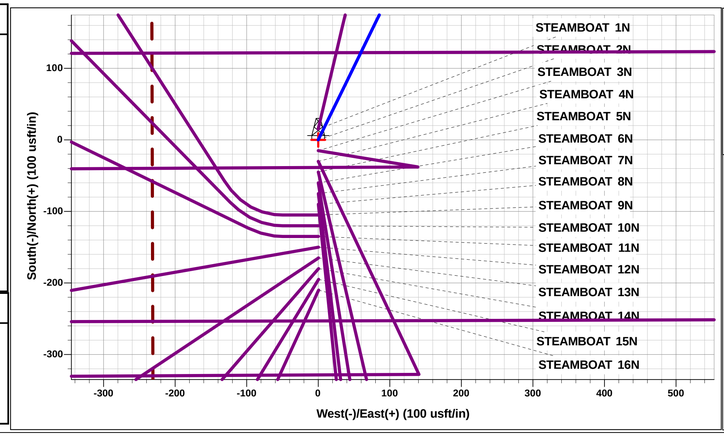
Project: WELD COUNTY, COLORADO (TRUE)
Site: NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)
Well: STEAMBOAT 2N
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 1708ft FSL & 2432ft FEL of Sec 34
400.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
995.62	1000.00	12.00	26.06	56.24	27.50	-25.86	62.60	EOB TO 12° INC
1883.92	1908.14	12.00	26.06	225.86	110.44	-103.84	251.42	END OF TANGENT
2479.55	2508.14	0.00	0.00	282.10	137.94	-129.69	314.02	EOD TO VERTICAL
6401.80	6430.40	0.00	0.00	282.10	137.94	-129.69	314.02	KOP (8°/100ft BUR)
7093.59	7367.89	75.00	269.70	279.32	-392.88	400.82	844.84	EP: 1990ft FSL & 2500ft FWL of Sec 34
7118.00	7555.40	90.00	269.70	278.35	-578.25	586.08	1030.22	HZ LANDING POINT
7118.00	15175.48	90.00	269.69	238.13	-8198.22	8201.68	8650.30	BHL: 1990ft FSL & 0ft FEL of Sec 32

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - STEAMBOAT 2N	6401.80	282.10	137.94	40.266487°N	104.762063°W
EP - STEAMBOAT 2N	7093.59	279.32	-392.88	40.266479°N	104.763965°W
BHL - STEAMBOAT 2N	7118.00	238.13	-8198.22	40.266362°N	104.791934°W
SHL - STEAMBOAT 2N	0.00	0.00	0.00	40.265712°N	104.762557°W

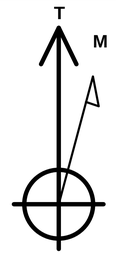


PROPOSED LOCAL COORDINATES:

SHL: 1708ft FSL & 2432ft FEL of Sec 34

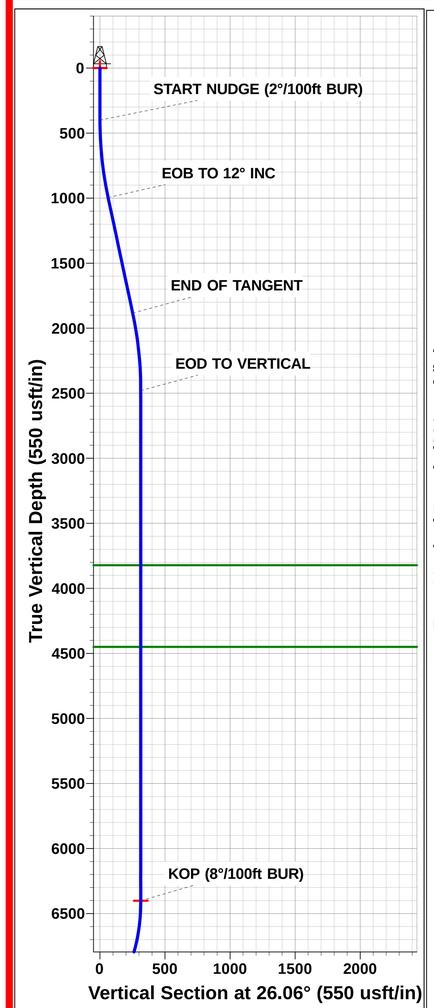
EP: 1990ft FSL & 2500ft FWL of Sec 34

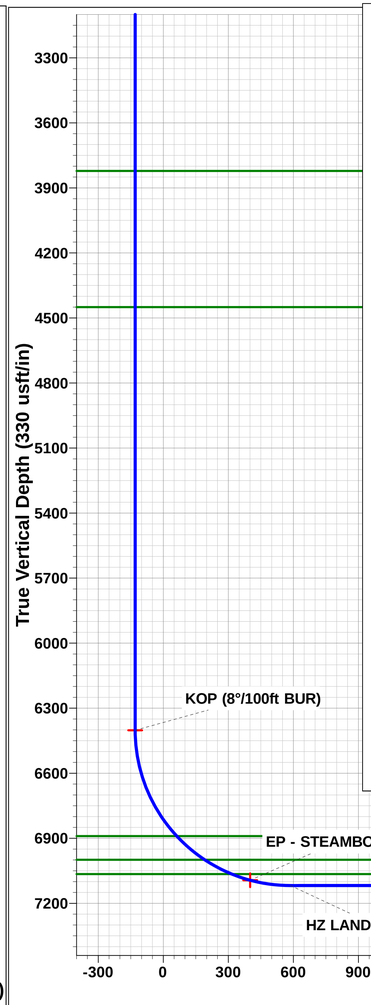
BHL: 1990ft FSL & 0ft FEL of Sec 32

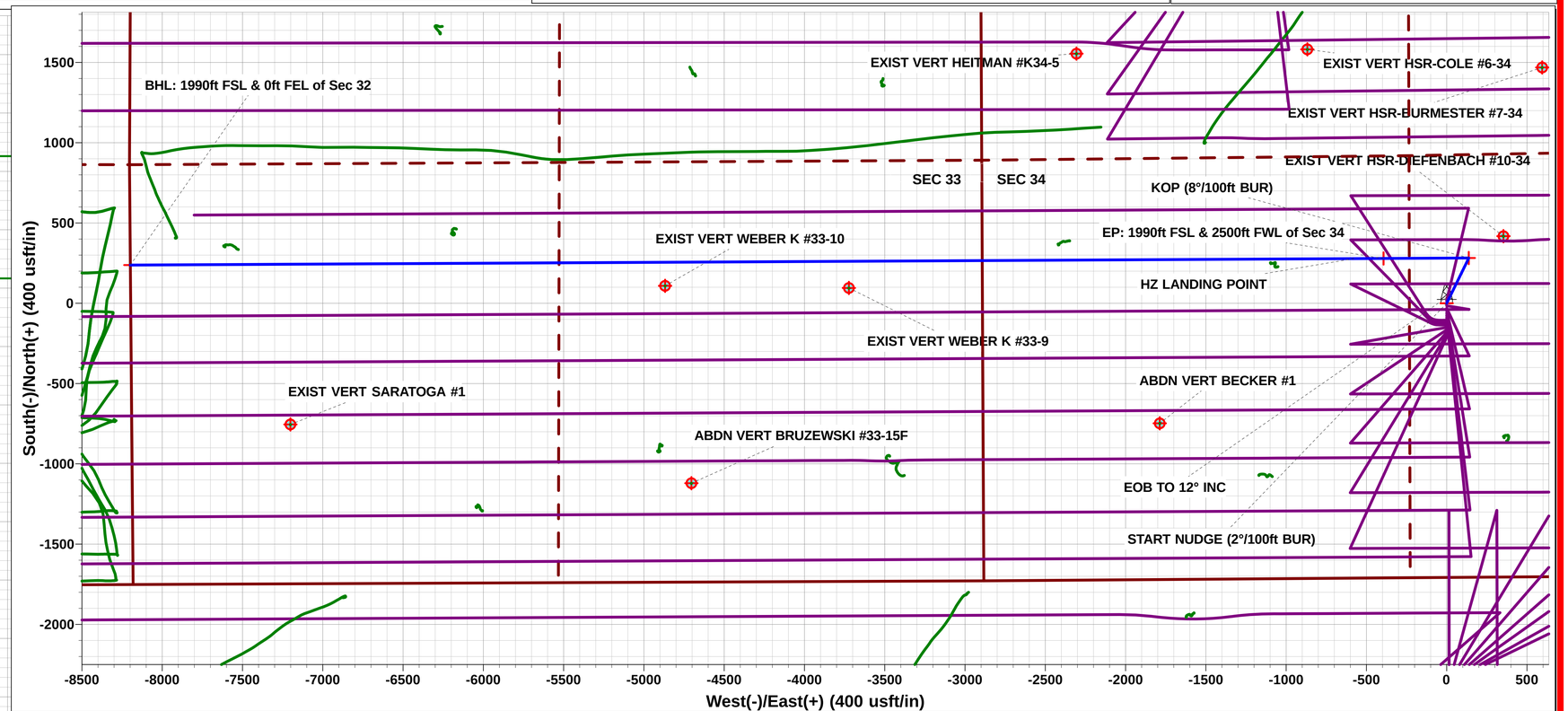


Azimuths to True North
Magnetic North: 8.03°

Magnetic Field
Strength: 52139.6snT
Dip Angle: 66.71°
Date: 24/01/2019
Model: IGRF2015







