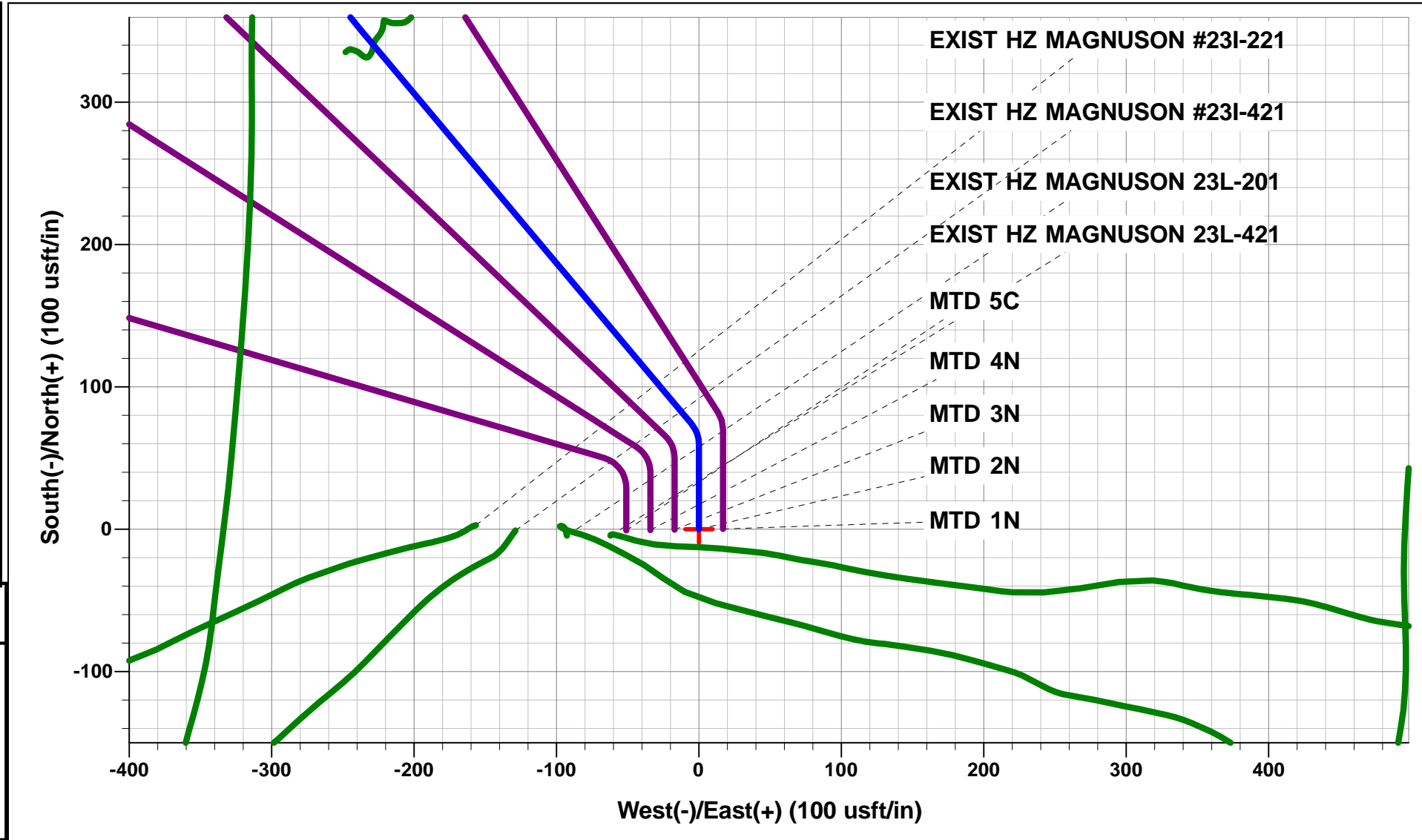




Project: WELD COUNTY, COLORADO (TRUE)  
Site: SW SW SEC. 23 T7N R66W 6th P.M. (MTD)  
Well: MTD 2N  
Wellbore: ORIGINAL WELLBORE  
Design: PROPOSAL #2

