

Crestone Peak Resources

DJ BASIN

S18-T2N-R67W (KUGEL)

KUGEL 1C-18H-H267

OH

PLAN #2 (6.11)

Anticollision Summary Report

11 June, 2018

Cathedral Energy Services

Anticollision Summary Report

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well KUGEL 1C-18H-H267 - Slot KUGEL 1C
Project:	DJ BASIN	TVD Reference:	23' KB @ 4974.00usft
Reference Site:	S18-T2N-R67W (KUGEL)	MD Reference:	23' KB @ 4974.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	KUGEL 1C-18H-H267	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	USA EDM 5000 Multi Users DB
Reference Design:	PLAN #2 (6.11)	Offset TVD Reference:	Offset Datum

Reference	PLAN #2 (6.11)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum ellipse separation of 1,000.00 usft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	6/11/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	400.00	PLAN #2 (6.11) (OH)	VESSI_GYROFLEX	VESSI Gyroflex Gyro	
2,001.00	15,469.97	PLAN #2 (6.11) (OH)	MWD+HDGM	OWSG MWD + HDGM	

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						
S18-T2N-R67W (KUGEL)						
BRETT 1 - HS RESOURCES - NO SURVEYS	3,471.34	3,365.15	944.89	923.98	45.187	CC
BRETT 1 - HS RESOURCES - NO SURVEYS	3,600.00	3,488.78	945.56	923.53	42.923	ES
BRETT 1 - HS RESOURCES - NO SURVEYS	5,200.00	5,026.20	1,059.24	1,023.76	29.860	SF
BRETT 2 - HS RESOURCES WELL - NO SURVEYS	5,531.12	5,035.00	2,047.78	2,011.17	55.943	CC, ES
BRETT 2 - HS RESOURCES WELL - NO SURVEYS	5,800.00	5,035.00	2,065.35	2,027.88	55.120	SF
BRETT 3 - KMG WELL - NO SURVEY	4,589.73	4,451.81	2,411.61	2,380.70	78.019	CC
BRETT 3 - KMG WELL - NO SURVEY	4,900.00	4,749.94	2,413.14	2,379.43	71.573	ES
BRETT 3 - KMG WELL - NO SURVEY	5,700.00	5,040.00	2,477.80	2,439.27	64.296	SF
BRETT 4 - KMG WELL - GYRO	6,800.00	6,560.01	328.88	290.49	8.567	CC, ES, SF
DREW 1 - KMG WELL - GYRO	7,096.54	6,827.74	1,705.41	1,673.21	52.975	CC
DREW 1 - KMG WELL - GYRO	7,100.00	6,830.83	1,705.41	1,673.20	52.944	ES
DREW 1 - KMG WELL - GYRO	7,500.00	7,135.44	1,785.23	1,750.27	51.064	SF
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	6,558.69	6,355.32	1,356.28	1,318.97	36.351	CC
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	6,600.00	6,392.55	1,356.36	1,318.75	36.061	ES
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	6,900.00	6,672.18	1,378.75	1,339.10	34.776	SF
FARNSWORTH 9-18A - KMG WELL - GYRO	1,994.70	1,967.40	952.95	945.86	134.455	CC
FARNSWORTH 9-18A - KMG WELL - GYRO	2,000.00	1,972.40	952.95	945.84	134.056	ES
FARNSWORTH 9-18A - KMG WELL - GYRO	6,800.00	6,542.73	1,666.11	1,632.78	49.974	SF
GTF RED V 6-16JI - KMG WELL - GYRO	15,469.97	7,177.25	1,783.59	1,645.35	12.902	CC, ES, SF
GTF RED V 6-4D - KMG WELL - GYRO	15,469.97	7,153.25	1,010.27	925.01	11.849	CC, ES, SF
GTF RED V6-16 - KMG WELL - GYRO	15,469.97	7,173.52	1,683.13	1,545.66	12.244	CC, ES, SF
HSR-OWEN 15-18A - KMG WELL - SURVEYS	4,197.17	3,835.43	894.08	876.76	51.643	CC
HSR-OWEN 15-18A - KMG WELL - SURVEYS	4,648.47	4,300.73	894.78	874.34	43.764	ES
HSR-OWEN 15-18A - KMG WELL - SURVEYS	5,100.00	4,578.93	939.92	916.59	40.293	SF
KUGEL 1 - EXTRACTION WELL - GYRO	517.76	509.26	1,189.72	1,188.11	740.564	CC, ES
KUGEL 1 - EXTRACTION WELL - GYRO	9,200.00	7,271.73	1,258.15	1,213.13	27.947	SF
KUGEL 1-18 - CPR WELL - GYRO	8,805.27	7,233.49	1,545.20	1,504.27	37.759	CC, ES
KUGEL 1-18 - CPR WELL - GYRO	9,500.00	7,227.36	1,694.18	1,643.30	33.299	SF
KUGEL 12-18 - KMG WELL - GYRO	8,053.78	7,258.56	1,030.21	994.02	28.469	CC, ES
KUGEL 12-18 - KMG WELL - GYRO	8,400.00	7,249.32	1,086.79	1,047.15	27.421	SF
KUGEL 1A-18H-H267 - OH - PLAN #3 (6.11)	406.60	407.78	18.51	17.29	15.145	CC, ES
KUGEL 1A-18H-H267 - OH - PLAN #3 (6.11)	15,338.50	15,610.00	373.36	164.14	1.785	SF
KUGEL 1B-18H-H267 - OH - PLAN #3 (6.11)	454.60	455.68	9.22	7.83	6.625	CC
KUGEL 1B-18H-H267 - OH - PLAN #3 (6.11)	15,400.00	15,500.00	190.84	-43.68	0.814	Level 1, ES, SF
KUGEL 1D-18H-H267 - OH - PLAN #2 (6.11)	555.40	555.29	9.12	7.38	5.225	CC, ES
KUGEL 1D-18H-H267 - OH - PLAN #2 (6.11)	12,600.00	12,588.43	167.85	8.72	1.055	Level 2, SF

