

Crestone Peak Resources

DJ BASIN

S18-T2N-R67W (KUGEL)

KUGEL 1B-18H-H267

OH

PLAN #3 (6.11)

Anticollision Summary Report

11 June, 2018

Cathedral Energy Services

Anticollision Summary Report

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well KUGEL 1B-18H-H267 - Slot KUGEL 1B
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 1B-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 #3 (6.11)	Offset TVD Reference:	Offset Datum

Reference	PLAN #3 (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 #3 (6.11) (OH)	VESSI_GYROFLEX	VESSI Gyroflex Gyro
2,001.00	15,593.90	PLAN #3 (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	3,121.57	3,011.70	982.66	964.46	53.984	CC
BRETT 1 - HS RESOURCES - NO SURVEYS	3,200.00	3,086.65	982.93	964.05	52.065	ES
BRETT 1 - HS RESOURCES - NO SURVEYS	5,200.00	4,997.93	1,157.74	1,121.99	32.379	SF
BRETT 2 - HS RESOURCES WELL - NO SURVEYS	5,528.81	5,035.00	2,052.27	2,014.31	54.068	CC, ES
BRETT 2 - HS RESOURCES WELL - NO SURVEYS	5,800.00	5,035.00	2,070.11	2,031.16	53.144	SF
BRETT 3 - KMG WELL - NO SURVEY	3,975.00	3,839.27	2,460.50	2,434.61	95.032	CC
BRETT 3 - KMG WELL - NO SURVEY	4,200.00	4,054.29	2,461.40	2,433.44	88.038	ES
BRETT 3 - KMG WELL - NO SURVEY	5,700.00	5,040.00	2,552.00	2,512.48	64.579	SF
BRETT 4 - KMG WELL - GYRO	6,650.36	6,380.34	391.30	352.07	9.976	CC
BRETT 4 - KMG WELL - GYRO	6,700.00	6,427.26	391.66	352.05	9.889	ES
BRETT 4 - KMG WELL - GYRO	6,800.00	6,522.40	394.05	353.74	9.778	SF
DREW 1 - KMG WELL - GYRO	7,214.25	6,901.99	1,550.79	1,517.38	46.420	CC, ES
DREW 1 - KMG WELL - GYRO	7,700.00	7,247.43	1,675.84	1,637.94	44.213	SF
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	5,976.48	5,766.00	1,428.02	1,393.92	41.879	CC
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	6,000.00	5,785.86	1,428.05	1,393.78	41.665	ES
DREW GAS UNIT-TRUE 1 - KMG WELL - GYRO	7,000.00	6,732.03	1,477.33	1,435.85	35.619	SF
FARNSWORTH 9-18A - KMG WELL - GYRO	1,685.79	1,659.56	978.53	972.61	165.184	CC
FARNSWORTH 9-18A - KMG WELL - GYRO	1,700.00	1,672.74	978.54	972.56	163.639	ES
FARNSWORTH 9-18A - KMG WELL - GYRO	6,900.00	6,602.14	1,837.63	1,803.52	53.869	SF
GTF RED V 6-16JI - KMG WELL - GYRO	15,528.70	7,245.62	1,971.52	1,833.74	14.309	CC, ES
GTF RED V 6-16JI - KMG WELL - GYRO	15,593.90	7,244.74	1,986.91	1,847.59	14.262	SF
GTF RED V 6-4D - KMG WELL - GYRO	15,593.90	7,217.98	1,119.59	1,016.59	10.870	CC, ES, SF
GTF RED V6-16 - KMG WELL - GYRO	15,533.82	7,242.60	1,871.09	1,733.80	13.629	CC, ES
GTF RED V6-16 - KMG WELL - GYRO	15,593.90	7,242.15	1,884.41	1,745.55	13.571	SF
HSR-OWEN 15-18A - KMG WELL - SURVEYS	4,209.72	3,840.47	843.86	825.78	46.674	CC, ES
HSR-OWEN 15-18A - KMG WELL - SURVEYS	5,000.00	4,510.00	882.90	858.96	36.868	SF
KUGEL 1 - EXTRACTION WELL - GYRO	374.72	358.75	1,180.49	1,179.40	1,083.749	CC
KUGEL 1 - EXTRACTION WELL - GYRO	500.00	488.28	1,180.76	1,179.23	769.269	ES
