

Crestone Peak Resources

DJ BASIN

S18-T2N-R67W (KUGEL)

KUGEL 1D-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 1D-18H-H267 - Slot KUGEL 1D
Project:	DJ BASIN	TVD Reference:	23" KB @ 4977.00usft
Reference Site:	S18-T2N-R67W (KUGEL)	MD Reference:	23" KB @ 4977.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	KUGEL 1D-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	2,000.00	PLAN #2 (6.11) (OH)	VESSI_GYROFLEX	VESSI Gyroflex Gyro
2,001.00	15,481.80	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	4,610.50	4,508.84	842.91	813.68	28.832	CC
BRETT 1 - HS RESOURCES - NO SURVEYS	4,800.00	4,693.62	843.96	813.15	27.391	ES
BRETT 1 - HS RESOURCES - NO SURVEYS	5,200.00	5,037.00	854.26	820.38	25.214	SF
BRETT 2 - HS RESOURCES WELL - NO SURVEYS	5,508.83	5,035.00	2,101.94	2,068.55	62.954	CC, ES
BRETT 2 - HS RESOURCES WELL - NO SURVEYS	5,700.00	5,035.00	2,110.61	2,076.73	62.285	SF
BRETT 3 - KMG WELL - NO SURVEY	5,223.15	5,040.00	2,290.43	2,256.41	67.323	CC, ES
BRETT 3 - KMG WELL - NO SURVEY	5,600.00	5,040.00	2,321.22	2,285.83	65.592	SF
BRETT 4 - KMG WELL - GYRO	6,921.29	6,763.75	448.60	417.46	14.403	CC, ES
BRETT 4 - KMG WELL - GYRO	7,000.00	6,838.95	452.64	420.89	14.258	SF
DREW 1 - KMG WELL - GYRO	7,074.62	6,887.26	2,060.51	2,028.96	65.299	CC, ES
DREW 1 - KMG WELL - GYRO	7,500.00	7,207.22	2,132.06	2,098.72	63.934	SF
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	6,757.21	6,616.54	1,220.24	1,185.59	35.210	CC, ES
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	6,900.00	6,758.91	1,233.15	1,197.59	34.679	SF
FARNSWORTH 9-18A - KMG WELL - GYRO	2,472.13	2,422.47	895.42	887.08	107.374	CC
FARNSWORTH 9-18A - KMG WELL - GYRO	2,500.00	2,448.56	895.46	887.00	105.932	ES
FARNSWORTH 9-18A - KMG WELL - GYRO	6,800.00	6,625.98	1,290.89	1,258.28	39.592	SF
GTF RED V 6-16JI - KMG WELL - GYRO	15,481.80	7,246.70	1,392.94	1,257.22	10.264	CC, ES, SF
GTF RED V 6-4D - KMG WELL - GYRO	15,400.00	7,221.77	983.47	937.17	21.244	SF
GTF RED V 6-4D - KMG WELL - GYRO	15,481.80	7,224.58	913.67	870.77	21.300	CC, ES
