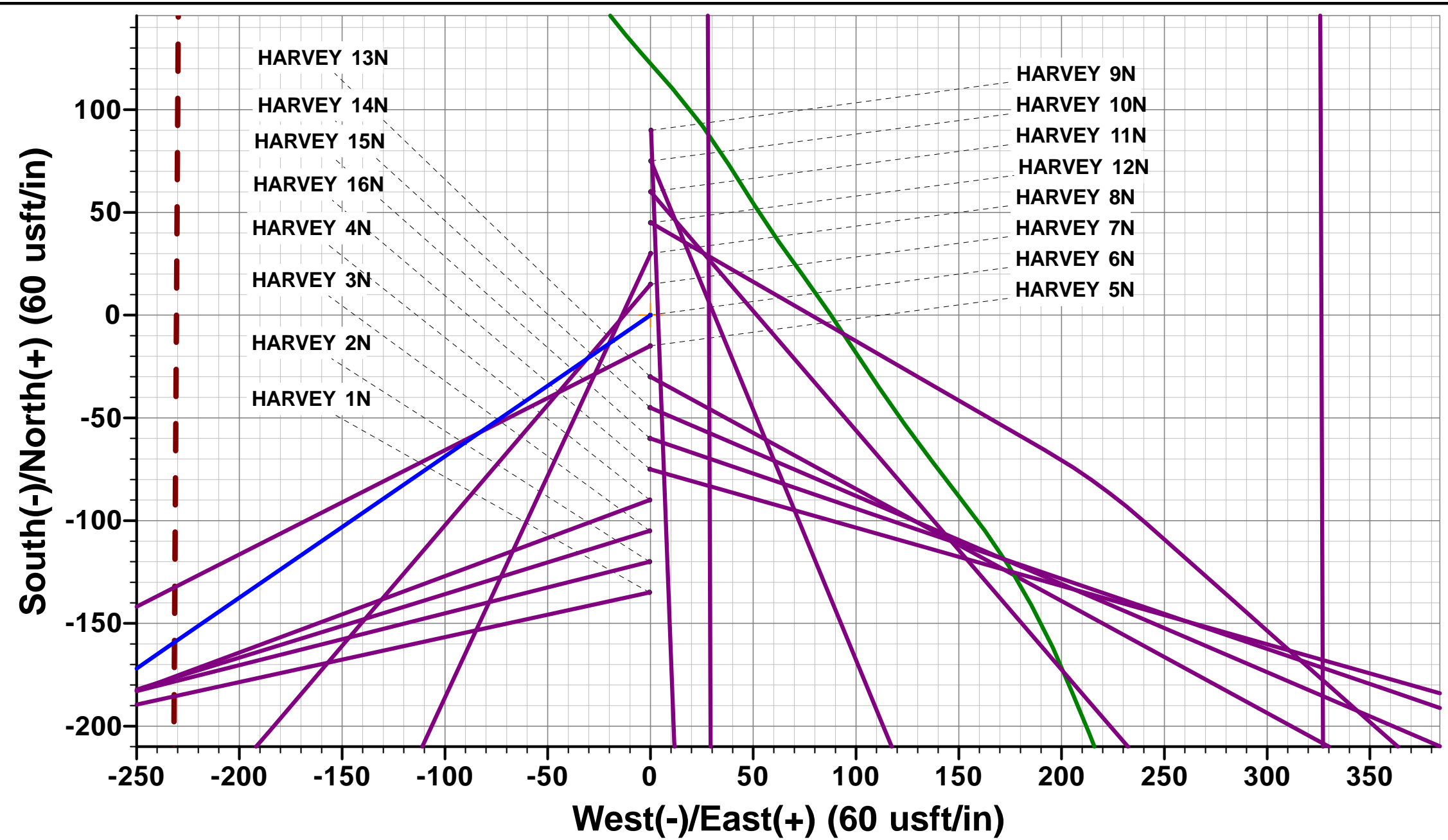
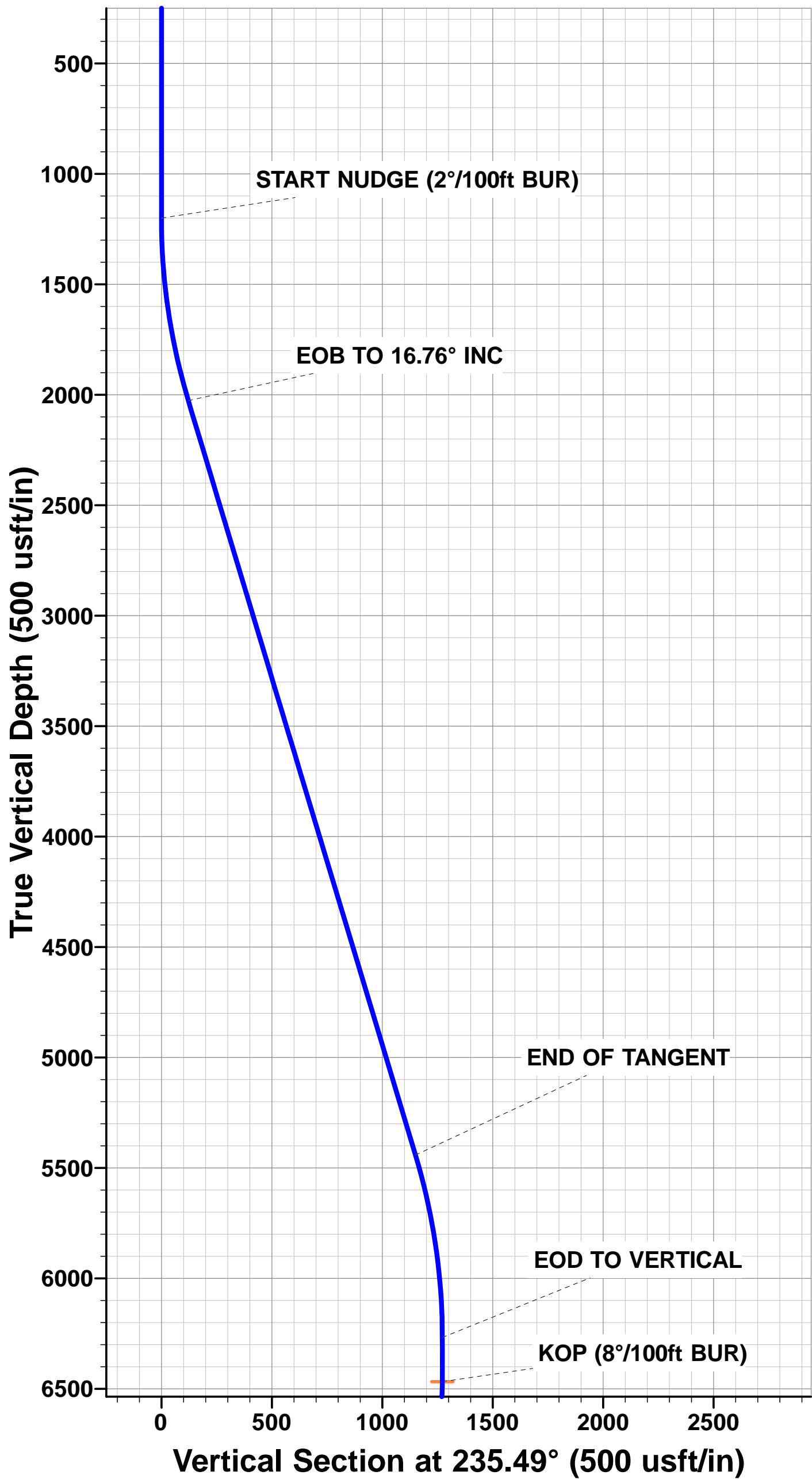
SHL: 745ft FSL & 2434ft FEL Sec 32