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

Cathedral Energy Services

Anticollision Summary Report

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Reference Site:	S18-T2N-R67W (KUGEL)	MD Reference:	23' KB @ 4974.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	KUGEL 1C-18H-H267	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	USA EDM 5000 Multi Users DB
Reference Design:	PLAN #2 (6.11)	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						
S18-T2N-R67W (KUGEL)						
KUGEL 1E-18H-H267 - OH - PLAN #2 (6.11)	618.27	618.03	18.10	16.13	9.197	CC, ES
KUGEL 1E-18H-H267 - OH - PLAN #2 (6.11)	15,469.97	15,555.17	620.21	376.24	2.542	SF
KUGEL 1F-18H-H267 - OH - PLAN #2 (6.11)	200.00	200.00	29.99	29.50	60.829	CC, ES
KUGEL 1F-18H-H267 - OH - PLAN #2 (6.11)	15,469.97	15,316.84	659.85	407.02	2.610	SF
KUGEL 1G-18H-H267 - OH - PLAN #2 (6.11)	712.92	711.30	36.16	33.86	15.722	CC, ES
KUGEL 1G-18H-H267 - OH - PLAN #2 (6.11)	15,469.97	15,342.96	1,072.03	818.80	4.233	SF
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	200.00	199.00	49.99	49.50	101.763	CC, ES
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	15,469.97	15,255.58	1,319.71	1,066.33	5.209	SF
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	783.37	781.23	54.24	51.69	21.273	CC
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	800.00	797.70	54.29	51.68	20.817	ES
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	15,469.97	15,456.99	1,475.99	1,223.79	5.852	SF
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	200.00	199.00	69.98	69.49	142.456	CC, ES
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	15,100.00	14,840.23	1,648.53	1,409.12	6.886	SF
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	300.00	299.00	79.98	79.13	94.404	CC, ES
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	15,469.97	15,227.75	1,979.28	1,725.78	7.808	SF
KUGEL 1L-18H-H267 - OH - PLAN #2 (6.11)	835.92	839.06	46.60	43.85	16.912	CC, ES, SF
KUGEL 1M-18H-H267 - OH - PLAN #2 (6.11)	833.88	837.23	49.36	46.60	17.915	CC, ES, SF
KUGEL 1N-18H-H267 - OH - PLAN #2 (6.11)	792.59	797.57	51.45	48.83	19.614	CC, ES
KUGEL 1N-18H-H267 - OH - PLAN #2 (6.11)	800.00	804.61	51.51	48.86	19.454	SF
KUGEL 21-18 - CPR WELL - GYRO	9,548.00	7,255.32	1,094.02	1,043.86	21.810	CC, ES
KUGEL 21-18 - CPR WELL - GYRO	9,900.00	7,264.37	1,149.22	1,092.71	20.337	SF
KUGEL 2-18 - CPR WELL - GYRO	965.61	944.97	619.90	616.73	195.412	CC
KUGEL 2-18 - CPR WELL - GYRO	1,000.00	978.79	619.93	616.64	188.198	ES