PDC ENERGY

WELD COUNTY, COLORADO (TRUE)
NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)
STEAMBOAT 2N

ORIGINAL WELLBORE
PROPOSAL #1

Anticollision Report

25 January, 2019

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**Offset TVD Reference:**	Offset Datum

Reference PROPOSAL #1

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 9,999.98 usft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 25/01/2019

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	15,175.48	PROPOSAL #1 (ORIGINAL WELLBORE)	MWD	MWD - Standard

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
NE NE SEC 2 T3N R66W 6th P.M. (CHEYENNE)						
CHEYENNE 1N - ORIGINAL WELLBORE - PROPOSAL	6,400.00	6,622.49	5,288.51	5,241.34	112.101	CC
CHEYENNE 1N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,635.75	5,288.55	5,241.30	111.916	ES
CHEYENNE 1N - ORIGINAL WELLBORE - PROPOSAL	11,600.00	6,850.00	9,953.55	9,800.72	65.125	SF
CHEYENNE 2N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,580.29	5,618.97	5,577.44	135.293	CC, ES
CHEYENNE 2N - ORIGINAL WELLBORE - PROPOSAL	11,300.00	6,850.00	9,993.42	9,852.00	70.666	SF
CHEYENNE 3N - ORIGINAL WELLBORE - PROPOSAL	6,400.00	6,504.31	5,938.75	5,902.23	162.622	CC
CHEYENNE 3N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,509.72	5,938.80	5,902.21	162.292	ES
CHEYENNE 3N - ORIGINAL WELLBORE - PROPOSAL	10,900.00	6,732.02	9,931.34	9,806.60	79.618	SF
CHEYENNE 4N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,514.07	6,250.52	6,217.79	190.962	CC
CHEYENNE 4N - ORIGINAL WELLBORE - PROPOSAL	6,450.00	6,533.67	6,250.78	6,215.53	177.323	ES
CHEYENNE 4N - ORIGINAL WELLBORE - PROPOSAL	10,600.00	6,800.00	9,948.46	9,832.91	86.093	SF
CHEYENNE 5N - ORIGINAL WELLBORE - PROPOSAL	6,400.00	6,475.87	6,551.32	6,521.25	217.893	CC
CHEYENNE 5N - ORIGINAL WELLBORE - PROPOSAL	6,450.00	6,500.00	6,551.69	6,515.89	183.001	ES
CHEYENNE 5N - ORIGINAL WELLBORE - PROPOSAL	10,300.00	6,700.00	9,963.82	9,859.58	95.582	SF
CHEYENNE 6N - ORIGINAL WELLBORE - PROPOSAL	4,965.74	5,041.93	6,852.98	6,829.57	292.754	CC
CHEYENNE 6N - ORIGINAL WELLBORE - PROPOSAL	6,450.00	6,528.07	6,853.33	6,816.64	186.788	ES
CHEYENNE 6N - ORIGINAL WELLBORE - PROPOSAL	10,000.00	6,777.10	9,969.48	9,871.33	101.572	SF
CHEYENNE 7N - ORIGINAL WELLBORE - PROPOSAL	360.78	375.78	6,959.85	6,958.47	5,046.684	CC
CHEYENNE 7N - ORIGINAL WELLBORE - PROPOSAL	1,000.00	800.00	6,961.18	6,957.10	1,705.714	ES
CHEYENNE 7N - ORIGINAL WELLBORE - PROPOSAL	9,600.00	6,723.34	9,934.62	9,845.57	111.564	SF
CHEYENNE 8N - ORIGINAL WELLBORE - PROPOSAL	260.78	275.78	6,974.18	6,973.26	7,502.657	CC
CHEYENNE 8N - ORIGINAL WELLBORE - PROPOSAL	300.00	300.00	6,974.20	6,973.13	6,504.970	ES
CHEYENNE 8N - ORIGINAL WELLBORE - PROPOSAL	9,200.00	6,831.17	9,910.46	9,826.29	117.746	SF
EXIST DD LORENZ #39-35 - Wellbore #1 - Wellbore #1	2,154.88	1,888.93	7,287.63	7,276.68	665.544	CC, ES
EXIST DD LORENZ #39-35 - Wellbore #1 - Wellbore #1	9,300.00	7,267.55	9,967.89	9,883.65	118.329	SF
EXIST DD MILE HIGH #30-2 - Wellbore #1 - Wellbore #1	5,687.39	5,729.81	3,107.38	3,079.07	109.770	CC
EXIST DD MILE HIGH #30-2 - Wellbore #1 - Wellbore #1	6,430.40	6,484.08	3,107.55	3,076.46	99.947	ES
EXIST DD MILE HIGH #30-2 - Wellbore #1 - Wellbore #1	14,300.00	7,546.00	9,992.82	9,772.24	45.302	SF
EXIST VERT HSR-BACANSKAS #13-35 - Wellbore #1 -	5,686.19	5,659.57	3,302.92	3,289.00	237.138	CC
EXIST VERT HSR-BACANSKAS #13-35 - Wellbore #1 -	5,900.00	5,861.49	3,303.31	3,288.88	228.883	ES
EXIST VERT HSR-BACANSKAS #13-35 - Wellbore #1 -	13,700.00	7,200.00	9,965.04	9,774.08	52.186	SF
EXIST VERT HSR-BANCROFT #15-35 - Wellbore #1 - W	6,408.89	6,369.36	5,878.55	5,862.72	371.254	CC
EXIST VERT HSR-BANCROFT #15-35 - Wellbore #1 - W	6,432.09	6,400.00	5,878.57	5,861.49	344.147	ES
EXIST VERT HSR-BANCROFT #15-35 - Wellbore #1 - W	11,000.00	7,000.00	9,969.85	9,854.49	86.420	SF
EXIST VERT LORENZ #14-35 - Wellbore #1 - Wellbore #	6,436.31	6,434.02	4,633.16	4,616.17	272.759	CC, ES
EXIST VERT LORENZ #14-35 - Wellbore #1 - Wellbore #	12,300.00	7,150.00	9,956.55	9,804.71	65.573	SF

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

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**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
NE NE SEC 2 T3N R66W 6th P.M. (CHEYENNE)						
EXIST VERT LORENZ #16-35 - Wellbore #1 - Wellbore #	6,440.57	6,513.16	7,134.41	7,117.31	417.049	CC, ES
EXIST VERT LORENZ #16-35 - Wellbore #1 - Wellbore #	9,700.00	7,200.00	9,943.94	9,864.19	124.688	SF