EP : 737ft FSL & 1810ft FWL Sec 32

BHL: 150ft FNL & 1810ft FWL Sec 29

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP: HARVEY 6N (P4)	6467.80	-720.65	-1048.35	40.261738	-104.690180
EP: HARVEY 6N (P4)	7184.00	-4.45	-1047.23	40.263704	-104.690176
BHL: HARVEY 6N (P4)	7184.00	9659.63	-1031.40	40.290231	-104.690121
SHL: HARVEY 6N	0.00	0.00	0.00	40.263716	-104.686424



PDC ENERGY

**WELD COUNTY, COLORADO (TRUE)
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)
HARVEY 6N**

**ORIGINAL WELLBORE
PROPOSAL #4**

Anticollision Report

02 September, 2018



Anticollision Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well HARVEY 6N
Project:	WELD COUNTY, COLORADO (TRUE)	TVD Reference:	KB-EST @ 4919.00usft (Original Well Elev)
Reference Site:	SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)	MD Reference:	KB-EST @ 4919.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	HARVEY 6N	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 #4	Offset TVD Reference:	Offset Datum

Reference	PROPOSAL #4		
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	02/09/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	17,432.86	PROPOSAL #4 (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						
SE SW SEC. 32 T4N R65W 6th P.M.						
EXIST VERT HAMBERT R G 32-5 - Wellbore #1 - Desig	10,282.33	7,183.99	1,221.52	1,151.36	17.409	CC
EXIST VERT HAMBERT R G 32-5 - Wellbore #1 - Desig	10,300.00	7,183.99	1,221.65	1,151.17	17.332	ES
EXIST VERT HAMBERT R G 32-5 - Wellbore #1 - Desig	10,700.00	7,183.99	1,290.96	1,213.21	16.604	SF
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)						
ABDN VERT BOHLENDER 2 - Wellbore #1 - Design #1	15,584.08	4,856.00	3,632.72	3,500.84	27.545	CC
ABDN VERT BOHLENDER 2 - Wellbore #1 - Design #1	15,600.00	4,856.00	3,632.75	3,500.63	27.495	ES
ABDN VERT BOHLENDER 2 - Wellbore #1 - Design #1	16,700.00	4,856.00	3,792.60	3,643.89	25.504	SF
ABDN VERT BOHLENDER 31-29 #3 - Wellbore #1 - Des	16,822.38	4,736.00	2,863.94	2,748.35	24.777	CC, ES
ABDN VERT BOHLENDER 31-29 #3 - Wellbore #1 - Des	17,432.88	4,736.00	2,927.27	2,804.51	23.845	SF
ABDN VERT HAMBERT R G 32-4 - Wellbore #1 - Design	11,680.12	7,183.98	1,005.37	909.49	10.486	CC
ABDN VERT HAMBERT R G 32-4 - Wellbore #1 - Design	11,700.00	7,183.98	1,005.57	909.32	10.448	ES
ABDN VERT HAMBERT R G 32-4 - Wellbore #1 - Design	11,900.00	7,183.98	1,029.13	929.15	10.293	SF
ABDN VERT HSR-MAYA 4-29 - Wellbore #1 - Wellbore #	16,208.78	7,000.00	996.09	829.99	5.997	CC, ES
ABDN VERT HSR-MAYA 4-29 - Wellbore #1 - Wellbore #	16,300.00	7,000.00	1,000.26	832.44	5.961	SF
ABDN VERT MUSICK MCCLINTOCK 3 - Wellbore #1 - W	11,631.91	4,521.19	2,898.33	2,846.73	56.175	CC, ES
ABDN VERT MUSICK MCCLINTOCK 3 - Wellbore #1 - W	13,300.00	4,521.19	3,344.07	3,275.95	49.091	SF
ABDN VERT NGL C3 - Wellbore #1 - Design #1	11,475.89	7,183.98	1,151.01	1,058.93	12.501	CC
ABDN VERT NGL C3 - Wellbore #1 - Design #1	11,500.00	7,183.98	1,151.26	1,058.74	12.443	ES
ABDN VERT NGL C3 - Wellbore #1 - Design #1	11,700.00	7,183.98	1,172.62	1,076.37	12.183	SF
ABDN VERT UPRR 21 PAN AM A#1 - Wellbore #1 - Wel	12,988.83	7,100.00	1,083.10	976.85	10.193	CC
ABDN VERT UPRR 21 PAN AM A#1 - Wellbore #1 - Wel	13,000.00	7,100.00	1,083.16	976.69	10.174	ES
ABDN VERT UPRR 21 PAN AM A#1 - Wellbore #1 - Wel	13,200.00	7,100.00	1,103.50	993.26	10.010	SF
EXIST DD NGL C3A - Wellbore #1 - Wellbore #1	13,577.69	7,496.57	1,298.79	1,143.14	8.344	CC
EXIST DD NGL C3A - Wellbore #1 - Wellbore #1	13,600.00	7,507.97	1,298.95	1,142.79	8.318	ES
EXIST DD NGL C3A - Wellbore #1 - Wellbore #1	13,800.00	7,587.26	1,314.94	1,154.64	8.203	SF
EXIST DD RAY 23-32 - Wellbore #1 - Wellbore #1	2,061.45	2,107.42	347.90	339.34	40.614	CC, ES
EXIST DD RAY 23-32 - Wellbore #1 - Wellbore #1	8,300.00	7,255.83	896.03	855.16	21.923	SF
EXIST DD RAY 24-32 - Wellbore #1 - Wellbore #1	9,519.22	7,274.73	2,224.41	2,166.58	38.467	CC, ES
EXIST DD RAY 24-32 - Wellbore #1 - Wellbore #1	11,100.00	7,264.29	2,728.87	2,642.73	31.679	SF
EXIST DD RAY 36-32 - Wellbore #1 - Wellbore #1	1,246.18	1,242.00	325.95	321.38	71.314	CC
EXIST DD RAY 36-32 - Wellbore #1 - Wellbore #1	1,300.00	1,295.72	326.02	321.23	68.025	ES
EXIST DD RAY 36-32 - Wellbore #1 - Wellbore #1	4,200.00	4,173.63	474.11	448.73	18.679	SF
EXIST DD RURAL LAND G32-33D - Wellbore #1 - Wellb	8,439.51	7,320.02	1,704.75	1,662.61	40.454	CC, ES
EXIST DD RURAL LAND G32-33D - Wellbore #1 - Wellb	9,700.00	7,318.99	2,120.14	2,058.47	34.376	SF
EXIST DD SPAYD 19-29 - Wellbore #1 - Wellbore #1	13,583.37	7,600.05	458.74	303.42	2.954	CC