KUGEL 1 - EXTRACTION WELL - GYRO	9,300.00	7,337.77	1,488.84	1,443.30	32.699	SF
KUGEL 1-18 - CPR WELL - GYRO	8,949.71	7,324.83	1,318.65	1,276.77	31.483	CC, ES
KUGEL 1-18 - CPR WELL - GYRO	9,500.00	7,323.58	1,428.86	1,377.90	28.039	SF
KUGEL 12-18 - KMG WELL - GYRO	8,186.95	7,328.82	818.79	781.79	22.126	CC, ES
KUGEL 12-18 - KMG WELL - GYRO	8,500.00	7,320.55	876.56	835.52	21.362	SF
KUGEL 1A-18H-H267 - OH - PLAN #3 (6.11)	356.11	356.19	9.27	8.23	8.905	CC
KUGEL 1A-18H-H267 - OH - PLAN #3 (6.11)	6,900.00	6,896.53	49.52	-1.07	0.979	Level 1, ES, SF
KUGEL 1C-18H-H267 - OH - PLAN #2 (6.11)	455.04	451.95	9.22	7.83	6.651	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 1B-18H-H267 - Slot KUGEL 1B
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 1B-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 #3 (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 1C-18H-H267 - OH - PLAN #2 (6.11)	15,500.00	15,391.27	189.92	-44.40	0.810	Level 1, ES, SF
KUGEL 1D-18H-H267 - OH - PLAN #2 (6.11)	510.41	507.21	18.40	16.82	11.635	CC, ES
KUGEL 1D-18H-H267 - OH - PLAN #2 (6.11)	15,200.00	15,063.59	455.89	215.26	1.895	SF
KUGEL 1E-18H-H267 - OH - PLAN #2 (6.11)	559.30	555.94	27.60	25.85	15.733	CC, ES
KUGEL 1E-18H-H267 - OH - PLAN #2 (6.11)	15,500.00	15,481.68	770.57	521.94	3.099	SF
KUGEL 1F-18H-H267 - OH - PLAN #2 (6.11)	200.00	197.00	39.98	39.49	81.980	CC, ES
KUGEL 1F-18H-H267 - OH - PLAN #2 (6.11)	15,500.00	15,245.06	838.15	588.93	3.363	SF
KUGEL 1G-18H-H267 - OH - PLAN #2 (6.11)	634.74	629.97	46.01	43.99	22.778	CC, ES
KUGEL 1G-18H-H267 - OH - PLAN #2 (6.11)	15,500.00	15,252.21	1,245.05	994.93	4.978	SF
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	200.00	196.00	59.98	59.50	123.441	CC, ES
KUGEL 1H-18H-H267 - OH - PLAN #3 (6.11)	15,500.00	15,255.58	1,497.93	1,245.86	5.942	SF
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	696.18	690.91	64.40	62.17	28.780	CC
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	700.00	694.70	64.41	62.16	28.608	ES
KUGEL 1I-18H-H267 - OH - PLAN #3 (6.11)	15,500.00	15,413.89	1,642.47	1,391.02	6.532	SF
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	200.00	196.00	79.97	79.49	164.582	CC, ES
KUGEL 1J-18H-H267 - OH - PLAN #2 (6.11)	15,300.00	14,900.00	1,838.37	1,597.30	7.626	SF
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	300.00	296.00	89.97	89.13	106.869	CC, ES
KUGEL 1K-18H-H267 - OH - PLAN #2 (6.11)	15,500.00	15,177.86	2,155.72	1,904.52	8.582	SF
KUGEL 1L-18H-H267 - OH - PLAN #2 (6.11)	806.25	806.56	62.26	59.60	23.467	CC, ES
KUGEL 1L-18H-H267 - OH - PLAN #2 (6.11)	900.00	895.53	69.65	66.67	23.341	SF
KUGEL 1M-18H-H267 - OH - PLAN #2 (6.11)	806.67	807.24	65.07	62.40	24.453	CC, ES
KUGEL 1M-18H-H267 - OH - PLAN #2 (6.11)	900.00	895.20	72.85	69.86	24.338	SF
KUGEL 1N-18H-H267 - OH - PLAN #2 (6.11)	770.65	772.92	66.27	63.73	26.019	CC, ES
KUGEL 1N-18H-H267 - OH - PLAN #2 (6.11)	800.00	800.67	67.07	64.42	25.324	SF