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**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
NE NW SEC 34 T4N R66W 6th P.M. (CHATFIELD)						
ABDN DD PIERSON #21-34 - Wellbore #1 - Wellbore #1	7,284.55	7,060.98	2,069.55	2,036.25	62.155	CC
ABDN DD PIERSON #21-34 - Wellbore #1 - Wellbore #1	7,300.00	7,066.12	2,069.60	2,036.08	61.756	ES
ABDN DD PIERSON #21-34 - Wellbore #1 - Wellbore #1	12,000.00	7,108.50	5,147.89	4,990.91	32.794	SF
ABDN DD PIERSON #27-34 - Wellbore #1 - Wellbore #1	2,031.67	1,563.00	2,694.63	2,685.20	285.664	CC, ES
ABDN DD PIERSON #27-34 - Wellbore #1 - Wellbore #1	15,175.48	7,353.00	9,910.43	9,651.80	38.319	SF
ABDN DD PIERSON #28-34 - Wellbore #1 - Wellbore #1	1,780.66	1,200.00	2,733.26	2,727.96	514.997	CC
ABDN DD PIERSON #28-34 - Wellbore #1 - Wellbore #1	1,800.00	1,200.00	2,733.28	2,727.92	509.114	ES
ABDN DD PIERSON #28-34 - Wellbore #1 - Wellbore #1	15,175.48	7,167.06	8,625.55	8,392.72	37.046	SF
ABDN VERT AGRI PROD INC FED #32-7F - Wellbore #	15,175.48	6,978.34	2,435.61	2,203.43	10.490	CC, ES, SF
ABDN VERT AGRI PROD INC FED #32-8F - Wellbore #	15,175.48	7,038.04	1,339.40	1,107.17	5.768	CC, ES, SF
ABDN VERT BECKER #1 - Wellbore #1 - Design #1	8,769.43	7,061.00	1,019.56	827.28	5.302	CC
ABDN VERT BECKER #1 - Wellbore #1 - Design #1	8,800.00	7,061.00	1,020.02	826.92	5.282	ES
ABDN VERT BECKER #1 - Wellbore #1 - Design #1	8,900.00	7,061.00	1,027.89	832.11	5.250	SF
ABDN VERT DEROO WILFRED #1 - Wellbore #1 - Well	15,175.48	6,992.81	1,877.47	1,645.16	8.082	CC, ES, SF
ABDN VERT FRANK #21-32 - Wellbore #1 - Wellbore #1	15,175.48	7,011.17	3,891.47	3,659.13	16.749	CC, ES, SF
ABDN VERT HEITMAN K #34-4 - Wellbore #1 - Wellbore	9,319.91	7,040.77	2,745.42	2,676.00	39.550	CC
ABDN VERT HEITMAN K #34-4 - Wellbore #1 - Wellbore	9,400.00	7,040.62	2,746.59	2,674.98	38.359	ES
ABDN VERT HEITMAN K #34-4 - Wellbore #1 - Wellbore	12,400.00	7,035.32	4,126.08	3,971.25	26.649	SF
ABDN VERT HSR-SPILMAN #9-35 - Wellbore #1 - Wellb	6,207.70	6,140.74	6,877.26	6,861.94	448.884	CC, ES
ABDN VERT HSR-SPILMAN #9-35 - Wellbore #1 - Wellb	9,900.00	7,039.06	9,941.50	9,865.52	130.830	SF
ABDN VERT JOHNSON UPRR #31-35 - Wellbore #1 - W	6,242.03	6,152.21	6,042.25	6,026.45	382.499	CC
ABDN VERT JOHNSON UPRR #31-35 - Wellbore #1 - W	6,300.00	6,200.00	6,042.34	6,026.41	379.380	ES
ABDN VERT JOHNSON UPRR #31-35 - Wellbore #1 - W	11,000.00	6,900.00	9,960.44	9,844.98	86.269	SF
ABDN VERT RAYMOND MARTIN GU #1 - Wellbore #1 -	4,769.02	4,657.61	1,724.82	1,711.84	132.833	CC
ABDN VERT RAYMOND MARTIN GU #1 - Wellbore #1 -	6,430.40	6,324.52	1,725.03	1,708.48	104.198	ES
ABDN VERT RAYMOND MARTIN GU #1 - Wellbore #1 -	15,175.48	7,040.18	9,141.63	8,909.28	39.343	SF
ABDN VERT SWEET VALLEY FARMS-UPRR #41-33 - W	10,465.56	7,029.00	2,623.88	2,384.49	10.961	CC
ABDN VERT SWEET VALLEY FARMS-UPRR #41-33 - W	10,500.00	7,029.00	2,624.10	2,383.77	10.918	ES
ABDN VERT SWEET VALLEY FARMS-UPRR #41-33 - W	11,300.00	7,029.00	2,753.37	2,490.80	10.486	SF
ABDN VERT TANNER K FED #33-12 - Wellbore #1 - We	14,592.73	7,027.01	114.06	-101.99	0.528	Level 1, CC, ES, SF
ABDN VERT UPRR 21 PAN AM K #1 - Wellbore #1 - De	6,430.40	6,356.80	4,356.91	4,217.25	31.195	CC
ABDN VERT UPRR 21 PAN AM K #1 - Wellbore #1 - De	6,450.00	6,376.40	4,357.18	4,216.69	31.014	ES
ABDN VERT UPRR 21 PAN AM K #1 - Wellbore #1 - De	6,500.00	6,426.29	4,360.29	4,219.32	30.932	SF
CHATFIELD 10N - ORIGINAL WELLBORE - PROPOSA	8,490.79	7,350.00	2,288.77	2,221.19	33.871	CC
CHATFIELD 10N - ORIGINAL WELLBORE - PROPOSA	8,700.00	7,177.39	2,290.52	2,218.80	31.937	ES
CHATFIELD 10N - ORIGINAL WELLBORE - PROPOSA	10,800.00	6,571.35	2,932.79	2,806.63	23.246	SF
CHATFIELD 11N - ORIGINAL WELLBORE - PROPOSAL	7,925.54	8,003.86	1,981.96	1,919.61	31.792	CC
CHATFIELD 11N - ORIGINAL WELLBORE - PROPOSAL	8,000.00	7,967.33	1,982.63	1,919.22	31.269	ES
CHATFIELD 11N - ORIGINAL WELLBORE - PROPOSAL	10,300.00	6,700.00	2,409.79	2,296.37	21.246	SF
CHATFIELD 12N - ORIGINAL WELLBORE - PROPOSA	8,462.57	7,420.71	1,669.42	1,601.99	24.759	CC
CHATFIELD 12N - ORIGINAL WELLBORE - PROPOSA	8,700.00	7,222.54	1,672.24	1,600.02	23.156	ES
CHATFIELD 12N - ORIGINAL WELLBORE - PROPOSA	9,900.00	6,728.90	1,944.91	1,842.93	19.070	SF
CHATFIELD 13N - ORIGINAL WELLBORE - PROPOSA	8,583.42	7,434.66	1,357.04	1,286.85	19.333	CC
CHATFIELD 13N - ORIGINAL WELLBORE - PROPOSA	8,700.00	7,333.20	1,357.88	1,285.10	18.658	ES
CHATFIELD 13N - ORIGINAL WELLBORE - PROPOSA	9,600.00	6,900.00	1,526.76	1,431.99	16.110	SF
CHATFIELD 14N - ORIGINAL WELLBORE - PROPOSA	8,430.40	7,602.73	1,040.66	973.32	15.454	CC
CHATFIELD 14N - ORIGINAL WELLBORE - PROPOSA	8,600.00	7,455.17	1,042.46	972.00	14.795	ES
CHATFIELD 14N - ORIGINAL WELLBORE - PROPOSA	9,200.00	7,081.05	1,120.96	1,037.68	13.459	SF
CHATFIELD 15N - ORIGINAL WELLBORE - PROPOSA	8,124.31	8,086.94	750.04	685.61	11.642	CC
CHATFIELD 15N - ORIGINAL WELLBORE - PROPOSA	8,700.00	7,524.98	758.32	684.86	10.323	ES
CHATFIELD 15N - ORIGINAL WELLBORE - PROPOSA	9,000.00	7,318.35	789.70	710.25	9.940	SF
CHATFIELD 8N - ORIGINAL WELLBORE - PROPOSAL	1,434.34	1,000.00	2,844.31	2,838.35	477.043	CC