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 HARVEY 6N
Project:	WELD COUNTY, COLORADO (TRUE)	TVD Reference:	KB-EST @ 4919.00usft (Original Well Elev)
Reference Site:	SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)	MD Reference:	KB-EST @ 4919.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	HARVEY 6N	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 #4	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
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)						
EXIST DD SPAYD 19-29 - Wellbore #1 - Wellbore #1	13,600.00	7,600.01	459.04	303.41	2.950	ES, SF
EXIST DD SPAYD 20-29 - Wellbore #1 - Wellbore #1	13,661.57	7,103.00	2,081.52	1,949.68	15.789	CC
EXIST DD SPAYD 20-29 - Wellbore #1 - Wellbore #1	13,700.00	7,086.98	2,081.78	1,949.33	15.716	ES
EXIST DD SPAYD 20-29 - Wellbore #1 - Wellbore #1	14,300.00	7,071.18	2,176.86	2,033.15	15.147	SF
EXIST DD SPAYD 22-29 - Wellbore #1 - Wellbore #1	14,672.76	7,193.63	213.31	60.68	1.398	Level 3, CC, ES, SF
EXIST DD SPAYD 23-29 - Wellbore #1 - Wellbore #1	13,690.48	7,430.54	929.17	793.47	6.847	CC
EXIST DD SPAYD 23-29 - Wellbore #1 - Wellbore #1	13,700.00	7,430.47	929.22	793.34	6.839	ES
EXIST DD SPAYD 23-29 - Wellbore #1 - Wellbore #1	13,800.00	7,429.72	935.60	797.83	6.791	SF
EXIST DD SPAYD 30-29 - Wellbore #1 - Wellbore #1	17,432.88	7,596.78	1,751.71	1,526.47	7.777	CC, ES, SF
EXIST DD SPAYD 33-29 - Wellbore #1 - Wellbore #1	13,609.41	7,655.73	1,703.13	1,546.90	10.902	CC, ES
EXIST DD SPAYD 33-29 - Wellbore #1 - Wellbore #1	14,000.00	7,651.48	1,747.34	1,583.69	10.678	SF
EXIST DD SPAYD 36-29 - Wellbore #1 - Wellbore #1	12,334.35	7,549.19	714.21	592.60	5.873	CC, ES
EXIST DD SPAYD 36-29 - Wellbore #1 - Wellbore #1	12,400.00	7,548.39	717.22	594.39	5.839	SF
EXIST DD SPAYD 37-29 - Wellbore #1 - Wellbore #1	12,384.10	7,309.85	2,021.24	1,902.19	16.978	CC
EXIST DD SPAYD 37-29 - Wellbore #1 - Wellbore #1	12,400.00	7,309.41	2,021.30	1,901.95	16.936	ES
EXIST DD SPAYD 37-29 - Wellbore #1 - Wellbore #1	13,000.00	7,290.00	2,112.91	1,982.36	16.184	SF
EXIST VERT BOHLENDER 29-13 - Wellbore #1 - Design	15,467.12	7,183.97	1,647.31	1,479.80	9.834	CC
EXIST VERT BOHLENDER 29-13 - Wellbore #1 - Design	15,500.00	7,183.97	1,647.64	1,479.51	9.800	ES
EXIST VERT BOHLENDER 29-13 - Wellbore #1 - Design	15,800.00	7,183.96	1,680.61	1,506.76	9.667	SF
EXIST VERT BOHLENDER 29-3 - Wellbore #1 - Design	15,388.93	7,180.97	2,863.86	2,697.85	17.251	CC
EXIST VERT BOHLENDER 29-3 - Wellbore #1 - Design	15,400.00	7,180.97	2,863.88	2,697.66	17.229	ES
EXIST VERT BOHLENDER 29-3 - Wellbore #1 - Design	16,300.00	7,180.96	3,005.29	2,821.91	16.388	SF
EXIST VERT BOHLENDER 32-29 #1 - Wellbore #1 - Des	15,640.17	7,183.97	1,423.00	1,252.20	8.331	CC, ES
EXIST VERT BOHLENDER 32-29 #1 - Wellbore #1 - Des	15,900.00	7,183.96	1,446.53	1,270.78	8.230	SF
