

Crestone Peak Resources

DJ BASIN

S18-T2N-R67W (KUGEL)

KUGEL 1F-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 1F-18H-H267 - Slot KUGEL 1F
Project:	DJ BASIN	TVD Reference:	23' KB @ 4976.00usft
Reference Site:	S18-T2N-R67W (KUGEL)	MD Reference:	23' KB @ 4976.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	KUGEL 1F-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
2.00	2,002.00	PLAN #2 (6.11) (OH)	VESSI_GYROFLEX	VESSI Gyroflex Gyro
2,003.00	15,316.88	PLAN #2 (6.11) (OH)	MWD+HDGM	OWSG MWD + HDGM

Summary	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Site Name Offset Well - Wellbore - Design						
S18-T2N-R67W (KUGEL)						
BRETT 1 - HS RESOURCES - NO SURVEYS	5,131.37	5,037.00	748.84	716.51	23.165	CC, ES
BRETT 1 - HS RESOURCES - NO SURVEYS	5,200.00	5,037.00	751.98	719.47	23.132	SF
BRETT 2 - HS RESOURCES WELL - NO SURVEYS	5,457.14	5,035.00	2,122.50	2,090.57	66.464	CC, ES
BRETT 2 - HS RESOURCES WELL - NO SURVEYS	5,700.00	5,035.00	2,136.35	2,103.88	65.798	SF
BRETT 3 - KMG WELL - NO SURVEY	5,231.80	5,040.00	2,215.20	2,182.61	67.976	CC, ES
BRETT 3 - KMG WELL - NO SURVEY	5,600.00	5,040.00	2,245.59	2,211.88	66.622	SF
BRETT 4 - KMG WELL - GYRO	6,848.68	6,739.91	620.28	590.27	20.670	CC, ES
BRETT 4 - KMG WELL - GYRO	6,900.00	6,786.47	621.64	591.40	20.562	SF
DREW 1 - KMG WELL - GYRO	6,928.21	6,791.59	2,272.42	2,241.76	74.117	CC, ES
DREW 1 - KMG WELL - GYRO	7,400.00	7,150.38	2,350.03	2,317.66	72.602	SF
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	6,671.27	6,577.34	1,185.54	1,153.94	37.512	CC, ES
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	6,800.00	6,700.00	1,197.52	1,165.18	37.023	SF
FARNSWORTH 9-18A - KMG WELL - GYRO	2,726.33	2,674.59	841.01	831.66	89.984	CC
FARNSWORTH 9-18A - KMG WELL - GYRO	2,900.00	2,847.00	841.46	831.26	82.535	ES
FARNSWORTH 9-18A - KMG WELL - GYRO	6,700.00	6,570.36	1,075.58	1,044.26	34.345	SF
GTF RED V 6-16JI - KMG WELL - GYRO	15,316.84	7,179.33	1,161.12	1,028.88	8.781	CC, ES, SF
GTF RED V 6-4D - KMG WELL - GYRO	15,316.84	7,157.88	937.75	893.51	21.197	CC, ES, SF
GTF RED V6-16 - KMG WELL - GYRO	15,316.84	7,174.89	1,073.42	944.66	8.337	CC, ES, SF
HSR-OWEN 15-18A - KMG WELL - SURVEYS	3,964.24	3,696.00	1,096.39	1,081.40	73.130	CC
HSR-OWEN 15-18A - KMG WELL - SURVEYS	4,000.00	3,719.06	1,096.57	1,081.39	72.260	ES
HSR-OWEN 15-18A - KMG WELL - SURVEYS	6,000.00	5,361.67	1,441.97	1,415.31	54.068	SF
KUGEL 1 - EXTRACTION WELL - GYRO	8,885.86	7,266.81	616.38	572.22	13.956	CC, ES
KUGEL 1 - EXTRACTION WELL - GYRO	8,900.00	7,266.95	616.55	572.31	13.938	SF
KUGEL 1-18 - CPR WELL - GYRO	8,701.47	7,218.57	2,183.92	2,142.71	53.003	CC, ES
KUGEL 1-18 - CPR WELL - GYRO	9,700.00	7,207.55	2,401.35	2,348.17	45.151	SF
KUGEL 12-18 - KMG WELL - GYRO	7,938.07	7,247.23	1,687.06	1,651.78	47.829	CC, ES
KUGEL 12-18 - KMG WELL - GYRO	8,700.00	7,227.13	1,851.02	1,808.67	43.705	SF
KUGEL 1A-18H-H267 - OH - PLAN #3 (6.11)	200.99	202.00	49.98	49.48	100.314	CC, ES
KUGEL 1A-18H-H267 - OH - PLAN #3 (6.11)	15,300.00	15,610.00	989.66	744.41	4.035	SF
KUGEL 1B-18H-H267 - OH - PLAN #3 (6.11)	200.00	201.00	39.98	39.49	80.801	CC, ES
KUGEL 1B-18H-H267 - OH - PLAN #3 (6.11)	15,300.00	15,500.00	840.11	589.18	3.348	SF
KUGEL 1C-18H-H267 - OH - PLAN #2 (6.11)	200.00	201.00	29.99	29.50	60.611	CC, ES
KUGEL 1C-18H-H267 - OH - PLAN #2 (6.11)	15,316.84	15,445.41	659.39	406.19	2.604	SF
KUGEL 1D-18H-H267 - OH - PLAN #2 (6.11)	200.00	201.00	19.99	19.50	40.400	CC
KUGEL 1D-18H-H267 - OH - PLAN #2 (6.11)	15,316.84	15,481.80	259.30	14.70	1.060	Level 2, ES, SF
KUGEL 1E-18H-H267 - OH - PLAN #2 (6.11)	200.00	200.00	9.99	9.50	20.263	CC