GTF RED V6-16 - KMG WELL - GYRO	15,481.80	7,243.57	1,298.75	1,164.93	9.705	CC, ES, SF
HSR-OWEN 15-18A - KMG WELL - SURVEYS	4,093.47	3,772.39	1,047.73	1,031.88	66.137	CC
HSR-OWEN 15-18A - KMG WELL - SURVEYS	4,100.00	3,776.14	1,047.75	1,031.87	66.003	ES
HSR-OWEN 15-18A - KMG WELL - SURVEYS	7,100.00	6,946.88	1,910.93	1,872.28	49.439	SF
KUGEL 1 - EXTRACTION WELL - GYRO	9,004.51	7,335.01	866.23	821.90	19.541	CC, ES
KUGEL 1 - EXTRACTION WELL - GYRO	9,100.00	7,335.87	871.47	826.74	19.480	SF
KUGEL 1-18 - CPR WELL - GYRO	8,818.95	7,327.08	1,934.40	1,892.96	46.680	CC, ES
KUGEL 1-18 - CPR WELL - GYRO	9,700.00	7,324.67	2,125.60	2,072.93	40.359	SF
KUGEL 12-18 - KMG WELL - GYRO	8,054.12	7,319.55	1,438.03	1,402.08	40.002	CC, ES
KUGEL 12-18 - KMG WELL - GYRO	8,700.00	7,302.51	1,576.32	1,534.16	37.390	SF
KUGEL 1A-18H-H267 - OH - PLAN #3 (6.11)	454.62	454.95	27.77	26.37	19.957	CC, ES
KUGEL 1A-18H-H267 - OH - PLAN #3 (6.11)	15,100.00	15,384.74	596.37	361.97	2.544	SF
KUGEL 1B-18H-H267 - OH - PLAN #3 (6.11)	509.74	509.94	18.40	16.82	11.610	CC, ES
KUGEL 1B-18H-H267 - OH - PLAN #3 (6.11)	15,100.00	15,226.19	456.58	214.38	1.885	SF
KUGEL 1C-18H-H267 - OH - PLAN #2 (6.11)	555.30	555.40	9.12	7.38	5.225	CC, ES
KUGEL 1C-18H-H267 - OH - PLAN #2 (6.11)	12,600.00	12,608.65	168.05	8.21	1.051	Level 2, SF
KUGEL 1E-18H-H267 - OH - PLAN #2 (6.11)	687.12	683.97	8.56	6.36	3.887	CC

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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Project:	DJ BASIN	TVD Reference:	23" KB @ 4977.00usft
Reference Site:	S18-T2N-R67W (KUGEL)	MD Reference:	23" KB @ 4977.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	KUGEL 1D-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 Offset Well - Wellbore - Design	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)	700.00	696.84	8.58	6.33	3.818	ES
KUGEL 1E-18H-H267 - OH - PLAN #2 (6.11)	15,481.80	15,555.17	228.70	16.14	1.076	Level 2, SF
KUGEL 1F-18H-H267 - OH - PLAN #2 (6.11)	200.00	197.00	19.99	19.50	40.990	CC