EXIST VERT CLYDE MARSHALL 1 - Wellbore #1 - Desi	2,184.99	2,166.84	1,428.43	1,418.15	138.859	CC
EXIST VERT CLYDE MARSHALL 1 - Wellbore #1 - Desi	2,300.00	2,276.97	1,428.82	1,417.70	128.449	ES
EXIST VERT CLYDE MARSHALL 1 - Wellbore #1 - Desi	5,200.00	4,765.00	1,697.02	1,665.07	53.113	SF
EXIST VERT CPC BOHLENDER 29-1 - Wellbore #1 - De	16,802.74	7,183.96	2,662.77	2,470.46	13.846	CC, ES
EXIST VERT CPC BOHLENDER 29-1 - Wellbore #1 - De	17,432.88	7,184.00	2,740.54	2,536.99	13.463	SF
EXIST VERT CPC BOHLENDER 29-2 - Wellbore #1 - De	17,110.56	7,183.97	1,484.95	1,287.55	7.523	CC, ES
EXIST VERT CPC BOHLENDER 29-2 - Wellbore #1 - De	17,300.00	7,183.99	1,496.98	1,295.97	7.447	SF
EXIST VERT HAMBERT G 32-4X - Wellbore #1 - Design	11,446.68	7,183.98	951.17	859.64	10.392	CC, ES
EXIST VERT HAMBERT G 32-4X - Wellbore #1 - Design	11,600.00	7,183.98	963.45	869.06	10.208	SF
EXIST VERT HAMBERT R G 32-1 - Wellbore #1 - Desig	11,693.15	7,183.98	2,699.40	2,603.28	28.084	CC
EXIST VERT HAMBERT R G 32-1 - Wellbore #1 - Desig	11,700.00	7,183.98	2,699.41	2,603.16	28.046	ES
EXIST VERT HAMBERT R G 32-1 - Wellbore #1 - Desig	13,100.00	7,183.98	3,044.01	2,921.45	24.836	SF
EXIST VERT HAMBERT R G 32-2 - Wellbore #1 - Desig	11,510.78	7,183.98	1,653.58	1,560.86	17.834	CC, ES
EXIST VERT HAMBERT R G 32-2 - Wellbore #1 - Desig	12,100.00	7,183.98	1,755.42	1,651.69	16.923	SF
EXIST VERT HAMBERT R G 32-3 - Wellbore #1 - Desig	11,577.79	7,183.98	238.74	144.77	2.541	CC, ES
EXIST VERT HAMBERT R G 32-3 - Wellbore #1 - Desig	11,600.00	7,183.98	239.77	145.39	2.540	SF
EXIST VERT HAMBERT R G 32-6 - Wellbore #1 - Desig	10,251.48	7,183.99	73.33	3.72	1.053	Level 2, CC, ES, SF
EXIST VERT HAMBERT R G 32-7 - Wellbore #1 - Desig	10,231.86	7,183.99	1,521.66	1,452.40	21.970	CC, ES
EXIST VERT HAMBERT R G 32-7 - Wellbore #1 - Desig	10,800.00	7,183.99	1,624.26	1,544.68	20.410	SF
EXIST VERT HAMBERT R G 32-8 - Wellbore #1 - Desig	10,547.35	7,183.99	2,877.63	2,802.66	38.386	CC
EXIST VERT HAMBERT R G 32-8 - Wellbore #1 - Desig	10,600.00	7,183.99	2,878.11	2,802.19	37.908	ES
EXIST VERT HAMBERT R G 32-8 - Wellbore #1 - Desig	12,600.00	7,183.98	3,534.71	3,421.58	31.245	SF
EXIST VERT HSR-CARTER 11-29 - Wellbore #1 - Design	14,077.01	7,183.97	296.31	155.24	2.100	CC, ES
EXIST VERT HSR-CARTER 11-29 - Wellbore #1 - Design	14,100.00	7,183.97	297.20	155.69	2.100	SF
EXIST VERT HSR-CROUSE 5-29 - Wellbore #1 - Design	15,383.17	7,183.97	1,074.45	908.55	6.476	CC
EXIST VERT HSR-CROUSE 5-29 - Wellbore #1 - Design	15,400.00	7,183.97	1,074.58	908.36	6.465	ES
EXIST VERT HSR-CROUSE 5-29 - Wellbore #1 - Design	15,500.00	7,183.97	1,080.78	912.65	6.428	SF
EXIST VERT HSR-DICERSON 14-29A - Wellbore #1 - D	12,950.79	7,183.98	50.75	-68.99	0.424	Level 1, CC, ES, SF