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

Cathedral Energy Services

Anticollision Summary Report

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well KUGEL 1F-18H-H267 - Slot KUGEL 1F
Project:	DJ BASIN	TVD Reference:	23' KB @ 4976.00usft
Reference Site:	S18-T2N-R67W (KUGEL)	MD Reference:	23' KB @ 4976.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	KUGEL 1F-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
S18-T2N-R67W (KUGEL)						
KUGEL 1E-18H-H267 - OH - PLAN #2 (6.11)	6,781.87	6,787.80	34.02	-6.28	0.844	Level 1, ES, SF
KUGEL 1G-18H-H267 - OH - PLAN #2 (6.11)	408.75	405.57	6.44	5.22	5.295	CC, ES
KUGEL 1G-18H-H267 - OH - PLAN #2 (6.11)	12,600.00	12,618.03	252.82	85.59	1.512	SF
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	200.00	197.00	20.00	19.51	41.011	CC
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	300.00	296.40	20.13	19.30	24.017	ES
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	15,305.85	15,255.58	659.77	405.46	2.594	SF
KUGEL 1J-18H-H267 - OH - PLAN #3 (6.11)	545.25	541.43	20.08	18.38	11.822	CC, ES
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	15,316.84	15,456.99	829.90	581.43	3.340	SF
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	200.00	197.00	39.99	39.50	82.001	CC
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	300.00	295.66	40.29	39.45	48.064	ES
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	14,900.00	14,837.22	995.17	755.44	4.151	SF
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	458.66	452.98	45.90	44.51	32.982	CC
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	500.00	493.52	46.04	44.51	29.967	ES
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	15,316.84	15,227.75	1,319.43	1,064.99	5.186	SF
KUGEL 1L-18H-H267 - OH - PLAN #2 (6.11)	638.77	635.32	31.54	29.50	15.484	CC, ES
KUGEL 1L-18H-H267 - OH - PLAN #2 (6.11)	11,100.00	7,900.00	1,595.89	1,491.78	15.329	SF
KUGEL 1M-18H-H267 - OH - PLAN #2 (6.11)	649.61	645.83	35.00	32.92	16.836	CC, ES
KUGEL 1M-18H-H267 - OH - PLAN #2 (6.11)	11,100.00	7,861.35	1,697.97	1,594.90	16.474	SF
KUGEL 1N-18H-H267 - OH - PLAN #2 (6.11)	627.58	624.98	37.47	35.46	18.641	CC, ES, SF
KUGEL 21-18 - CPR WELL - GYRO	9,433.07	7,254.06	1,715.18	1,664.11	33.584	CC, ES
KUGEL 21-18 - CPR WELL - GYRO	10,000.00	7,270.71	1,806.39	1,747.65	30.753	SF
KUGEL 2-18 - CPR WELL - GYRO	8,357.80	7,264.97	576.56	537.98	14.947	CC, ES
KUGEL 2-18 - CPR WELL - GYRO	8,400.00	7,266.23	578.10	539.33	14.913	SF
