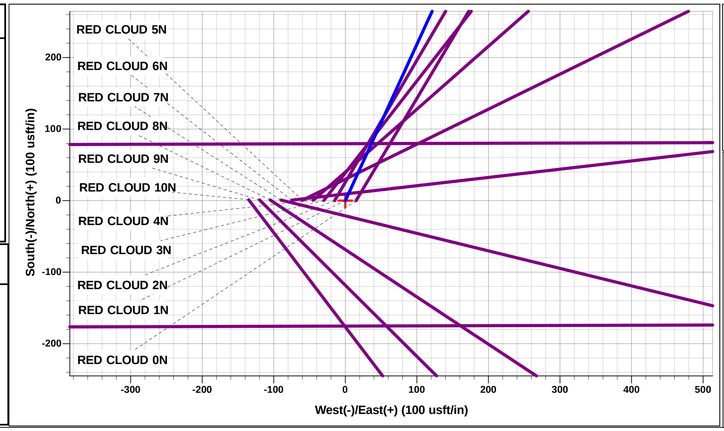
Project: WELD COUNTY, COLORADO (TRUE)
Site: SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)
Well: RED CLOUD 1N
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #2

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: 1530ft FNL & 644ft FEL of Sec 1
400.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1374.51	1394.36	19.89	24.61	155.33	71.14	-49.09	170.84	EOB TO 19.89° INC
4629.29	4855.54	19.89	24.61	1225.78	561.43	-387.40	1348.23	END OF TANGENT
5603.80	5849.90	0.00	0.00	1381.10	632.57	-436.49	1519.08	EOD TO VERTICAL
5803.80	6049.90	0.00	0.00	1381.10	632.57	-436.49	1519.08	KOP (8°/100ft BUR)
6520.00	7174.90	90.00	269.84	1379.10	-83.62	272.61	2235.27	EP: 150ft FNL & 737ft FEL of Sec 1
6520.00	16824.82	90.00	269.84	1352.35	-9733.50	9827.00	11885.19	BHL: 150ft FNL & 50ft FWL of Sec 2

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - RED CLOUD 1N	5803.80	1381.10	632.57	40.348273	-104.489576
EP - RED CLOUD 1N	6520.00	1379.10	-83.62	40.348267	-104.492146
BHL - RED CLOUD 1N	6520.00	1352.35	-9733.50	40.348188	-104.526766
SHL - RED CLOUD 1N	0.00	0.00	0.00	40.344482	-104.491846

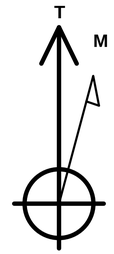


PROPOSED LOCAL COORDINATES:

SHL: 1530ft FNL & 644ft FEL of Sec 1

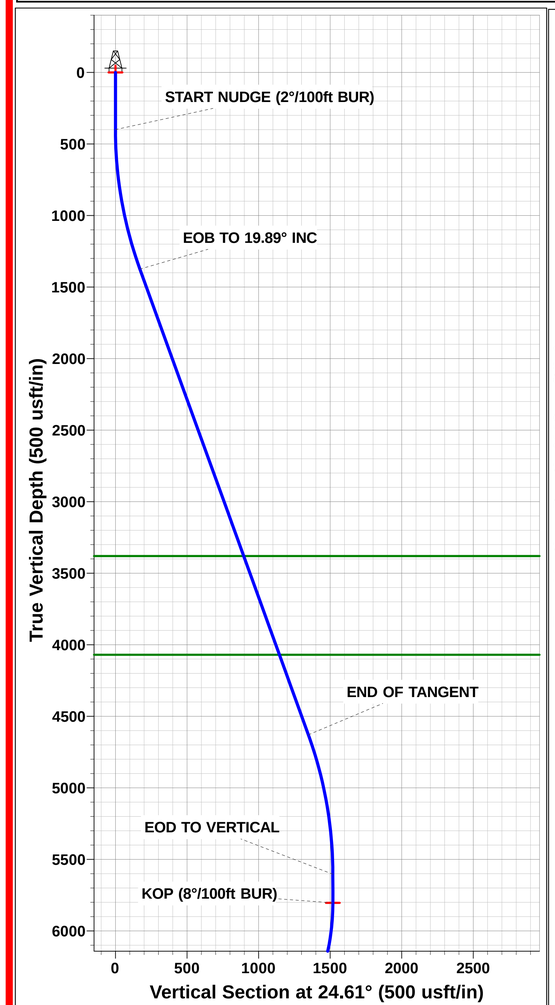
EP: 150ft FNL & 737ft FEL of Sec 1

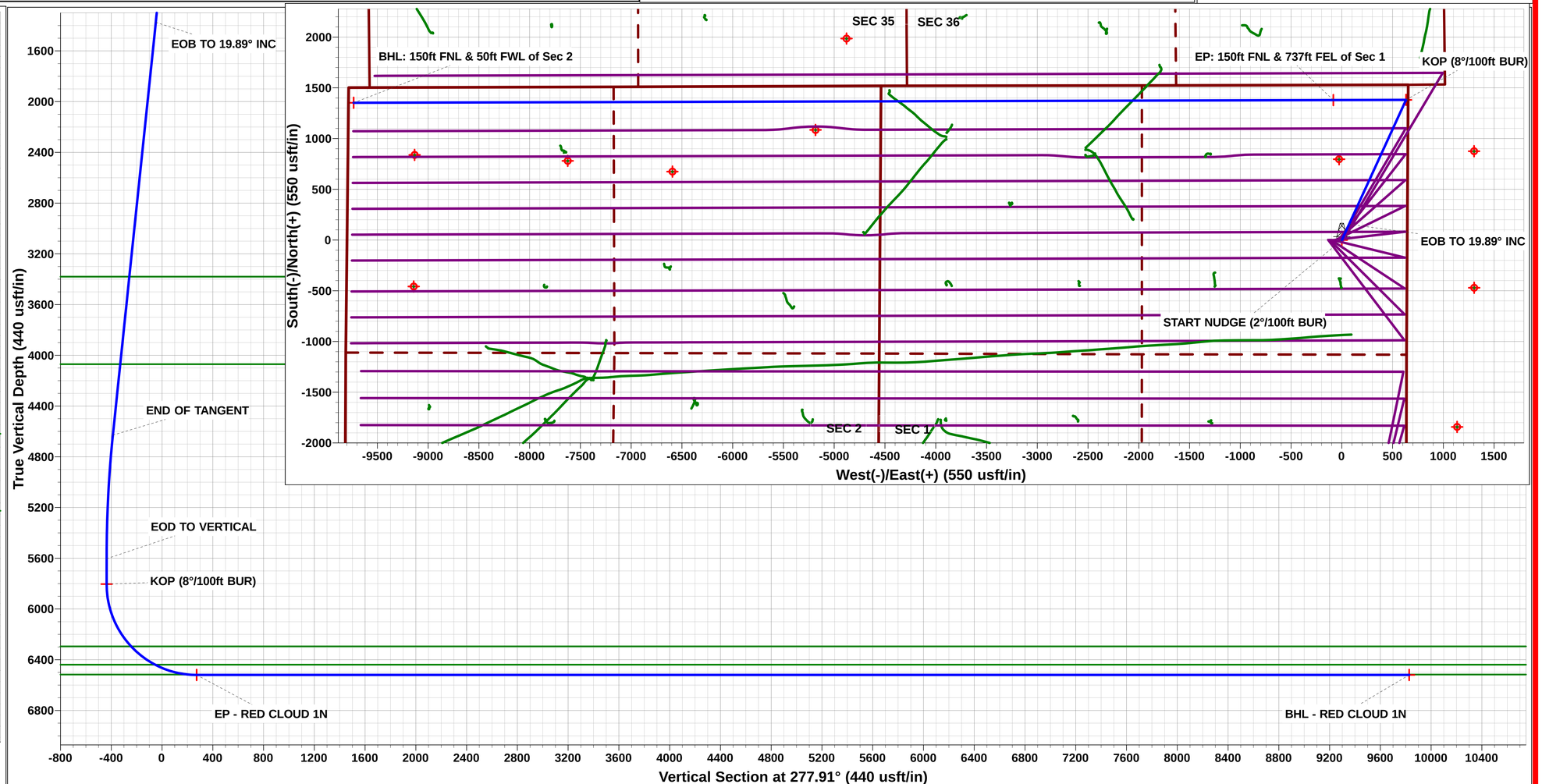
BHL: 150ft FNL & 50ft FWL of Sec 2



Azimuths to True North
Magnetic North: 7.94°

Magnetic Field
Strength: 52267.3snT
Dip Angle: 66.82°
Date: 26/07/2018
Model: IGRF2015





PDC ENERGY

WELD COUNTY, COLORADO (TRUE)
SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)
RED CLOUD 1N

ORIGINAL WELLBORE
PROPOSAL #2

Anticollision Report

13 August, 2018

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well RED CLOUD 1N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Reference Site:	SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)	**MD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	RED CLOUD 1N	**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 #2	**Offset TVD Reference:**	Offset Datum

Reference	PROPOSAL #2		
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** 13/08/2018

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	16,824.82	PROPOSAL #2 (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
SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)						
EXIST HZ SOONER STATE B #36-63HN - Wellbore #1 -	10,854.88	11,055.00	1,145.03	900.39	4.680	CC
EXIST HZ SOONER STATE B #36-63HN - Wellbore #1 -	10,900.00	11,055.00	1,145.92	900.02	4.660	ES
EXIST HZ SOONER STATE B #36-63HN - Wellbore #1 -	11,000.00	11,055.00	1,154.18	905.52	4.641	SF
EXIST VERT ROTHE #4-6 - Wellbore #1 - Design #1	4,825.90	4,584.41	819.75	700.66	6.883	CC
EXIST VERT ROTHE #4-6 - Wellbore #1 - Design #1	6,100.00	5,836.86	840.88	693.82	5.718	ES, SF
EXIST VERT ROTHE #5-6 - Wellbore #1 - Design #1	1,214.48	1,186.55	1,380.97	1,354.13	51.447	CC
EXIST VERT ROTHE #5-6 - Wellbore #1 - Design #1	1,500.00	1,456.85	1,384.02	1,350.09	40.788	ES
EXIST VERT ROTHE #5-6 - Wellbore #1 - Design #1	6,300.00	6,031.85	1,984.42	1,840.16	13.756	SF
RED CLOUD 0N - ORIGINAL WELLBORE - PROPOSAL	300.00	300.00	14.97	13.90	13.962	CC
RED CLOUD 0N - ORIGINAL WELLBORE - PROPOSAL	16,600.00	17,171.18	273.99	-269.86	0.504	Level 1, ES, SF
RED CLOUD 10N - ORIGINAL WELLBORE - PROPOSA	400.00	400.00	134.98	133.45	88.703	CC, ES
RED CLOUD 10N - ORIGINAL WELLBORE - PROPOSA	16,824.82	16,799.03	2,369.87	1,803.00	4.181	SF
RED CLOUD 2N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	15.00	13.48	9.855	CC
RED CLOUD 2N - ORIGINAL WELLBORE - PROPOSAL	16,824.82	16,806.90	285.28	-273.15	0.511	Level 1, ES, SF
RED CLOUD 3N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	29.99	28.47	19.712	CC
RED CLOUD 3N - ORIGINAL WELLBORE - PROPOSAL	16,824.82	16,680.67	535.27	-31.16	0.945	Level 1, ES, SF
RED CLOUD 4N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	44.99	43.47	29.568	CC, ES
RED CLOUD 4N - ORIGINAL WELLBORE - PROPOSAL	16,824.82	16,716.03	791.74	225.62	1.399	Level 3, SF
RED CLOUD 5N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	59.99	58.47	39.424	CC, ES
RED CLOUD 5N - ORIGINAL WELLBORE - PROPOSAL	16,824.82	16,624.83	1,044.95	477.94	1.843	SF
RED CLOUD 6N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	74.99	73.47	49.279	CC, ES
RED CLOUD 6N - ORIGINAL WELLBORE - PROPOSAL	16,824.82	16,692.39	1,300.85	733.91	2.295	SF
RED CLOUD 7N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	89.98	88.46	59.135	CC, ES
RED CLOUD 7N - ORIGINAL WELLBORE - PROPOSAL	16,824.82	16,611.87	1,554.86	987.83	2.742	SF
RED CLOUD 8N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	104.98	103.46	68.991	CC, ES
RED CLOUD 8N - ORIGINAL WELLBORE - PROPOSAL	16,824.82	16,694.31	1,860.12	1,293.43	3.282	SF
RED CLOUD 9N - ORIGINAL WELLBORE - PROPOSAL	400.00	400.00	119.98	118.46	78.847	CC, ES
RED CLOUD 9N - ORIGINAL WELLBORE - PROPOSAL	16,824.82	16,668.35	2,114.66	1,547.84	3.731	SF