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

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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 #4	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
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)						
EXIST VERT HSR-FRISBIE 16-29A - Wellbore #1 - Desi	12,995.13	7,183.98	2,672.45	2,551.87	22.163	CC
EXIST VERT HSR-FRISBIE 16-29A - Wellbore #1 - Desi	13,000.00	7,183.98	2,672.46	2,551.78	22.146	ES
EXIST VERT HSR-FRISBIE 16-29A - Wellbore #1 - Desi	14,100.00	7,183.97	2,891.84	2,750.33	20.436	SF
EXIST VERT HSR-FROELICH 12-29A - Wellbore #1 - De	14,111.41	7,183.97	1,056.95	915.23	7.458	CC, ES
EXIST VERT HSR-FROELICH 12-29A - Wellbore #1 - De	14,300.00	7,183.97	1,073.64	928.34	7.389	SF
EXIST VERT HSR-HARRISON 9-32 - Wellbore #1 - Des	1,200.00	1,200.00	2,268.59	2,263.47	443.264	CC, ES
EXIST VERT HSR-HARRISON 9-32 - Wellbore #1 - Des	12,600.00	7,183.98	4,615.92	4,502.79	40.802	SF
EXIST VERT HSR-MUNDS 13.29 - Wellbore #1 - Design	13,135.67	7,183.98	1,147.87	1,024.63	9.314	CC, ES
EXIST VERT HSR-MUNDS 13.29 - Wellbore #1 - Design	13,300.00	7,183.98	1,159.57	1,033.23	9.178	SF
EXIST VERT HSR-NICHOLS 15-32 - Wellbore #1 - Desig	1,200.00	1,200.00	822.26	817.14	160.663	CC, ES
EXIST VERT HSR-NICHOLS 15-32 - Wellbore #1 - Desig	10,000.00	7,183.99	2,688.16	2,623.04	41.281	SF
EXIST VERT HSR-RAY 3-29 - Wellbore #1 - Design #1	16,857.78	7,183.96	33.24	-160.29	0.172	Level 1, CC, ES, SF
EXIST VERT HSR-SALISBURY 6-29 - Wellbore #1 - Des	15,675.06	7,183.96	41.77	-129.70	0.244	Level 1, CC, ES, SF
EXIST VERT HSR-TEAGLE 10-29A - Wellbore #1 - Desi	14,416.44	7,183.97	1,400.94	1,253.42	9.497	CC, ES
EXIST VERT HSR-TEAGLE 10-29A - Wellbore #1 - Desi	14,700.00	7,183.97	1,429.35	1,276.44	9.348	SF
EXIST VERT HSR-WILLIAM 10-32A - Wellbore #1 - Des	1,200.00	1,200.00	1,322.18	1,317.06	258.342	CC, ES
EXIST VERT HSR-WILLIAM 10-32A - Wellbore #1 - Des	9,900.00	7,183.99	1,776.05	1,712.70	28.035	SF
EXIST VERT HSR-WRIGHT 9-29A - Wellbore #1 - Desig	14,349.48	7,183.97	2,586.27	2,440.03	17.685	CC
EXIST VERT HSR-WRIGHT 9-29A - Wellbore #1 - Desig	14,400.00	7,183.97	2,586.76	2,439.56	17.573	ES
EXIST VERT HSR-WRIGHT 9-29A - Wellbore #1 - Desig	15,200.00	7,183.97	2,722.53	2,560.11	16.763	SF
EXIST VERT MARSHALL 32-11G - Wellbore #1 - Design	9,165.96	7,183.99	169.87	118.99	3.339	CC, ES, SF
EXIST VERT MARSHALL 32-12G - Wellbore #1 - Design	8,818.19	7,184.00	979.37	933.90	21.539	CC, ES
EXIST VERT MARSHALL 32-12G - Wellbore #1 - Design	9,200.00	7,183.99	1,051.17	999.75	20.442	SF
EXIST VERT MARSHALL 32-14G - Wellbore #1 - Design	7,578.76	7,159.10	45.40	10.65	1.307	Level 3, CC, ES, SF
EXIST VERT MARSHALL G 32-13JI - Wellbore #1 - Des	6,750.00	6,574.24	1,496.54	1,456.00	36.917	SF
EXIST VERT MARSHALL G 32-13JI - Wellbore #1 - Des	7,713.76	7,181.93	1,346.13	1,311.27	38.619	CC, ES
EXIST VERT MEL SMOOKLER GAS UNIT 1 - Wellbore	8,298.19	7,184.00	821.76	783.07	21.238	CC
EXIST VERT MEL SMOOKLER GAS UNIT 1 - Wellbore	8,300.00	7,184.00	821.77	783.06	21.228	ES
EXIST VERT MEL SMOOKLER GAS UNIT 1 - Wellbore	8,500.00	7,184.00	846.18	805.11	20.605	SF
EXIST VERT MUSICK 1-32 - Wellbore #1 - Design #1	10,659.53	7,183.99	389.95	312.94	5.064	CC, ES
EXIST VERT MUSICK 1-32 - Wellbore #1 - Design #1	10,700.00	7,183.99	392.05	314.30	5.042	SF
EXIST VERT MUSICK GAS UNIT 1 - Wellbore #1 - Desi	10,692.75	7,183.99	2,233.90	2,156.29	28.781	CC
EXIST VERT MUSICK GAS UNIT 1 - Wellbore #1 - Desi	10,700.00	7,183.99	2,233.91	2,156.17	28.732	ES
EXIST VERT MUSICK GAS UNIT 1 - Wellbore #1 - Desi	11,900.00	7,183.98	2,539.25	2,439.26	25.396	SF
EXIST VERT MUSICK MCCLINTOCK 2 - Wellbore #1 - D	10,364.47	4,755.00	2,452.78	2,421.47	78.352	CC
EXIST VERT MUSICK MCCLINTOCK 2 - Wellbore #1 - D	10,400.00	4,755.00	2,453.03	2,421.47	77.709	ES
EXIST VERT MUSICK MCCLINTOCK 2 - Wellbore #1 - D	11,800.00	4,755.00	2,841.98	2,799.93	67.584	SF
EXIST VERT MUSICK MCCLINTOCK 4 - Wellbore #1 - D	1,200.00	1,200.00	2,990.04	2,984.92	584.230	CC, ES
EXIST VERT MUSICK MCCLINTOCK 4 - Wellbore #1 - D	16,625.03	4,750.00	7,375.14	7,224.33	48.903	SF
EXIST VERT MUSICK MCCLINTOCK 6 - Wellbore #1 - D	10,463.47	4,750.00	2,604.08	2,563.44	64.066	CC
EXIST VERT MUSICK MCCLINTOCK 6 - Wellbore #1 - D	10,500.00	4,750.00	2,604.34	2,563.36	63.554	ES
EXIST VERT MUSICK MCCLINTOCK 6 - Wellbore #1 - D	12,000.00	4,750.00	3,023.60	2,968.74	55.109	SF
EXIST VERT MUSICK MCCLINTOCK 7 - Wellbore #1 - D	1,200.00	1,200.00	2,543.85	2,538.73	497.047	CC, ES
EXIST VERT MUSICK MCCLINTOCK 7 - Wellbore #1 - D	16,625.03	4,739.00	7,030.40	6,899.52	53.717	SF
EXIST VERT MUSICK-MCCLINTOCK 1 - Wellbore #1 - D	11,637.43	4,803.00	2,848.15	2,790.93	49.777	CC
EXIST VERT MUSICK-MCCLINTOCK 1 - Wellbore #1 - D	11,700.00	4,803.00	2,848.84	2,790.87	49.148	ES
EXIST VERT MUSICK-MCCLINTOCK 1 - Wellbore #1 - D	13,400.00	4,803.00	3,349.42	3,271.04	42.733	SF
EXIST VERT MUSICK-MCCLINTOCK 5 - Wellbore #1 - D	11,690.82	4,752.00	2,432.48	2,391.85	59.871	CC
EXIST VERT MUSICK-MCCLINTOCK 5 - Wellbore #1 - D	11,700.00	4,752.00	2,432.50	2,391.80	59.774	ES
EXIST VERT MUSICK-MCCLINTOCK 5 - Wellbore #1 - D	12,700.00	4,752.00	2,633.52	2,585.63	54.994	SF
EXIST VERT NGL C3B - Wellbore #1 - Design #1	16,688.86	7,183.96	3,109.75	2,920.38	16.421	CC
EXIST VERT NGL C3B - Wellbore #1 - Design #1	16,700.00	7,183.96	3,109.80	2,920.10	16.393	ES