KUGEL 22-18 - CPR WELL - GYRO	7,967.62	7,203.36	1,561.22	1,525.79	44.064	CC, ES
KUGEL 22-18 - CPR WELL - GYRO	8,600.00	7,185.22	1,684.33	1,643.01	40.766	SF
KUGEL 31-18 - CPR WELL - GYRO	9,557.83	7,265.05	529.99	477.25	10.050	CC, ES
KUGEL 31-18 - CPR WELL - GYRO	9,600.00	7,265.13	531.66	478.06	9.918	SF
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	5,103.93	5,018.00	926.29	894.11	28.786	CC, ES
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	5,200.00	5,018.00	931.26	898.80	28.687	SF
KUGEL 41-18 - CPR WELL - GYRO	9,522.52	7,240.11	1,103.00	1,050.71	21.095	CC, ES
KUGEL 41-18 - CPR WELL - GYRO	9,700.00	7,241.92	1,117.18	1,063.68	20.880	SF
KUGEL 42-18 - CPR WELL - GYRO	204.15	186.34	222.14	221.66	463.639	CC, ES
KUGEL 42-18 - CPR WELL - GYRO	7,900.00	7,247.53	1,124.24	1,089.43	32.292	SF
KUGEL V18-3 - KMG WELL - GYRO	9,383.76	7,236.76	1,754.90	1,704.48	34.807	CC
KUGEL V18-3 - KMG WELL - GYRO	9,400.00	7,237.15	1,754.98	1,704.30	34.633	ES
KUGEL V18-3 - KMG WELL - GYRO	10,000.00	7,252.44	1,859.89	1,801.29	31.738	SF
LINCOLN 2 - LINCOLN 2 - HS RESOURCES WELL	5,489.22	5,010.00	2,086.50	2,055.15	66.539	CC, ES
LINCOLN 2 - LINCOLN 2 - HS RESOURCES WELL	5,700.00	5,010.00	2,097.12	2,065.36	66.031	SF
LISA 1 - KMG WELL - GYRO	7,043.43	6,887.88	1,765.66	1,734.26	56.241	CC, ES
LISA 1 - KMG WELL - GYRO	7,300.00	7,094.22	1,785.06	1,752.99	55.655	SF
LISA 2 - KMG WELL - GYRO	6,793.15	6,668.04	2,336.26	2,306.52	78.565	CC
LISA 2 - KMG WELL - GYRO	6,800.00	6,674.83	2,336.28	2,306.51	78.475	ES
LISA 2 - KMG WELL - GYRO	7,200.00	7,036.69	2,417.66	2,386.02	76.413	SF
ROCKY MOUNTAIN FUEL 12 - HS RESOURCES WELL	5,638.64	5,100.00	3,168.35	3,135.21	95.601	CC, ES
ROCKY MOUNTAIN FUEL 12 - HS RESOURCES WELL	6,200.00	5,100.00	3,217.70	3,183.09	92.966	SF
ROCKY MTN FUEL D 8 - HS RESOURCES WELL - NO	5,734.08	5,026.00	3,610.67	3,578.10	110.867	CC, ES
ROCKY MTN FUEL D 8 - HS RESOURCES WELL - NO	6,400.00	5,026.00	3,671.57	3,637.33	107.235	SF
STREAR V 06-23D - KMG WELL - GYRO	15,316.84	7,286.55	1,362.06	1,306.68	24.594	CC, ES, SF
STREAR V 06-63HN - KMG WELL - SURVEYS	15,316.84	8,352.64	1,091.87	1,007.90	13.004	CC, ES, SF
WANDELL 1 - CPR WELL - GYRO	14,329.67	7,213.85	615.50	491.17	4.951	CC, ES, SF
WANDELL 21-7 - CPR WELL - GYRO	14,395.44	7,170.00	1,404.49	1,279.28	11.217	CC
WANDELL 21-7 - CPR WELL - GYRO	14,400.00	7,169.93	1,404.50	1,279.20	11.209	ES
WANDELL 21-7 - CPR WELL - GYRO	14,600.00	7,166.91	1,419.30	1,291.10	11.070	SF

