

PDC ENERGY

**WELD COUNTY, COLORADO
SE SE SEC. 18 T5N R64W 6th P.M.
GILLHAM 18X-102**

**ORIGINAL WELLBORE
PROPOSAL #2**

Anticollision Report

18 September, 2015



Anticollision Report



Company:	PDC ENERGY	Local Co-ordinate Reference:	Well GILLHAM 18X-102
Project:	WELD COUNTY, COLORADO	TVD Reference:	KB-EST @ 4638.0usft (Original Well Elev)
Reference Site:	SE SE SEC. 18 T5N R64W 6th P.M.	MD Reference:	KB-EST @ 4638.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	True
Reference Well:	GILLHAM 18X-102	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 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 98.4usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0 us	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	18/09/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	12,093.1	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
NW SW SEC. 17 T5N R64W 6th P.M.						
CECIL'S KERSEY FARM 17B-212 - ORIGINAL WELLBC	7,660.4	6,787.7	435.8	381.4	8.014	CC
CECIL'S KERSEY FARM 17B-212 - ORIGINAL WELLBC	12,093.6	11,239.4	455.3	184.0	1.678	ES, SF
CECIL'S KERSEY FARM 17B-214 - ORIGINAL WELLBC	8,418.5	6,746.7	523.3	451.7	7.304	CC
CECIL'S KERSEY FARM 17B-214 - ORIGINAL WELLBC	8,464.5	6,709.9	524.0	451.2	7.202	ES
CECIL'S KERSEY FARM 17B-214 - ORIGINAL WELLBC	8,600.0	6,616.6	535.9	460.3	7.091	SF
CECIL'S KERSEY FARM 17B-302 - ORIGINAL WELLBC	7,551.8	6,741.1	216.8	165.1	4.193	CC
CECIL'S KERSEY FARM 17B-302 - ORIGINAL WELLBC	12,093.6	11,329.9	276.4	49.6	1.218	Level 2, ES, SF
CECIL'S KERSEY FARM 17B-304 - ORIGINAL WELLBC	8,518.7	6,702.4	313.4	239.2	4.222	CC, ES
CECIL'S KERSEY FARM 17B-304 - ORIGINAL WELLBC	8,563.0	6,672.1	315.0	239.7	4.184	SF
CECIL'S KERSEY FARM 17K-204 - ORIGINAL WELLBC	8,412.4	6,791.5	1,298.5	1,226.7	18.083	CC
CECIL'S KERSEY FARM 17K-204 - ORIGINAL WELLBC	8,500.0	6,723.8	1,299.6	1,225.5	17.543	ES
CECIL'S KERSEY FARM 17K-204 - ORIGINAL WELLBC	9,200.0	6,424.1	1,435.8	1,343.8	15.610	SF
CECIL'S KERSEY FARM 17K-232 - ORIGINAL WELLBC	7,653.0	6,838.6	1,194.7	1,139.8	21.755	CC
CECIL'S KERSEY FARM 17K-232 - ORIGINAL WELLBC	12,093.6	11,293.7	1,201.1	919.7	4.268	ES, SF
CECIL'S KERSEY FARM 17K-332 - ORIGINAL WELLBC	7,546.2	6,761.4	938.9	886.8	18.035	CC
CECIL'S KERSEY FARM 17K-332 - ORIGINAL WELLBC	12,093.6	11,352.0	954.6	676.2	3.429	ES, SF
CECIL'S KERSEY FARM 17K-334 - ORIGINAL WELLBC	8,513.4	6,720.2	1,048.3	974.0	14.118	CC
CECIL'S KERSEY FARM 17K-334 - ORIGINAL WELLBC	8,563.0	6,686.3	1,048.9	973.3	13.871	ES
CECIL'S KERSEY FARM 17K-334 - ORIGINAL WELLBC	9,000.0	6,500.0	1,120.5	1,033.6	12.895	SF
CECIL'S KERSEY FARM 17K-402 - ORIGINAL WELLBC	7,478.3	6,785.6	1,421.6	1,370.4	27.724	CC
CECIL'S KERSEY FARM 17K-402 - ORIGINAL WELLBC	12,093.6	11,472.7	1,446.6	1,168.5	5.202	ES, SF
CECIL'S KERSEY FARM 17K-404 - ORIGINAL WELLBC	8,560.3	6,752.5	1,538.2	1,462.0	20.178	CC
CECIL'S KERSEY FARM 17K-404 - ORIGINAL WELLBC	8,600.0	6,728.6	1,538.6	1,461.2	19.887	ES
CECIL'S KERSEY FARM 17K-404 - ORIGINAL WELLBC	9,500.0	6,475.0	1,755.9	1,654.4	17.293	SF
EXIST VERT B&H #1 - Wellbore #1 - Design #1	5,936.9	5,880.8	3,709.4	3,575.3	27.667	CC, ES, SF
EXIST VERT BRIGHT #2 - Wellbore #1 - Design #1	5,936.9	5,880.8	4,056.9	3,922.5	30.169	CC, ES, SF
EXIST VERT DUNN #22-18 - Wellbore #1 - Design #1	5,936.9	5,877.8	3,244.5	3,110.3	24.169	CC, ES, SF
EXIST VERT DUNN/MILLER #1 - Wellbore #1 - Design #	7,962.4	6,586.0	810.4	635.9	4.645	CC
EXIST VERT DUNN/MILLER #1 - Wellbore #1 - Design #	7,972.4	6,585.9	810.4	635.7	4.638	ES
EXIST VERT DUNN/MILLER #1 - Wellbore #1 - Design #	8,070.8	6,585.2	817.6	640.3	4.612	SF
EXIST VERT DUNN/MILLER #17B - Wellbore #1 - Desig	8,614.3	6,573.9	293.1	101.5	1.530	CC, ES, SF
EXIST VERT DUNN/MILLER #23-17 - Wellbore #1 - Des	9,263.2	6,566.7	952.6	743.4	4.555	CC
EXIST VERT DUNN/MILLER #23-17 - Wellbore #1 - Des	9,300.0	6,566.4	953.3	743.1	4.536	ES
EXIST VERT DUNN/MILLER #23-17 - Wellbore #1 - Des	9,400.0	6,565.6	962.3	749.5	4.521	SF
EXIST VERT GUNTHER #18-2 - Wellbore #1 - Design #	6,583.8	6,436.2	2,168.1	2,022.9	14.928	CC
EXIST VERT GUNTHER #18-2 - Wellbore #1 - Design #	6,650.0	6,474.8	2,168.8	2,022.5	14.826	ES
EXIST VERT GUNTHER #18-2 - Wellbore #1 - Design #	7,381.9	6,587.5	2,298.6	2,138.3	14.340	SF