ANNOTATIONS										
TVD	MD	Inc	Azi	+N/-S	+E/-W	V Sct	Dep	Annotation		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 228ft FSL & 841ft FWL of Sec 23		
100.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2"/100ft BUR)		
349.68	350.00	5.00	0.00	10.90	0.00	2.58	10.90	EOB TO 5° INC		
909.84	912.30	5.00	0.00	59.91	0.00	14.16	59.91	END OF TANGENT		
1083.10	1086.21	5.00	320.00	73.80	-5.04	12.55	75.07	EOT TO 320° AZ		
1998.63	2036.21	24.00	320.00	255.24	-157.27	-92.47	311.84	EOB TO 24° INC		
2272.69	2336.21	24.00	320.00	348.72	-235.71	-146.59	433.86	END OF TANGENT		
2310.77	2377.90	24.00	322.05	361.90	-246.37	-153.83	450.82	EOT TO 322.05° AZ		
5295.44	5645.00	24.00	322.05	1409.72	-1063.55	-700.13	1779.62	END OF TANGENT		
6460.81	6844.95	0.00	0.00	1605.01	-1215.85	-801.94	2027.27	EOD TO VERTICAL		
6620.81	7005.15	0.00	0.00	1605.01	-1215.85	-801.94	2027.27	KOP (8"/100ft BUR)		
7312.60	7942.65	75.00	89.34	1611.12	-685.05	-284.75	2558.10	EP: 1850ft FSL & 150ft FWL of Sec 23		
7337.00	8132.40	90.18	89.34	1613.28	-497.45	-101.96	2745.72	HZ LANDING POINT		
7323.57	12182.32	90.19	89.34	1659.91	3552.18	3843.91	6795.62	END OF TANGENT		
7322.91	12382.33	90.19	83.34	1672.67	3751.69	4040.78	6995.63	EOT TO 83.34° AZ		
7322.81	12412.33	90.19	83.34	1676.15	3781.49	4070.55	7025.63	END OF TANGENT		
7322.15	12612.33	90.19	89.34	1688.91	3980.99	4267.41	7225.63	EOT TO 89.34° AZ		
7321.52	12805.66	90.19	95.14	1681.36	4174.09	4453.25	7418.95	EOT TO 95.14° AZ		
7321.42	12835.66	90.19	95.14	1678.67	4203.96	4481.65	7448.95	END OF TANGENT		
7320.78	13029.15	90.19	89.34	1671.12	4397.22	4667.65	7642.44	EOT TO 89.34° AZ		
7312.00	15624.15	90.19	89.34	1701.21	6992.03	7196.02	10237.43	BHL: 1850ft FSL & 2542ft FWL of Sec 24		

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - MTD 2N (P2)	6620.81	1605.01	-1215.85	40.558428°N	104.755622°W
EP - MTD 2N (P2)	7312.60	1611.12	-685.05	40.558444°N	104.753712°W
BHL - MTD 2N (P2)	7312.00	1701.21	6992.04	40.558689°N	104.726083°W
SHL - MTD 2N	0.00	0.00	0.00	40.554022°N	104.751246°W



PROPOSED LOCAL COORDINATES:

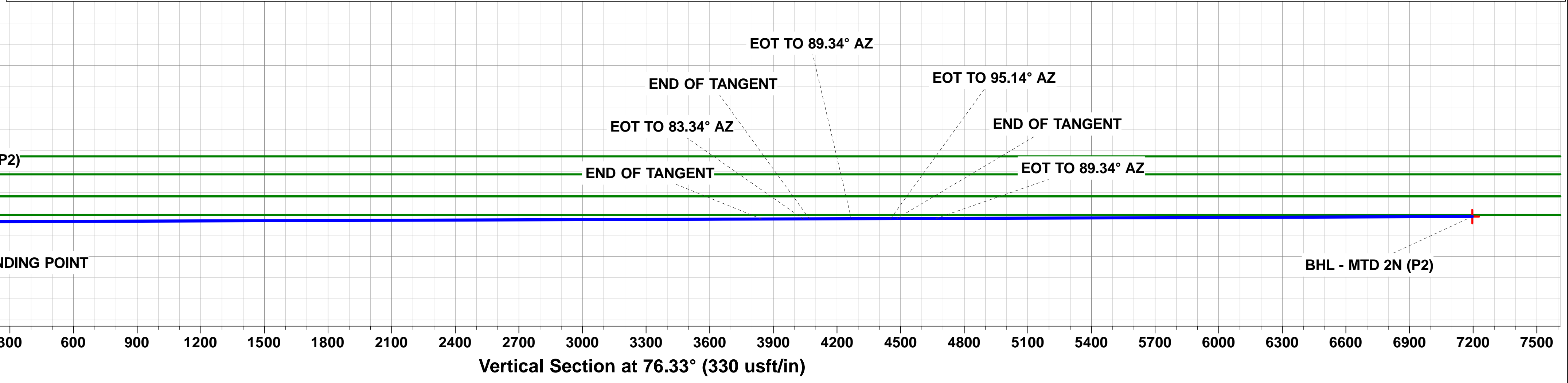
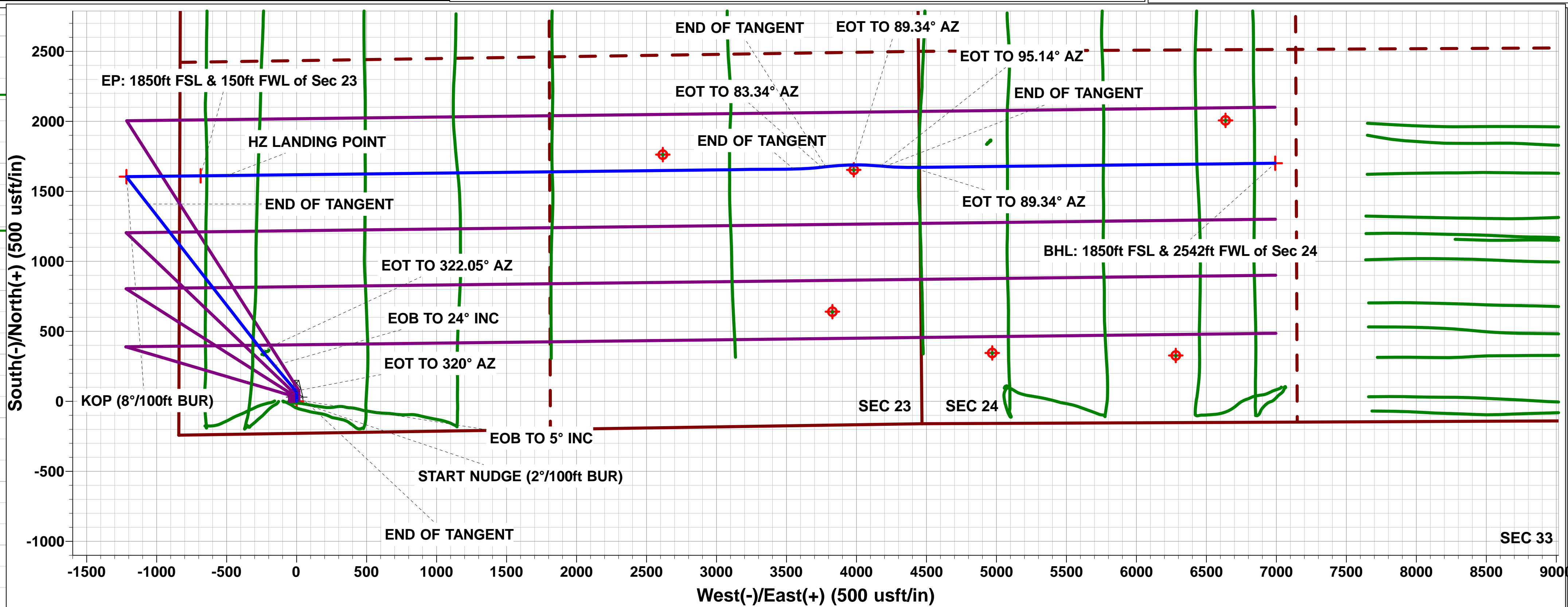
