



Project: WELD COUNTY, COLORADO (TRUE)
 Site: SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)
 Well: HARVEY 7N
 Wellbore: ORIGINAL WELLBORE
 Design: PROPOSAL #4

ANNOTATIONS

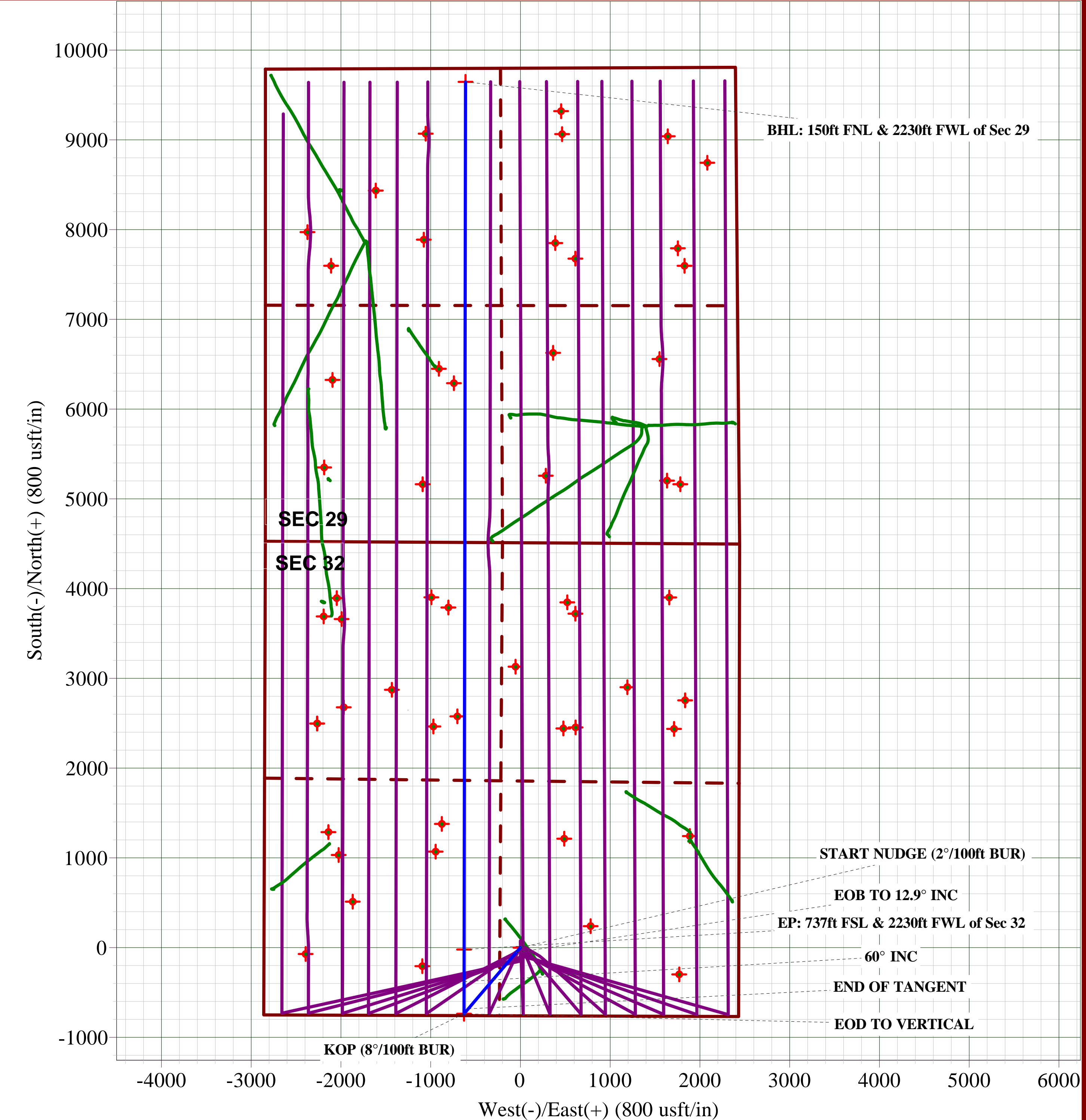
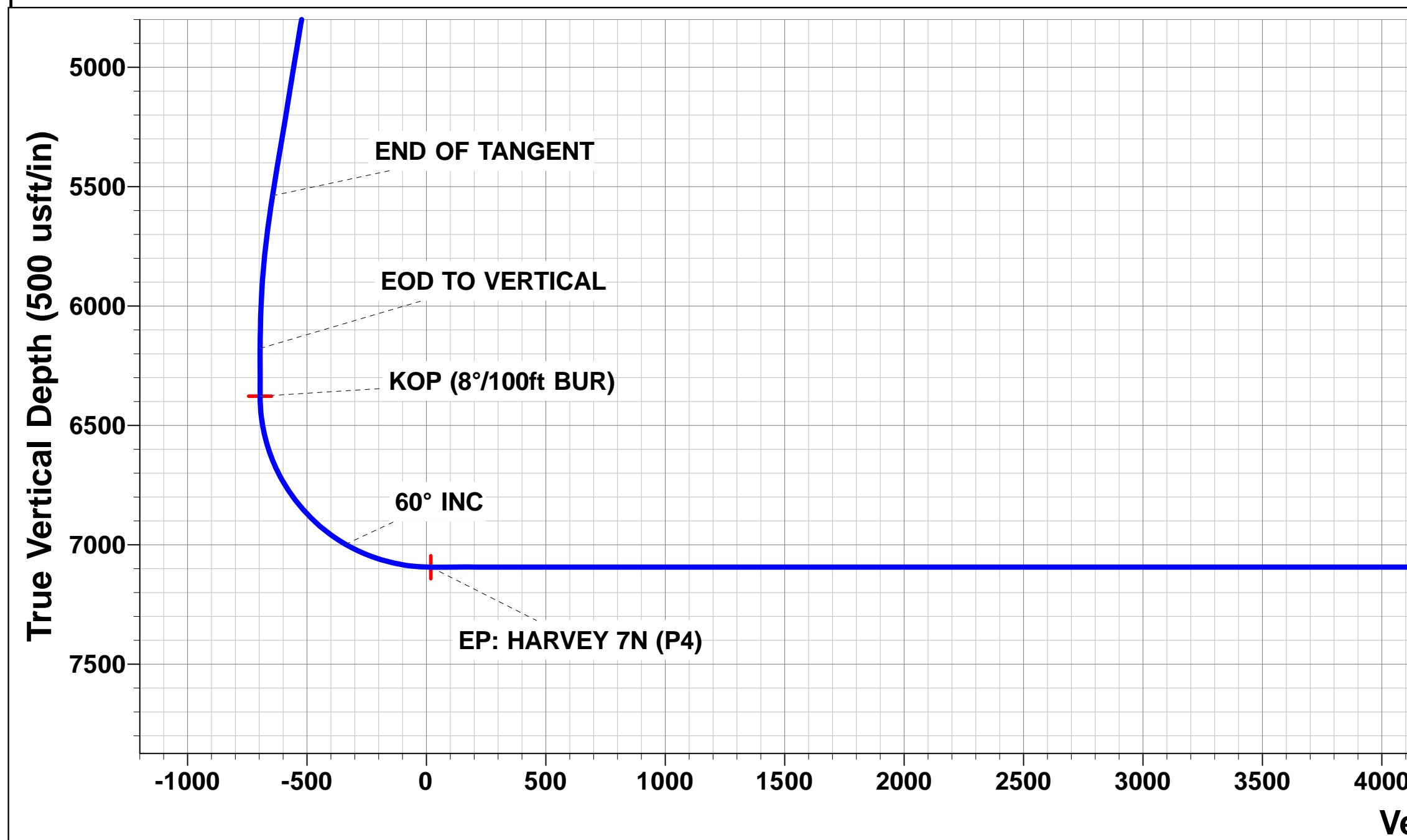
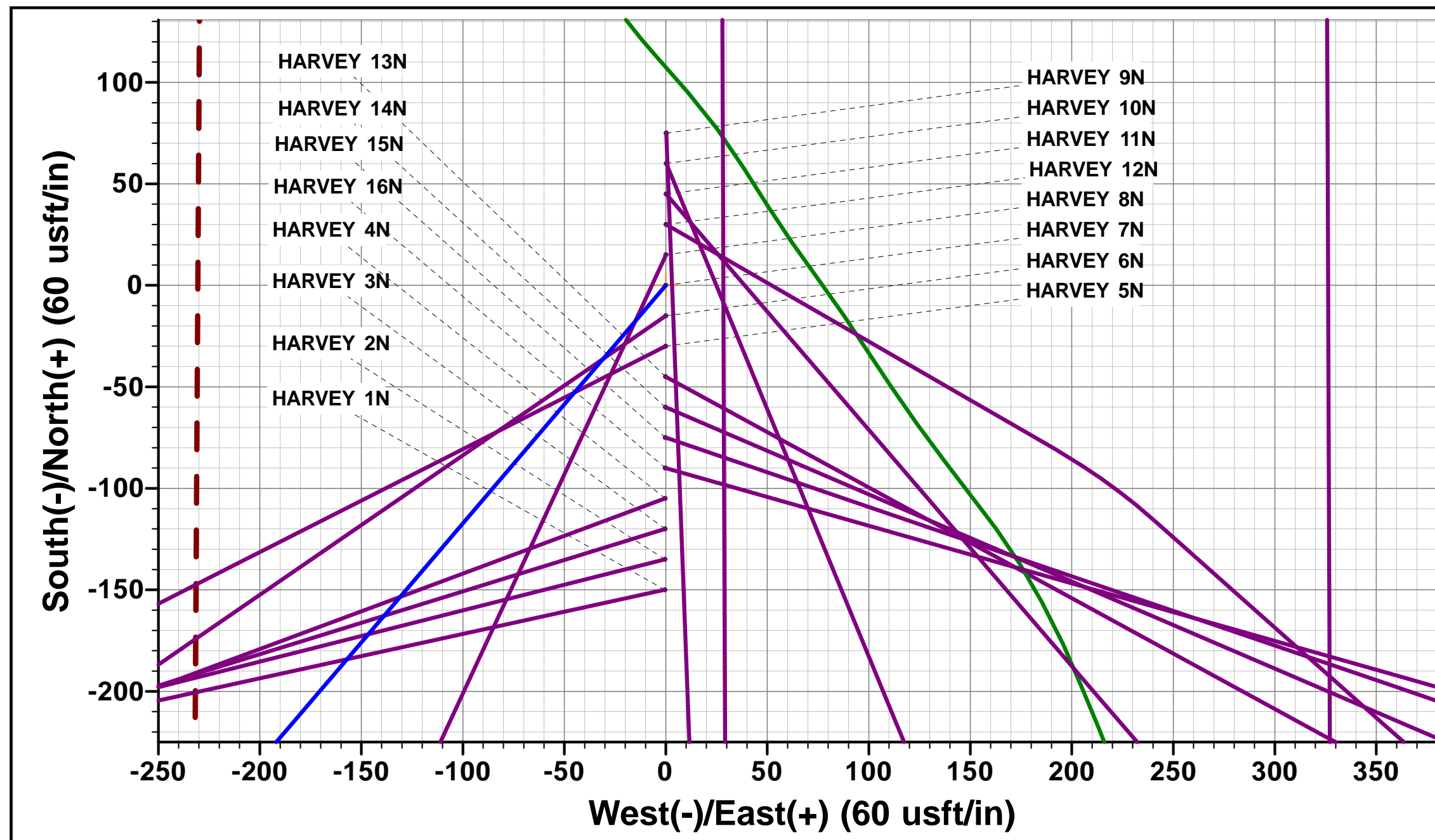
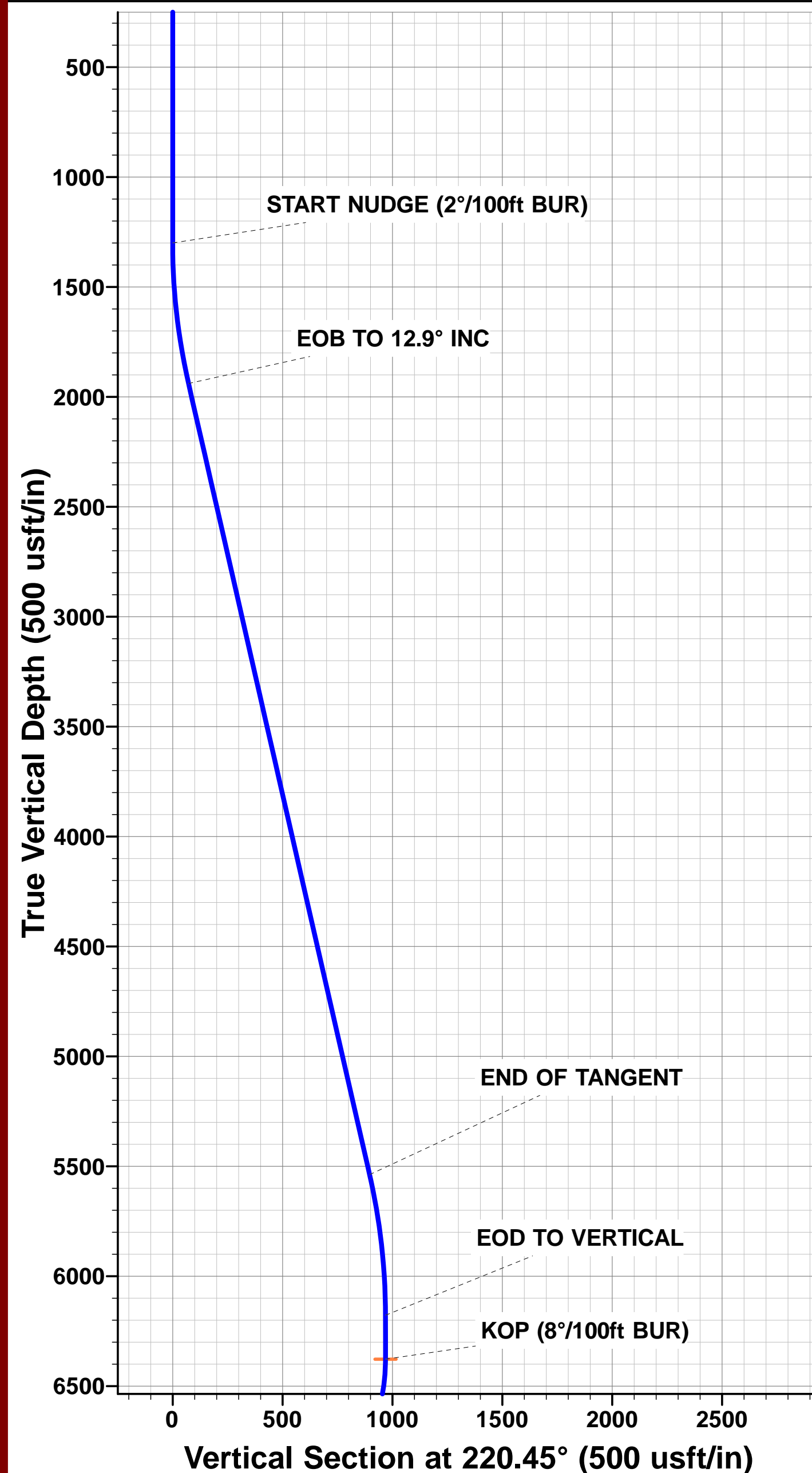
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 760ft FSL & 2434ft FEL of Sec 32
1300.00	1300.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUJGE (2"/100ft BUR)
1939.43	1944.86	12.90	220.45	-54.99	-46.89	-51.92	72.27	EOB TO 12.9° INC
5538.38	5636.95	12.90	220.45	-682.07	-581.58	-643.91	896.35	END OF TANGENT
6177.80	6281.81	0.00	0.00	-737.06	-628.47	-695.82	968.62	EOD TO VERTICAL
6377.80	6481.81	0.00	0.00	-737.06	-628.47	-695.82	968.62	KOP (8"/100ft BUR)
6998.05	7231.81	60.00	0.09	-378.96	-627.91	-338.48	1326.93	60° INC
7094.00	7606.81	90.00	0.09	-20.86	-627.35	18.87	1684.82	EP: 737ft FSL & 2230ft FWL of Sec 32
7094.00	17273.90	90.00	0.10	9646.21	-611.51	9665.58	11351.91	BHL: 150ft FNL & 2230ft FWL of Sec 29

PROPOSED LOCAL COORDINATES:

SHL: 760ft FSL & 2434ft FEL Sec 32
 EP : 737ft FSL & 2230ft FWL Sec 32
 BHL: 150ft FNL & 2230ft FWL Sec 29

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP: HARVEY 7N (P4)	6377.80	-737.06	-628.47	40.261734	-104.688676
EP: HARVEY 7N (P4)	7094.00	-20.86	-627.35	40.263700	-104.688672
BHL: HARVEY 7N (P4)	7094.00	9646.21	-611.51	40.290236	-104.688616
SHL: HARVEY 7N	0.00	0.00	0.00	40.263757	-104.686424



PDC ENERGY

**WELD COUNTY, COLORADO (TRUE)
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)
HARVEY 7N**

**ORIGINAL WELLBORE
PROPOSAL #4**

Anticollision Report

02 September, 2018





Company:	PDC ENERGY	Local Co-ordinate Reference:	Well HARVEY 7N
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 7N	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	17,273.90	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
SE SW SEC. 32 T4N R65W 6th P.M.						
EXIST VERT HAMBERT R G 32-5 - Wellbore #1 - Desig	10,121.64	7,093.99	1,641.49	1,573.96	24.305	CC, ES
EXIST VERT HAMBERT R G 32-5 - Wellbore #1 - Desig	10,900.00	7,093.99	1,816.69	1,734.94	22.224	SF
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)						
ABDN VERT BOHLENDER 2 - Wellbore #1 - Design #1	15,423.74	4,856.00	3,258.48	3,132.95	25.956	CC
ABDN VERT BOHLENDER 2 - Wellbore #1 - Design #1	15,500.00	4,856.00	3,259.38	3,132.71	25.733	ES
ABDN VERT BOHLENDER 2 - Wellbore #1 - Design #1	16,700.00	4,856.00	3,499.50	3,355.10	24.235	SF
ABDN VERT BOHLENDER 31-29 #3 - Wellbore #1 - Des	16,692.95	4,736.00	2,592.41	2,489.29	25.142	CC
ABDN VERT BOHLENDER 31-29 #3 - Wellbore #1 - Des	16,700.00	4,736.00	2,592.41	2,489.23	25.124	ES
ABDN VERT BOHLENDER 31-29 #3 - Wellbore #1 - Des	17,273.90	4,736.00	2,656.70	2,547.57	24.344	SF
ABDN VERT HAMBERT R G 32-4 - Wellbore #1 - Design	11,519.41	7,093.99	1,425.41	1,332.16	15.285	CC, ES
ABDN VERT HAMBERT R G 32-4 - Wellbore #1 - Design	11,900.00	7,093.99	1,475.35	1,374.97	14.697	SF
ABDN VERT HSR-MAYA 4-29 - Wellbore #1 - Wellbore #	16,047.98	7,000.00	1,403.08	1,238.15	8.507	CC
ABDN VERT HSR-MAYA 4-29 - Wellbore #1 - Wellbore #	16,100.00	7,000.00	1,404.04	1,238.12	8.462	ES