KUGEL 2-18 - CPR WELL - GYRO	8,700.00	7,271.01	1,234.84	1,194.79	30.832	SF
KUGEL 22-18 - CPR WELL - GYRO	8,085.69	7,238.37	905.69	869.28	24.873	CC, ES
KUGEL 22-18 - CPR WELL - GYRO	8,400.00	7,228.84	958.64	918.90	24.126	SF
KUGEL 31-18 - CPR WELL - GYRO	9,700.00	7,258.65	87.82	35.68	1.684	ES, SF
KUGEL 31-18 - CPR WELL - GYRO	9,701.05	7,258.65	87.82	35.77	1.687	CC
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	4,555.60	4,409.00	701.97	671.41	22.968	CC
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	4,600.00	4,451.67	702.08	671.12	22.677	ES
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	5,200.00	5,018.00	724.37	688.36	20.116	SF
KUGEL 41-18 - CPR WELL - GYRO	434.37	406.30	1,687.48	1,686.21	1,322.651	CC
KUGEL 41-18 - CPR WELL - GYRO	9,704.85	7,240.71	1,721.21	1,669.04	32.994	ES
KUGEL 41-18 - CPR WELL - GYRO	10,000.00	7,243.66	1,746.33	1,692.35	32.350	SF
KUGEL 42-18 - CPR WELL - GYRO	439.78	426.26	225.49	224.17	171.606	CC, ES
KUGEL 42-18 - CPR WELL - GYRO	8,300.00	7,235.81	1,815.53	1,778.56	49.103	SF
KUGEL V18-3 - KMG WELL - GYRO	9,497.83	7,240.43	1,132.57	1,083.01	22.854	CC
KUGEL V18-3 - KMG WELL - GYRO	9,500.00	7,240.48	1,132.57	1,082.97	22.834	ES
KUGEL V18-3 - KMG WELL - GYRO	9,900.00	7,250.84	1,201.81	1,145.26	21.254	SF
LINCOLN 2 - LINCOLN 2 - HS RESOURCES WELL	5,684.82	5,010.00	1,674.68	1,642.19	51.550	CC, ES
LINCOLN 2 - LINCOLN 2 - HS RESOURCES WELL	5,800.00	5,010.00	1,678.64	1,646.04	51.492	SF
LISA 1 - KMG WELL - GYRO	7,190.71	6,907.56	1,157.56	1,125.04	35.592	CC, ES
LISA 1 - KMG WELL - GYRO	7,500.00	7,135.55	1,205.00	1,170.63	35.060	SF
LISA 2 - KMG WELL - GYRO	6,940.72	6,690.07	1,922.22	1,888.74	57.420	CC, ES
LISA 2 - KMG WELL - GYRO	7,300.00	7,014.84	2,001.11	1,964.81	55.123	SF
ROCKY MOUNTAIN FUEL 12 - HS RESOURCES WELL	5,725.84	5,100.00	3,118.72	3,080.69	82.011	CC, ES
ROCKY MOUNTAIN FUEL 12 - HS RESOURCES WELL	6,400.00	5,100.00	3,190.75	3,150.35	78.975	SF
ROCKY MTN FUEL D 8 - HS RESOURCES WELL - NO	5,925.15	5,026.00	3,429.16	3,392.17	92.697	CC, ES
ROCKY MTN FUEL D 8 - HS RESOURCES WELL - NO	6,600.00	5,026.00	3,494.93	3,455.83	89.379	SF
STREAR V 06-23D - KMG WELL - GYRO	15,469.97	7,285.84	1,633.69	1,532.25	16.104	CC, ES, SF
STREAR V 06-63HN - KMG WELL - SURVEYS	15,469.97	9,002.53	1,166.72	1,055.83	10.522	CC, ES, SF
WANDELL 1 - CPR WELL - GYRO	14,445.50	7,222.91	1,253.86	1,130.75	10.184	CC, ES
WANDELL 1 - CPR WELL - GYRO	14,500.00	7,223.09	1,255.05	1,131.65	10.171	SF