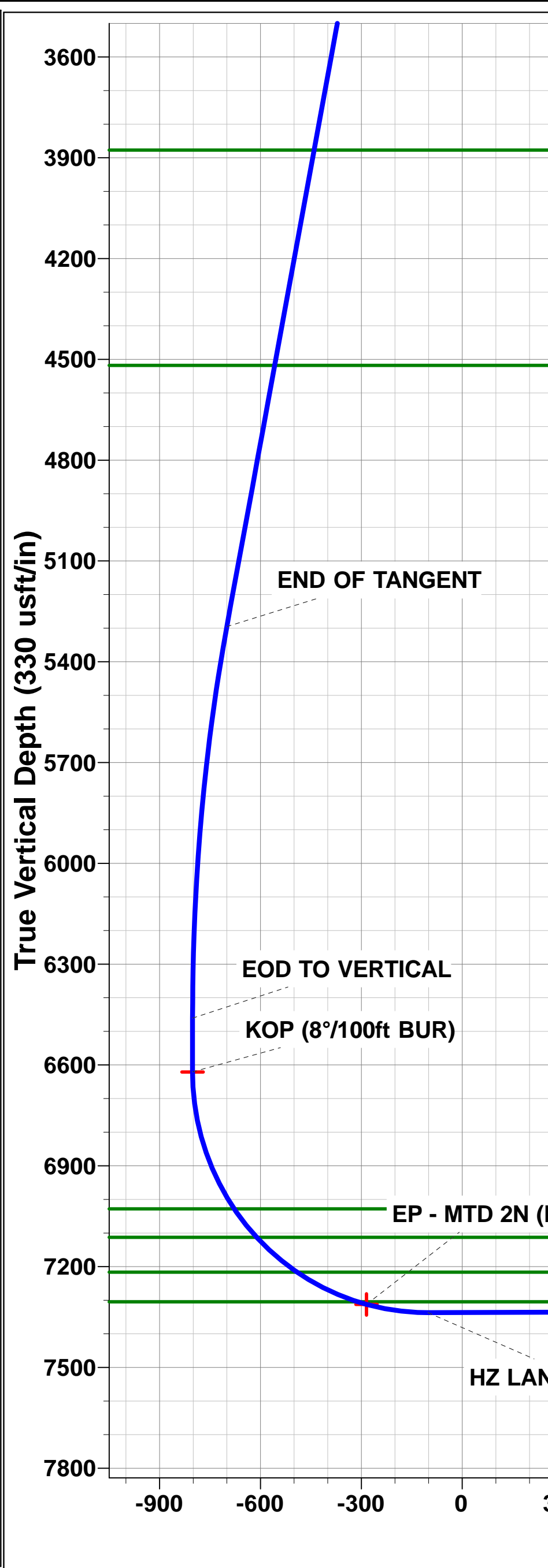