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well RED CLOUD 1N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Reference Site:	SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)	**MD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	RED CLOUD 1N	**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 #2	**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 NE SEC. 36 T5N R64W 6th P.M. (PYRAMID)						
ABDN VERT ROTHE STATE B #36-15 - Wellbore #1 - W	7,884.49	6,431.62	696.33	657.26	17.822	CC
ABDN VERT ROTHE STATE B #36-15 - Wellbore #1 - W	7,900.00	6,431.00	696.51	657.07	17.660	ES
ABDN VERT ROTHE STATE B #36-15 - Wellbore #1 - W	8,200.00	6,419.61	764.38	717.51	16.308	SF
ABDN VERT ROTHE STATE B #36-16 - Wellbore #1 - W	6,804.46	6,363.02	964.23	943.01	45.455	CC, ES
ABDN VERT ROTHE STATE B #36-16 - Wellbore #1 - W	9,500.00	6,363.10	2,833.57	2,752.34	34.885	SF
EXIST DD ECKHARDT B #35-13 - Wellbore #1 - Wellbor	16,042.03	6,620.46	688.06	423.71	2.603	CC, ES
EXIST DD ECKHARDT B #35-13 - Wellbore #1 - Wellbor	16,100.00	6,620.04	690.50	424.51	2.596	SF
EXIST VERT BAKER STATE B #36-13 - Wellbore #1 - W	10,792.05	6,478.77	844.99	728.29	7.241	CC
EXIST VERT BAKER STATE B #36-13 - Wellbore #1 - W	10,800.00	6,478.34	845.03	728.11	7.227	ES
EXIST VERT BAKER STATE B #36-13 - Wellbore #1 - W	11,000.00	6,467.84	870.14	747.67	7.105	SF
EXIST VERT BAKER STATE B #36-14 - Wellbore #1 - W	9,403.57	6,473.28	704.95	626.38	8.971	CC, ES
EXIST VERT BAKER STATE B #36-14 - Wellbore #1 - W	9,600.00	6,470.18	731.80	647.87	8.719	SF
EXIST VERT HOSHIKO #2 - Wellbore #1 - Wellbore #1	13,361.92	6,552.72	852.58	664.15	4.525	CC
EXIST VERT HOSHIKO #2 - Wellbore #1 - Wellbore #1	13,400.00	6,552.83	853.43	663.94	4.504	ES
EXIST VERT HOSHIKO #2 - Wellbore #1 - Wellbore #1	13,500.00	6,553.12	863.68	671.40	4.492	SF
EXIST VERT HOSHIKO #35-16H4 - Wellbore #1 - Desig	11,968.45	6,530.02	619.63	343.25	2.242	CC
EXIST VERT HOSHIKO #35-16H4 - Wellbore #1 - Desig	12,000.00	6,530.02	620.44	343.17	2.238	ES, SF
EXIST VERT HOSHIKO B #35-14 - Wellbore #1 - Wellbo	14,872.60	6,531.78	767.15	536.62	3.328	CC
EXIST VERT HOSHIKO B #35-14 - Wellbore #1 - Wellbo	14,900.00	6,531.55	767.64	536.34	3.319	ES, SF