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

Cathedral Energy Services

Anticollision Summary Report

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Reference Well:	KUGEL 1C-18H-H267	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	USA EDM 5000 Multi Users DB
Reference Design:	PLAN #2 (6.11)	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						
S18-T2N-R67W (KUGEL)						
WANDELL 21-7 - CPR WELL - GYRO	14,553.71	7,176.88	764.29	639.62	6.130	CC, ES
WANDELL 21-7 - CPR WELL - GYRO	14,600.00	7,176.06	765.69	639.82	6.083	SF
WANDELL 22-7 - CPR WELL - SURVEYS	13,431.32	7,511.22	719.34	607.16	6.413	CC, ES
WANDELL 22-7 - CPR WELL - SURVEYS	13,500.00	7,511.58	722.61	608.44	6.330	SF
WANDELL 24-7 - CPR WELL - SURVEYS	10,634.27	7,388.68	979.93	898.70	12.064	CC, ES
WANDELL 24-7 - CPR WELL - SURVEYS	10,800.00	7,389.27	993.84	909.11	11.729	SF
WANDELL 31-7 - CPR WELL - SURVEYS	14,900.00	7,325.44	387.25	242.86	2.682	ES, SF
WANDELL 31-7 - CPR WELL - SURVEYS	14,908.27	7,325.47	387.16	242.92	2.684	CC
WANDELL 32-7 - CPR WELL - GYRO	13,500.00	7,211.78	336.33	228.02	3.105	ES, SF
WANDELL 32-7 - CPR WELL - GYRO	13,502.04	7,211.78	336.33	228.04	3.106	CC
WANDELL 33-7 - CPR WELL - SURVEYS	12,157.04	7,386.70	288.37	181.54	2.699	CC, ES, SF
WANDELL 34-7 - CPR WELL - GYRO	10,684.49	7,389.19	232.06	165.73	3.498	CC, ES, SF
WANDELL 4-0-7 - CPR WELL - SURVEYS	15,400.00	7,470.80	308.04	157.28	2.043	ES, SF
WANDELL 4-0-7 - CPR WELL - SURVEYS	15,400.77	7,470.80	308.04	157.28	2.043	CC
WANDELL 41-7 - CPR WELL - SURVEYS	14,932.23	7,306.01	1,791.58	1,660.80	13.699	CC, ES
WANDELL 41-7 - CPR WELL - SURVEYS	15,100.00	7,310.47	1,799.42	1,667.52	13.643	SF
WANDELL 42-7 - CPR WELL - SURVEYS	13,356.11	7,393.40	1,713.79	1,589.80	13.822	CC, ES
WANDELL 42-7 - CPR WELL - SURVEYS	13,500.00	7,393.72	1,719.82	1,595.09	13.789	SF
WANDELL 43-7 - CPR WELL - SURVEYS	12,044.56	7,600.51	1,565.53	1,456.36	14.341	CC, ES, SF
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,713.14	7,557.37	444.01	335.76	4.102	CC, ES
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,800.00	7,557.86	452.42	338.66	3.977	SF
WANDELL 4-6-7 - CPR WELL - SURVEYS	11,451.33	7,598.73	138.40	36.74	1.361	Level 3, CC, ES, SF
WANDELL 6-0-7 - CPR WELL - SURVEYS	15,399.54	7,317.00	971.82	818.06	6.320	CC
WANDELL 6-0-7 - CPR WELL - SURVEYS	15,400.00	7,317.00	971.82	818.05	6.320	ES, SF
WANDELL 6-4-7 - CPR WELL - SURVEYS	12,609.10	7,605.17	975.13	854.22	8.065	CC, ES, SF
WANDELL 6-8-7 - CPR WELL - SURVEYS	10,221.49	7,383.88	979.97	906.21	13.286	CC, ES
WANDELL 6-8-7 - CPR WELL - SURVEYS	10,300.00	7,384.20	983.11	908.98	13.262	SF
WANDELL 8-2-7 - CPR WELL - SURVEYS	14,033.84	7,396.70	2,231.10	2,099.50	16.954	CC, ES
WANDELL 8-2-7 - CPR WELL - SURVEYS	14,200.00	7,397.20	2,237.28	2,104.51	16.851	SF
WANDELL 8-4-7 - CPR WELL - SURVEYS	12,824.80	7,623.00	2,183.76	2,059.81	17.618	CC, ES
WANDELL 8-4-7 - CPR WELL - SURVEYS	12,900.00	7,623.00	2,185.06	2,060.73	17.576	SF
WANDELL E UNIT 1 - CPR WELL - NO SURVEYS	11,120.43	7,239.00	1,329.28	1,254.00	17.659	CC, ES
WANDELL E UNIT 1 - CPR WELL - NO SURVEYS	11,200.00	7,239.00	1,331.66	1,256.02	17.607	SF