KUGEL 1F-18H-H267 - OH - PLAN #2 (6.11)	15,481.80	15,316.84	258.78	13.77	1.056	Level 2, ES, SF
KUGEL 1G-18H-H267 - OH - PLAN #2 (6.11)	801.99	797.43	25.43	22.82	9.757	CC, ES
KUGEL 1G-18H-H267 - OH - PLAN #2 (6.11)	15,481.80	15,342.96	659.86	406.43	2.604	SF
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	200.00	196.00	39.99	39.51	82.301	CC, ES
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	15,481.80	15,255.58	912.28	659.54	3.610	SF
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	889.99	884.79	42.37	39.46	14.527	CC
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	900.00	894.70	42.40	39.45	14.365	ES
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	15,481.80	15,456.99	1,060.70	808.36	4.203	SF
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	200.00	196.00	59.98	59.50	123.441	CC, ES
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	15,481.80	15,100.00	1,294.94	1,050.10	5.289	SF
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	300.00	296.00	69.98	69.14	83.125	CC, ES
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	15,481.80	15,227.75	1,570.81	1,317.36	6.198	SF
KUGEL 1L-18H-H267 - OH - PLAN #2 (6.11)	857.25	856.81	31.84	29.02	11.304	CC, ES, SF
KUGEL 1M-18H-H267 - OH - PLAN #2 (6.11)	853.94	853.65	34.67	31.86	12.328	CC, ES, SF
KUGEL 1N-18H-H267 - OH - PLAN #2 (6.11)	808.98	810.26	38.08	35.41	14.273	CC, ES, SF
KUGEL 21-18 - CPR WELL - GYRO	9,552.74	7,332.12	1,464.85	1,413.79	28.686	CC
KUGEL 21-18 - CPR WELL - GYRO	9,600.00	7,333.15	1,465.62	1,413.73	28.247	ES
KUGEL 21-18 - CPR WELL - GYRO	10,000.00	7,341.81	1,531.58	1,473.75	26.485	SF
KUGEL 2-18 - CPR WELL - GYRO	635.28	617.38	631.49	629.47	313.877	CC
KUGEL 2-18 - CPR WELL - GYRO	700.00	681.50	631.55	629.31	282.491	ES
KUGEL 2-18 - CPR WELL - GYRO	8,600.00	7,332.77	835.81	796.31	21.160	SF
KUGEL 22-18 - CPR WELL - GYRO	8,083.23	7,296.00	1,314.19	1,278.07	36.388	CC, ES
KUGEL 22-18 - CPR WELL - GYRO	8,600.00	7,281.90	1,412.08	1,370.99	34.361	SF
KUGEL 31-18 - CPR WELL - GYRO	9,675.99	7,330.82	279.20	226.53	5.301	CC, ES