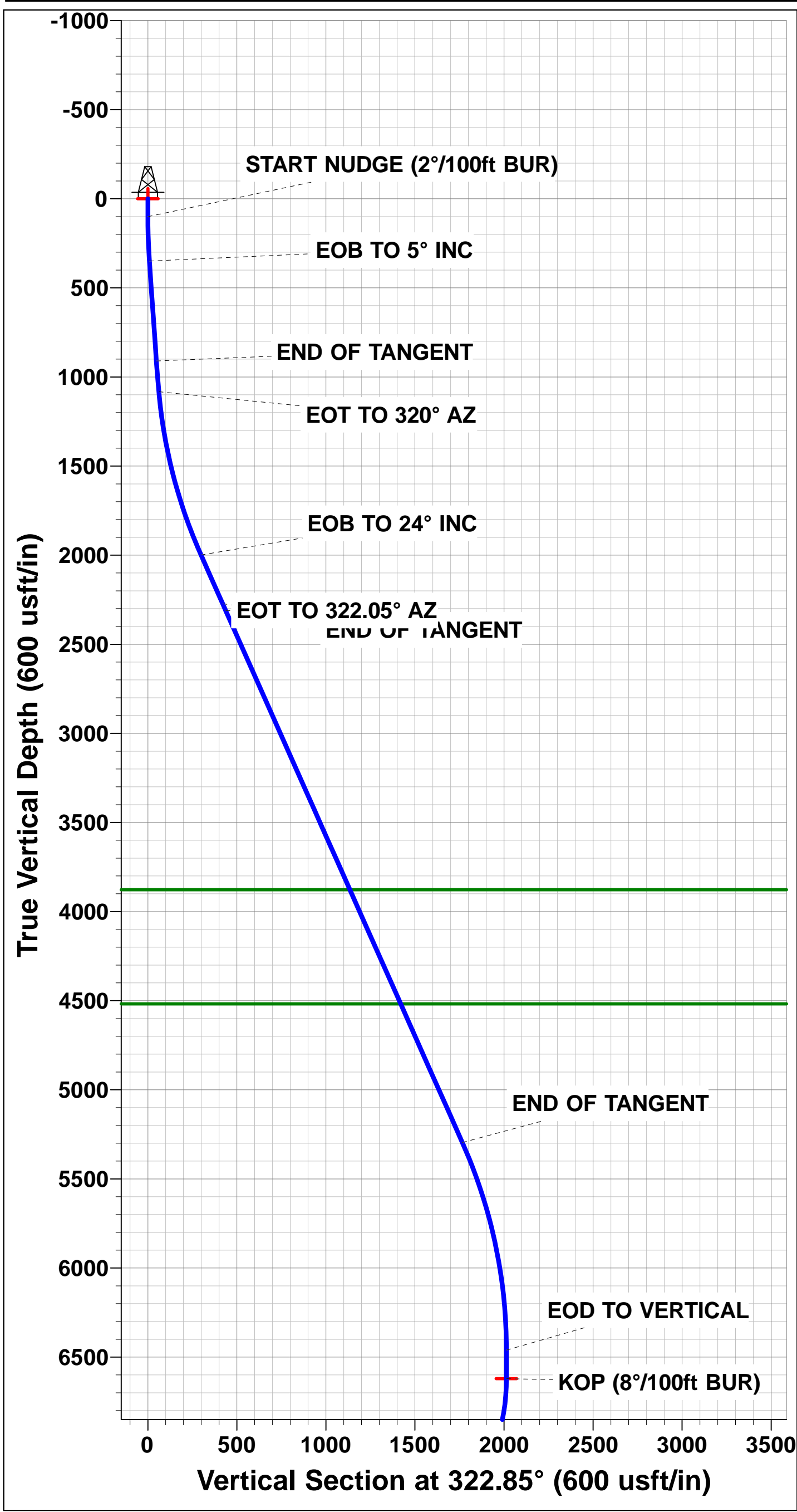
SHL: 228ft FSL & 841ft FWL of Sec 23