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 HARVEY 6N
Project:	WELD COUNTY, COLORADO (TRUE)	TVD Reference:	KB-EST @ 4919.00usft (Original Well Elev)
Reference Site:	SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)	MD Reference:	KB-EST @ 4919.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	HARVEY 6N	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 #4	Offset TVD Reference:	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)						
EXIST VERT NGL C3B - Wellbore #1 - Design #1	17,432.88	7,184.00	3,241.23	3,037.67	15.923	SF
EXIST VERT R G 32-5 - Wellbore #1 - Design #1	10,282.33	7,183.99	1,221.52	1,151.36	17.409	CC
EXIST VERT R G 32-5 - Wellbore #1 - Design #1	10,300.00	7,183.99	1,221.65	1,151.17	17.332	ES
EXIST VERT R G 32-5 - Wellbore #1 - Design #1	10,700.00	7,183.99	1,290.96	1,213.21	16.604	SF
EXIST VERT SPAYD 5-29 - Wellbore #1 - Design #1	15,757.65	7,183.96	1,338.37	1,165.33	7.734	CC
EXIST VERT SPAYD 5-29 - Wellbore #1 - Design #1	15,800.00	7,183.96	1,339.04	1,165.20	7.702	ES
EXIST VERT SPAYD 5-29 - Wellbore #1 - Design #1	16,000.00	7,183.96	1,360.14	1,182.48	7.656	SF
EXIST VERT UPRR 21 PAN AM D #1 - Wellbore #1 - De	14,237.06	4,730.00	2,457.34	2,398.28	41.606	CC, ES
EXIST VERT UPRR 21 PAN AM D #1 - Wellbore #1 - De	15,000.00	4,730.00	2,573.05	2,508.40	39.800	SF
EXIST VERT UPRR 21 PAN AM D #2 - Wellbore #1 - De	12,955.30	7,183.98	2,820.40	2,700.57	23.537	CC
EXIST VERT UPRR 21 PAN AM D #2 - Wellbore #1 - De	13,000.00	7,183.98	2,820.75	2,700.08	23.375	ES
EXIST VERT UPRR 21 PAN AM D #2 - Wellbore #1 - De	14,200.00	7,183.97	3,082.85	2,939.44	21.498	SF
EXIST VERT UPRR 21 PAN AM G #1 - Wellbore #1 - De	16,221.82	4,660.00	2,589.17	2,506.04	31.147	CC, ES
EXIST VERT UPRR 21 PAN AM G #1 - Wellbore #1 - De	16,924.37	4,660.00	2,684.14	2,593.48	29.605	SF
EXIST VERT UPRR PAN AM "J"1 - Wellbore #1 - Design	13,047.62	7,183.98	1,321.90	1,200.32	10.873	CC, ES
EXIST VERT UPRR PAN AM "J"1 - Wellbore #1 - Design	13,300.00	7,183.98	1,345.77	1,219.43	10.652	SF
EXIST VERT VERN MARSHALL 1 - Wellbore #1 - Desig	4,940.34	4,785.00	2,286.01	2,253.66	70.674	CC, ES
EXIST VERT VERN MARSHALL 1 - Wellbore #1 - Desig	16,924.37	4,785.00	8,282.72	8,154.08	64.385	SF
EXIST VERT WEINMASTER G 32-18 - Wellbore #1 - De	10,919.56	7,183.99	987.59	905.82	12.077	CC, ES
EXIST VERT WEINMASTER G 32-18 - Wellbore #1 - De	11,100.00	7,183.99	1,003.94	918.84	11.797	SF
HARVEY 10N - ORIGINAL WELLBORE - PROPOSAL #	1,200.00	1,200.00	75.01	69.89	14.656	CC, ES
HARVEY 10N - ORIGINAL WELLBORE - PROPOSAL #	17,432.88	17,389.22	1,321.80	946.62	3.523	SF
HARVEY 11N - ORIGINAL WELLBORE - PROPOSAL #4	1,200.00	1,200.00	60.00	54.88	11.724	CC, ES
HARVEY 11N - ORIGINAL WELLBORE - PROPOSAL #4	17,432.88	17,361.01	1,671.16	1,296.23	4.457	SF
HARVEY 12N - ORIGINAL WELLBORE - PROPOSAL #	1,200.00	1,200.00	44.99	39.87	8.791	CC, ES
HARVEY 12N - ORIGINAL WELLBORE - PROPOSAL #	17,432.88	17,458.28	1,938.66	1,562.64	5.156	SF
HARVEY 13N - ORIGINAL WELLBORE - PROPOSAL #	1,000.00	1,000.00	29.99	25.77	7.108	CC, ES
HARVEY 13N - ORIGINAL WELLBORE - PROPOSAL #	17,432.88	17,410.79	2,275.15	1,897.55	6.025	SF