KUGEL 31-18 - CPR WELL - GYRO	9,700.00	7,330.95	280.23	226.76	5.241	SF
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	5,082.62	4,971.20	827.82	794.63	24.938	CC
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	5,100.00	4,988.15	827.83	794.49	24.830	ES
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	5,200.00	5,018.00	830.99	797.16	24.560	SF
KUGEL 41-18 - CPR WELL - GYRO	9,641.15	7,305.49	1,353.20	1,300.96	25.903	CC, ES
KUGEL 41-18 - CPR WELL - GYRO	9,800.00	7,306.79	1,362.49	1,309.13	25.536	SF
KUGEL 42-18 - CPR WELL - GYRO	539.45	522.74	222.52	220.86	134.108	CC, ES
KUGEL 42-18 - CPR WELL - GYRO	8,000.00	7,308.72	1,370.21	1,334.76	38.642	SF
KUGEL V18-3 - KMG WELL - GYRO	9,503.66	7,301.55	1,505.39	1,454.93	29.835	CC, ES
KUGEL V18-3 - KMG WELL - GYRO	10,000.00	7,316.95	1,585.02	1,527.25	27.434	SF
LINCOLN 2 - LINCOLN 2 - HS RESOURCES WELL	5,584.19	5,010.00	1,954.50	1,922.69	61.451	CC, ES
LINCOLN 2 - LINCOLN 2 - HS RESOURCES WELL	5,700.00	5,010.00	1,957.92	1,925.91	61.166	SF
LISA 1 - KMG WELL - GYRO	7,194.33	6,996.16	1,539.17	1,506.89	47.679	CC
LISA 1 - KMG WELL - GYRO	7,200.00	7,001.28	1,539.18	1,506.89	47.660	ES
LISA 1 - KMG WELL - GYRO	7,400.00	7,152.30	1,554.81	1,521.97	47.337	SF
LISA 2 - KMG WELL - GYRO	6,924.96	6,755.00	2,174.59	2,143.57	70.100	CC, ES
LISA 2 - KMG WELL - GYRO	7,300.00	7,097.49	2,249.37	2,216.23	67.872	SF
ROCKY MOUNTAIN FUEL 12 - HS RESOURCES WELL	5,700.58	5,100.00	3,158.04	3,123.27	90.838	CC, ES
ROCKY MOUNTAIN FUEL 12 - HS RESOURCES WELL	6,300.00	5,100.00	3,214.42	3,177.94	88.101	SF
ROCKY MTN FUEL D 8 - HS RESOURCES WELL - NO	5,838.17	5,026.00	3,556.21	3,522.25	104.716	CC, ES
ROCKY MTN FUEL D 8 - HS RESOURCES WELL - NO	6,500.00	5,026.00	3,617.27	3,581.55	101.281	SF
STREAR V 06-23D - KMG WELL - GYRO	15,481.80	7,337.78	1,435.18	1,359.03	18.845	CC, ES, SF
STREAR V 06-63HN - KMG WELL - SURVEYS	15,481.80	8,618.41	1,124.13	1,030.60	12.019	CC, ES, SF
WANDELL 1 - CPR WELL - GYRO	14,487.96	7,291.44	1,011.40	886.38	8.090	CC, ES, SF
WANDELL 21-7 - CPR WELL - GYRO	14,497.25	7,234.98	1,009.84	884.83	8.078	CC