ABDN VERT HSR-MAYA 4-29 - Wellbore #1 - Wellbore #	16,300.00	7,000.00	1,425.53	1,255.79	8.398	SF
ABDN VERT MUSICK MCCLINTOCK 3 - Wellbore #1 - W	11,471.18	4,521.19	3,012.57	2,957.64	54.837	CC
ABDN VERT MUSICK MCCLINTOCK 3 - Wellbore #1 - W	11,500.00	4,521.19	3,012.71	2,957.44	54.513	ES
ABDN VERT MUSICK MCCLINTOCK 3 - Wellbore #1 - W	13,400.00	4,521.19	3,577.15	3,499.96	46.341	SF
ABDN VERT NGL C3 - Wellbore #1 - Design #1	11,315.18	7,093.99	1,571.04	1,481.59	17.564	CC, ES
ABDN VERT NGL C3 - Wellbore #1 - Design #1	11,800.00	7,093.99	1,644.14	1,545.64	16.691	SF
ABDN VERT UPRR 21 PAN AM A#1 - Wellbore #1 - Wel	12,828.09	7,100.00	1,500.36	1,396.63	14.465	CC, ES
ABDN VERT UPRR 21 PAN AM A#1 - Wellbore #1 - Wel	13,200.00	7,100.00	1,545.77	1,435.00	13.955	SF
EXIST DD NGL C3A - Wellbore #1 - Wellbore #1	13,377.69	7,381.35	1,713.66	1,561.90	11.292	CC
EXIST DD NGL C3A - Wellbore #1 - Wellbore #1	13,400.00	7,386.27	1,713.80	1,561.57	11.258	ES
EXIST DD NGL C3A - Wellbore #1 - Wellbore #1	13,800.00	7,537.48	1,759.87	1,599.29	10.960	SF
EXIST DD RAY 23-32 - Wellbore #1 - Wellbore #1	2,375.84	2,409.70	294.71	284.17	27.982	CC
EXIST DD RAY 23-32 - Wellbore #1 - Wellbore #1	2,400.00	2,432.38	294.83	284.15	27.599	ES
EXIST DD RAY 23-32 - Wellbore #1 - Wellbore #1	8,000.00	7,169.83	457.57	419.70	12.082	SF
EXIST DD RAY 24-32 - Wellbore #1 - Wellbore #1	9,359.19	7,187.97	1,804.07	1,748.74	32.606	CC
EXIST DD RAY 24-32 - Wellbore #1 - Wellbore #1	9,400.00	7,187.75	1,804.53	1,748.51	32.213	ES
EXIST DD RAY 24-32 - Wellbore #1 - Wellbore #1	10,400.00	7,182.32	2,082.76	2,009.06	28.260	SF
EXIST DD RAY 36-32 - Wellbore #1 - Wellbore #1	4,090.34	4,084.29	244.33	219.62	9.889	CC
EXIST DD RAY 36-32 - Wellbore #1 - Wellbore #1	4,100.00	4,093.40	244.34	219.56	9.860	ES
EXIST DD RAY 36-32 - Wellbore #1 - Wellbore #1	4,300.00	4,284.73	247.91	221.85	9.511	SF
EXIST DD RURAL LAND G32-33D - Wellbore #1 - Wellb	8,278.78	7,238.00	2,125.61	2,085.48	52.973	CC
EXIST DD RURAL LAND G32-33D - Wellbore #1 - Wellb	8,300.00	7,238.00	2,125.71	2,085.36	52.675	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 7N
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 7N	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	Offset	Distance		Separation Factor	Warning
	Measured Depth (usft)	Measured Depth (usft)	Between Centres (usft)	Between Ellipses (usft)		
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)						
EXIST DD RURAL LAND G32-33D - Wellbore #1 - Wellb	10,600.00	7,238.00	3,147.45	3,069.33	40.293	SF
EXIST DD SPAYD 19-29 - Wellbore #1 - Wellbore #1	13,422.88	7,507.20	879.04	726.15	5.750	CC, ES
EXIST DD SPAYD 19-29 - Wellbore #1 - Wellbore #1	13,500.00	7,507.02	882.42	728.07	5.717	SF
EXIST DD SPAYD 20-29 - Wellbore #1 - Wellbore #1	13,503.56	7,040.63	1,657.22	1,527.72	12.797	CC, ES
EXIST DD SPAYD 20-29 - Wellbore #1 - Wellbore #1	13,900.00	7,031.37	1,703.94	1,566.98	12.441	SF
EXIST DD SPAYD 22-29 - Wellbore #1 - Wellbore #1	14,513.33	7,100.63	633.15	482.99	4.217	CC, ES
EXIST DD SPAYD 22-29 - Wellbore #1 - Wellbore #1	14,600.00	7,099.17	639.05	487.24	4.210	SF
EXIST DD SPAYD 23-29 - Wellbore #1 - Wellbore #1	13,530.86	7,342.77	508.05	374.84	3.814	CC, ES