Cathedral Energy Services

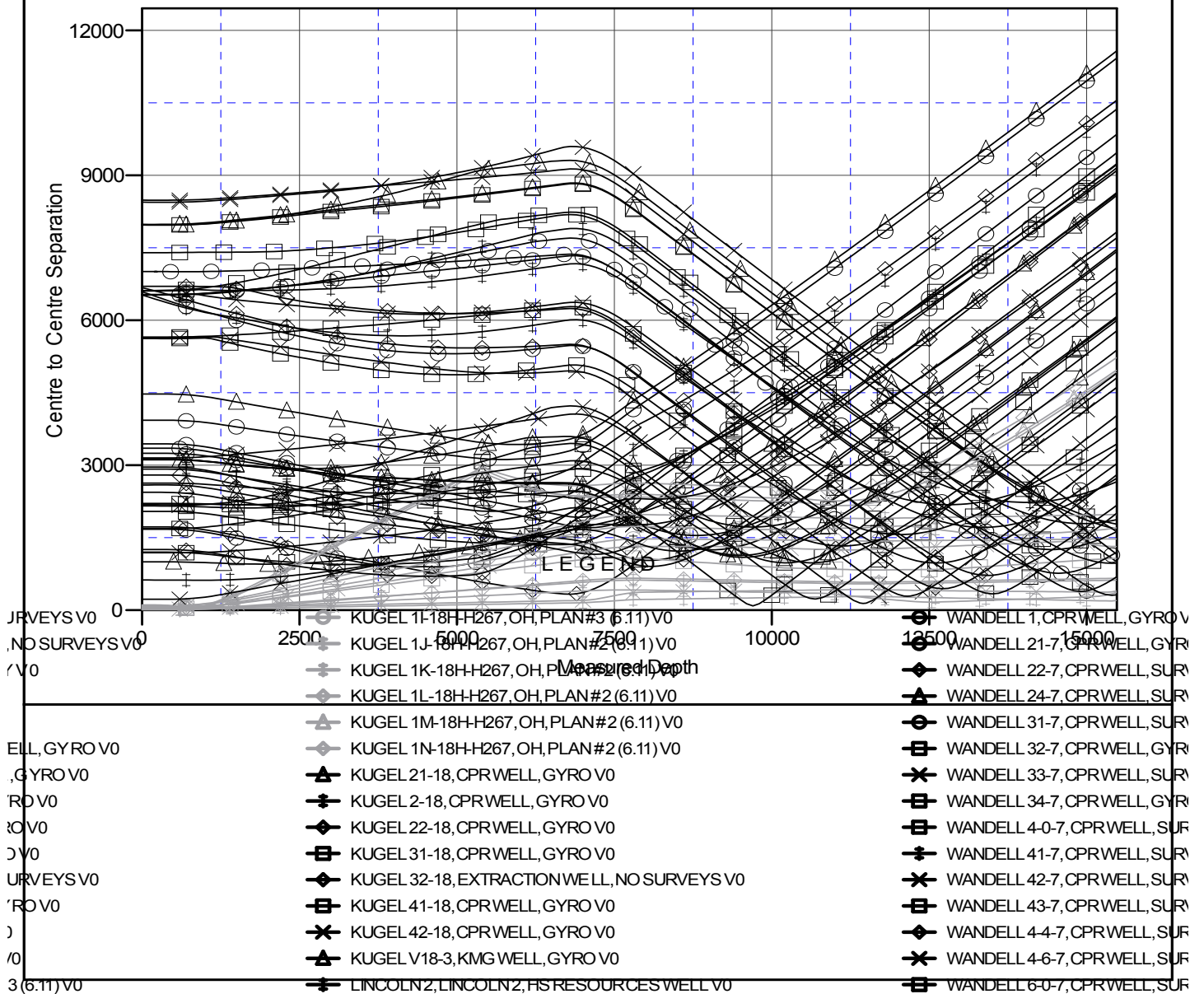
Anticollision Summary Report

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Reference Well:	KUGEL 1C-18H-H267	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	USA EDM 5000 Multi Users DB
Reference Design:	PLAN #2 (6.11)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 23' KB @ 4974.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: KUGEL 1C-18H-H267 - Slot KUGEL 1C
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.37°