EP: 1850ft FSL & 150ft FWL of Sec 23

BHL: 1850ft FSL & 2542ft FWL of Sec 24

Azimuths to True North  
Magnetic North: 8.05°

Magnetic Field  
Strength: 52294.7snT  
Dip Angle: 66.94°  
Date: 07/01/2019  
Model: IGRF2015



# **PDC ENERGY**

**WELD COUNTY, COLORADO (TRUE)  
SW SW SEC. 23 T7N R66W 6th P.M. (MTD)  
MTD 2N**

**ORIGINAL WELLBORE  
PROPOSAL #2**

## **Anticollision Report**

**14 January, 2019**



## Anticollision Report



<b>Company:</b>	PDC ENERGY	<b>Local Co-ordinate Reference:</b>	Well MTD 2N
<b>Project:</b>	WELD COUNTY, COLORADO (TRUE)	<b>TVD Reference:</b>	KB 23' @ 4922.00usft (Original Well Elev)
<b>Reference Site:</b>	SW SW SEC. 23 T7N R66W 6th P.M. (MTD)	<b>MD Reference:</b>	KB 23' @ 4922.00usft (Original Well Elev)
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	MTD 2N	<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>	Database 1
<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 9,999.98 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>	14/01/2019		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.00	15,624.16	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 SW SEC. 23 T7N R66W 6th P.M. (MTD)						
ABDN HZ PAWNEE HILLS BIG BEAR #1 - Wellbore #1	7,005.15	10,928.00	1,495.07	1,357.55	10.872	ES, SF
ABDN HZ PAWNEE HILLS BIG BEAR #1 - Wellbore #1	7,240.28	10,928.00	1,443.91	1,402.81	35.134	CC
ABDN VERT DALTON #13-24 - Wellbore #1 - Wellbore #	13,593.37	7,266.30	183.11	15.47	1.092	Level 2, CC
ABDN VERT DALTON #13-24 - Wellbore #1 - Wellbore #	13,600.00	7,266.28	183.23	15.41	1.092	Level 2, ES, SF
ABDN VERT HASBROUCK #1 - Wellbore #1 - Design #1	7,005.15	6,614.81	1,641.03	1,475.00	9.884	CC, ES, SF
ABDN VERT MAGNUSON #1-23 - Wellbore #1 - Wellbor	2,305.68	2,221.26	31.13	17.44	2.274	CC, ES, SF
ABDN VERT RUSCO #44-23 - Wellbore #1 - Design #1	12,353.98	7,302.00	1,034.24	757.88	3.742	CC
ABDN VERT RUSCO #44-23 - Wellbore #1 - Design #1	12,382.33	7,301.91	1,034.84	757.79	3.735	ES
ABDN VERT RUSCO #44-23 - Wellbore #1 - Design #1	12,500.00	7,301.52	1,044.44	764.04	3.725	SF
ABDN VERT TRACY #32-23 - Wellbore #1 - Wellbore #1	11,264.84	7,300.00	1,627.75	1,510.57	13.891	CC
ABDN VERT TRACY #32-23 - Wellbore #1 - Wellbore #1	11,300.00	7,300.00	1,628.13	1,510.00	13.783	ES
ABDN VERT TRACY #32-23 - Wellbore #1 - Wellbore #1	11,900.00	7,300.00	1,747.28	1,612.86	12.998	SF
EXIST HZ DALTON #24L-201 - Wellbore #1 - Wellbore #	14,397.08	8,697.67	77.52	4.60	1.063	Level 2, CC
EXIST HZ DALTON #24L-201 - Wellbore #1 - Wellbore #	14,400.00	8,697.74	77.57	4.59	1.063	Level 2, ES, SF
EXIST HZ DALTON #24L-441 - Wellbore #1 - Wellbore #	13,711.04	8,796.54	90.27	24.78	1.378	Level 3, CC, ES, SF
EXIST HZ DALTON #24Q-441 - Wellbore #1 - Wellbore #	15,064.59	8,814.00	87.31	11.47	1.151	Level 2, CC, ES, SF
EXIST HZ DALTON 24Q-241 - Wellbore #1 - Wellbore #1	15,476.99	8,661.75	70.76	-7.80	0.901	Level 1, CC, ES, SF
EXIST HZ MAGNUSON #231-221 - Wellbore #1 - Wellbo	7,971.04	8,727.13	72.76	44.83	2.605	CC, ES, SF
EXIST HZ MAGNUSON #231-421 - Wellbore #1 - Wellbo	8,353.02	8,876.42	91.71	62.66	3.157	CC, ES, SF
EXIST HZ MAGNUSON 23L-201 - Wellbore #1 - Wellbor	9,120.74	8,750.11	75.43	41.30	2.210	CC, ES, SF
EXIST HZ MAGNUSON 23L-421 - Wellbore #1 - Wellbor	609.31	604.61	53.42	50.90	21.158	CC
EXIST HZ MAGNUSON 23L-421 - Wellbore #1 - Wellbor	9,781.93	9,004.79	90.92	50.46	2.247	ES, SF
EXIST HZ TRACY #23M-203 - Wellbore #1 - Wellbore #1	10,456.36	10,507.25	87.51	31.90	1.574	CC, ES, SF
EXIST HZ TRACY #23U-203 - Wellbore #1 - Wellbore #1	13,077.10	10,494.88	56.48	-17.66	0.762	Level 1, CC, ES, SF
EXIST HZ TRACY #31-23H - Wellbore #1 - Wellbore #1	11,723.90	10,366.32	64.00	1.62	1.026	Level 2, CC, ES, SF