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Cathedral Energy Services

Anticollision Summary Report

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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
S18-T2N-R67W (KUGEL)						
Offset Well - Wellbore - Design						
WANDELL 22-7 - CPR WELL - SURVEYS	13,274.12	7,511.77	1,335.92	1,223.08	11.839	CC
WANDELL 22-7 - CPR WELL - SURVEYS	13,300.00	7,511.91	1,336.17	1,222.78	11.784	ES
WANDELL 22-7 - CPR WELL - SURVEYS	13,500.00	7,512.99	1,354.88	1,238.15	11.607	SF
WANDELL 24-7 - CPR WELL - SURVEYS	10,516.30	7,382.99	1,575.10	1,492.44	19.054	CC, ES
WANDELL 24-7 - CPR WELL - SURVEYS	10,800.00	7,384.03	1,600.45	1,513.56	18.420	SF
WANDELL 31-7 - CPR WELL - SURVEYS	14,774.06	7,317.15	260.78	115.74	1.798	CC, ES
WANDELL 31-7 - CPR WELL - SURVEYS	14,800.00	7,317.21	262.07	116.19	1.796	SF
WANDELL 32-7 - CPR WELL - GYRO	13,367.10	7,210.12	281.98	172.67	2.580	CC, ES, SF
WANDELL 33-7 - CPR WELL - SURVEYS	12,021.40	7,385.88	301.55	193.64	2.794	CC, ES, SF
WANDELL 34-7 - CPR WELL - GYRO	10,537.52	7,384.69	362.27	294.87	5.375	CC, ES
WANDELL 34-7 - CPR WELL - GYRO	10,600.00	7,384.62	367.62	299.01	5.358	SF
WANDELL 4-0-7 - CPR WELL - SURVEYS	15,251.81	7,467.90	966.27	814.53	6.368	CC, ES, SF
WANDELL 41-7 - CPR WELL - SURVEYS	14,827.45	7,297.99	1,142.83	1,010.71	8.650	CC, ES
WANDELL 41-7 - CPR WELL - SURVEYS	14,900.00	7,299.95	1,145.13	1,012.54	8.637	SF
WANDELL 42-7 - CPR WELL - SURVEYS	13,250.25	7,388.37	1,098.29	972.91	8.760	CC, ES
WANDELL 42-7 - CPR WELL - SURVEYS	13,300.00	7,388.55	1,099.41	973.81	8.753	SF
WANDELL 43-7 - CPR WELL - SURVEYS	11,900.00	7,597.25	978.37	867.89	8.856	SF
WANDELL 43-7 - CPR WELL - SURVEYS	11,935.87	7,597.33	977.71	867.34	8.859	CC, ES
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,561.93	7,563.04	1,045.47	936.74	9.615	CC
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,600.00	7,563.27	1,046.16	936.00	9.497	ES
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,800.00	7,564.50	1,072.23	956.28	9.247	SF
WANDELL 4-6-7 - CPR WELL - SURVEYS	11,310.42	7,597.90	715.34	612.42	6.950	CC, ES
WANDELL 4-6-7 - CPR WELL - SURVEYS	11,400.00	7,598.37	720.93	616.07	6.875	SF
WANDELL 6-0-7 - CPR WELL - SURVEYS	15,277.59	7,310.03	313.44	158.67	2.025	CC, ES, SF
WANDELL 6-4-7 - CPR WELL - SURVEYS	12,487.84	7,601.64	375.53	253.31	3.073	CC, ES, SF
WANDELL 6-8-7 - CPR WELL - SURVEYS	10,056.75	7,381.56	374.34	300.03	5.038	CC, ES, SF
WANDELL 8-2-7 - CPR WELL - SURVEYS	13,938.73	7,387.98	1,601.21	1,468.15	12.034	CC, ES
WANDELL 8-2-7 - CPR WELL - SURVEYS	14,000.00	7,388.14	1,602.38	1,468.88	12.003	SF
WANDELL 8-4-7 - CPR WELL - SURVEYS	12,728.99	7,623.00	1,579.36	1,453.99	12.597	CC, ES
WANDELL 8-4-7 - CPR WELL - SURVEYS	12,800.00	7,623.00	1,580.96	1,455.39	12.590	SF
WANDELL E UNIT 1 - CPR WELL - NO SURVEYS	10,947.09	7,237.00	745.05	668.91	9.786	CC, ES
WANDELL E UNIT 1 - CPR WELL - NO SURVEYS	11,000.00	7,237.00	746.93	670.57	9.782	SF