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well RED CLOUD 1N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Reference Site:	SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)	**MD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	RED CLOUD 1N	**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 #2	**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. 1 T4N R64W 6th P.M. (LINDSEY)						
ABDN DD MERCER C #11-30D - Wellbore #1 - Wellbore	16,824.82	6,497.96	5,198.59	4,912.83	18.192	CC, ES, SF
ABDN VERT BOOY HILLS FARM #2-12 - Wellbore #1 -	16,090.43	6,611.64	2,983.09	2,718.42	11.271	CC
ABDN VERT BOOY HILLS FARM #2-12 - Wellbore #1 -	16,200.00	6,613.17	2,985.10	2,717.36	11.149	ES
ABDN VERT BOOY HILLS FARM #2-12 - Wellbore #1 -	16,824.82	6,621.60	3,072.14	2,786.90	10.770	SF
ABDN VERT FHA #10-1 - Wellbore #1 - Wellbore #1	0.00	0.00	2,210.36			
ABDN VERT FHA #10-1 - Wellbore #1 - Wellbore #1	400.00	384.05	2,211.14	2,210.10	2,127.631	ES
ABDN VERT FHA #10-1 - Wellbore #1 - Wellbore #1	14,000.00	6,590.85	6,420.76	6,214.61	31.146	SF
ABDN VERT FHA #15-1 - Wellbore #1 - Wellbore #1	0.00	0.00	3,372.13			
ABDN VERT FHA #15-1 - Wellbore #1 - Wellbore #1	400.76	390.66	3,372.43	3,371.45	3,432.660	ES
ABDN VERT FHA #15-1 - Wellbore #1 - Wellbore #1	16,824.82	6,285.72	9,571.17	9,286.41	33.611	SF
ABDN VERT HOSHIKO C #2-8 - Wellbore #1 - Wellbore	12,592.13	6,560.87	1,892.00	1,724.97	11.327	CC
ABDN VERT HOSHIKO C #2-8 - Wellbore #1 - Wellbore	12,600.00	6,561.13	1,892.01	1,724.76	11.312	ES
ABDN VERT HOSHIKO C #2-8 - Wellbore #1 - Wellbore	13,200.00	6,582.24	1,987.16	1,803.16	10.800	SF
ABDN VERT SAND CREEK RANCH C #2-3X - Wellbore	14,788.04	6,527.10	430.57	202.18	1.885	CC
ABDN VERT SAND CREEK RANCH C #2-3X - Wellbore	14,800.00	6,527.30	430.74	202.01	1.883	ES, SF
ABDN VERT SAND CREEK RANCH CO #2-3 - Wellbore	14,717.62	6,526.02	577.93	224.72	1.636	CC, ES, SF
ABDN VERT SHAKLEE #1 - Wellbore #1 - Wellbore #1	16,322.86	6,517.03	4,418.66	4,147.47	16.293	CC
ABDN VERT SHAKLEE #1 - Wellbore #1 - Wellbore #1	16,400.00	6,517.21	4,419.33	4,145.98	16.167	ES
ABDN VERT SHAKLEE #1 - Wellbore #1 - Wellbore #1	16,824.82	6,518.18	4,447.08	4,161.80	15.589	SF
ABDN VERT SHAKLEE #2 - Wellbore #1 - Wellbore #1	14,987.61	6,515.42	4,390.27	4,156.46	18.777	CC
ABDN VERT SHAKLEE #2 - Wellbore #1 - Wellbore #1	15,100.00	6,518.67	4,391.71	4,154.75	18.534	ES
ABDN VERT SHAKLEE #2 - Wellbore #1 - Wellbore #1	16,824.82	6,571.69	4,758.80	4,473.45	16.677	SF
ABDN VERT SHAKLEE #3 - Wellbore #1 - Wellbore #1	14,949.81	6,550.79	3,121.24	2,888.51	13.412	CC
ABDN VERT SHAKLEE #3 - Wellbore #1 - Wellbore #1	15,000.00	6,550.43	3,121.64	2,887.51	13.333	ES
ABDN VERT SHAKLEE #3 - Wellbore #1 - Wellbore #1	16,100.00	6,543.49	3,326.41	3,061.45	12.554	SF
EXIST DD HOFFMAN C #2-20D - Wellbore #1 - Wellbore	15,525.11	6,680.70	2,407.72	2,138.20	8.933	CC
EXIST DD HOFFMAN C #2-20D - Wellbore #1 - Wellbore	15,600.00	6,681.85	2,408.88	2,137.27	8.869	ES
EXIST DD HOFFMAN C #2-20D - Wellbore #1 - Wellbore	16,100.00	6,689.36	2,475.39	2,189.74	8.666	SF
EXIST DD HOFFMAN C #2-25D - Wellbore #1 - Wellbore	15,596.13	6,806.02	3,815.18	3,541.20	13.925	CC
EXIST DD HOFFMAN C #2-25D - Wellbore #1 - Wellbore	15,700.00	6,806.09	3,816.59	3,539.71	13.784	ES
EXIST DD HOFFMAN C #2-25D - Wellbore #1 - Wellbore	16,824.82	6,806.75	4,008.15	3,699.72	12.995	SF
EXIST DD HOFFMAN C #2-33D - Wellbore #1 - Wellbore	16,824.82	7,266.69	3,821.42	3,484.38	11.338	CC, ES, SF
EXIST DD HOFFMAN C 2-21D - Wellbore #1 - Wellbore	14,344.68	6,544.57	2,346.30	2,118.97	10.321	CC
EXIST DD HOFFMAN C 2-21D - Wellbore #1 - Wellbore	14,400.00	6,544.97	2,346.95	2,118.07	10.254	ES
EXIST DD HOFFMAN C 2-21D - Wellbore #1 - Wellbore	15,000.00	6,549.00	2,436.09	2,190.38	9.914	SF
EXIST DD MARLEY C #1-18D - Wellbore #1 - Wellbore #	9,147.41	6,622.60	1,170.99	1,085.11	13.635	CC
EXIST DD MARLEY C #1-18D - Wellbore #1 - Wellbore #	9,200.00	6,623.00	1,172.17	1,084.87	13.426	ES
EXIST DD MARLEY C #1-18D - Wellbore #1 - Wellbore #	9,600.00	6,626.11	1,255.41	1,157.21	12.785	SF
EXIST DD MARLEY C #1-24D - Wellbore #1 - Wellbore #	8,961.78	7,043.69	3,882.15	3,772.91	35.536	CC
EXIST DD MARLEY C #1-24D - Wellbore #1 - Wellbore #	9,100.00	7,042.37	3,884.61	3,771.65	34.389	ES
EXIST DD MARLEY C #1-24D - Wellbore #1 - Wellbore #	12,700.00	6,997.57	5,389.27	5,176.82	25.366	SF
EXIST DD MARLEY C #1-28D - Wellbore #1 - Wellbore #	8,882.54	6,644.61	335.77	253.67	4.090	CC
EXIST DD MARLEY C #1-28D - Wellbore #1 - Wellbore #	8,900.00	6,644.83	336.22	253.66	4.072	ES, SF
EXIST DD MARLEY C #1-30D - Wellbore #1 - Wellbore #	11,546.25	6,586.60	107.65	-45.10	0.705	Level 1, CC, ES, SF
EXIST DD MARLEY C #1-31D - Wellbore #1 - Wellbore #	11,805.56	6,741.46	1,289.48	1,125.47	7.862	CC, ES
EXIST DD MARLEY C #1-31D - Wellbore #1 - Wellbore #	12,100.00	6,745.05	1,322.66	1,150.45	7.680	SF
EXIST DD MARLEY C #1-33D - Wellbore #1 - Wellbore #	11,511.75	6,645.48	3,781.10	3,630.01	25.026	CC
EXIST DD MARLEY C #1-33D - Wellbore #1 - Wellbore #	11,600.00	6,645.32	3,782.13	3,628.59	24.632	ES
EXIST DD MARLEY C #1-33D - Wellbore #1 - Wellbore #	14,200.00	6,641.26	4,639.35	4,413.18	20.513	SF
EXIST DD PANTHER C #11-27D - Wellbore #1 - Wellbor	13,008.64	6,661.72	5,079.10	4,886.06	26.311	CC
EXIST DD PANTHER C #11-27D - Wellbore #1 - Wellbor	13,200.00	6,660.88	5,082.71	4,884.32	25.620	ES