EXIST HZ WAAG #15 - Wellbore #1 - Wellbore #1	15,624.16	11,925.00	723.59	379.52	2.103	CC, ES, SF
EXIST HZ WAAG #16 - Wellbore #1 - Wellbore #1	15,624.16	12,150.00	691.33	350.76	2.030	CC, ES, SF
EXIST HZ WAAG #17 - Wellbore #1 - Wellbore #1	15,624.16	12,050.00	665.85	375.67	2.295	CC, ES, SF
EXIST HZ WAAG #18 - Wellbore #1 - Wellbore #1	15,624.16	12,065.00	753.20	400.17	2.134	CC, ES, SF
EXIST HZ WAAG #19 - ORIGINAL WELLBORE - ORIGI	15,624.16	11,443.00	1,398.22	1,061.74	4.155	CC, ES, SF
EXIST HZ WAAG #19 - SIDETRACK - SIDETRACK	15,624.16	12,080.00	824.80	471.29	2.333	CC, ES, SF
EXIST HZ WAAG #20 - Wellbore #1 - Wellbore #1	15,624.16	11,856.00	963.40	618.55	2.794	CC, ES, SF
EXIST HZ WAAG #21 - Wellbore #1 - Wellbore #1	15,624.16	11,876.00	1,202.96	847.91	3.388	CC, ES, SF
EXIST HZ WAAG #22 - Wellbore #1 - Wellbore #1	15,624.16	12,063.00	1,347.96	992.24	3.789	CC, ES, SF
EXIST HZ WAAG #23 - Wellbore #1 - Wellbore #1	15,624.16	11,876.00	1,570.48	1,217.49	4.449	CC, ES, SF
EXIST HZ WAAG #24 - Wellbore #1 - Wellbore #1	15,624.16	11,810.00	1,799.23	1,444.55	5.073	CC, ES, SF
EXIST HZ WAAG #25 - Wellbore #1 - Wellbore #1	15,624.16	12,011.00	1,902.10	1,547.40	5.363	CC, ES, 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 MTD 2N
<b>Project:</b>	WELD COUNTY, COLORADO (TRUE)	<b>TVD Reference:</b>	KB 23' @ 4922.00usft (Original Well Elev)
<b>Reference Site:</b>	SW SW SEC. 23 T7N R66W 6th P.M. (MTD)	<b>MD Reference:</b>	KB 23' @ 4922.00usft (Original Well Elev)
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	MTD 2N	<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>	Database 1
<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
<b>Offset Well - Wellbore - Design</b>						
SW SW SEC. 23 T7N R66W 6th P.M. (MTD)						
EXIST VERT DALTON #14-24 - Wellbore #1 - Design #1	13,586.85	7,277.89	1,331.91	1,020.97	4.283	CC
EXIST VERT DALTON #14-24 - Wellbore #1 - Design #1	13,600.00	7,277.85	1,331.97	1,020.67	4.279	ES
EXIST VERT DALTON #14-24 - Wellbore #1 - Design #1	13,700.00	7,277.51	1,336.70	1,022.64	4.256	SF
EXIST VERT DALTON #23-24 - Wellbore #1 - Design #1	15,272.87	7,271.19	310.35	-47.31	0.868	Level 1, CC, ES, SF
EXIST VERT DALTON #24-24 - Wellbore #1 - Design #1	14,898.17	7,273.46	1,365.03	1,017.77	3.931	CC
EXIST VERT DALTON #24-24 - Wellbore #1 - Design #1	14,900.00	7,273.45	1,365.04	1,017.72	3.930	ES
EXIST VERT DALTON #24-24 - Wellbore #1 - Design #1	15,000.00	7,273.11	1,368.83	1,018.74	3.910	SF
EXIST VERT RUSCO #33-23 - Wellbore #1 - Design #1	11,247.91	7,305.67	113.47	-132.79	0.461	Level 1, CC, ES, SF
EXIST VERT RUSCO #43-23 - Wellbore #1 - Design #1	12,611.78	7,300.15	35.40	-248.87	0.125	Level 1, CC, SF
EXIST VERT RUSCO #43-23 - Wellbore #1 - Design #1	12,612.33	7,300.15	35.41	-248.87	0.125	Level 1, ES
MTD 1N - ORIGINAL WELLBORE - PROPOSAL #2	912.30	912.28	16.98	12.61	3.885	CC
MTD 1N - ORIGINAL WELLBORE - PROPOSAL #2	15,624.16	15,786.45	399.91	-45.15	0.899	Level 1, ES, SF
MTD 3N - ORIGINAL WELLBORE - PROPOSAL #2	800.40	800.42	17.01	13.25	4.521	CC
MTD 3N - ORIGINAL WELLBORE - PROPOSAL #2	15,624.16	15,506.94	399.92	-43.26	0.902	Level 1, ES, SF
MTD 4N - ORIGINAL WELLBORE - PROPOSAL #2	665.89	665.94	34.02	30.98	11.217	CC
MTD 4N - ORIGINAL WELLBORE - PROPOSAL #2	700.00	699.87	34.05	30.84	10.593	ES
MTD 4N - ORIGINAL WELLBORE - PROPOSAL #2	15,624.16	15,433.07	799.80	356.06	1.802	SF
MTD 5C - ORIGINAL WELLBORE - PROPOSAL #2	557.12	557.19	51.00	48.55	20.855	CC
MTD 5C - ORIGINAL WELLBORE - PROPOSAL #2	600.00	599.53	51.16	48.49	19.156	ES
MTD 5C - ORIGINAL WELLBORE - PROPOSAL #2	15,624.16	15,481.73	1,217.70	774.46	2.747	SF