KUGEL 21-18 - CPR WELL - GYRO	9,685.60	7,328.86	852.52	801.38	16.668	CC
KUGEL 21-18 - CPR WELL - GYRO	9,700.00	7,329.18	852.64	801.14	16.553	ES
KUGEL 21-18 - CPR WELL - GYRO	9,900.00	7,333.59	879.05	822.99	15.679	SF
KUGEL 2-18 - CPR WELL - GYRO	1,006.87	980.09	607.84	604.52	182.731	CC, ES
KUGEL 2-18 - CPR WELL - GYRO	8,800.00	7,331.18	1,455.14	1,414.58	35.880	SF
KUGEL 22-18 - CPR WELL - GYRO	8,216.36	7,318.77	695.43	658.19	18.677	CC, ES
KUGEL 22-18 - CPR WELL - GYRO	8,400.00	7,314.47	719.25	679.72	18.197	SF
KUGEL 31-18 - CPR WELL - GYRO	9,800.00	7,323.31	332.82	279.78	6.276	SF
KUGEL 31-18 - CPR WELL - GYRO	9,814.40	7,323.37	332.51	279.75	6.303	CC, ES
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	4,361.78	4,198.90	651.01	621.60	22.135	CC
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	4,400.00	4,235.42	651.11	621.35	21.879	ES
KUGEL 32-18 - EXTRACTION WELL - NO SURVEYS	5,200.00	4,999.93	696.25	659.79	19.099	SF
KUGEL 41-18 - CPR WELL - GYRO	100.00	57.94	1,678.07	1,677.95	10,000.000	CC
KUGEL 41-18 - CPR WELL - GYRO	339.55	309.33	1,678.22	1,677.28	1,789.987	ES
KUGEL 41-18 - CPR WELL - GYRO	10,100.00	7,306.08	1,989.84	1,935.43	36.574	SF
KUGEL 42-18 - CPR WELL - GYRO	319.98	302.24	228.82	227.94	258.621	CC, ES
KUGEL 42-18 - CPR WELL - GYRO	8,400.00	7,295.33	2,024.72	1,987.21	53.972	SF
KUGEL V18-3 - KMG WELL - GYRO	9,636.59	7,307.10	892.85	842.23	17.639	CC, ES
KUGEL V18-3 - KMG WELL - GYRO	9,900.00	7,315.37	930.86	874.53	16.526	SF
LINCOLN 2 - LINCOLN 2 - HS RESOURCES WELL	5,712.61	5,010.00	1,572.98	1,540.11	47.862	CC, ES
LINCOLN 2 - LINCOLN 2 - HS RESOURCES WELL	5,800.00	5,010.00	1,575.40	1,542.46	47.829	SF
LISA 1 - KMG WELL - GYRO	7,300.62	6,977.73	987.84	954.44	29.580	CC, ES
LISA 1 - KMG WELL - GYRO	7,600.00	7,195.19	1,038.04	1,001.93	28.749	SF
LISA 2 - KMG WELL - GYRO	7,051.73	6,759.30	1,826.73	1,790.92	51.008	CC, ES
LISA 2 - KMG WELL - GYRO	7,400.00	7,075.93	1,903.34	1,864.41	48.887	SF
ROCKY MOUNTAIN FUEL 12 - HS RESOURCES WELL	5,720.82	5,100.00	3,126.37	3,087.04	79.488	CC, ES
ROCKY MOUNTAIN FUEL 12 - HS RESOURCES WELL	6,400.00	5,100.00	3,199.29	3,157.32	76.234	SF
ROCKY MTN FUEL D 8 - HS RESOURCES WELL - NO	5,940.23	5,026.00	3,400.47	3,362.12	88.671	CC, ES
ROCKY MTN FUEL D 8 - HS RESOURCES WELL - NO	6,600.00	5,026.00	3,463.88	3,423.27	85.296	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 1B-18H-H267 - Slot KUGEL 1B
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 1B-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 #3 (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)						
STREAR V 06-23D - KMG WELL - GYRO	15,593.90	7,335.15	1,763.45	1,652.05	15.830	CC, ES, SF
STREAR V 06-63HN - KMG WELL - SURVEYS	15,593.90	9,235.35	1,195.41	1,076.86	10.084	CC, ES, SF
WANDELL 1 - CPR WELL - GYRO	14,591.67	7,299.48	1,453.95	1,330.50	11.778	CC
WANDELL 1 - CPR WELL - GYRO	14,600.00	7,299.52	1,453.97	1,330.48	11.774	ES, SF