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

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**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
NE NW SEC 34 T4N R66W 6th P.M. (CHATFIELD)						
CHATFIELD 8N - ORIGINAL WELLBORE - PROPOSAL	1,500.00	1,039.83	2,844.62	2,838.31	450.657	ES
CHATFIELD 8N - ORIGINAL WELLBORE - PROPOSAL	11,900.00	6,550.00	4,131.75	3,973.21	26.062	SF
CHATFIELD 9N - ORIGINAL WELLBORE - PROPOSAL	8,627.08	7,295.01	2,601.60	2,531.01	36.855	CC
CHATFIELD 9N - ORIGINAL WELLBORE - PROPOSAL	8,800.00	7,156.66	2,603.05	2,528.38	34.861	ES
CHATFIELD 9N - ORIGINAL WELLBORE - PROPOSAL	11,500.00	6,600.00	3,602.04	3,454.99	24.495	SF
CHATFIELD FEDERAL 1N - ORIGINAL WELLBORE - P	147.92	83.92	2,827.26	2,827.00	10,000.000	CC
CHATFIELD FEDERAL 1N - ORIGINAL WELLBORE - P	15,175.48	13,939.87	3,021.87	2,591.48	7.021	ES, SF
CHATFIELD FEDERAL 2N - ORIGINAL WELLBORE - P	8,446.81	7,259.94	2,544.57	2,481.54	40.374	CC
CHATFIELD FEDERAL 2N - ORIGINAL WELLBORE - P	15,175.48	13,982.48	2,571.30	2,140.88	5.974	ES, SF
CHATFIELD FEDERAL 3N - ORIGINAL WELLBORE - P	8,599.04	7,319.55	2,238.44	2,169.07	32.266	CC
CHATFIELD FEDERAL 3N - ORIGINAL WELLBORE - P	15,175.48	13,888.06	2,282.59	1,852.55	5.308	ES, SF
CHATFIELD FEDERAL 4N - ORIGINAL WELLBORE - P	8,463.45	7,298.67	1,944.71	1,881.46	30.746	CC
CHATFIELD FEDERAL 4N - ORIGINAL WELLBORE - P	15,175.48	14,009.25	1,991.55	1,561.46	4.631	ES, SF
CHATFIELD FEDERAL 5N - ORIGINAL WELLBORE - P	8,621.44	7,412.41	1,619.01	1,548.86	23.080	CC
CHATFIELD FEDERAL 5N - ORIGINAL WELLBORE - P	15,175.48	13,962.05	1,668.09	1,238.47	3.883	ES, SF
CHATFIELD FEDERAL 6N - ORIGINAL WELLBORE - P	8,485.41	7,392.34	1,304.88	1,239.88	20.073	CC
CHATFIELD FEDERAL 6N - ORIGINAL WELLBORE - P	15,175.48	14,082.11	1,381.48	951.49	3.213	ES, SF
CHATFIELD FEDERAL 7N - ORIGINAL WELLBORE - P	8,635.03	7,564.53	938.45	866.74	13.086	CC
CHATFIELD FEDERAL 7N - ORIGINAL WELLBORE - P	15,175.48	14,101.24	964.26	535.64	2.250	ES, SF
EXIST DD HUNT K FEDERAL #33-19 - Wellbore #1 - W	13,809.64	7,159.28	1,981.76	1,785.20	10.082	CC
EXIST DD HUNT K FEDERAL #33-19 - Wellbore #1 - W	13,900.00	7,158.33	1,983.82	1,784.73	9.964	ES
EXIST DD HUNT K FEDERAL #33-19 - Wellbore #1 - W	14,400.00	7,153.44	2,067.81	1,854.71	9.704	SF
EXIST DD PIERSON #18-34 - Wellbore #1 - Wellbore #1	8,512.02	7,279.41	1,974.79	1,899.56	26.249	CC
EXIST DD PIERSON #18-34 - Wellbore #1 - Wellbore #1	8,600.00	7,278.79	1,976.75	1,899.21	25.491	ES
EXIST DD PIERSON #18-34 - Wellbore #1 - Wellbore #1	10,000.00	7,268.93	2,472.62	2,357.04	21.394	SF
EXIST DD PIERSON #22-34 - Wellbore #1 - Wellbore #1	8,478.77	7,548.36	726.11	650.19	9.564	CC
EXIST DD PIERSON #22-34 - Wellbore #1 - Wellbore #1	8,500.00	7,548.29	726.42	649.95	9.498	ES
EXIST DD PIERSON #22-34 - Wellbore #1 - Wellbore #1	8,700.00	7,547.57	759.07	677.31	9.284	SF
EXIST DD PIERSON #29-34 - Wellbore #1 - Wellbore #1	1,822.97	1,274.57	2,791.47	2,783.05	331.496	CC
EXIST DD PIERSON #29-34 - Wellbore #1 - Wellbore #1	1,900.00	1,323.68	2,791.99	2,783.04	312.076	ES
EXIST DD PIERSON #29-34 - Wellbore #1 - Wellbore #1	12,200.00	7,289.00	4,806.23	4,627.77	26.932	SF
EXIST HZ PEAKS #K26-77-1HN - Wellbore #1 - Wellbor	2,319.60	1,991.23	4,209.43	4,200.37	464.457	CC, ES
EXIST HZ PEAKS #K26-77-1HN - Wellbore #1 - Wellbor	12,400.00	5,676.98	9,939.16	9,786.05	64.918	SF
EXIST HZ PEAKS #K26-78-1HN - Wellbore #1 - Wellbor	2,241.37	1,817.07	4,215.80	4,206.80	468.830	CC, ES
EXIST HZ PEAKS #K26-78-1HN - Wellbore #1 - Wellbor	12,900.00	6,672.00	9,944.40	9,764.34	55.227	SF
EXIST HZ PEPPLER #K26-79-1HN - Wellbore #1 - Wellb	2,549.99	2,471.50	4,136.22	4,124.49	352.567	CC, ES
EXIST HZ PEPPLER #K26-79-1HN - Wellbore #1 - Wellb	13,500.00	6,913.00	9,915.17	9,713.38	49.136	SF
EXIST HZ TANNER FED #K33-65HN - Wellbore #1 - We	12,490.89	9,453.25	642.31	416.33	2.842	CC
EXIST HZ TANNER FED #K33-65HN - Wellbore #1 - We	12,500.00	9,447.63	642.34	416.26	2.841	ES
EXIST HZ TANNER FED #K33-65HN - Wellbore #1 - We	12,600.00	9,395.00	645.97	418.53	2.840	SF
EXIST HZ TARIN FED #32W-234 - Wellbore #1 - Wellbo	15,175.48	7,005.00	493.54	291.14	2.438	CC, ES, SF
EXIST HZ WIEDMAN #29O-243 - Wellbore #1 - Wellbore	15,175.48	11,542.00	3,091.14	2,835.31	12.083	CC, ES, SF
EXIST VERT AGRI PROD FED #32-17 - Wellbore #1 - D	15,175.48	7,026.00	2,202.59	1,831.67	5.938	CC, ES, SF
EXIST VERT AGRI PROD INC #32-1F - Wellbore #1 - D	15,175.48	7,029.00	2,630.77	2,259.82	7.092	CC, ES, SF
EXIST VERT AGRI PROD INC #32-2F - Wellbore #1 - D	15,175.48	7,037.00	3,298.09	2,927.06	8.889	CC, ES, SF
EXIST VERT BERIG #17-35 - Wellbore #1 - Design #1	6,430.40	6,350.80	6,591.84	6,451.96	47.127	CC
EXIST VERT BERIG #17-35 - Wellbore #1 - Design #1	6,450.00	6,370.40	6,592.09	6,451.92	47.030	ES
EXIST VERT BERIG #17-35 - Wellbore #1 - Design #1	10,300.00	7,067.00	9,925.72	9,691.54	42.387	SF
EXIST VERT BIERIG UPRR #41-35 #2 - Wellbore #1 - W	6,434.59	6,380.43	7,444.30	7,427.99	456.348	CC, ES
EXIST VERT BIERIG UPRR #41-35 #2 - Wellbore #1 - W	9,500.00	7,126.93	9,981.61	9,907.47	134.627	SF
EXIST VERT BIERIG-UPRR #42-35 - Wellbore #1 - Well	6,434.30	6,387.18	6,894.07	6,877.57	417.632	CC, ES
EXIST VERT BIERIG-UPRR #42-35 - Wellbore #1 - Well	9,900.00	7,056.76	9,912.47	9,827.32	116.416	SF