EXIST DD SPAYD 23-29 - Wellbore #1 - Wellbore #1	13,600.00	7,341.73	512.73	378.23	3.812	SF
EXIST DD SPAYD 30-29 - Wellbore #1 - Wellbore #1	17,273.90	7,497.51	2,170.99	1,946.59	9.675	CC, ES, SF
EXIST DD SPAYD 33-29 - Wellbore #1 - Wellbore #1	13,449.49	7,575.95	2,124.23	1,970.43	13.812	CC
EXIST DD SPAYD 33-29 - Wellbore #1 - Wellbore #1	13,500.00	7,575.45	2,124.83	1,970.07	13.730	ES
EXIST DD SPAYD 33-29 - Wellbore #1 - Wellbore #1	14,000.00	7,570.52	2,194.40	2,030.13	13.359	SF
EXIST DD SPAYD 36-29 - Wellbore #1 - Wellbore #1	12,174.65	7,473.90	291.84	172.60	2.448	CC, ES
EXIST DD SPAYD 36-29 - Wellbore #1 - Wellbore #1	12,200.00	7,473.63	292.94	173.23	2.447	SF
EXIST DD SPAYD 37-29 - Wellbore #1 - Wellbore #1	12,225.94	7,237.80	1,599.33	1,482.70	13.712	CC, ES
EXIST DD SPAYD 37-29 - Wellbore #1 - Wellbore #1	12,600.00	7,227.73	1,642.46	1,518.82	13.284	SF
EXIST VERT BOHLENDER 29-13 - Wellbore #1 - Design	15,306.65	7,093.99	1,226.91	1,061.91	7.436	CC, ES
EXIST VERT BOHLENDER 29-13 - Wellbore #1 - Design	15,500.00	7,093.99	1,242.05	1,073.36	7.363	SF
EXIST VERT BOHLENDER 29-3 - Wellbore #1 - Design	15,228.61	7,090.99	2,443.47	2,279.96	14.944	CC
EXIST VERT BOHLENDER 29-3 - Wellbore #1 - Design	15,300.00	7,090.99	2,444.51	2,279.64	14.827	ES
EXIST VERT BOHLENDER 29-3 - Wellbore #1 - Design	15,900.00	7,090.99	2,534.03	2,357.70	14.372	SF
EXIST VERT BOHLENDER 32-29 #1 - Wellbore #1 - Des	15,479.68	7,093.99	1,002.58	834.28	5.957	CC
EXIST VERT BOHLENDER 32-29 #1 - Wellbore #1 - Des	15,500.00	7,093.99	1,002.79	834.10	5.945	ES
EXIST VERT BOHLENDER 32-29 #1 - Wellbore #1 - Des	15,600.00	7,093.99	1,009.77	839.18	5.919	SF
EXIST VERT CLYDE MARSHALL 1 - Wellbore #1 - Desi	1,300.00	1,300.00	1,426.56	1,420.99	256.232	CC
EXIST VERT CLYDE MARSHALL 1 - Wellbore #1 - Desi	1,400.00	1,399.98	1,426.81	1,420.82	238.131	ES
EXIST VERT CLYDE MARSHALL 1 - Wellbore #1 - Desi	5,100.00	4,765.00	1,735.62	1,708.20	63.297	SF
EXIST VERT CPC BOHLENDER 29-1 - Wellbore #1 - De	16,670.96	7,094.00	2,254.00	2,062.94	11.797	CC
EXIST VERT CPC BOHLENDER 29-1 - Wellbore #1 - De	16,700.00	7,094.00	2,254.19	2,062.58	11.764	ES
EXIST VERT CPC BOHLENDER 29-1 - Wellbore #1 - De	17,200.00	7,094.00	2,315.25	2,114.08	11.509	SF
EXIST VERT CPC BOHLENDER 29-2 - Wellbore #1 - De	16,949.42	7,094.00	1,065.07	868.68	5.423	CC, ES
EXIST VERT CPC BOHLENDER 29-2 - Wellbore #1 - De	17,100.00	7,094.00	1,075.66	876.39	5.398	SF
EXIST VERT HAMBERT G 32-4X - Wellbore #1 - Design	11,285.98	7,093.99	1,371.20	1,282.30	15.423	CC
EXIST VERT HAMBERT G 32-4X - Wellbore #1 - Design	11,300.00	7,093.99	1,371.27	1,282.11	15.379	ES
EXIST VERT HAMBERT G 32-4X - Wellbore #1 - Design	11,700.00	7,093.99	1,432.34	1,335.71	14.822	SF
EXIST VERT HAMBERT R G 32-1 - Wellbore #1 - Desig	11,532.69	7,093.99	2,279.36	2,185.86	24.377	CC
EXIST VERT HAMBERT R G 32-1 - Wellbore #1 - Desig	11,600.00	7,093.99	2,280.35	2,185.59	24.064	ES
EXIST VERT HAMBERT R G 32-1 - Wellbore #1 - Desig	12,600.00	7,093.99	2,516.86	2,403.30	22.162	SF
EXIST VERT HAMBERT R G 32-2 - Wellbore #1 - Desig	11,350.24	7,093.99	1,233.55	1,143.44	13.691	CC, ES
EXIST VERT HAMBERT R G 32-2 - Wellbore #1 - Desig	11,700.00	7,093.99	1,282.17	1,185.54	13.268	SF
EXIST VERT HAMBERT R G 32-3 - Wellbore #1 - Desig	11,417.12	7,093.99	181.30	89.95	1.985	CC, ES, SF