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

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Project:	WELD COUNTY, COLORADO	TVD Reference:	KB-EST @ 4638.0usft (Original Well Elev)
Reference Site:	SE SE SEC. 18 T5N R64W 6th P.M.	MD Reference:	KB-EST @ 4638.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	True
Reference Well:	GILLHAM 18X-102	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 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	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
NW SW SEC. 17 T5N R64W 6th P.M.						
EXIST VERT GUNTHER-PM B #18-7 - Wellbore #1 - We	5,936.9	5,916.0	2,497.1	2,480.0	145.822	ES
EXIST VERT GUNTHER-PM B #18-7 - Wellbore #1 - We	5,965.8	5,945.4	2,496.8	2,480.8	155.300	CC
EXIST VERT GUNTHER-PM B #18-7 - Wellbore #1 - We	12,093.1	6,600.0	7,157.4	6,999.7	45.387	SF
EXIST VERT H&S #1 - Wellbore #1 - Design #1	10,802.7	6,558.4	659.1	407.6	2.620	CC
EXIST VERT H&S #1 - Wellbore #1 - Design #1	10,826.7	6,558.2	659.6	407.4	2.615	ES, SF
EXIST VERT HETTINGER #1 - Wellbore #1 - Design #1	6,599.6	6,449.9	839.5	694.0	5.769	CC
EXIST VERT HETTINGER #1 - Wellbore #1 - Design #1	6,600.0	6,450.1	839.5	694.0	5.768	ES
EXIST VERT HETTINGER #1 - Wellbore #1 - Design #1	6,692.9	6,501.0	843.1	696.2	5.739	SF
EXIST VERT HETTINGER #33-18 - Wellbore #1 - Design	5,936.9	5,871.8	1,265.1	1,130.7	9.416	CC, ES, SF
EXIST VERT HETTINGER #34-18 - Wellbore #1 - Design	5,936.9	5,876.8	1,139.1	1,006.9	8.618	CC
EXIST VERT HETTINGER #34-18 - Wellbore #1 - Design	5,950.0	5,889.9	1,139.2	1,005.5	8.520	ES
EXIST VERT HETTINGER #34-18 - Wellbore #1 - Design	6,000.0	5,939.8	1,141.6	1,007.2	8.496	SF
EXIST VERT HETTINGER #44-18 - Wellbore #1 - Design	1,841.0	1,827.9	248.2	207.6	6.119	CC
EXIST VERT HETTINGER #44-18 - Wellbore #1 - Design	1,968.5	1,952.5	249.6	206.1	5.739	ES
EXIST VERT HETTINGER #44-18 - Wellbore #1 - Design	6,650.0	6,473.8	476.3	330.0	3.255	SF
EXIST VERT HOSHIKO #32-17 - Wellbore #1 - Design #	10,594.4	6,558.1	2,176.8	1,931.1	8.858	CC
EXIST VERT HOSHIKO #32-17 - Wellbore #1 - Design #	10,629.9	6,557.8	2,177.1	1,930.4	8.824	ES
EXIST VERT HOSHIKO #32-17 - Wellbore #1 - Design #	11,122.0	6,553.9	2,239.8	1,979.5	8.603	SF
EXIST VERT HOSHIKO #42-17 - Wellbore #1 - Design #	11,923.0	6,547.4	2,188.0	1,905.4	7.743	CC