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**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
NE NW SEC 34 T4N R66W 6th P.M. (CHATFIELD)						
EXIST VERT BRUZEWSKI #33-15F - Wellbore #1 - Des	11,688.15	7,049.00	1,376.86	1,103.28	5.033	CC
EXIST VERT BRUZEWSKI #33-15F - Wellbore #1 - Des	11,700.00	7,049.00	1,376.92	1,103.00	5.027	ES
EXIST VERT BRUZEWSKI #33-15F - Wellbore #1 - Des	11,900.00	7,049.00	1,393.07	1,113.57	4.984	SF
EXIST VERT BRUZEWSKI #33-15F (2) - Wellbore #1 - W	11,898.10	7,064.60	1,176.56	1,035.88	8.363	CC
EXIST VERT BRUZEWSKI #33-15F (2) - Wellbore #1 - W	11,900.00	7,064.61	1,176.57	1,035.83	8.360	ES
EXIST VERT BRUZEWSKI #33-15F (2) - Wellbore #1 - W	12,200.00	7,065.32	1,214.68	1,065.57	8.146	SF
EXIST VERT BRUZEWSKI #33-16F - Wellbore #1 - Wel	10,453.57	7,041.35	1,213.26	1,112.66	12.060	CC
EXIST VERT BRUZEWSKI #33-16F - Wellbore #1 - Wel	10,500.00	7,040.93	1,214.15	1,112.26	11.916	ES
EXIST VERT BRUZEWSKI #33-16F - Wellbore #1 - Wel	10,900.00	7,037.41	1,292.78	1,179.79	11.442	SF
EXIST VERT FRANK #32-24 - Wellbore #1 - Wellbore #1	15,175.48	7,080.59	3,454.50	3,222.24	14.873	CC, ES, SF
EXIST VERT HEITMAN #K34-5 - Wellbore #1 - Design #	9,276.21	7,046.00	1,285.57	1,078.74	6.216	CC
EXIST VERT HEITMAN #K34-5 - Wellbore #1 - Design #	9,300.00	7,046.00	1,285.79	1,078.32	6.197	ES
EXIST VERT HEITMAN #K34-5 - Wellbore #1 - Design #	9,500.00	7,046.00	1,304.90	1,091.97	6.128	SF
EXIST VERT HSR-BURMESTER #7-34 - Wellbore #1 - D	6,430.40	6,342.80	1,271.68	1,131.49	9.071	CC, ES
EXIST VERT HSR-BURMESTER #7-34 - Wellbore #1 - D	6,650.00	6,558.98	1,284.23	1,141.11	8.973	SF
EXIST VERT HSR-CARRICO #3-34 - Wellbore #1 - Desi	7,985.38	7,035.00	2,750.15	2,577.32	15.912	CC
EXIST VERT HSR-CARRICO #3-34 - Wellbore #1 - Desi	8,100.00	7,035.00	2,752.54	2,576.89	15.671	ES
EXIST VERT HSR-CARRICO #3-34 - Wellbore #1 - Desi	9,200.00	7,035.00	3,006.44	2,801.80	14.691	SF
EXIST VERT HSR-COLE #6-34 - Wellbore #1 - Design #	7,838.13	7,064.00	1,304.89	1,136.26	7.738	CC, ES
EXIST VERT HSR-COLE #6-34 - Wellbore #1 - Design #	8,100.00	7,064.00	1,330.91	1,155.98	7.608	SF
EXIST VERT HSR-DIEFENBACH #10-34 - Wellbore #1 -	6,430.40	6,346.80	255.02	114.99	1.821	CC, ES, SF
EXIST VERT HSR-ENGSTROM #15-34 - Wellbore #1 - W	100.00	54.83	934.68	934.60	10,000.000	CC
EXIST VERT HSR-ENGSTROM #15-34 - Wellbore #1 - W	400.00	353.79	935.37	934.39	951.291	ES
EXIST VERT HSR-ENGSTROM #15-34 - Wellbore #1 - W	15,175.48	7,112.80	8,622.81	8,390.56	37.127	SF
EXIST VERT HSR-FRAHM #9-34 - Wellbore #1 - Design	6,430.40	6,359.80	1,728.20	1,588.61	12.381	CC
EXIST VERT HSR-FRAHM #9-34 - Wellbore #1 - Design	6,450.00	6,379.40	1,728.46	1,587.83	12.291	ES
EXIST VERT HSR-FRAHM #9-34 - Wellbore #1 - Design	6,500.00	6,429.29	1,731.55	1,590.43	12.270	SF
EXIST VERT HSR-FRENCH #16-34 - Wellbore #1 - Wel	100.00	62.46	1,567.80	1,567.71	10,000.000	CC
EXIST VERT HSR-FRENCH #16-34 - Wellbore #1 - Wel	300.00	259.41	1,568.01	1,567.31	2,238.177	ES
EXIST VERT HSR-FRENCH #16-34 - Wellbore #1 - Wel	15,175.48	7,179.35	9,548.74	9,316.92	41.191	SF
EXIST VERT HSR-SCHMID #2-34 - Wellbore #1 - Desig	6,430.40	6,327.80	2,644.00	2,503.05	18.758	CC
EXIST VERT HSR-SCHMID #2-34 - Wellbore #1 - Desig	6,550.00	6,446.85	2,645.27	2,502.43	18.520	ES
EXIST VERT HSR-SCHMID #2-34 - Wellbore #1 - Desig	7,550.00	7,043.98	2,822.36	2,659.17	17.295	SF
EXIST VERT HSR-THOMAS #10-35 - Wellbore #1 - Wel	6,437.53	6,434.96	5,714.05	5,697.15	338.191	CC, ES
EXIST VERT HSR-THOMAS #10-35 - Wellbore #1 - Wel	11,100.00	7,048.32	9,977.53	9,868.94	91.880	SF
EXIST VERT HSR-TRAIN #12-35 - Wellbore #1 - Wellbo	5,100.11	5,060.36	3,077.94	3,065.16	240.785	CC
EXIST VERT HSR-TRAIN #12-35 - Wellbore #1 - Wellbo	6,450.00	6,400.00	3,080.49	3,063.95	186.195	ES
EXIST VERT HSR-TRAIN #12-35 - Wellbore #1 - Wellbo	12,500.00	7,000.00	8,746.34	8,606.74	62.653	SF
EXIST VERT JOHNSON #32-35 - Wellbore #1 - Design #	6,430.40	6,353.80	5,893.47	5,753.64	42.147	CC
EXIST VERT JOHNSON #32-35 - Wellbore #1 - Design #	6,450.00	6,373.40	5,893.73	5,753.46	42.018	ES
EXIST VERT JOHNSON #32-35 - Wellbore #1 - Design #	11,000.00	7,070.00	9,973.67	9,720.05	39.325	SF
EXIST VERT MARGHEIM #24-35 - Wellbore #1 - Design	6,430.40	6,370.80	6,343.14	6,203.28	45.354	CC
EXIST VERT MARGHEIM #24-35 - Wellbore #1 - Design	6,450.00	6,390.40	6,343.41	6,202.83	45.123	ES
EXIST VERT MARGHEIM #24-35 - Wellbore #1 - Design	10,500.00	7,087.00	9,993.17	9,753.26	41.653	SF
EXIST VERT SANDAU #24-34 - Wellbore #1 - Wellbore	8,154.01	7,061.06	1,347.01	1,308.74	35.197	CC
EXIST VERT SANDAU #24-34 - Wellbore #1 - Wellbore	8,200.00	7,060.98	1,347.80	1,308.37	34.186	ES
EXIST VERT SANDAU #24-34 - Wellbore #1 - Wellbore	9,500.00	7,058.87	1,904.23	1,830.14	25.701	SF
EXIST VERT SANDAU #34-11F - Wellbore #1 - Wellbore	8,071.68	6,540.14	521.48	503.30	28.682	CC, ES
EXIST VERT SANDAU #34-11F - Wellbore #1 - Wellbore	8,200.00	6,540.14	537.04	518.13	28.401	SF
EXIST VERT SANDAU #34-12F - Wellbore #1 - Wellbore	9,394.75	7,061.97	94.65	23.50	1.330	Level 3, CC, ES
EXIST VERT SANDAU #34-12F - Wellbore #1 - Wellbore	9,400.00	7,062.00	94.80	23.50	1.330	Level 3, SF
EXIST VERT SARATOGA #1 - Wellbore #1 - Design #1	14,183.93	7,045.00	997.64	654.31	2.906	CC