EXIST VERT HAMBERT R G 32-6 - Wellbore #1 - Desig	10,090.85	7,093.99	346.63	279.65	5.175	CC
EXIST VERT HAMBERT R G 32-6 - Wellbore #1 - Desig	10,100.00	7,093.99	346.75	279.61	5.164	ES, SF
EXIST VERT HAMBERT R G 32-7 - Wellbore #1 - Desig	10,071.30	7,093.99	1,101.69	1,035.06	16.533	CC
EXIST VERT HAMBERT R G 32-7 - Wellbore #1 - Desig	10,100.00	7,093.99	1,102.07	1,034.92	16.412	ES
EXIST VERT HAMBERT R G 32-7 - Wellbore #1 - Desig	10,400.00	7,093.99	1,149.68	1,077.11	15.842	SF
EXIST VERT HAMBERT R G 32-8 - Wellbore #1 - Desig	10,386.85	7,093.99	2,457.65	2,385.31	33.976	CC
EXIST VERT HAMBERT R G 32-8 - Wellbore #1 - Desig	10,400.00	7,093.99	2,457.68	2,385.11	33.865	ES
EXIST VERT HAMBERT R G 32-8 - Wellbore #1 - Desig	12,000.00	7,093.99	2,939.76	2,837.50	28.748	SF
EXIST VERT HSR-CARTER 11-29 - Wellbore #1 - Desig	13,916.34	7,093.99	123.94	-14.58	0.895	Level 1, CC, ES, SF
EXIST VERT HSR-CROUSE 5-29 - Wellbore #1 - Design	15,222.37	7,093.99	1,494.84	1,331.45	9.149	CC, 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 7N
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Site Error:	0.00 usft	North Reference:	True
Reference Well:	HARVEY 7N	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	Offset	Distance		Separation	Warning
	Measured	Measured	Between	Between		
Offset Well - Wellbore - Design	Depth	Depth	Centres	Ellipses	Factor	
	(usft)	(usft)	(usft)	(usft)		
SW SE SEC. 32 T4N R65W 6th P.M. (HARVEY)						
EXIST VERT HSR-CROUSE 5-29 - Wellbore #1 - Design	15,500.00	7,093.99	1,520.40	1,351.72	9.013	SF
EXIST VERT HSR-DICERSON 14-29A - Wellbore #1 - D	12,790.12	7,093.99	470.89	353.73	4.019	CC
EXIST VERT HSR-DICERSON 14-29A - Wellbore #1 - D	12,800.00	7,093.99	470.99	353.65	4.014	ES, SF
EXIST VERT HSR-FRISBIE 16-29A - Wellbore #1 - Desi	12,834.71	7,093.99	2,252.31	2,134.31	19.087	CC
EXIST VERT HSR-FRISBIE 16-29A - Wellbore #1 - Desi	12,900.00	7,093.99	2,253.26	2,134.02	18.897	ES
EXIST VERT HSR-FRISBIE 16-29A - Wellbore #1 - Desi	13,700.00	7,093.99	2,412.80	2,278.40	17.952	SF
EXIST VERT HSR-FROELICH 12-29A - Wellbore #1 - De	13,950.64	7,093.99	1,477.20	1,338.03	10.614	CC
EXIST VERT HSR-FROELICH 12-29A - Wellbore #1 - De	14,000.00	7,093.99	1,478.02	1,337.92	10.549	ES
EXIST VERT HSR-FROELICH 12-29A - Wellbore #1 - De	14,200.00	7,093.99	1,498.10	1,354.19	10.410	SF
EXIST VERT HSR-HARRISON 9-32 - Wellbore #1 - Des	1,300.00	1,300.00	2,260.27	2,254.71	405.980	CC, ES
EXIST VERT HSR-HARRISON 9-32 - Wellbore #1 - Des	11,600.00	7,093.99	3,706.75	3,611.99	39.116	SF
EXIST VERT HSR-MUNDS 13.29 - Wellbore #1 - Design	12,974.92	7,093.99	1,568.02	1,447.37	12.996	CC
EXIST VERT HSR-MUNDS 13.29 - Wellbore #1 - Design	13,000.00	7,093.99	1,568.22	1,447.09	12.947	ES
EXIST VERT HSR-MUNDS 13.29 - Wellbore #1 - Design	13,400.00	7,093.99	1,624.62	1,495.91	12.622	SF
EXIST VERT HSR-NICHOLS 15-32 - Wellbore #1 - Desig	1,300.00	1,300.00	817.72	812.15	146.875	CC, ES
EXIST VERT HSR-NICHOLS 15-32 - Wellbore #1 - Desig	8,800.00	7,093.99	1,688.59	1,643.40	37.372	SF
EXIST VERT HSR-RAY 3-29 - Wellbore #1 - Design #1	16,695.49	7,094.00	443.22	251.69	2.314	CC
EXIST VERT HSR-RAY 3-29 - Wellbore #1 - Design #1	16,700.00	7,094.00	443.24	251.63	2.313	ES, SF