Ladder Plot



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

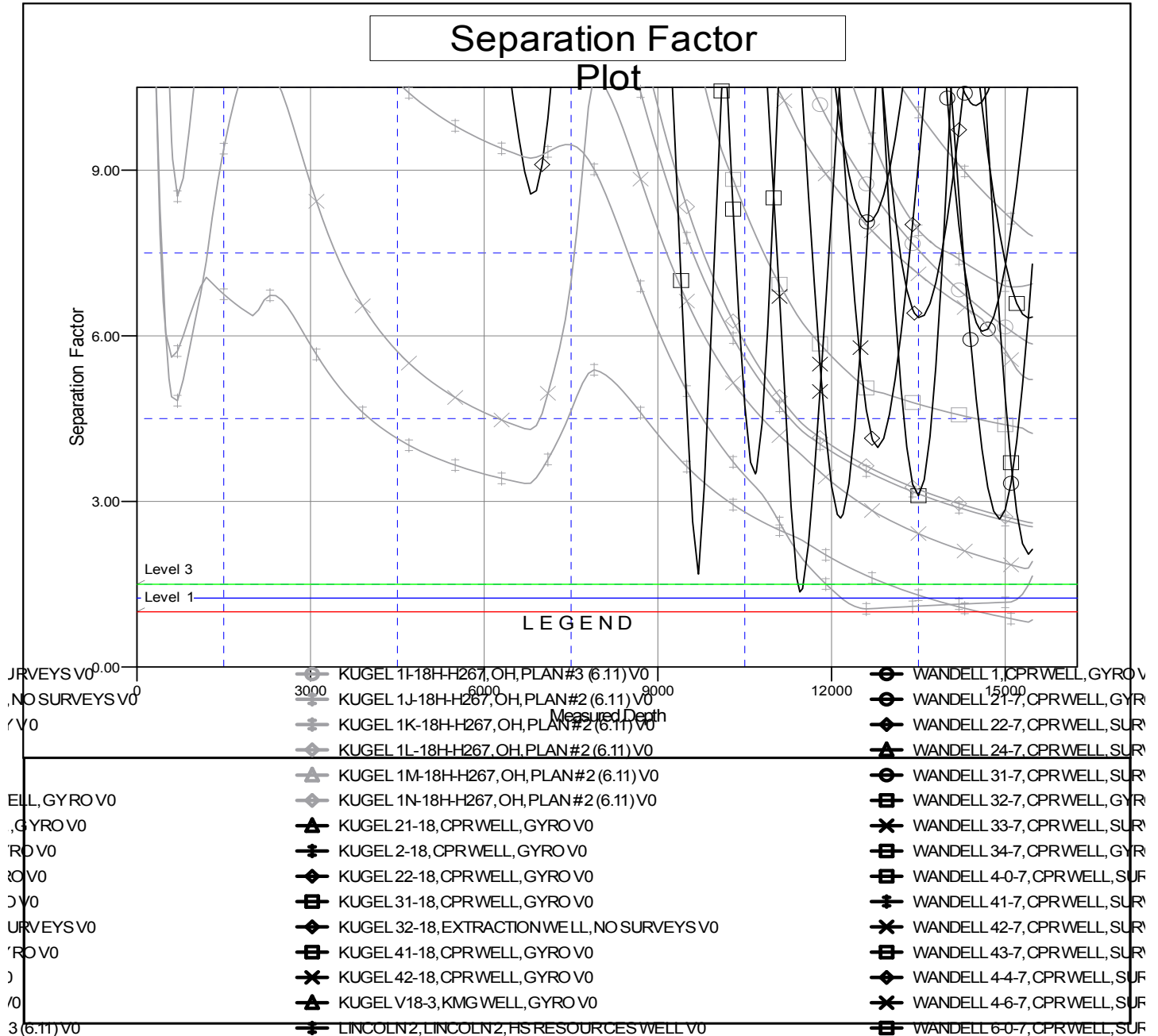
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Reference Wellbore	OH	Database:	USA EDM 5000 Multi Users DB
Reference Design:	PLAN #2 (6.11)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 23' KB @ 4974.00usft
Offset Depths are relative to Offset Datum
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Coordinates are relative to: KUGEL 1C-18H-H267 - Slot KUGEL 1C
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