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**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
NE NW SEC 34 T4N R66W 6th P.M. (CHATFIELD)						
EXIST VERT SARATOGA #1 - Wellbore #1 - Design #1	14,200.00	7,045.00	997.77	653.99	2.902	ES
EXIST VERT SARATOGA #1 - Wellbore #1 - Design #1	14,300.00	7,045.00	1,004.37	657.79	2.898	SF
EXIST VERT SHUTT #20-34 - Wellbore #1 - Wellbore #1	6,043.82	5,975.57	953.12	938.21	63.941	CC
EXIST VERT SHUTT #20-34 - Wellbore #1 - Wellbore #1	6,431.00	6,363.48	953.49	936.45	55.955	ES
EXIST VERT SHUTT #20-34 - Wellbore #1 - Wellbore #1	15,175.48	7,123.31	9,190.83	8,959.39	39.711	SF
EXIST VERT SHUTT #24-34 - Wellbore #1 - Design #1	6,430.40	6,350.80	1,154.10	1,014.13	8.245	CC, ES
EXIST VERT SHUTT #24-34 - Wellbore #1 - Design #1	6,500.00	6,420.29	1,157.15	1,016.50	8.227	SF
EXIST VERT SWEET VALLEY FARMS #31-33 2 - Wellb	11,960.93	7,024.00	2,723.10	2,442.16	9.693	CC
EXIST VERT SWEET VALLEY FARMS #31-33 2 - Wellb	12,000.00	7,024.00	2,723.38	2,441.35	9.656	ES
EXIST VERT SWEET VALLEY FARMS #31-33 2 - Wellb	12,700.00	7,024.00	2,821.62	2,520.03	9.356	SF
EXIST VERT TANNER K #33-11 - Wellbore #1 - Wellbore	13,144.66	7,039.55	213.57	38.07	1.217	Level 2, CC, ES, SF
EXIST VERT TANNER K #33-14 - Wellbore #1 - Wellbor	13,030.12	7,068.75	1,515.47	1,343.20	8.797	CC
EXIST VERT TANNER K #33-14 - Wellbore #1 - Wellbor	13,100.00	7,068.71	1,517.08	1,342.85	8.708	ES
EXIST VERT TANNER K #33-14 - Wellbore #1 - Wellbor	13,400.00	7,068.56	1,559.95	1,377.33	8.542	SF
EXIST VERT UPRC #33-7F - Wellbore #1 - Wellbore #1	11,679.78	6,978.03	1,204.63	1,069.87	8.939	CC
EXIST VERT UPRC #33-7F - Wellbore #1 - Wellbore #1	11,700.00	6,978.46	1,204.80	1,069.48	8.903	ES
EXIST VERT UPRC #33-7F - Wellbore #1 - Wellbore #1	12,000.00	6,984.84	1,246.44	1,102.74	8.674	SF
EXIST VERT UPRC #33-8F - Wellbore #1 - Wellbore #1	10,481.72	7,015.75	1,135.87	1,034.58	11.215	CC
EXIST VERT UPRC #33-8F - Wellbore #1 - Wellbore #1	10,500.00	7,015.74	1,136.01	1,034.23	11.161	ES
EXIST VERT UPRC #33-8F - Wellbore #1 - Wellbore #1	10,800.00	7,015.63	1,179.62	1,069.50	10.713	SF
EXIST VERT UPRC #35-3F - Wellbore #1 - Wellbore #1	6,430.40	6,353.92	4,970.83	4,954.42	302.929	ES
EXIST VERT UPRC #35-3F - Wellbore #1 - Wellbore #1	6,434.20	6,356.55	4,970.82	4,954.94	312.989	CC
EXIST VERT UPRC #35-3F - Wellbore #1 - Wellbore #1	12,300.00	6,862.22	9,967.86	9,816.26	65.750	SF
EXIST VERT UPRC #35-4F - Wellbore #1 - Wellbore #1	4,858.30	4,746.76	3,956.40	3,943.43	304.975	CC
EXIST VERT UPRC #35-4F - Wellbore #1 - Wellbore #1	6,430.40	6,454.57	3,958.43	3,941.99	240.736	ES
EXIST VERT UPRC #35-4F - Wellbore #1 - Wellbore #1	13,500.00	7,231.03	9,944.03	9,759.16	53.790	SF
EXIST VERT UPRC #35-5F - Wellbore #1 - Wellbore #1	5,814.22	5,728.00	3,156.97	3,142.25	214.375	CC, ES
EXIST VERT UPRC #35-5F - Wellbore #1 - Wellbore #1	13,800.00	7,250.00	9,947.31	9,755.64	51.897	SF
EXIST VERT UPRC #35-6F - Wellbore #1 - Wellbore #1	6,443.69	6,424.03	4,232.16	4,215.61	255.764	CC, ES
EXIST VERT UPRC #35-6F - Wellbore #1 - Wellbore #1	12,700.00	7,000.00	9,968.18	9,805.26	61.187	SF
EXIST VERT UPRC FEDERAL #33-3F - Wellbore #1 - W	12,914.53	6,982.94	2,589.01	2,419.71	15.292	CC
EXIST VERT UPRC FEDERAL #33-3F - Wellbore #1 - W	13,000.00	6,982.23	2,590.42	2,418.73	15.088	ES
EXIST VERT UPRC FEDERAL #33-3F - Wellbore #1 - W	14,000.00	6,973.50	2,807.34	2,607.67	14.060	SF
EXIST VERT UPRC FEDERAL #33-4F - Wellbore #1 - D	14,343.04	7,026.00	2,428.12	2,080.52	6.985	CC
EXIST VERT UPRC FEDERAL #33-4F - Wellbore #1 - D	14,400.00	7,026.00	2,428.79	2,079.60	6.955	ES
EXIST VERT UPRC FEDERAL #33-4F - Wellbore #1 - D	14,800.00	7,026.00	2,470.74	2,110.35	6.856	SF
EXIST VERT UPRC FEDERAL #33-5K - Wellbore #1 - W	14,740.36	7,023.06	1,608.62	1,388.10	7.295	CC
EXIST VERT UPRC FEDERAL #33-5K - Wellbore #1 - W	14,800.00	7,022.77	1,609.73	1,387.53	7.245	ES
EXIST VERT UPRC FEDERAL #33-5K - Wellbore #1 - W	15,100.00	7,021.25	1,648.33	1,417.73	7.148	SF
EXIST VERT UPRC FEDERAL #33-6F - Wellbore #1 - W	13,233.76	7,006.23	1,475.02	1,297.05	8.288	CC
EXIST VERT UPRC FEDERAL #33-6F - Wellbore #1 - W	13,300.00	7,003.12	1,476.50	1,296.68	8.211	ES
EXIST VERT UPRC FEDERAL #33-6F - Wellbore #1 - W	13,600.00	6,991.08	1,519.72	1,331.52	8.075	SF
EXIST VERT UPRC K #35-19 - Wellbore #1 - Wellbore #	4,853.71	4,749.77	4,200.94	4,188.14	328.122	CC
EXIST VERT UPRC K #35-19 - Wellbore #1 - Wellbore #	6,430.40	6,386.14	4,201.91	4,185.67	258.639	ES
EXIST VERT UPRC K #35-19 - Wellbore #1 - Wellbore #	12,900.00	6,700.00	9,972.65	9,805.99	59.837	SF
EXIST VERT WEBER K #33-10 - Wellbore #1 - Design #	11,845.79	7,045.00	146.82	-131.12	0.528	Level 1, CC, ES, SF
EXIST VERT WEBER K #33-9 - Wellbore #1 - Design #1	10,701.13	7,053.00	166.18	-79.98	0.675	Level 1, CC, ES, SF
EXIST VERT WILLIAMS #41-34-1 - Wellbore #1 - Design	6,430.40	6,327.80	3,138.99	2,997.93	22.252	CC, ES
EXIST VERT WILLIAMS #41-34-1 - Wellbore #1 - Design	7,500.00	7,041.85	3,528.38	3,366.59	21.809	SF
EXIST VERT WILLIAMS #42-34 - Wellbore #1 - Design #	6,430.40	6,341.80	2,311.97	2,171.90	16.506	CC, ES
EXIST VERT WILLIAMS #42-34 - Wellbore #1 - Design #	6,550.00	6,460.85	2,319.65	2,178.82	16.471	SF