EXIST VERT HSR-SALISBURY 6-29 - Wellbore #1 - Des	15,514.39	7,093.99	462.19	293.23	2.735	CC, ES, SF
EXIST VERT HSR-TEAGLE 10-29A - Wellbore #1 - Desi	14,255.93	7,093.99	980.66	835.68	6.764	CC, ES
EXIST VERT HSR-TEAGLE 10-29A - Wellbore #1 - Desi	14,400.00	7,093.99	991.18	843.47	6.710	SF
EXIST VERT HSR-WILLIAM 10-32A - Wellbore #1 - Des	8,843.23	7,093.99	1,113.44	1,067.60	24.288	CC, ES
EXIST VERT HSR-WILLIAM 10-32A - Wellbore #1 - Des	9,300.00	7,093.99	1,203.49	1,150.31	22.629	SF
EXIST VERT HSR-WRIGHT 9-29A - Wellbore #1 - Desig	14,189.09	7,093.99	2,166.00	2,022.29	15.073	CC
EXIST VERT HSR-WRIGHT 9-29A - Wellbore #1 - Desig	14,200.00	7,093.99	2,166.03	2,022.11	15.051	ES
EXIST VERT HSR-WRIGHT 9-29A - Wellbore #1 - Desig	14,800.00	7,093.99	2,250.50	2,095.16	14.488	SF
EXIST VERT MARSHALL 32-11G - Wellbore #1 - Design	9,005.37	7,093.99	250.06	201.70	5.170	CC, ES, SF
EXIST VERT MARSHALL 32-12G - Wellbore #1 - Design	8,657.54	7,094.00	1,399.30	1,356.19	32.465	CC, ES
EXIST VERT MARSHALL 32-12G - Wellbore #1 - Design	9,500.00	7,093.99	1,633.33	1,576.75	28.868	SF
EXIST VERT MARSHALL 32-14G - Wellbore #1 - Design	7,400.00	7,064.35	465.64	431.94	13.819	SF
EXIST VERT MARSHALL 32-14G - Wellbore #1 - Design	7,418.17	7,069.30	465.31	431.64	13.819	CC, ES
EXIST VERT MARSHALL G 32-13JI - Wellbore #1 - Des	7,553.13	7,091.99	1,766.04	1,732.21	52.199	CC, ES
EXIST VERT MARSHALL G 32-13JI - Wellbore #1 - Des	10,200.00	7,093.99	3,181.93	3,112.99	46.149	SF
EXIST VERT MEL SMOOKLER GAS UNIT 1 - Wellbore	8,137.56	7,094.00	1,241.68	1,204.88	33.743	CC, ES
EXIST VERT MEL SMOOKLER GAS UNIT 1 - Wellbore	8,800.00	7,093.99	1,407.34	1,362.15	31.148	SF
EXIST VERT MUSICK 1-32 - Wellbore #1 - Design #1	10,498.87	7,093.99	809.94	735.56	10.890	CC
EXIST VERT MUSICK 1-32 - Wellbore #1 - Design #1	10,500.00	7,093.99	809.94	735.54	10.887	ES
EXIST VERT MUSICK 1-32 - Wellbore #1 - Design #1	10,700.00	7,093.99	834.54	756.48	10.691	SF
EXIST VERT MUSICK GAS UNIT 1 - Wellbore #1 - Desi	10,532.23	7,093.99	1,813.92	1,738.93	24.190	CC, ES
EXIST VERT MUSICK GAS UNIT 1 - Wellbore #1 - Desi	11,400.00	7,093.99	2,010.80	1,919.77	22.090	SF
EXIST VERT MUSICK MCCLINTOCK 2 - Wellbore #1 - D	10,203.84	4,755.00	2,340.33	2,309.82	76.698	CC, ES
EXIST VERT MUSICK MCCLINTOCK 2 - Wellbore #1 - D	11,500.00	4,755.00	2,675.29	2,635.56	67.336	SF
EXIST VERT MUSICK MCCLINTOCK 4 - Wellbore #1 - D	1,300.00	1,300.00	2,977.73	2,972.16	534.846	CC, ES
EXIST VERT MUSICK MCCLINTOCK 4 - Wellbore #1 - D	13,500.00	4,750.00	4,766.80	4,671.82	50.184	SF
EXIST VERT MUSICK MCCLINTOCK 6 - Wellbore #1 - D	10,302.79	4,750.00	2,702.81	2,658.96	61.636	CC, ES
EXIST VERT MUSICK MCCLINTOCK 6 - Wellbore #1 - D	12,200.00	4,750.00	3,302.22	3,237.46	50.992	SF
EXIST VERT MUSICK MCCLINTOCK 7 - Wellbore #1 - D	1,300.00	1,300.00	2,529.28	2,523.71	454.297	CC, ES
EXIST VERT MUSICK MCCLINTOCK 7 - Wellbore #1 - D	12,200.00	4,739.00	3,399.87	3,340.14	56.924	SF
EXIST VERT MUSICK-MCCLINTOCK 1 - Wellbore #1 - D	11,476.88	4,803.00	2,560.26	2,509.22	50.171	CC
EXIST VERT MUSICK-MCCLINTOCK 1 - Wellbore #1 - D	11,500.00	4,803.00	2,560.36	2,509.09	49.935	ES
EXIST VERT MUSICK-MCCLINTOCK 1 - Wellbore #1 - D	12,800.00	4,803.00	2,881.93	2,816.88	44.301	SF