HARVEY 14N - ORIGINAL WELLBORE - PROPOSAL #	900.00	900.00	44.99	41.22	11.936	CC, ES
HARVEY 14N - ORIGINAL WELLBORE - PROPOSAL #	17,432.88	17,589.89	2,588.55	2,211.71	6.869	SF
HARVEY 15N - ORIGINAL WELLBORE - PROPOSAL #	800.00	800.00	59.96	56.64	18.063	CC, ES
HARVEY 15N - ORIGINAL WELLBORE - PROPOSAL #	17,432.88	17,644.07	2,959.83	2,581.61	7.126	SF
HARVEY 16N - ORIGINAL WELLBORE - PROPOSAL #	700.00	700.00	74.97	72.10	26.121	CC, ES
HARVEY 16N - ORIGINAL WELLBORE - PROPOSAL #	17,432.88	17,858.54	3,308.38	2,927.11	8.677	SF
HARVEY 1N - ORIGINAL WELLBORE - PROPOSAL #6	300.00	300.00	134.94	133.87	125.860	CC, ES
HARVEY 1N - ORIGINAL WELLBORE - PROPOSAL #6	17,200.00	17,504.15	1,616.05	1,253.51	4.458	SF
HARVEY 2N - ORIGINAL WELLBORE - PROPOSAL #5	400.00	400.00	119.97	118.44	78.838	CC, ES
HARVEY 2N - ORIGINAL WELLBORE - PROPOSAL #5	17,432.88	17,835.26	1,329.87	955.80	3.555	SF
HARVEY 3N - ORIGINAL WELLBORE - PROPOSAL #5	500.00	500.00	104.96	102.99	53.245	CC, ES
HARVEY 3N - ORIGINAL WELLBORE - PROPOSAL #5	17,432.88	17,603.66	937.40	561.70	2.495	SF
HARVEY 4N - ORIGINAL WELLBORE - PROPOSAL #5	600.00	600.00	89.95	87.53	37.157	CC, ES
HARVEY 4N - ORIGINAL WELLBORE - PROPOSAL #5	17,432.88	17,589.00	645.16	273.05	1.734	SF
HARVEY 5N - ORIGINAL WELLBORE - PROPOSAL #4	1,100.00	1,100.00	14.97	10.30	3.207	CC
HARVEY 5N - ORIGINAL WELLBORE - PROPOSAL #4	17,432.88	17,431.85	351.64	-14.67	0.960	Level 1, ES, SF
HARVEY 7N - ORIGINAL WELLBORE - PROPOSAL #4	1,200.00	1,200.00	15.01	9.89	2.933	CC, ES
HARVEY 7N - ORIGINAL WELLBORE - PROPOSAL #4	17,432.88	17,271.59	429.45	63.08	1.172	Level 2, SF
HARVEY 8N - ORIGINAL WELLBORE - PROPOSAL #4	1,200.00	1,200.00	30.02	24.90	5.865	CC, ES
HARVEY 8N - ORIGINAL WELLBORE - PROPOSAL #4	17,432.88	17,342.37	699.82	324.71	1.866	SF
HARVEY 9N - ORIGINAL WELLBORE - PROPOSAL #4	1,200.00	1,200.00	89.98	84.87	17.582	CC, ES
HARVEY 9N - ORIGINAL WELLBORE - PROPOSAL #4	17,432.88	17,290.40	1,027.79	655.85	2.763	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 HARVEY 6N
Project:	WELD COUNTY, COLORADO (TRUE)	TVD Reference:	KB-EST @ 4919.00usft (Original Well Elev)
Reference Site:	SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)	MD Reference:	KB-EST @ 4919.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	HARVEY 6N	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 #4	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)						
EXIST DD RAY 39-32 - Wellbore #1 - Wellbore #1	100.00	66.75	2,227.46	2,227.30	10,000.000	CC, ES
EXIST DD RAY 39-32 - Wellbore #1 - Wellbore #1	14,700.00	7,286.80	7,234.25	7,078.40	46.418	SF
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	13,645.35	7,191.00	3,407.28	3,274.39	25.638	CC
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	13,700.00	7,191.00	3,407.72	3,273.79	25.443	ES
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	15,300.00	7,191.00	3,787.80	3,623.47	23.050	SF
EXIST VERT HSR-KOCH 16-32 - Wellbore #1 - Design #	1,200.00	1,172.00	1,791.65	1,786.58	354.038	CC, ES
EXIST VERT HSR-KOCH 16-32 - Wellbore #1 - Design #	16,478.01	7,155.96	9,415.56	9,228.84	50.426	SF