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**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
NE NW SEC. 2 T3N R66W 6th P.M. (EL DORADO)						
EL DORADO 1N - ORIGINAL WELLBORE - PROPOSAL	6,400.00	6,677.99	2,948.04	2,897.02	57.772	CC
EL DORADO 1N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,691.28	2,948.12	2,897.01	57.687	ES
EL DORADO 1N - ORIGINAL WELLBORE - PROPOSAL	14,100.00	6,900.00	9,902.19	9,679.74	44.515	SF
EL DORADO 2N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,623.42	3,246.24	3,200.75	71.359	CC, ES
EL DORADO 2N - ORIGINAL WELLBORE - PROPOSAL	13,800.00	6,900.00	9,941.99	9,730.16	46.933	SF
EL DORADO 3N - ORIGINAL WELLBORE - PROPOSAL	6,400.00	6,535.91	3,548.46	3,508.24	88.235	CC
EL DORADO 3N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,550.00	3,548.52	3,508.22	88.056	ES
EL DORADO 3N - ORIGINAL WELLBORE - PROPOSAL	13,500.00	6,770.25	9,986.46	9,790.06	50.848	SF
EL DORADO 4N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,529.13	3,847.76	3,811.98	107.535	CC, ES
EL DORADO 4N - ORIGINAL WELLBORE - PROPOSAL	13,100.00	6,800.00	9,912.80	9,728.75	53.860	SF
EL DORADO 5N - ORIGINAL WELLBORE - PROPOSAL	6,400.00	6,486.76	4,105.28	4,072.86	126.645	CC
EL DORADO 5N - ORIGINAL WELLBORE - PROPOSAL	6,450.00	6,500.00	4,105.71	4,071.44	119.822	ES
EL DORADO 5N - ORIGINAL WELLBORE - PROPOSAL	12,900.00	6,720.83	9,996.58	9,822.26	57.344	SF
EL DORADO 6N - ORIGINAL WELLBORE - PROPOSAL	6,430.40	6,512.49	4,426.26	4,396.35	147.985	CC
EL DORADO 6N - ORIGINAL WELLBORE - PROPOSAL	6,450.00	6,532.08	4,426.51	4,390.89	124.271	ES
EL DORADO 6N - ORIGINAL WELLBORE - PROPOSAL	12,500.00	6,800.00	9,937.54	9,772.32	60.147	SF
EL DORADO 7N - ORIGINAL WELLBORE - PROPOSAL	6,400.00	6,487.11	4,675.46	4,646.20	159.783	CC
EL DORADO 7N - ORIGINAL WELLBORE - PROPOSAL	6,450.00	6,500.00	4,675.88	4,639.16	127.342	ES
EL DORADO 7N - ORIGINAL WELLBORE - PROPOSAL	12,200.00	6,720.83	9,908.22	9,752.50	63.630	SF
EL DORADO 8N - ORIGINAL WELLBORE - PROPOSAL	256.14	280.14	4,772.76	4,771.83	5,137.984	CC
EL DORADO 8N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	4,773.11	4,771.59	3,141.201	ES
EL DORADO 8N - ORIGINAL WELLBORE - PROPOSAL	11,900.00	6,800.00	9,952.61	9,800.17	65.287	SF
NW NE SEC. 3 T3N R66W 6th P.M. (TRIPPETT)						
TRIPPETT 1N - ORIGINAL WELLBORE - PROPOSAL #	6,430.40	6,482.21	1,578.02	1,540.00	41.503	ES
TRIPPETT 1N - ORIGINAL WELLBORE - PROPOSAL #	6,521.80	6,557.21	1,577.63	1,547.50	52.366	CC
TRIPPETT 1N - ORIGINAL WELLBORE - PROPOSAL #	11,500.00	6,750.00	4,823.51	4,685.53	34.956	SF
TRIPPETT 2N - ORIGINAL WELLBORE - PROPOSAL #	6,410.40	6,470.63	1,580.67	1,543.16	42.142	CC, ES
TRIPPETT 2N - ORIGINAL WELLBORE - PROPOSAL #	15,175.48	6,700.00	8,668.08	8,432.47	36.791	SF
TRIPPETT 3N - ORIGINAL WELLBORE - PROPOSAL #	6,430.40	6,516.26	1,652.75	1,617.37	46.719	CC
TRIPPETT 3N - ORIGINAL WELLBORE - PROPOSAL #	6,450.00	6,535.86	1,652.83	1,615.72	44.533	ES
TRIPPETT 3N - ORIGINAL WELLBORE - PROPOSAL #	15,175.48	6,800.00	9,003.21	8,761.77	37.290	SF
TRIPPETT 4N - ORIGINAL WELLBORE - PROPOSAL #	6,410.40	6,537.81	1,763.85	1,730.86	53.479	CC
TRIPPETT 4N - ORIGINAL WELLBORE - PROPOSAL #	6,450.00	6,550.00	1,764.21	1,721.87	41.669	ES
TRIPPETT 4N - ORIGINAL WELLBORE - PROPOSAL #	15,175.48	6,768.49	9,292.83	9,051.01	38.429	SF
TRIPPETT 5N - ORIGINAL WELLBORE - PROPOSAL #	6,430.40	6,607.37	1,915.66	1,883.88	60.268	CC
TRIPPETT 5N - ORIGINAL WELLBORE - PROPOSAL #	6,450.00	6,626.97	1,915.82	1,868.55	40.533	ES
TRIPPETT 5N - ORIGINAL WELLBORE - PROPOSAL #	15,175.48	6,881.94	9,578.47	9,329.93	38.539	SF
TRIPPETT 6N - ORIGINAL WELLBORE - PROPOSAL #	5,181.21	5,398.19	2,082.15	2,055.27	77.458	CC
TRIPPETT 6N - ORIGINAL WELLBORE - PROPOSAL #	6,450.00	6,663.02	2,095.33	2,043.90	40.736	ES
TRIPPETT 6N - ORIGINAL WELLBORE - PROPOSAL #	15,100.00	6,900.00	9,794.05	9,545.15	39.348	SF
TRIPPETT 7N - ORIGINAL WELLBORE - PROPOSAL #	3,959.84	4,165.79	2,244.67	2,223.48	105.930	CC
TRIPPETT 7N - ORIGINAL WELLBORE - PROPOSAL #	4,000.00	4,202.47	2,244.73	2,223.35	104.954	ES
TRIPPETT 7N - ORIGINAL WELLBORE - PROPOSAL #	12,800.00	7,050.00	7,938.11	7,742.54	40.589	SF
TRIPPETT 8N - ORIGINAL WELLBORE - PROPOSAL #	536.05	609.17	2,309.73	2,307.42	997.538	CC
TRIPPETT 8N - ORIGINAL WELLBORE - PROPOSAL #	3,300.00	3,495.33	2,324.59	2,306.38	127.653	ES
TRIPPETT 8N - ORIGINAL WELLBORE - PROPOSAL #	12,100.00	7,100.00	7,562.63	7,381.96	41.859	SF
TRIPPETT 9N - ORIGINAL WELLBORE - PROPOSAL #	15,175.48	15,350.49	2,208.64	1,744.67	4.760	CC, ES, SF

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**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
NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)						
ABDN VERT HSR-BOB 16-35 - Wellbore #1 - Wellbore #	6,405.60	6,355.36	6,693.60	6,677.74	422.114	CC
ABDN VERT HSR-BOB 16-35 - Wellbore #1 - Wellbore #	6,450.00	6,400.00	6,693.99	6,677.56	407.464	ES
ABDN VERT HSR-BOB 16-35 - Wellbore #1 - Wellbore #	10,100.00	7,135.18	9,931.71	9,840.99	109.475	SF
EXIST HZ LORENZ 23-35 - Wellbore #1 - Wellbore #1	6,437.27	6,424.67	4,878.35	4,861.25	285.283	CC, ES
EXIST HZ LORENZ 23-35 - Wellbore #1 - Wellbore #1	11,900.00	7,131.73	9,914.47	9,773.98	70.569	SF
EXIST VERT CLIFFORD L3-29 - Wellbore #1 - Wellbore	8,611.39	7,090.28	2,226.47	2,176.30	44.374	CC
EXIST VERT CLIFFORD L3-29 - Wellbore #1 - Wellbore	8,700.00	7,090.20	2,228.24	2,175.71	42.423	ES
EXIST VERT CLIFFORD L3-29 - Wellbore #1 - Wellbore	11,400.00	7,087.98	3,568.38	3,441.62	28.151	SF
EXIST VERT HSR-BIG GEORGE #14-35 - Wellbore #1 -	6,430.40	6,388.80	4,059.24	3,917.43	28.624	CC
EXIST VERT HSR-BIG GEORGE #14-35 - Wellbore #1 -	6,450.00	6,408.40	4,059.50	3,916.50	28.386	ES
EXIST VERT HSR-BIG GEORGE #14-35 - Wellbore #1 -	6,500.00	6,458.29	4,062.52	3,919.00	28.306	SF
STEAMBOAT 10N - ORIGINAL WELLBORE - PROPOSA	7,185.75	7,242.83	116.04	80.63	3.277	CC, ES, SF
STEAMBOAT 11N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	134.97	133.45	88.702	CC
STEAMBOAT 11N - ORIGINAL WELLBORE - PROPOSA	7,276.49	7,222.34	158.68	122.48	4.383	ES, SF
STEAMBOAT 12N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	149.98	148.46	98.566	CC, ES
STEAMBOAT 12N - ORIGINAL WELLBORE - PROPOSA	7,300.00	7,167.57	540.92	504.66	14.918	SF
STEAMBOAT 13N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	164.96	163.44	108.406	CC, ES
STEAMBOAT 13N - ORIGINAL WELLBORE - PROPOSA	7,900.00	6,950.00	978.39	931.95	21.069	SF
STEAMBOAT 14N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	179.97	178.44	118.269	CC, ES
STEAMBOAT 14N - ORIGINAL WELLBORE - PROPOSA	8,500.00	6,800.00	1,569.56	1,509.07	25.946	SF
STEAMBOAT 15N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	194.98	193.45	128.133	CC, ES
STEAMBOAT 15N - ORIGINAL WELLBORE - PROPOSA	8,900.00	6,822.30	2,028.48	1,955.40	27.757	SF
STEAMBOAT 16N - ORIGINAL WELLBORE - PROPOSA	300.00	300.00	209.95	208.88	195.823	CC, ES
STEAMBOAT 16N - ORIGINAL WELLBORE - PROPOSA	10,000.00	6,750.00	3,078.65	2,976.24	30.061	SF
STEAMBOAT 1N - ORIGINAL WELLBORE - PROPOSA	300.00	300.00	14.98	13.91	13.973	CC
STEAMBOAT 1N - ORIGINAL WELLBORE - PROPOSA	14,800.00	14,901.13	324.62	-96.37	0.771	Level 1, ES, SF
STEAMBOAT 3N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	15.01	13.49	9.864	CC
STEAMBOAT 3N - ORIGINAL WELLBORE - PROPOSA	15,175.48	15,252.21	333.42	-110.80	0.751	Level 1, ES, SF
STEAMBOAT 4N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	30.02	28.50	19.728	CC, ES
STEAMBOAT 4N - ORIGINAL WELLBORE - PROPOSA	15,175.48	15,176.86	609.55	148.13	1.321	Level 3, SF
STEAMBOAT 5N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	44.99	43.47	29.567	CC, ES
STEAMBOAT 5N - ORIGINAL WELLBORE - PROPOSA	15,175.48	15,303.23	944.25	485.07	2.056	SF
STEAMBOAT 6N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	60.00	58.48	39.431	CC, ES
STEAMBOAT 6N - ORIGINAL WELLBORE - PROPOSA	15,175.48	15,237.75	1,239.43	778.13	2.687	SF
STEAMBOAT 7N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	75.01	73.49	49.295	CC, ES
STEAMBOAT 7N - ORIGINAL WELLBORE - PROPOSA	15,175.48	15,387.37	1,572.25	1,111.70	3.414	SF
STEAMBOAT 8N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	89.98	88.46	59.135	CC, ES
STEAMBOAT 8N - ORIGINAL WELLBORE - PROPOSA	15,175.48	15,373.70	1,859.31	1,397.77	4.028	SF
STEAMBOAT 9N - ORIGINAL WELLBORE - PROPOSA	341.94	341.94	104.99	103.74	83.586	CC
STEAMBOAT 9N - ORIGINAL WELLBORE - PROPOSA	400.00	399.97	105.00	103.49	69.506	ES
STEAMBOAT 9N - ORIGINAL WELLBORE - PROPOSA	7,350.00	7,219.03	396.57	359.03	10.564	SF