EXIST VERT MUSICK-MCCLINTOCK 5 - Wellbore #1 - D	11,530.17	4,752.00	2,371.18	2,328.90	56.083	CC, 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 7N
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 7N	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 VERT MUSICK-MCCLINTOCK 5 - Wellbore #1 - D	12,600.00	4,752.00	2,601.36	2,550.88	51.533	SF
EXIST VERT NGL C3B - Wellbore #1 - Design #1	16,376.66	7,094.00	2,695.32	2,509.89	14.535	CC
EXIST VERT NGL C3B - Wellbore #1 - Design #1	16,400.00	7,094.00	2,695.42	2,509.54	14.501	ES
EXIST VERT NGL C3B - Wellbore #1 - Design #1	17,100.00	7,094.00	2,790.69	2,591.42	14.005	SF
EXIST VERT R G 32-5 - Wellbore #1 - Design #1	10,121.64	7,093.99	1,641.49	1,573.96	24.305	CC, ES
EXIST VERT R G 32-5 - Wellbore #1 - Design #1	10,900.00	7,093.99	1,816.69	1,734.94	22.224	SF
EXIST VERT SPAYD 5-29 - Wellbore #1 - Design #1	15,596.81	7,093.99	1,758.81	1,588.27	10.313	CC
EXIST VERT SPAYD 5-29 - Wellbore #1 - Design #1	15,600.00	7,093.99	1,758.81	1,588.21	10.310	ES
EXIST VERT SPAYD 5-29 - Wellbore #1 - Design #1	15,900.00	7,093.99	1,784.75	1,608.42	10.122	SF
EXIST VERT UPRR 21 PAN AM D #1 - Wellbore #1 - De	14,076.40	4,730.00	2,381.91	2,321.37	39.349	CC
EXIST VERT UPRR 21 PAN AM D #1 - Wellbore #1 - De	14,100.00	4,730.00	2,382.02	2,321.31	39.235	ES
EXIST VERT UPRR 21 PAN AM D #1 - Wellbore #1 - De	14,800.00	4,730.00	2,489.39	2,423.38	37.713	SF
EXIST VERT UPRR 21 PAN AM D #2 - Wellbore #1 - De	12,794.89	7,093.99	2,400.26	2,283.01	20.472	CC
EXIST VERT UPRR 21 PAN AM D #2 - Wellbore #1 - De	12,800.00	7,093.99	2,400.27	2,282.92	20.455	ES
EXIST VERT UPRR 21 PAN AM D #2 - Wellbore #1 - De	13,700.00	7,093.99	2,565.24	2,430.83	19.086	SF
EXIST VERT UPRR 21 PAN AM G #1 - Wellbore #1 - De	16,061.05	4,660.00	2,630.62	2,535.34	27.608	CC
EXIST VERT UPRR 21 PAN AM G #1 - Wellbore #1 - De	16,100.00	4,660.00	2,630.91	2,535.24	27.500	ES
EXIST VERT UPRR 21 PAN AM G #1 - Wellbore #1 - De	16,800.00	4,660.00	2,732.44	2,629.86	26.636	SF
EXIST VERT UPRR PAN AM "J"1 - Wellbore #1 - Design	12,887.08	7,093.99	901.75	782.76	7.578	CC
EXIST VERT UPRR PAN AM "J"1 - Wellbore #1 - Design	12,900.00	7,093.99	901.84	782.60	7.563	ES
EXIST VERT UPRR PAN AM "J"1 - Wellbore #1 - Design	13,000.00	7,093.99	908.79	787.66	7.503	SF
EXIST VERT VERN MARSHALL 1 - Wellbore #1 - Desig	3,452.10	3,408.64	2,463.04	2,444.83	135.197	CC
EXIST VERT VERN MARSHALL 1 - Wellbore #1 - Desig	3,800.00	3,747.77	2,464.27	2,443.65	119.536	ES
EXIST VERT VERN MARSHALL 1 - Wellbore #1 - Desig	12,000.00	4,785.00	4,142.17	4,076.39	62.973	SF
EXIST VERT WEINMASTER G 32-18 - Wellbore #1 - De	10,758.97	7,093.99	567.59	488.45	7.171	CC, ES
EXIST VERT WEINMASTER G 32-18 - Wellbore #1 - De	10,800.00	7,093.99	569.07	489.17	7.122	SF
HARVEY 10N - ORIGINAL WELLBORE - PROPOSAL #	1,300.00	1,300.00	60.00	54.43	10.777	CC, ES
HARVEY 10N - ORIGINAL WELLBORE - PROPOSAL #	17,273.90	17,389.26	906.36	533.40	2.430	SF
HARVEY 11N - ORIGINAL WELLBORE - PROPOSAL #4	1,300.00	1,300.00	44.99	39.42	8.081	CC, ES
HARVEY 11N - ORIGINAL WELLBORE - PROPOSAL #4	17,273.90	17,361.01	1,248.81	874.15	3.333	SF
HARVEY 12N - ORIGINAL WELLBORE - PROPOSAL #	1,300.00	1,300.00	29.98	24.41	5.385	CC, ES
HARVEY 12N - ORIGINAL WELLBORE - PROPOSAL #	17,273.90	17,458.28	1,521.41	1,146.76	4.061	SF