EXIST DD PANTHER C #11-27D - Wellbore #1 - Wellbor	16,800.00	6,646.04	6,338.12	6,038.90	21.182	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 RED CLOUD 1N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Reference Site:	SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)	**MD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	RED CLOUD 1N	**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 #2	**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. 1 T4N R64W 6th P.M. (LINDSEY)						
EXIST DD PANTHER C #11-28D - Wellbore #1 - Wellbor	14,366.35	7,048.16	5,057.62	4,802.71	19.841	CC
EXIST DD PANTHER C #11-28D - Wellbore #1 - Wellbor	14,500.00	7,046.72	5,059.39	4,800.73	19.560	ES
EXIST DD PANTHER C #11-28D - Wellbore #1 - Wellbor	16,824.82	7,022.75	5,623.44	5,299.64	17.367	SF
EXIST DD PANTHER C #2-23D - Wellbore #1 - Wellbore	12,981.84	6,673.95	3,788.03	3,595.55	19.680	CC
EXIST DD PANTHER C #2-23D - Wellbore #1 - Wellbore	13,100.00	6,672.69	3,789.87	3,594.09	19.358	ES
EXIST DD PANTHER C #2-23D - Wellbore #1 - Wellbore	15,100.00	6,651.11	4,339.98	4,088.26	17.242	SF
EXIST HZ BOBCAT C #12-69HN - Wellbore #1 - Wellbor	7,537.51	11,078.00	4,985.43	4,822.02	30.509	CC
EXIST HZ BOBCAT C #12-69HN - Wellbore #1 - Wellbor	7,600.00	11,078.00	4,985.74	4,821.01	30.266	ES
EXIST HZ BOBCAT C #12-69HN - Wellbore #1 - Wellbor	16,600.00	5,949.00	6,602.25	6,315.17	22.998	SF
EXIST HZ HOFFMAN C #02-65HN - Wellbore #1 - Wellb	6,999.22	13,691.00	2,311.76	2,084.54	10.174	CC
EXIST HZ HOFFMAN C #02-65HN - Wellbore #1 - Wellb	7,000.00	13,691.00	2,311.76	2,084.53	10.174	ES
EXIST HZ HOFFMAN C #02-65HN - Wellbore #1 - Wellb	7,100.00	13,682.80	2,313.91	2,085.80	10.144	SF
EXIST HZ TOBY C #12-79HN - Wellbore #1 - Wellbore #	11,588.56	6,030.95	5,172.61	5,016.87	33.214	CC
EXIST HZ TOBY C #12-79HN - Wellbore #1 - Wellbore #	11,700.00	6,030.84	5,173.81	5,015.00	32.577	ES
EXIST HZ TOBY C #12-79HN - Wellbore #1 - Wellbore #	16,400.00	6,009.00	7,064.64	6,775.49	24.433	SF
EXIST VERT AMIGO #1 - Wellbore #1 - Wellbore #1	10,938.20	6,350.00	1,827.63	1,707.53	15.217	CC
EXIST VERT AMIGO #1 - Wellbore #1 - Wellbore #1	11,000.00	6,350.00	1,828.67	1,706.86	15.012	ES
EXIST VERT AMIGO #1 - Wellbore #1 - Wellbore #1	11,700.00	6,350.00	1,980.04	1,838.83	14.021	SF
EXIST VERT AMIGO #2 - Wellbore #1 - Wellbore #1	9,688.06	6,526.56	1,779.58	1,692.96	20.543	CC
EXIST VERT AMIGO #2 - Wellbore #1 - Wellbore #1	9,700.00	6,526.74	1,779.62	1,692.67	20.466	ES
EXIST VERT AMIGO #2 - Wellbore #1 - Wellbore #1	10,700.00	6,542.66	2,047.12	1,932.60	17.875	SF
EXIST VERT AMIGO FARMS #1-12 - Wellbore #1 - Well	10,999.76	6,527.87	3,126.68	3,004.32	25.553	CC
EXIST VERT AMIGO FARMS #1-12 - Wellbore #1 - Well	11,100.00	6,527.80	3,128.29	3,003.14	24.998	ES
EXIST VERT AMIGO FARMS #1-12 - Wellbore #1 - Well	13,200.00	6,526.37	3,823.25	3,639.56	20.813	SF
EXIST VERT FEIT #1 - Wellbore #1 - Wellbore #1	9,525.54	6,507.63	521.39	439.60	6.374	CC, ES
EXIST VERT FEIT #1 - Wellbore #1 - Wellbore #1	9,600.00	6,505.33	526.68	442.86	6.283	SF
EXIST VERT FEIT #1-4 - Wellbore #1 - Wellbore #1	10,931.76	6,350.00	275.32	171.01	2.640	CC, ES, SF
EXIST VERT FHA #2-1 - Wellbore #1 - Wellbore #1	14,952.93	6,551.43	1,801.58	1,568.74	7.737	CC
EXIST VERT FHA #2-1 - Wellbore #1 - Wellbore #1	15,000.00	6,551.45	1,802.20	1,568.04	7.697	ES
EXIST VERT FHA #2-1 - Wellbore #1 - Wellbore #1	15,300.00	6,551.55	1,834.71	1,592.15	7.564	SF
EXIST VERT FOOS #1-16I4 - Wellbore #1 - Wellbore #1	0.00	0.00	2,783.39			
EXIST VERT FOOS #1-16I4 - Wellbore #1 - Wellbore #1	300.00	275.96	2,783.94	2,783.21	3,798.249	ES
EXIST VERT FOOS #1-16I4 - Wellbore #1 - Wellbore #1	16,600.00	6,900.00	9,951.12	9,672.83	35.757	SF
EXIST VERT FUEGO C #1-19 - Wellbore #1 - Wellbore #	10,349.38	6,527.48	1,011.61	907.09	9.679	CC
EXIST VERT FUEGO C #1-19 - Wellbore #1 - Wellbore #	10,400.00	6,528.36	1,012.87	906.96	9.563	ES
EXIST VERT FUEGO C #1-19 - Wellbore #1 - Wellbore #	10,600.00	6,531.73	1,042.18	930.73	9.351	SF
EXIST VERT HAPPY AMIGO C #1-25 - Wellbore #1 - W	10,358.15	6,557.21	4,086.70	3,981.76	38.942	CC
EXIST VERT HAPPY AMIGO C #1-25 - Wellbore #1 - W	10,500.00	6,555.85	4,089.16	3,980.30	37.563	ES
EXIST VERT HAPPY AMIGO C #1-25 - Wellbore #1 - W	14,800.00	6,520.56	6,035.73	5,806.92	26.379	SF
EXIST VERT HAPPY TALK #1 - Wellbore #1 - Wellbore	9,747.26	6,500.00	3,104.35	3,016.16	35.202	CC
EXIST VERT HAPPY TALK #1 - Wellbore #1 - Wellbore	9,800.00	6,500.00	3,104.80	3,015.17	34.639	ES
EXIST VERT HAPPY TALK #1 - Wellbore #1 - Wellbore	12,800.00	6,482.36	4,353.85	4,180.95	25.181	SF
EXIST VERT HAPPY TALK #2 - Wellbore #1 - Wellbore	358.17	346.19	3,973.65	3,972.72	4,254.363	CC
EXIST VERT HAPPY TALK #2 - Wellbore #1 - Wellbore	400.00	382.28	3,973.68	3,972.62	3,760.071	ES
EXIST VERT HAPPY TALK #2 - Wellbore #1 - Wellbore	16,000.00	6,551.75	7,680.37	7,418.23	29.299	SF
EXIST VERT HOFFMAN C #11-29 - Wellbore #1 - Wellb	15,673.29	15,673.29	4,839.16	4,583.95	18.962	CC
EXIST VERT HOFFMAN C #11-29 - Wellbore #1 - Wellb	15,800.00	15,800.00	4,840.81	4,582.04	18.707	ES
EXIST VERT HOFFMAN C #11-29 - Wellbore #1 - Wellb	16,824.82	6,700.00	4,974.19	4,688.68	17.422	SF
EXIST VERT HOSHIKO #1-2 - Wellbore #1 - Design #1	12,275.79	6,518.02	280.39	-4.45	0.984	Level 1, CC, ES, SF
EXIST VERT HOSHIKO #2-2 - Wellbore #1 - Design #1	13,686.60	6,542.02	686.73	362.22	2.116	CC
EXIST VERT HOSHIKO #2-2 - Wellbore #1 - Design #1	13,700.00	6,542.02	686.86	361.97	2.114	ES, SF