EXIST VERT HOSHIKO #42-17 - Wellbore #1 - Design #	12,000.0	6,546.8	2,189.4	1,904.7	7.690	ES
EXIST VERT HOSHIKO #42-17 - Wellbore #1 - Design #	12,093.6	6,546.0	2,194.6	1,907.3	7.639	SF
EXIST VERT HOSHIKO/SOLIS #1 - Wellbore #1 - Wellb	10,603.8	6,550.3	704.3	587.9	6.050	CC
EXIST VERT HOSHIKO/SOLIS #1 - Wellbore #1 - Wellb	10,629.9	6,550.4	704.8	587.6	6.016	ES
EXIST VERT HOSHIKO/SOLIS #1 - Wellbore #1 - Wellb	10,728.3	6,550.6	715.2	595.3	5.966	SF
EXIST VERT HOWARD #14-18 - Wellbore #1 - Design #	5,936.9	5,878.8	3,745.6	3,612.4	28.121	CC, ES
EXIST VERT HOWARD #14-18 - Wellbore #1 - Design #	6,003.9	5,945.7	3,748.7	3,615.4	28.120	SF
EXIST VERT HOWARD #24-18 - Wellbore #1 - Design #	5,936.9	5,880.8	2,247.1	2,114.4	16.924	CC
EXIST VERT HOWARD #24-18 - Wellbore #1 - Design #	5,950.0	5,893.9	2,247.2	2,114.0	16.870	ES
EXIST VERT HOWARD #24-18 - Wellbore #1 - Design #	6,003.9	5,947.7	2,250.1	2,116.3	16.814	SF
EXIST VERT MASON #1 - Wellbore #1 - Design #1	5,936.9	5,877.8	2,422.2	2,288.0	18.045	CC, ES, SF
EXIST VERT MILLER #1 - Wellbore #1 - Wellbore #1	7,915.6	6,590.2	527.7	484.8	12.316	CC, ES
EXIST VERT MILLER #1 - Wellbore #1 - Wellbore #1	8,070.8	6,589.0	550.0	503.2	11.736	SF
EXIST VERT MILLER #2 - Wellbore #1 - Wellbore #1	9,282.4	6,566.0	534.5	454.9	6.711	CC
EXIST VERT MILLER #2 - Wellbore #1 - Wellbore #1	9,300.0	6,566.0	534.8	454.7	6.674	ES
EXIST VERT MILLER #2 - Wellbore #1 - Wellbore #1	9,400.0	6,565.7	547.3	464.4	6.603	SF
EXIST VERT SCHAUMBERG #12-17 - Wellbore #1 - De	8,101.6	6,579.9	2,136.5	1,958.5	12.001	CC
EXIST VERT SCHAUMBERG #12-17 - Wellbore #1 - De	8,169.3	6,579.4	2,137.5	1,957.8	11.889	ES
EXIST VERT SCHAUMBERG #12-17 - Wellbore #1 - De	8,800.0	6,574.4	2,247.7	2,051.1	11.433	SF
EXIST VERT SOLIS #43-17 - Wellbore #1 - Design #1	11,917.7	6,559.4	690.7	408.1	2.445	CC, ES
EXIST VERT SOLIS #43-17 - Wellbore #1 - Design #1	12,000.0	6,558.8	695.6	410.7	2.442	SF
EXIST VERT SOLIS #44-17 - Wellbore #1 - Wellbore #1	12,093.6	6,553.6	276.7	119.1	1.756	CC, ES, SF
EXIST VERT STEINMETZ #1 - Wellbore #1 - Design #1	9,263.4	6,571.7	2,155.1	1,946.0	10.302	CC
EXIST VERT STEINMETZ #1 - Wellbore #1 - Design #1	9,300.0	6,571.4	2,155.5	1,945.3	10.255	ES
EXIST VERT STEINMETZ #1 - Wellbore #1 - Design #1	9,900.0	6,566.7	2,247.2	2,020.6	9.916	SF