HARVEY 13N - ORIGINAL WELLBORE - PROPOSAL #	1,000.00	1,000.00	45.00	40.78	10.665	CC, ES
HARVEY 13N - ORIGINAL WELLBORE - PROPOSAL #	17,273.90	17,410.79	1,853.45	1,476.40	4.916	SF
HARVEY 14N - ORIGINAL WELLBORE - PROPOSAL #	900.00	900.00	60.00	56.23	15.918	CC, ES
HARVEY 14N - ORIGINAL WELLBORE - PROPOSAL #	17,273.90	17,589.94	2,170.49	1,794.80	5.777	SF
HARVEY 15N - ORIGINAL WELLBORE - PROPOSAL #	800.00	800.00	74.97	71.65	22.584	CC, ES
HARVEY 15N - ORIGINAL WELLBORE - PROPOSAL #	17,273.90	17,644.07	2,538.54	2,161.02	6.724	SF
HARVEY 16N - ORIGINAL WELLBORE - PROPOSAL #	700.00	700.00	89.98	87.11	31.350	CC, ES
HARVEY 16N - ORIGINAL WELLBORE - PROPOSAL #	17,273.90	17,858.54	2,889.86	2,509.66	7.601	SF
HARVEY 1N - ORIGINAL WELLBORE - PROPOSAL #6	300.00	300.00	149.95	148.88	139.859	CC, ES
HARVEY 1N - ORIGINAL WELLBORE - PROPOSAL #6	17,100.00	17,504.15	2,038.22	1,675.65	5.621	SF
HARVEY 2N - ORIGINAL WELLBORE - PROPOSAL #5	400.00	400.00	134.97	133.45	88.702	CC, ES
HARVEY 2N - ORIGINAL WELLBORE - PROPOSAL #5	17,273.90	17,835.26	1,753.09	1,380.76	4.708	SF
HARVEY 3N - ORIGINAL WELLBORE - PROPOSAL #5	500.00	500.00	119.97	117.99	60.859	CC, ES
HARVEY 3N - ORIGINAL WELLBORE - PROPOSAL #5	17,273.90	17,603.66	1,354.86	979.87	3.613	SF
HARVEY 4N - ORIGINAL WELLBORE - PROPOSAL #5	600.00	600.00	104.96	102.54	43.357	CC, ES
HARVEY 4N - ORIGINAL WELLBORE - PROPOSAL #5	17,273.90	17,589.00	1,070.44	701.03	2.898	SF
HARVEY 5N - ORIGINAL WELLBORE - PROPOSAL #4	1,100.00	1,100.00	29.98	25.31	6.422	CC, ES
HARVEY 5N - ORIGINAL WELLBORE - PROPOSAL #4	17,273.90	17,431.85	759.85	385.90	2.032	SF
HARVEY 6N - ORIGINAL WELLBORE - PROPOSAL #4	1,200.00	1,200.00	15.01	9.89	2.933	CC, ES
HARVEY 6N - ORIGINAL WELLBORE - PROPOSAL #4	17,273.90	17,432.88	429.46	63.05	1.172	Level 2, 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 7N
Project:	WELD SEC. 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 7N	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)						
HARVEY 8N - ORIGINAL WELLBORE - PROPOSAL #4	1,300.00	1,300.00	15.01	9.44	2.696	CC
HARVEY 8N - ORIGINAL WELLBORE - PROPOSAL #4	17,273.90	17,344.61	294.02	-66.35	0.816	Level 1, ES, SF
HARVEY 9N - ORIGINAL WELLBORE - PROPOSAL #4	1,300.00	1,300.00	74.97	69.41	13.466	CC, ES
HARVEY 9N - ORIGINAL WELLBORE - PROPOSAL #4	17,273.90	17,290.40	603.92	231.31	1.621	SF
SW SW SEC. 33 T4N R65W 6th P.M. (CRAWFORD)						
EXIST DD RAY 39-32 - Wellbore #1 - Wellbore #1	100.00	66.78	2,219.38	2,219.22	10,000.000	CC, ES
EXIST DD RAY 39-32 - Wellbore #1 - Wellbore #1	13,500.00	7,203.00	6,120.91	5,987.29	45.808	SF
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	13,485.18	7,118.24	2,985.32	2,854.88	22.887	CC
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	13,500.00	7,118.28	2,985.36	2,854.64	22.838	ES
EXIST DD SPAYD 39-29 - Wellbore #1 - Wellbore #1	14,800.00	7,120.74	3,262.02	3,106.57	20.984	SF
EXIST VERT HSR-KOCH 16-32 - Wellbore #1 - Design #	1,300.00	1,272.00	1,794.05	1,788.54	325.591	CC, ES
EXIST VERT HSR-KOCH 16-32 - Wellbore #1 - Design #	16,000.00	7,065.99	8,992.13	8,813.95	50.467	SF

Offset Design													Offset Site Error:	0.00 usft
SE SW SEC. 32 T4N R65W 6th P.M. - EXIST VERT HAMBERT R G 32-5 - Wellbore #1 - Design #1													Offset Well Error:	0.00 usft