EXIST VERT HOSHIKO #7-2 - Wellbore #1 - Wellbore #1	13,771.73	6,548.37	1,596.73	1,396.92	7.992	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 RED CLOUD 1N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Reference Site:	SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)	**MD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	RED CLOUD 1N	**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 #2	**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. 1 T4N R64W 6th P.M. (LINDSEY)						
EXIST VERT HOSHIKO #7-2 - Wellbore #1 - Wellbore #1	13,800.00	6,548.49	1,596.98	1,396.38	7.961	ES
EXIST VERT HOSHIKO #7-2 - Wellbore #1 - Wellbore #1	14,100.00	6,549.78	1,630.12	1,421.13	7.800	SF
EXIST VERT MCDERMED #1-1 - Wellbore #1 - Design #	2,986.56	2,857.76	356.40	286.50	5.099	CC
EXIST VERT MCDERMED #1-1 - Wellbore #1 - Design #	3,100.00	2,964.44	358.48	285.77	4.930	ES
EXIST VERT MCDERMED #1-1 - Wellbore #1 - Design #	7,150.00	6,505.57	583.85	433.18	3.875	SF
EXIST VERT MCDERMED #2-1 - Wellbore #1 - Wellbore	8,384.87	6,507.31	526.42	474.98	10.233	CC
EXIST VERT MCDERMED #2-1 - Wellbore #1 - Wellbore	8,400.00	6,507.32	526.64	474.81	10.161	ES
EXIST VERT MCDERMED #2-1 - Wellbore #1 - Wellbore	8,500.00	6,507.40	538.86	484.43	9.899	SF
EXIST VERT MCFERREN #4-2 - Wellbore #1 - Design #	16,225.43	4,629.00	1,963.73	1,841.69	16.090	CC, ES
EXIST VERT MCFERREN #4-2 - Wellbore #1 - Design #	16,500.00	4,629.00	1,982.84	1,858.00	15.884	SF
EXIST VERT MCFERREN #5-2 - Wellbore #1 - Design #	16,237.83	6,546.01	1,811.88	1,530.39	6.437	CC
EXIST VERT MCFERREN #5-2 - Wellbore #1 - Design #	16,300.00	6,546.00	1,812.95	1,529.72	6.401	ES
EXIST VERT MCFERREN #5-2 - Wellbore #1 - Design #	16,600.00	6,546.00	1,847.73	1,556.08	6.335	SF
EXIST VERT MINOR #1 - Wellbore #1 - Wellbore #1	11,031.52	6,400.00	4,558.86	4,435.76	37.034	CC
EXIST VERT MINOR #1 - Wellbore #1 - Wellbore #1	11,200.00	6,400.00	4,561.97	4,434.19	35.702	ES
EXIST VERT MINOR #1 - Wellbore #1 - Wellbore #1	15,800.00	6,400.00	6,597.13	6,340.79	25.736	SF
EXIST VERT REIN #1 - Wellbore #1 - Wellbore #1	448.94	431.94	1,332.09	1,330.83	1,060.005	CC, ES
EXIST VERT REIN #1 - Wellbore #1 - Wellbore #1	9,900.00	6,480.03	2,301.96	2,209.37	24.861	SF
EXIST VERT REIN #1-8 - Wellbore #1 - Wellbore #1	405.63	383.47	469.55	468.52	453.895	CC, ES
EXIST VERT REIN #1-8 - Wellbore #1 - Wellbore #1	13,700.00	6,400.00	6,822.19	6,624.84	34.568	SF
EXIST VERT ROTHE #1 - Wellbore #1 - Wellbore #1	12,414.32	6,521.94	3,037.81	2,876.01	18.775	CC
EXIST VERT ROTHE #1 - Wellbore #1 - Wellbore #1	12,500.00	6,523.57	3,039.02	2,874.82	18.508	ES
EXIST VERT ROTHE #1 - Wellbore #1 - Wellbore #1	14,000.00	6,550.19	3,426.65	3,220.50	16.622	SF
EXIST VERT ROTHE #2 - Wellbore #1 - Wellbore #1	13,647.39	6,477.69	4,430.23	4,234.02	22.579	CC
EXIST VERT ROTHE #2 - Wellbore #1 - Wellbore #1	13,800.00	6,476.80	4,432.86	4,232.38	22.112	ES
EXIST VERT ROTHE #2 - Wellbore #1 - Wellbore #1	16,500.00	6,461.06	5,269.18	4,993.06	19.083	SF
EXIST VERT ROTHE #2-10 - Wellbore #1 - Wellbore #1	13,471.01	6,100.00	2,969.45	2,780.14	15.686	CC
EXIST VERT ROTHE #2-10 - Wellbore #1 - Wellbore #1	13,600.00	6,100.00	2,972.25	2,779.37	15.410	ES
EXIST VERT ROTHE #2-10 - Wellbore #1 - Wellbore #1	14,800.00	6,100.00	3,253.29	3,027.11	14.384	SF
EXIST VERT ROTHE #3 - Wellbore #1 - Wellbore #1	12,369.21	6,513.74	4,420.43	4,259.60	27.485	CC
EXIST VERT ROTHE #3 - Wellbore #1 - Wellbore #1	12,500.00	6,513.21	4,422.36	4,257.88	26.887	ES
EXIST VERT ROTHE #3 - Wellbore #1 - Wellbore #1	15,800.00	6,500.00	5,595.58	5,338.74	21.786	SF
EXIST VERT SPIKE STATE #CC6-12 - Wellbore #1 - De	400.00	377.00	2,163.62	2,157.69	364.800	CC
EXIST VERT SPIKE STATE #CC6-12 - Wellbore #1 - De	500.00	476.98	2,164.59	2,156.38	263.882	ES
EXIST VERT SPIKE STATE #CC6-12 - Wellbore #1 - De	8,200.00	6,497.01	3,923.21	3,750.01	22.650	SF
EXIST VERT SPIKE STATE #CC6-13 - Wellbore #1 - We	294.96	273.97	3,448.21	3,447.58	5,498.522	CC
EXIST VERT SPIKE STATE #CC6-13 - Wellbore #1 - We	400.00	374.93	3,448.31	3,447.44	3,933.733	ES
EXIST VERT SPIKE STATE #CC6-13 - Wellbore #1 - We	14,800.00	6,247.71	9,967.45	9,739.35	43.697	SF
LINDSEY 10N - ORIGINAL WELLBORE - PROPOSAL #	264.16	271.16	3,434.20	3,433.27	3,705.653	CC
LINDSEY 10N - ORIGINAL WELLBORE - PROPOSAL #	300.00	300.00	3,434.20	3,433.13	3,203.147	ES
LINDSEY 10N - ORIGINAL WELLBORE - PROPOSAL #	16,824.82	16,473.16	5,031.54	4,464.48	8.873	SF
LINDSEY 1C - ORIGINAL WELLBORE - PROPOSAL #1	4,236.24	5,266.49	2,602.92	2,568.95	76.615	CC
LINDSEY 1C - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	17,061.79	2,657.59	2,093.05	4.707	ES, SF
LINDSEY 2N - ORIGINAL WELLBORE - PROPOSAL #1	4,017.80	5,042.89	2,813.65	2,781.83	88.429	CC
LINDSEY 2N - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	16,856.65	2,911.13	2,344.69	5.139	ES, SF
LINDSEY 3N - ORIGINAL WELLBORE - PROPOSAL #1	3,979.66	5,000.00	3,081.75	3,051.31	101.245	CC
LINDSEY 3N - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	16,822.59	3,177.65	2,611.18	5.610	ES, SF
LINDSEY 4N - ORIGINAL WELLBORE - PROPOSAL #1	1,329.22	2,289.44	3,258.72	3,249.38	349.011	CC
LINDSEY 4N - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	16,701.63	3,439.18	2,872.64	6.070	ES, SF
LINDSEY 5N - ORIGINAL WELLBORE - PROPOSAL #1	1,124.26	1,884.52	3,341.32	3,334.21	469.952	CC
LINDSEY 5N - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	16,694.71	3,705.63	3,139.05	6.540	ES, SF
LINDSEY 6N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	408.00	3,376.00	3,374.46	2,192.711	CC, ES