<b>Offset Design</b> SW SW SEC. 23 T7N R66W 6th P.M. (MTD) - ABDN HZ PAWNEE HILLS BIG BEAR #1 - Wellbore #1													Offset Site Error:	0.00 usft
Survey Program: 419-MWD													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	14.79	14.79	0.00	0.01	-49.71	4,547.21	-5,364.01	7,032.05					
100.00	100.00	120.43	120.43	0.09	0.09	-49.71	4,547.26	-5,363.90	7,032.00	7,031.82	0.18	N/A		
200.00	199.98	226.06	226.06	0.31	0.17	-49.74	4,547.37	-5,363.62	7,030.74	7,030.25	0.49	N/A		
300.00	299.84	331.56	331.56	0.56	0.25	-49.82	4,547.56	-5,363.16	7,027.14	7,026.33	0.81	8,645.346		
350.00	349.68	384.23	384.23	0.69	0.29	-49.89	4,547.68	-5,362.87	7,024.47	7,023.49	0.98	7,135.725		
400.00	399.49	435.84	435.83	0.80	0.35	-49.91	4,547.82	-5,362.55	7,021.51	7,020.34	1.17	6,000.246		
500.00	499.11	535.05	535.05	1.07	0.57	-49.96	4,548.09	-5,361.91	7,015.57	7,013.94	1.63	4,315.749		
600.00	598.73	634.27	634.27	1.34	0.78	-50.01	4,548.36	-5,361.28	7,009.64	7,007.55	2.09	3,356.369		
700.00	698.35	733.49	733.48	1.61	1.00	-50.06	4,548.65	-5,360.65	7,003.73	7,001.17	2.55	2,741.661		
800.00	797.97	832.71	832.70	1.88	1.21	-50.11	4,548.93	-5,360.02	6,997.82	6,994.80	3.02	2,315.354		
900.00	897.59	931.94	931.92	2.15	1.43	-50.16	4,549.23	-5,359.39	6,991.93	6,988.44	3.49	2,002.736		
912.30	909.84	944.14	944.13	2.19	1.45	-50.17	4,549.26	-5,359.31	6,991.21	6,987.66	3.55	1,969.960		
1,000.00	997.21	1,031.15	1,031.13	2.41	1.64	-30.01	4,549.53	-5,358.77	6,985.13	6,981.19	3.94	1,771.831		
1,086.21	1,083.09	1,108.00	1,107.98	2.61	1.81	-10.14	4,549.76	-5,358.28	6,977.87	6,973.58	4.28	1,629.675		
1,100.00	1,096.83	10,928.00	7,268.50	2.65	98.23	-7.91	2,315.95	-2,368.34	6,965.69	6,945.24	20.45	340.649		
1,200.00	1,196.22	10,928.00	7,268.50	2.92	98.23	-8.63	2,315.95	-2,368.34	6,872.85	6,852.65	20.19	340.345		
1,300.00	1,295.18	10,928.00	7,268.50	3.23	98.23	-9.49	2,315.95	-2,368.34	6,778.95	6,758.98	19.97	339.432		
1,400.00	1,393.57	10,928.00	7,268.50	3.58	98.23	-10.54	2,315.95	-2,368.34	6,684.09	6,664.25	19.84	336.938		
1,500.00	1,491.27	10,928.00	7,268.50	3.98	98.23	-11.83	2,315.95	-2,368.34	6,588.32	6,568.42	19.90	331.033		
1,600.00	1,588.18	10,928.00	7,268.50	4.43	98.23	-13.46	2,315.95	-2,368.34	6,491.73	6,471.36	20.37	318.696		
1,700.00	1,684.17	10,928.00	7,268.50	4.94	98.23	-15.59	2,315.95	-2,368.34	6,394.41	6,372.80	21.60	296.009		
1,800.00	1,779.12	10,928.00	7,268.50	5.51	98.23	-18.45	2,315.95	-2,368.34	6,296.43	6,272.23	24.20	260.218		
1,900.00	1,872.92	10,928.00	7,268.50	6.15	98.23	-22.50	2,315.95	-2,368.34	6,197.90	6,168.82	29.07	213.171		

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