Survey Program: 0-MWD														
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	0.00	0.00	0.00	0.00	-42.21	2,496.60	-2,264.86	3,370.84					
100.00	100.00	100.00	100.00	0.09	0.09	-42.21	2,496.60	-2,264.86	3,370.84	3,370.67	0.17	N/A		
200.00	200.00	200.00	200.00	0.31	0.31	-42.21	2,496.60	-2,264.86	3,370.84	3,370.22	0.62	5,414.122		
300.00	300.00	300.00	300.00	0.54	0.54	-42.21	2,496.60	-2,264.86	3,370.84	3,369.77	1.07	3,144.050		
400.00	400.00	400.00	400.00	0.76	0.76	-42.21	2,496.60	-2,264.86	3,370.84	3,369.32	1.52	2,215.232		
500.00	500.00	500.00	500.00	0.99	0.99	-42.21	2,496.60	-2,264.86	3,370.84	3,368.87	1.97	1,710.048		
600.00	600.00	600.00	600.00	1.21	1.21	-42.21	2,496.60	-2,264.86	3,370.84	3,368.42	2.42	1,392.490		
700.00	700.00	700.00	700.00	1.44	1.44	-42.21	2,496.60	-2,264.86	3,370.84	3,367.97	2.87	1,174.403		
800.00	800.00	800.00	800.00	1.66	1.66	-42.21	2,496.60	-2,264.86	3,370.84	3,367.52	3.32	1,015.377		
900.00	900.00	900.00	900.00	1.88	1.88	-42.21	2,496.60	-2,264.86	3,370.84	3,367.07	3.77	894.283		
1,000.00	1,000.00	1,000.00	1,000.00	2.11	2.11	-42.21	2,496.60	-2,264.86	3,370.84	3,366.62	4.22	798.994		
1,100.00	1,100.00	1,100.00	1,100.00	2.33	2.33	-42.21	2,496.60	-2,264.86	3,370.84	3,366.18	4.67	722.057		
1,200.00	1,200.00	1,200.00	1,200.00	2.56	2.56	-42.21	2,496.60	-2,264.86	3,370.84	3,365.73	5.12	658.635		
1,300.00	1,300.00	1,300.00	1,300.00	2.78	2.78	-42.21	2,496.60	-2,264.86	3,370.84	3,365.28	5.57	605.455		
1,400.00	1,399.98	1,399.98	1,399.98	2.98	3.01	97.36	2,496.60	-2,264.86	3,371.07	3,365.08	5.99	562.625		
1,500.00	1,499.84	1,499.84	1,499.84	3.17	3.23	97.43	2,496.60	-2,264.86	3,371.74	3,365.34	6.40	527.060		
1,600.00	1,599.45	1,599.45	1,599.45	3.36	3.46	97.56	2,496.60	-2,264.86	3,372.88	3,366.07	6.82	494.889		
1,700.00	1,698.70	1,698.70	1,698.70	3.57	3.68	97.73	2,496.60	-2,264.86	3,374.52	3,367.26	7.25	465.264		
1,800.00	1,797.47	1,797.47	1,797.47	3.82	3.90	97.94	2,496.60	-2,264.86	3,376.67	3,368.96	7.72	437.510		
1,900.00	1,895.62	1,895.62	1,895.62	4.10	4.12	98.21	2,496.60	-2,264.86	3,379.40	3,371.19	8.22	411.155		
1,944.86	1,939.43	1,939.43	1,939.43	4.24	4.22	98.34	2,496.60	-2,264.86	3,380.83	3,372.37	8.46	399.707		
2,000.00	1,993.18	1,993.18	1,993.18	4.43	4.34	98.54	2,496.60	-2,264.86	3,382.68	3,373.92	8.76	386.028		
2,100.00	2,090.65	2,090.65	2,090.65	4.78	4.56	98.90	2,496.60	-2,264.86	3,386.15	3,376.81	9.33	362.742		
2,200.00	2,188.13	2,188.13	2,188.13	5.16	4.78	99.26	2,496.60	-2,264.86	3,389.76	3,379.83	9.93	341.439		
2,300.00	2,285.61	2,285.61	2,285.61	5.56	5.00	99.63	2,496.60	-2,264.86	3,393.52	3,382.98	10.54	322.049		
2,400.00	2,383.09	2,383.09	2,383.09	5.97	5.22	99.99	2,496.60	-2,264.86	3,397.41	3,386.25	11.16	304.437		
2,500.00	2,480.56	2,480.56	2,480.56	6.39	5.44	100.35	2,496.60	-2,264.86	3,401.45	3,389.66	11.79	288.446		
2,600.00	2,578.04	2,578.04	2,578.04	6.82	5.66	100.71	2,496.60	-2,264.86	3,405.64	3,393.20	12.43	273.915		
2,700.00	2,675.52	2,675.52	2,675.52	7.26	5.88	101.07	2,496.60	-2,264.86	3,409.96	3,396.88	13.08	260.689		
2,800.00	2,772.99	2,772.99	2,772.99	7.70	6.09	101.43	2,496.60	-2,264.86	3,414.42	3,400.69	13.73	248.626		

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