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STEAMBOAT 2N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Reference Site:	NW SE SEC. 34 T4N R66W 6th P.M. (STEAMBOAT)	**MD Reference:**	KB 23' @ 4863.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STEAMBOAT 2N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**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
SE SE SEC.32 T4N R66W 6th P.M. (TARIN FEDERAL)						
EXIST VERT FLOYD #1 - Wellbore #1 - Wellbore #1	15,175.48	7,031.03	762.65	530.28	3.282	CC, ES, SF
EXIST VERT FLOYD #5 - Wellbore #1 - Wellbore #1	15,175.48	7,061.31	1,473.71	1,241.37	6.343	CC, ES, SF
EXIST VERT GLEN #44-32 - Wellbore #1 - Wellbore #1	15,175.48	7,050.88	1,336.43	1,103.84	5.746	CC, ES, SF
TARIN FEDERAL 32W-234 - JOB #2015-138-135 - FINA	15,175.48	7,005.00	492.50	289.55	2.427	CC, ES, SF
TARIN FEDERAL 32W-434 - JOB #2015-139-135 - FINA	15,175.48	7,042.56	217.58	109.49	2.013	CC, ES, SF
TARIN FEDERAL 32X-204 - JOB #2015-141-135 - FINAL	15,175.48	6,851.41	831.21	601.85	3.624	CC, ES, SF
TARIN FEDERAL 32X-314 - JOB #2015-140-135 - FINAL	15,175.48	6,946.74	443.65	242.42	2.205	CC, ES, SF
TARIN FEDERAL 32X-334 - JOB #2015-142-135 - FINAL	15,175.48	6,939.19	997.09	755.16	4.121	CC, ES, SF
TARIN FEDERAL 32Y-214 - JOB #2015-143-135 - FINAL	15,175.48	6,906.23	1,573.37	1,330.42	6.476	CC, ES, SF
TARIN FEDERAL 32Y-314 - JOB#2015-144-135 - FINAL	15,175.48	6,983.79	1,825.98	1,581.21	7.460	CC, ES, SF
TARIN FEDERAL 32Y-404 - JOB# 2015-145-135 - FINAL	15,175.48	7,041.38	1,978.54	1,732.64	8.046	CC, ES, SF
SW NE SEC. 5 T3N R66W 6th P.M. (NAVAJO)						
EXIST DD BRIGHT L #3-30D - Wellbore #1 - Wellbore #1	9,976.05	7,185.58	2,074.11	1,970.92	20.099	CC
EXIST DD BRIGHT L #3-30D - Wellbore #1 - Wellbore #1	10,000.00	7,185.52	2,074.25	1,970.39	19.973	ES
EXIST DD BRIGHT L #3-30D - Wellbore #1 - Wellbore #1	11,100.00	7,182.48	2,359.06	2,224.72	17.560	SF
EXIST DD WEBBER #29-4 - Wellbore #1 - Wellbore #1	13,863.98	7,200.59	2,078.48	1,862.81	9.638	CC
EXIST DD WEBBER #29-4 - Wellbore #1 - Wellbore #1	13,900.00	7,200.81	2,078.79	1,862.12	9.594	ES
EXIST DD WEBBER #29-4 - Wellbore #1 - Wellbore #1	14,400.00	7,203.72	2,146.48	1,915.80	9.305	SF

Offset Design NE NE SEC 2 T3N R66W 6th P.M. (CHEYENNE) - CHEYENNE 1N - ORIGINAL WELLBORE - PROPO

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	2,066.52	2,010.42	0.00	9.08	107.35	-1,933.37	6,189.89	6,784.86				
100.00	100.00	2,161.74	2,101.10	0.09	9.68	107.27	-1,917.26	6,165.69	6,755.45	6,747.78	7.67	880.639	
200.00	200.00	2,256.97	2,191.78	0.31	10.29	107.20	-1,901.14	6,141.49	6,726.06	6,717.71	8.35	805.344	
300.00	300.00	2,352.19	2,282.45	0.54	10.89	107.13	-1,885.03	6,117.29	6,696.67	6,687.64	9.03	741.248	
400.00	400.00	2,447.42	2,373.13	0.76	11.50	107.05	-1,868.91	6,093.09	6,667.30	6,657.58	9.72	686.037	
500.00	499.98	2,542.69	2,463.86	0.99	12.11	81.55	-1,852.79	6,068.88	6,637.68	6,629.63	8.04	825.216	
600.00	599.84	2,638.00	2,554.61	1.22	12.72	82.14	-1,836.66	6,044.66	6,607.57	6,599.04	8.53	774.213	
700.00	699.45	2,733.21	2,645.28	1.45	13.33	82.78	-1,820.55	6,020.47	6,577.01	6,567.98	9.03	728.043	
800.00	798.70	2,828.21	2,735.74	1.72	13.94	83.46	-1,804.48	5,996.32	6,546.03	6,536.48	9.55	685.219	
900.00	897.47	2,922.89	2,825.90	2.02	14.54	84.19	-1,788.45	5,972.26	6,514.68	6,504.58	10.10	644.744	
1,000.00	995.62	3,017.13	2,915.64	2.38	15.15	84.95	-1,772.51	5,948.31	6,483.01	6,472.32	10.70	606.045	
1,100.00	1,093.44	3,111.11	3,005.14	2.76	15.75	85.07	-1,756.60	5,924.43	6,451.21	6,439.84	11.37	567.312	
1,200.00	1,191.25	3,205.10	3,094.64	3.17	16.35	85.18	-1,740.70	5,900.55	6,419.43	6,407.37	12.06	532.242	
1,300.00	1,289.07	3,299.08	3,184.13	3.58	16.96	85.30	-1,724.79	5,876.66	6,387.68	6,374.92	12.76	500.574	
1,400.00	1,386.88	3,393.07	3,273.63	4.00	17.56	85.42	-1,708.89	5,852.78	6,355.95	6,342.48	13.47	471.959	
1,500.00	1,484.70	3,487.05	3,363.13	4.43	18.16	85.54	-1,692.99	5,828.90	6,324.24	6,310.07	14.18	446.048	
1,600.00	1,582.51	3,581.04	3,452.63	4.86	18.77	85.66	-1,677.08	5,805.01	6,292.57	6,277.67	14.89	422.518	
1,700.00	1,680.33	3,675.02	3,542.12	5.29	19.37	85.78	-1,661.18	5,781.13	6,260.91	6,245.30	15.61	401.080	
1,800.00	1,778.14	3,769.00	3,631.62	5.72	19.97	85.91	-1,645.27	5,757.25	6,229.29	6,212.96	16.33	381.484	
1,900.00	1,875.96	3,862.99	3,721.12	6.16	20.58	86.03	-1,629.37	5,733.36	6,197.69	6,180.64	17.05	363.513	
1,908.14	1,883.92	3,870.64	3,728.40	6.19	20.63	86.04	-1,628.07	5,731.42	6,195.12	6,178.01	17.11	362.116	
2,000.00	1,974.06	3,957.19	3,810.82	6.54	21.18	85.54	-1,613.43	5,709.43	6,166.22	6,148.45	17.77	346.969	
2,100.00	2,072.78	4,051.84	3,900.95	6.84	21.79	84.96	-1,597.41	5,685.37	6,135.02	6,116.59	18.43	332.891	
2,200.00	2,172.00	4,146.82	3,991.40	7.10	22.40	84.36	-1,581.34	5,661.24	6,104.12	6,085.05	19.07	320.170	

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