WANDELL 21-7 - CPR WELL - GYRO	14,500.00	7,234.91	1,009.84	884.76	8.073	ES

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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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)						
WANDELL 21-7 - CPR WELL - GYRO	14,600.00	7,232.52	1,015.05	887.51	7.959	SF
WANDELL 22-7 - CPR WELL - SURVEYS	13,380.12	7,579.78	909.51	796.57	8.053	CC
WANDELL 22-7 - CPR WELL - SURVEYS	13,400.00	7,579.91	909.73	796.16	8.010	ES
WANDELL 22-7 - CPR WELL - SURVEYS	13,500.00	7,580.52	917.38	801.16	7.893	SF
WANDELL 24-7 - CPR WELL - SURVEYS	10,634.56	7,456.94	1,325.53	1,242.97	16.056	CC, ES
WANDELL 24-7 - CPR WELL - SURVEYS	11,000.00	7,458.75	1,362.73	1,274.68	15.477	SF
WANDELL 31-7 - CPR WELL - SURVEYS	14,900.00	7,388.96	123.87	-22.19	0.848	Level 1, ES, SF
WANDELL 31-7 - CPR WELL - SURVEYS	14,908.28	7,388.96	123.59	-21.65	0.851	Level 1, CC
WANDELL 32-7 - CPR WELL - GYRO	13,500.00	7,279.14	141.18	31.22	1.284	Level 3, ES, SF
WANDELL 32-7 - CPR WELL - GYRO	13,501.17	7,279.14	141.18	31.31	1.285	Level 3, CC
WANDELL 33-7 - CPR WELL - SURVEYS	12,134.36	7,454.06	110.48	1.12	1.010	Level 2, CC, ES, SF
WANDELL 34-7 - CPR WELL - GYRO	10,655.44	7,454.85	112.63	45.45	1.677	CC, ES, SF
WANDELL 4-0-7 - CPR WELL - SURVEYS	15,230.60	7,538.32	623.18	476.05	4.235	CC, ES
WANDELL 4-0-7 - CPR WELL - SURVEYS	15,300.00	7,538.22	631.19	481.15	4.207	SF
WANDELL 41-7 - CPR WELL - SURVEYS	15,481.80	7,379.40	1,476.18	1,347.22	11.447	CC, ES, SF
WANDELL 42-7 - CPR WELL - SURVEYS	13,422.03	7,455.98	1,523.77	1,397.27	12.046	CC, ES, SF
WANDELL 43-7 - CPR WELL - SURVEYS	11,880.52	7,667.95	1,366.82	1,256.08	12.342	CC, ES
WANDELL 43-7 - CPR WELL - SURVEYS	11,900.00	7,668.03	1,366.96	1,256.10	12.331	SF
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,679.23	7,626.27	599.07	490.18	5.502	CC
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,700.00	7,626.43	599.84	489.58	5.440	ES
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,800.00	7,627.20	612.03	496.44	5.295	SF