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Anticollision Report



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Reference Well:	GILLHAM 18X-102	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 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	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
SE SE SEC. 18 T5N R64W 6th P.M.						
GILLHAM 18X-104 - ORIGINAL WELLBORE - PROPOS	1,250.0	1,250.0	75.2	69.8	14.018	CC
GILLHAM 18X-104 - ORIGINAL WELLBORE - PROPOS	7,185.0	6,969.0	103.1	57.8	2.278	ES
GILLHAM 18X-104 - ORIGINAL WELLBORE - PROPOS	7,200.0	6,954.5	103.3	57.9	2.275	SF
GILLHAM 18X-232 - ORIGINAL WELLBORE - PROPOS	1,037.1	1,037.1	29.8	25.4	6.762	CC
GILLHAM 18X-232 - ORIGINAL WELLBORE - PROPOS	1,082.7	1,082.4	30.0	25.4	6.509	ES
GILLHAM 18X-232 - ORIGINAL WELLBORE - PROPOS	12,093.6	12,182.3	445.2	139.6	1.457	Level 3, SF
GILLHAM 18X-234 - ORIGINAL WELLBORE - PROPOS	1,038.0	1,037.0	105.0	100.6	23.814	CC
GILLHAM 18X-234 - ORIGINAL WELLBORE - PROPOS	1,082.7	1,080.6	105.2	100.6	22.848	ES
GILLHAM 18X-234 - ORIGINAL WELLBORE - PROPOS	7,500.0	6,731.0	327.4	277.3	6.531	SF
GILLHAM 18X-332 - ORIGINAL WELLBORE - PROPOS	1,137.3	1,137.3	15.0	10.2	3.097	CC
GILLHAM 18X-332 - ORIGINAL WELLBORE - PROPOS	1,181.1	1,180.9	15.2	10.2	3.011	ES
GILLHAM 18X-332 - ORIGINAL WELLBORE - PROPOS	12,093.6	12,271.2	276.3	23.9	1.095	Level 2, SF
GILLHAM 18X-334 - ORIGINAL WELLBORE - PROPOS	1,138.1	1,137.1	90.0	85.1	18.513	CC
GILLHAM 18X-334 - ORIGINAL WELLBORE - PROPOS	7,538.3	6,737.0	106.9	55.2	2.067	ES, SF
GILLHAM 18Y-202 - ORIGINAL WELLBORE - PROPOS	1,250.0	1,250.0	30.1	24.7	5.607	CC, ES
GILLHAM 18Y-202 - ORIGINAL WELLBORE - PROPOS	12,093.6	12,217.1	963.6	654.0	3.113	SF
GILLHAM 18Y-214 - ORIGINAL WELLBORE - PROPOS	1,250.0	1,250.0	45.1	39.8	8.411	CC
GILLHAM 18Y-214 - ORIGINAL WELLBORE - PROPOS	1,279.5	1,279.5	45.3	39.8	8.235	ES
GILLHAM 18Y-214 - ORIGINAL WELLBORE - PROPOS	1,377.9	1,377.9	47.6	41.7	8.034	SF
GILLHAM 18Y-312 - ORIGINAL WELLBORE - PROPOS	1,250.0	1,250.0	15.0	9.7	2.804	CC
GILLHAM 18Y-312 - ORIGINAL WELLBORE - PROPOS	1,279.5	1,279.5	15.2	9.7	2.761	ES
GILLHAM 18Y-312 - ORIGINAL WELLBORE - PROPOS	12,093.6	12,288.9	769.9	465.7	2.531	SF
GILLHAM 18Y-314 - ORIGINAL WELLBORE - PROPOS	1,250.0	1,250.0	60.2	54.8	11.214	CC
GILLHAM 18Y-314 - ORIGINAL WELLBORE - PROPOS	1,279.5	1,279.5	60.3	54.8	10.972	ES
GILLHAM 18Y-314 - ORIGINAL WELLBORE - PROPOS	1,377.9	1,377.3	62.8	56.8	10.604	SF