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

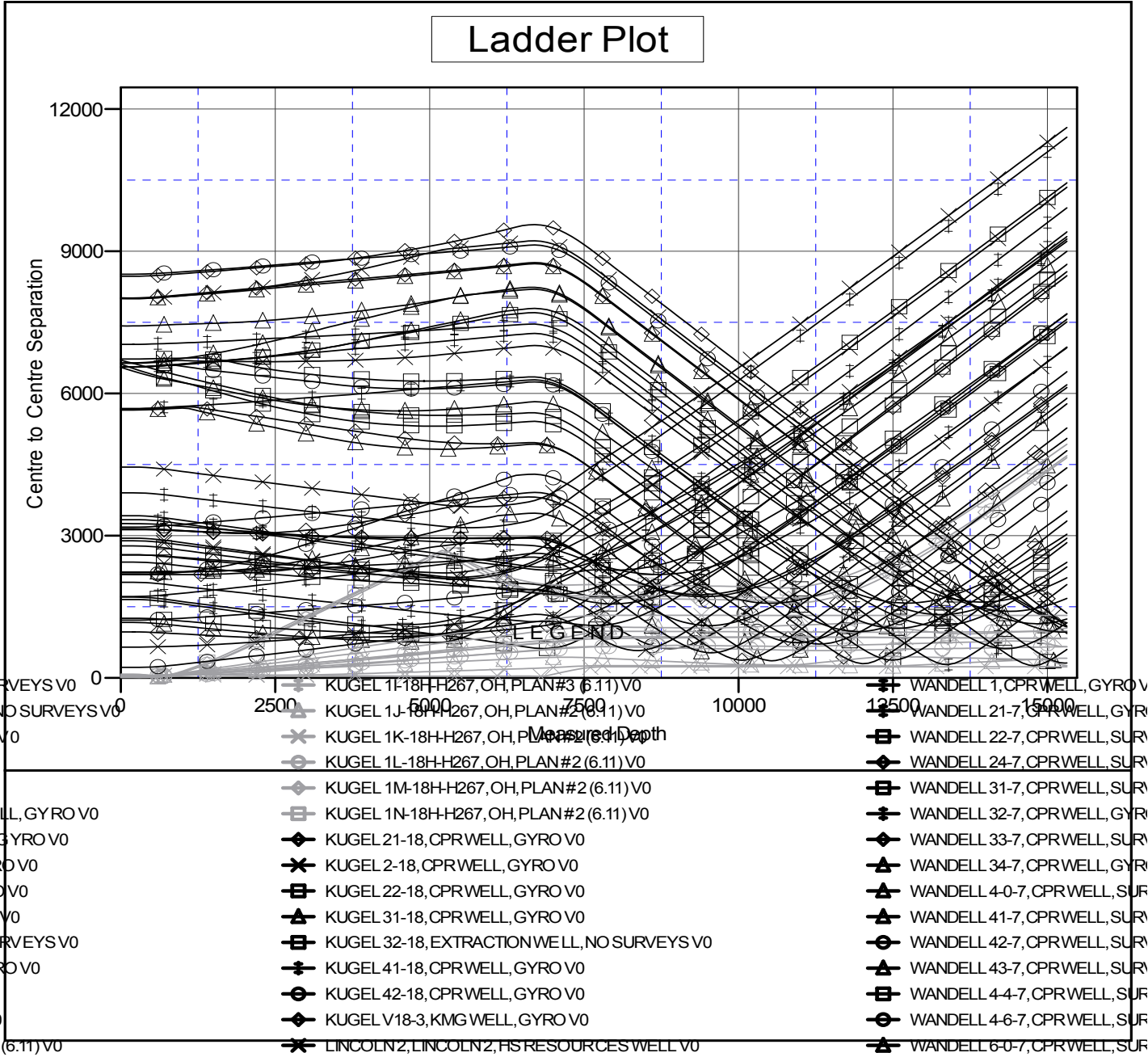
Cathedral Energy Services

Anticollision Summary Report

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well KUGEL 1F-18H-H267 - Slot KUGEL 1F
Project:	DJ BASIN	TVD Reference:	23' KB @ 4976.00usft
Reference Site:	S18-T2N-R67W (KUGEL)	MD Reference:	23' KB @ 4976.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	KUGEL 1F-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 @ 4976.00usft
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000