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well RED CLOUD 1N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Reference Site:	SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD)	**MD Reference:**	KB-EST @ 4625.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	RED CLOUD 1N	**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 #2	**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. 1 T4N R64W 6th P.M. (LINDSEY)						
LINDSEY 6N - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	16,594.46	3,970.98	3,404.40	7.009	SF
LINDSEY 7N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	408.00	3,390.55	3,389.01	2,202.160	CC, ES
LINDSEY 7N - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	16,630.53	4,237.33	3,670.45	7.475	SF
LINDSEY 8N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	408.00	3,405.10	3,403.56	2,211.609	CC, ES
LINDSEY 8N - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	16,558.58	4,499.11	3,931.93	7.932	SF
LINDSEY 9N - ORIGINAL WELLBORE - PROPOSAL #1	364.16	371.16	3,419.65	3,418.27	2,484.708	CC
LINDSEY 9N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	406.49	3,419.65	3,418.11	2,227.083	ES
LINDSEY 9N - ORIGINAL WELLBORE - PROPOSAL #1	16,824.82	16,608.36	4,765.42	4,197.90	8.397	SF

Offset Design SE NE SEC. 1 T4N R64W 6th P.M. (RED CLOUD) - EXIST HZ SOONER STATE B #36-63HN - Wellbo