Offset Design										NW SW SEC. 17 T5N R64W 6th P.M. - CECIL'S KERSEY FARM 17B-212 - ORIGINAL WELLBORE - P			Offset Site Error:		0.0 usft
Survey Program: 0-MWDD													Offset Well Error:		0.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
0.0	0.0	0.0	0.0	0.0	0.0	59.20	776.7	1,303.0	1,516.9						
98.4	98.4	96.4	96.4	0.1	0.1	59.20	776.7	1,303.0	1,516.9	1,516.8	0.19	7,972.119			
100.0	100.0	98.0	98.0	0.1	0.1	59.20	776.7	1,303.0	1,516.9	1,516.8	0.19	7,835.814			
196.8	196.8	194.8	194.8	0.3	0.3	59.20	776.7	1,303.0	1,516.9	1,516.3	0.63	2,421.597			
200.0	200.0	198.0	198.0	0.3	0.3	59.20	776.7	1,303.0	1,516.9	1,516.3	0.64	2,368.067			
295.3	295.3	293.3	293.3	0.5	0.5	59.20	776.7	1,303.0	1,516.9	1,515.9	1.07	1,419.197			
300.0	300.0	298.0	298.0	0.5	0.5	59.20	776.7	1,303.0	1,516.9	1,515.9	1.09	1,391.545			
393.7	393.7	391.7	391.7	0.8	0.8	59.20	776.7	1,303.0	1,516.9	1,515.4	1.51	1,003.717			
400.0	400.0	398.0	398.0	0.8	0.8	59.20	776.7	1,303.0	1,516.9	1,515.4	1.54	985.255			
492.1	492.1	490.1	490.1	1.0	1.0	59.20	776.7	1,303.0	1,516.9	1,515.0	1.95	776.416			
500.0	500.0	498.0	498.0	1.0	1.0	59.20	776.7	1,303.0	1,516.9	1,515.0	1.99	762.598			
590.5	590.5	588.5	588.5	1.2	1.2	59.20	776.7	1,303.0	1,516.9	1,514.5	2.40	633.054			
600.0	600.0	598.0	598.0	1.2	1.2	59.20	776.7	1,303.0	1,516.9	1,514.5	2.44	622.027			
689.0	689.0	687.0	687.0	1.4	1.4	59.20	776.7	1,303.0	1,516.9	1,514.1	2.84	534.383			
700.0	700.0	698.0	698.0	1.4	1.4	59.20	776.7	1,303.0	1,516.9	1,514.1	2.89	525.214			
787.4	787.4	785.4	785.4	1.6	1.6	59.20	776.7	1,303.0	1,516.9	1,513.7	3.28	462.323			
800.0	800.0	798.0	798.0	1.7	1.7	59.20	776.7	1,303.0	1,516.9	1,513.6	3.34	454.478			
885.8	885.8	883.8	883.8	1.9	1.9	59.20	776.7	1,303.0	1,516.9	1,513.2	3.72	407.388			
900.0	900.0	898.0	898.0	1.9	1.9	59.20	776.7	1,303.0	1,516.9	1,513.2	3.79	400.534			

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