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



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

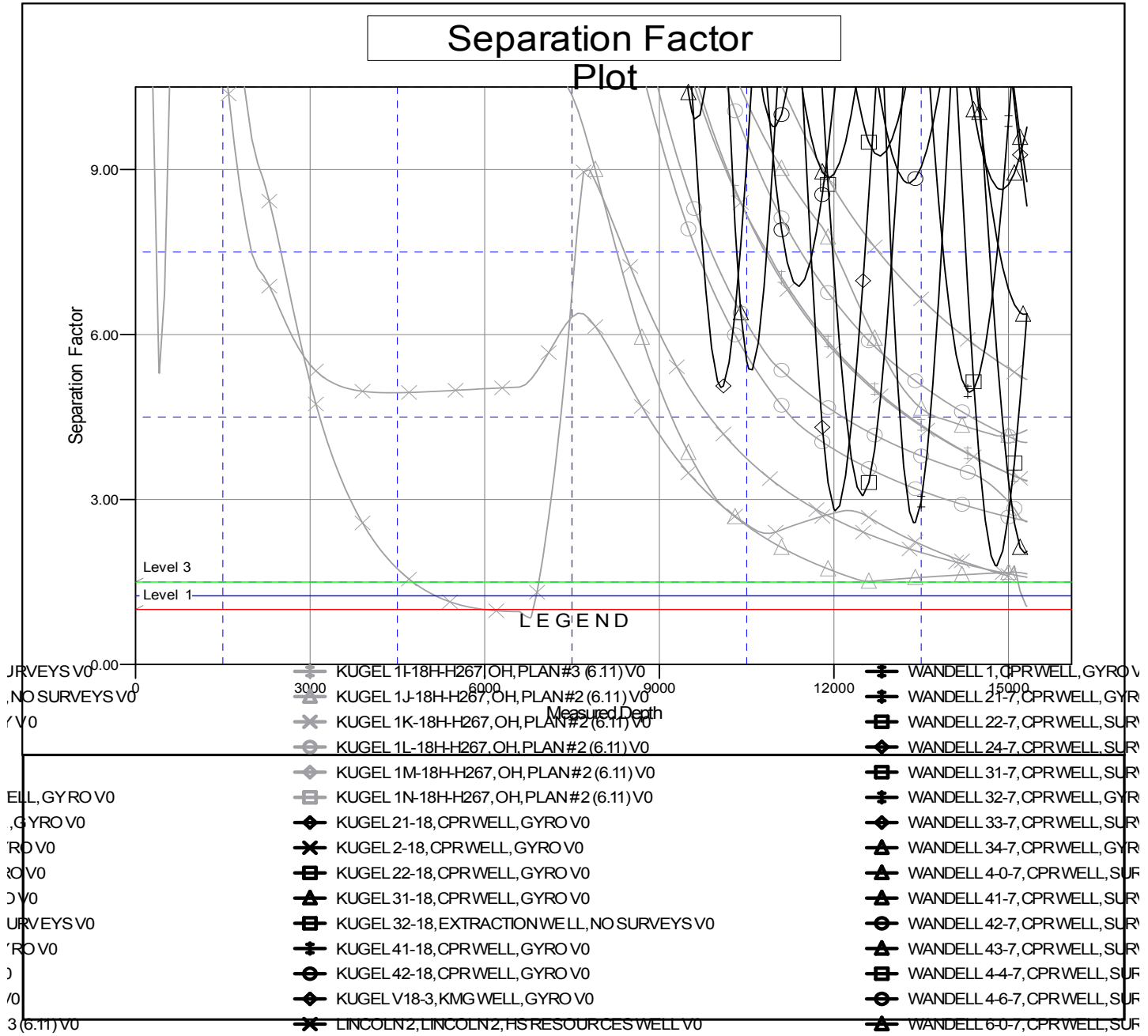
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Project: DJ BASIN	TVD Reference: 23' KB @ 4976.00usft
Reference Site: S18-T2N-R67W (KUGEL)	MD Reference: 23' KB @ 4976.00usft
Site Error: 0.00 usft	North Reference: True
Reference Well: KUGEL 1F-18H-H267	Survey Calculation Method: Minimum Curvature
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 @ 4976.00usft
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000

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



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