Survey Program: 572-MWD

Offset Site Error: 0.00 usft

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	23.39	1,795.47	776.51	1,956.19				
100.00	100.00	99.00	99.00	0.09	0.11	23.39	1,795.47	776.51	1,956.19	1,956.00	0.19	N/A	
200.00	200.00	199.00	199.00	0.31	0.22	23.39	1,795.47	776.51	1,956.19	1,955.67	0.53	3,716.585	
300.00	300.00	299.00	299.00	0.54	0.32	23.39	1,795.47	776.51	1,956.19	1,955.33	0.86	2,276.846	
400.00	400.00	399.00	399.00	0.76	0.43	23.39	1,795.47	776.51	1,956.19	1,955.00	1.19	1,641.109	
500.00	499.98	498.98	498.98	0.99	0.54	-1.22	1,795.47	776.51	1,954.45	1,952.92	1.53	1,278.234	
600.00	599.84	599.23	599.23	1.22	0.68	-1.23	1,795.49	776.47	1,949.21	1,947.31	1.90	1,023.490	
700.00	699.45	702.53	702.53	1.45	0.89	-1.26	1,795.72	775.70	1,940.41	1,938.06	2.35	824.651	
800.00	798.70	807.01	807.01	1.72	1.10	-1.30	1,795.72	774.79	1,927.88	1,925.09	2.80	689.275	
900.00	897.47	904.07	904.06	2.02	1.29	-1.34	1,795.59	773.91	1,911.77	1,908.53	3.23	591.185	
1,000.00	995.62	1,004.31	1,004.29	2.38	1.51	-1.39	1,795.56	772.90	1,892.28	1,888.60	3.68	513.811	
1,100.00	1,093.06	1,105.49	1,105.46	2.78	1.72	-1.45	1,795.36	771.80	1,869.20	1,865.06	4.14	451.899	
1,200.00	1,189.64	1,201.00	1,200.96	3.24	1.92	-1.52	1,795.16	770.55	1,842.64	1,838.06	4.58	401.997	
1,300.00	1,285.27	1,249.27	1,249.24	3.77	2.02	-1.57	1,795.55	770.17	1,813.93	1,808.99	4.94	367.122	
1,394.36	1,374.51	1,300.00	1,299.93	4.32	2.13	-1.60	1,797.22	770.82	1,786.28	1,780.99	5.28	338.159	
1,400.00	1,379.82	1,300.00	1,299.93	4.35	2.13	-1.60	1,797.22	770.82	1,784.59	1,779.29	5.30	336.778	
1,500.00	1,473.85	1,337.93	1,337.78	4.98	2.22	-1.61	1,799.43	771.82	1,756.47	1,750.81	5.66	310.408	
1,600.00	1,567.89	1,392.00	1,391.60	5.61	2.34	-1.64	1,804.25	773.64	1,731.31	1,725.26	6.05	286.384	
1,700.00	1,661.93	1,461.81	1,460.94	6.26	2.50	-1.70	1,812.06	775.84	1,708.20	1,701.71	6.49	263.337	
1,800.00	1,755.96	1,523.52	1,522.15	6.91	2.64	-1.77	1,819.76	777.32	1,686.26	1,679.34	6.92	243.672	
1,900.00	1,850.00	1,577.00	1,574.99	7.56	2.78	-1.84	1,827.80	779.12	1,666.90	1,659.56	7.34	226.973	
2,000.00	1,944.04	1,636.18	1,633.21	8.22	2.95	-1.93	1,838.10	781.57	1,650.03	1,642.24	7.78	211.956	
2,100.00	2,038.07	1,694.47	1,690.31	8.88	3.13	-2.02	1,849.53	784.32	1,635.48	1,627.25	8.23	198.748	
2,200.00	2,132.11	1,761.00	1,755.05	9.55	3.36	-2.13	1,864.35	788.07	1,623.58	1,614.88	8.70	186.666	
2,300.00	2,226.15	1,849.11	1,840.50	10.21	3.68	-2.29	1,885.24	793.01	1,613.15	1,603.93	9.23	174.814	
2,400.00	2,320.18	1,911.97	1,901.34	10.88	3.93	-2.42	1,900.71	796.41	1,603.64	1,593.94	9.71	165.231	
2,500.00	2,414.22	1,983.47	1,970.09	11.55	4.24	-2.57	1,919.83	800.88	1,596.40	1,586.19	10.21	156.337	
2,600.00	2,508.25	2,129.23	2,110.18	12.22	4.89	-2.92	1,959.26	808.82	1,589.65	1,578.73	10.91	145.666	
2,700.00	2,602.29	2,245.29	2,222.63	12.89	5.37	-3.19	1,987.46	814.23	1,579.57	1,568.04	11.53	137.003	
2,800.00	2,696.33	2,327.00	2,301.88	13.56	5.72	-3.38	2,006.96	817.99	1,569.22	1,557.15	12.06	130.064	
2,900.00	2,790.36	2,423.00	2,394.71	14.23	6.16	-3.58	2,030.80	823.45	1,560.10	1,547.45	12.65	123.370	
3,000.00	2,884.40	2,480.71	2,450.21	14.90	6.44	-3.69	2,046.08	827.46	1,552.76	1,539.63	13.13	118.253	
3,100.00	2,978.44	2,565.29	2,531.20	15.58	6.88	-3.89	2,069.88	832.83	1,547.10	1,533.40	13.70	112.949	
3,200.00	3,072.47	2,660.75	2,622.46	16.25	7.39	-4.15	2,097.40	838.04	1,541.85	1,527.55	14.30	107.786	

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