Offset Design

SE SW SEC. 32 T4N R65W 6th P.M. - EXIST VERT HAMBERT R G 32-5 - Wellbore #1 - Design #1												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset 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	-42.04	2,511.61	-2,264.83	3,381.96				
100.00	100.00	100.00	100.00	0.09	0.09	-42.04	2,511.61	-2,264.83	3,381.96	3,381.78	0.17	N/A	
200.00	200.00	200.00	200.00	0.31	0.31	-42.04	2,511.61	-2,264.83	3,381.96	3,381.33	0.62	5,431.971	
300.00	300.00	300.00	300.00	0.54	0.54	-42.04	2,511.61	-2,264.83	3,381.96	3,380.88	1.07	3,154.415	
400.00	400.00	400.00	400.00	0.76	0.76	-42.04	2,511.61	-2,264.83	3,381.96	3,380.44	1.52	2,222.535	
500.00	500.00	500.00	500.00	0.99	0.99	-42.04	2,511.61	-2,264.83	3,381.96	3,379.99	1.97	1,715.686	
600.00	600.00	600.00	600.00	1.21	1.21	-42.04	2,511.61	-2,264.83	3,381.96	3,379.54	2.42	1,397.081	
700.00	700.00	700.00	700.00	1.44	1.44	-42.04	2,511.61	-2,264.83	3,381.96	3,379.09	2.87	1,178.274	
800.00	800.00	800.00	800.00	1.66	1.66	-42.04	2,511.61	-2,264.83	3,381.96	3,378.64	3.32	1,018.725	
900.00	900.00	900.00	900.00	1.88	1.88	-42.04	2,511.61	-2,264.83	3,381.96	3,378.19	3.77	897.231	
1,000.00	1,000.00	1,000.00	1,000.00	2.11	2.11	-42.04	2,511.61	-2,264.83	3,381.96	3,377.74	4.22	801.628	
1,100.00	1,100.00	1,100.00	1,100.00	2.33	2.33	-42.04	2,511.61	-2,264.83	3,381.96	3,377.29	4.67	724.437	
1,200.00	1,200.00	1,200.00	1,200.00	2.56	2.56	-42.04	2,511.61	-2,264.83	3,381.96	3,376.84	5.12	660.807	
1,300.00	1,299.98	1,299.98	1,299.98	2.76	2.78	82.50	2,511.61	-2,264.83	3,381.73	3,376.18	5.55	609.833	
1,400.00	1,399.84	1,399.84	1,399.84	2.95	3.01	82.60	2,511.61	-2,264.83	3,381.05	3,375.09	5.96	567.522	
1,500.00	1,499.45	1,499.45	1,499.45	3.15	3.23	82.77	2,511.61	-2,264.83	3,379.93	3,373.55	6.38	529.504	
1,600.00	1,598.70	1,598.70	1,598.70	3.38	3.46	83.00	2,511.61	-2,264.83	3,378.41	3,371.58	6.83	494.684	
1,700.00	1,697.47	1,697.47	1,697.47	3.63	3.68	83.30	2,511.61	-2,264.83	3,376.52	3,369.22	7.31	462.214	
1,800.00	1,795.62	1,795.62	1,795.62	3.93	3.90	83.66	2,511.61	-2,264.83	3,374.32	3,366.50	7.82	431.515	
1,900.00	1,893.06	1,893.06	1,893.06	4.27	4.12	84.08	2,511.61	-2,264.83	3,371.85	3,363.47	8.38	402.249	
2,000.00	1,989.64	1,989.64	1,989.64	4.68	4.33	84.55	2,511.61	-2,264.83	3,369.20	3,360.20	9.00	374.283	
2,038.10	2,026.20	2,026.20	2,026.20	4.85	4.42	84.75	2,511.61	-2,264.83	3,368.15	3,358.90	9.25	363.966	
2,100.00	2,085.47	2,085.47	2,085.47	5.14	4.55	85.04	2,511.61	-2,264.83	3,366.49	3,356.82	9.68	347.850	
2,200.00	2,181.22	2,181.22	2,181.22	5.63	4.76	85.51	2,511.61	-2,264.83	3,364.01	3,353.63	10.39	323.894	
2,300.00	2,276.97	2,276.97	2,276.97	6.14	4.98	85.98	2,511.61	-2,264.83	3,361.78	3,350.66	11.12	302.401	
2,400.00	2,372.72	2,372.72	2,372.72	6.68	5.19	86.45	2,511.61	-2,264.83	3,359.79	3,347.92	11.87	283.164	
2,500.00	2,468.47	2,468.47	2,468.47	7.22	5.41	86.92	2,511.61	-2,264.83	3,358.04	3,345.41	12.63	265.944	
2,600.00	2,564.22	2,564.22	2,564.22	7.78	5.63	87.39	2,511.61	-2,264.83	3,356.55	3,343.15	13.40	250.503	
2,700.00	2,659.97	2,659.97	2,659.97	8.34	5.84	87.86	2,511.61	-2,264.83	3,355.30	3,341.12	14.18	236.621	
2,800.00	2,755.72	2,755.72	2,755.72	8.91	6.06	88.33	2,511.61	-2,264.83	3,354.29	3,339.33	14.97	224.105	
2,900.00	2,851.47	2,851.47	2,851.47	9.49	6.27	88.80	2,511.61	-2,264.83	3,353.54	3,337.78	15.76	212.782	
3,000.00	2,947.23	2,947.23	2,947.23	10.07	6.49	89.27	2,511.61	-2,264.83	3,353.03	3,336.47	16.56	202.507	
3,100.00	3,042.98	3,042.98	3,042.98	10.66	6.70	89.74	2,511.61	-2,264.83	3,352.77	3,335.42	17.36	193.151	
3,154.19	3,094.86	3,094.86	3,094.86	10.98	6.82	90.00	2,511.61	-2,264.83	3,352.74	3,334.94	17.79	188.423	
3,200.00	3,138.73	3,138.73	3,138.73	11.25	6.92	90.22	2,511.61	-2,264.83	3,352.76	3,334.60	18.16	184.606	

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