WANDELL 4-6-7 - CPR WELL - SURVEYS	11,485.46	7,666.85	393.92	288.86	3.749	CC
WANDELL 4-6-7 - CPR WELL - SURVEYS	11,500.00	7,666.92	394.18	288.82	3.741	ES, SF
WANDELL 6-0-7 - CPR WELL - SURVEYS	15,481.80	7,380.29	563.96	410.22	3.668	CC, ES, SF
WANDELL 6-4-7 - CPR WELL - SURVEYS	12,624.32	7,672.12	821.88	698.50	6.661	CC, ES, SF
WANDELL 6-8-7 - CPR WELL - SURVEYS	10,175.01	7,450.66	624.22	549.95	8.405	CC, ES
WANDELL 6-8-7 - CPR WELL - SURVEYS	10,200.00	7,450.76	624.72	550.31	8.396	SF
WANDELL 8-2-7 - CPR WELL - SURVEYS	14,123.82	7,463.24	2,007.44	1,873.23	14.958	CC, ES
WANDELL 8-2-7 - CPR WELL - SURVEYS	14,200.00	7,463.46	2,008.88	1,874.31	14.928	SF
WANDELL 8-4-7 - CPR WELL - SURVEYS	12,914.04	7,683.17	2,018.87	1,892.30	15.950	CC, ES, SF
WANDELL E UNIT 1 - CPR WELL - NO SURVEYS	10,978.41	7,306.00	1,009.36	934.10	13.412	CC, ES
WANDELL E UNIT 1 - CPR WELL - NO SURVEYS	11,100.00	7,306.00	1,019.22	942.97	13.368	SF

Cathedral Energy Services

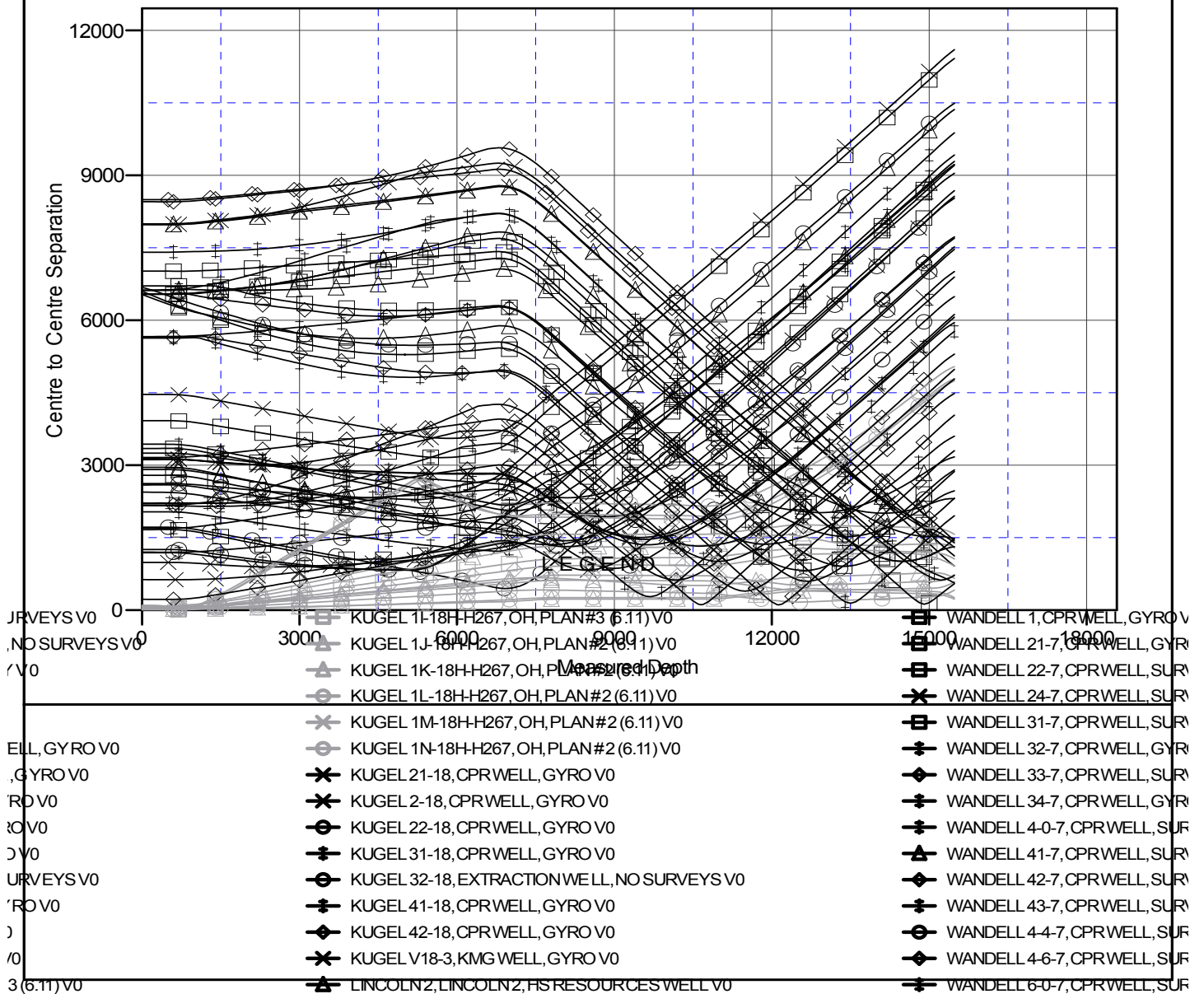
Anticollision Summary Report

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well KUGEL 1D-18H-H267 - Slot KUGEL 1D
Project:	DJ BASIN	TVD Reference:	23" KB @ 4977.00usft
Reference Site:	S18-T2N-R67W (KUGEL)	MD Reference:	23" KB @ 4977.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	KUGEL 1D-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 @ 4977.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: KUGEL 1D-18H-H267 - Slot KUGEL 1D
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

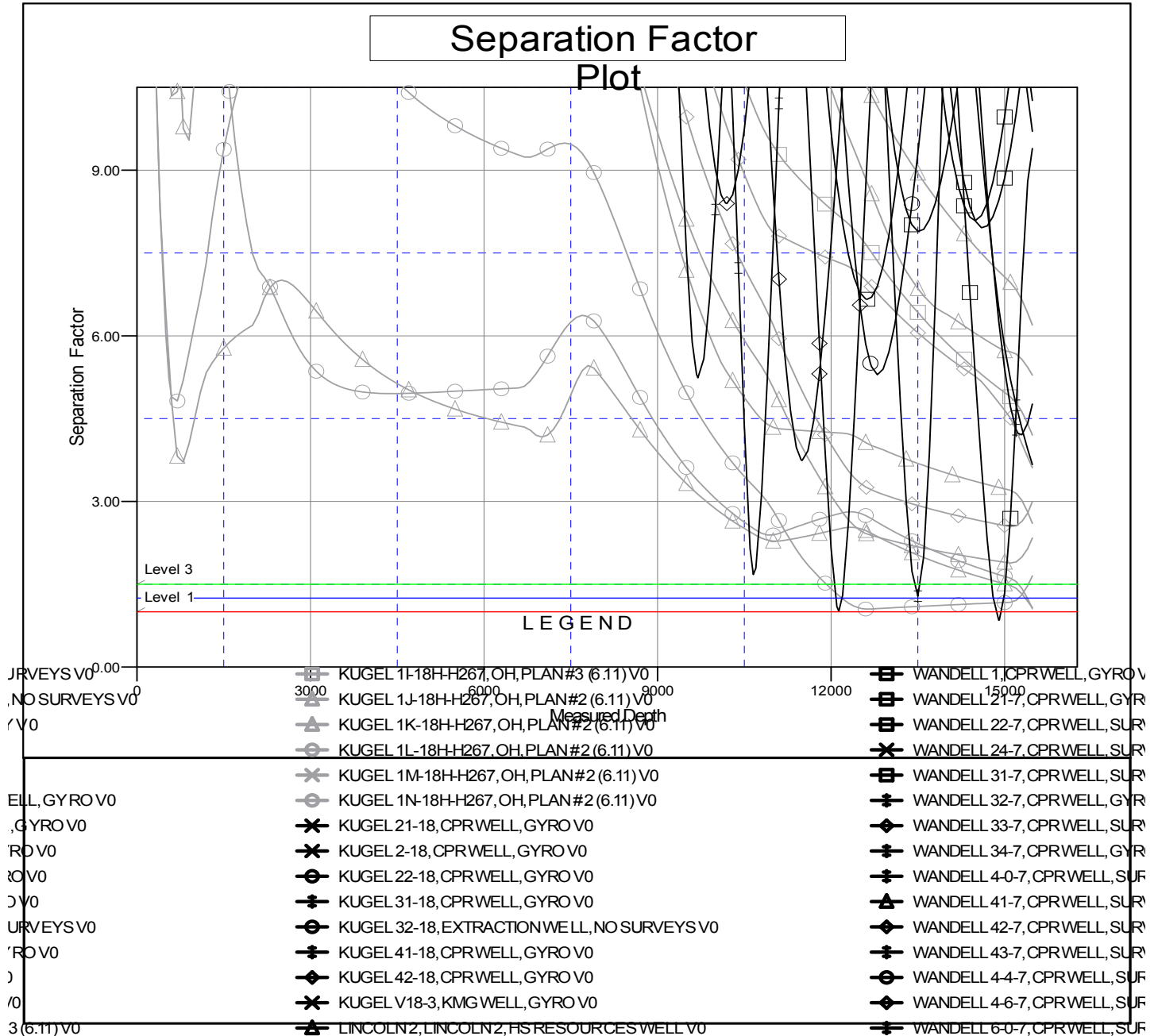
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Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well KUGEL 1D-18H-H267 - Slot KUGEL 1D
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Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	USA EDM 5000 Multi Users DB
Reference Design:	PLAN #2 (6.11)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 23" KB @ 4977.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: KUGEL 1D-18H-H267 - Slot KUGEL 1D
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