WANDELL 21-7 - CPR WELL - GYRO	14,646.01	7,243.53	566.61	442.46	4.564	CC, ES
WANDELL 21-7 - CPR WELL - GYRO	14,700.00	7,242.23	569.17	443.17	4.517	SF
WANDELL 22-7 - CPR WELL - SURVEYS	13,527.12	7,578.68	491.25	379.42	4.393	CC, ES
WANDELL 22-7 - CPR WELL - SURVEYS	13,600.00	7,579.12	496.63	381.91	4.329	SF
WANDELL 24-7 - CPR WELL - SURVEYS	10,768.15	7,460.07	718.22	635.85	8.720	CC
WANDELL 24-7 - CPR WELL - SURVEYS	10,800.00	7,460.23	718.93	635.58	8.626	ES
WANDELL 24-7 - CPR WELL - SURVEYS	10,900.00	7,460.70	730.22	644.41	8.510	SF
WANDELL 31-7 - CPR WELL - SURVEYS	15,000.00	7,392.32	576.71	432.25	3.992	SF
WANDELL 31-7 - CPR WELL - SURVEYS	15,031.75	7,392.37	575.83	431.75	3.997	CC, ES
WANDELL 32-7 - CPR WELL - GYRO	13,600.00	7,280.67	562.43	453.82	5.178	SF
WANDELL 32-7 - CPR WELL - GYRO	13,624.64	7,280.68	561.89	453.49	5.183	CC, ES
WANDELL 33-7 - CPR WELL - SURVEYS	12,278.34	7,453.86	548.79	441.54	5.117	CC, ES, SF
WANDELL 34-7 - CPR WELL - GYRO	10,794.64	7,457.82	494.57	427.51	7.375	CC, ES, SF
WANDELL 4-0-7 - CPR WELL - SURVEYS	15,500.00	7,539.22	131.11	-19.32	0.872	Level 1, ES, SF
WANDELL 4-0-7 - CPR WELL - SURVEYS	15,593.90	7,539.11	124.80	-4.26	0.967	Level 1, CC
WANDELL 41-7 - CPR WELL - SURVEYS	15,093.57	7,375.23	1,979.13	1,847.91	15.083	CC
WANDELL 41-7 - CPR WELL - SURVEYS	15,100.00	7,375.38	1,979.14	1,847.88	15.078	ES
WANDELL 41-7 - CPR WELL - SURVEYS	15,200.00	7,377.66	1,981.98	1,850.13	15.031	SF
WANDELL 42-7 - CPR WELL - SURVEYS	13,514.52	7,461.56	1,942.35	1,817.69	15.582	CC, ES
WANDELL 42-7 - CPR WELL - SURVEYS	13,600.00	7,461.61	1,944.23	1,819.18	15.548	SF
WANDELL 43-7 - CPR WELL - SURVEYS	12,199.50	7,671.12	1,828.09	1,718.34	16.657	CC, ES, SF
WANDELL 4-4-7 - CPR WELL - SURVEYS	12,816.26	7,622.16	196.97	89.28	1.829	CC, ES, SF
WANDELL 4-6-7 - CPR WELL - SURVEYS	11,566.28	7,666.04	138.33	35.98	1.352	Level 3, CC, ES, SF
WANDELL 6-0-7 - CPR WELL - SURVEYS	15,500.00	7,387.05	1,148.20	994.46	7.468	CC, ES, SF
WANDELL 6-4-7 - CPR WELL - SURVEYS	12,748.27	7,674.29	1,223.33	1,101.79	10.065	CC, ES
WANDELL 6-4-7 - CPR WELL - SURVEYS	12,800.00	7,674.12	1,224.43	1,102.76	10.063	SF
WANDELL 6-8-7 - CPR WELL - SURVEYS	10,317.65	7,451.91	1,233.65	1,159.33	16.599	CC, ES
WANDELL 6-8-7 - CPR WELL - SURVEYS	10,400.00	7,452.22	1,236.39	1,161.64	16.541	SF
WANDELL 8-2-7 - CPR WELL - SURVEYS	14,205.28	7,469.26	2,441.60	2,309.26	18.449	CC, ES
WANDELL 8-2-7 - CPR WELL - SURVEYS	14,400.00	7,469.88	2,449.35	2,315.90	18.355	SF
WANDELL 8-4-7 - CPR WELL - SURVEYS	12,995.53	7,684.88	2,425.95	2,301.31	19.463	CC
WANDELL 8-4-7 - CPR WELL - SURVEYS	13,000.00	7,684.90	2,425.96	2,301.29	19.460	ES
WANDELL 8-4-7 - CPR WELL - SURVEYS	13,100.00	7,685.34	2,428.20	2,303.18	19.423	SF
WANDELL E UNIT 1 - CPR WELL - NO SURVEYS	11,209.44	7,307.00	1,600.23	1,524.46	21.119	CC, ES
WANDELL E UNIT 1 - CPR WELL - NO SURVEYS	11,300.00	7,307.00	1,602.79	1,526.57	21.027	SF

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

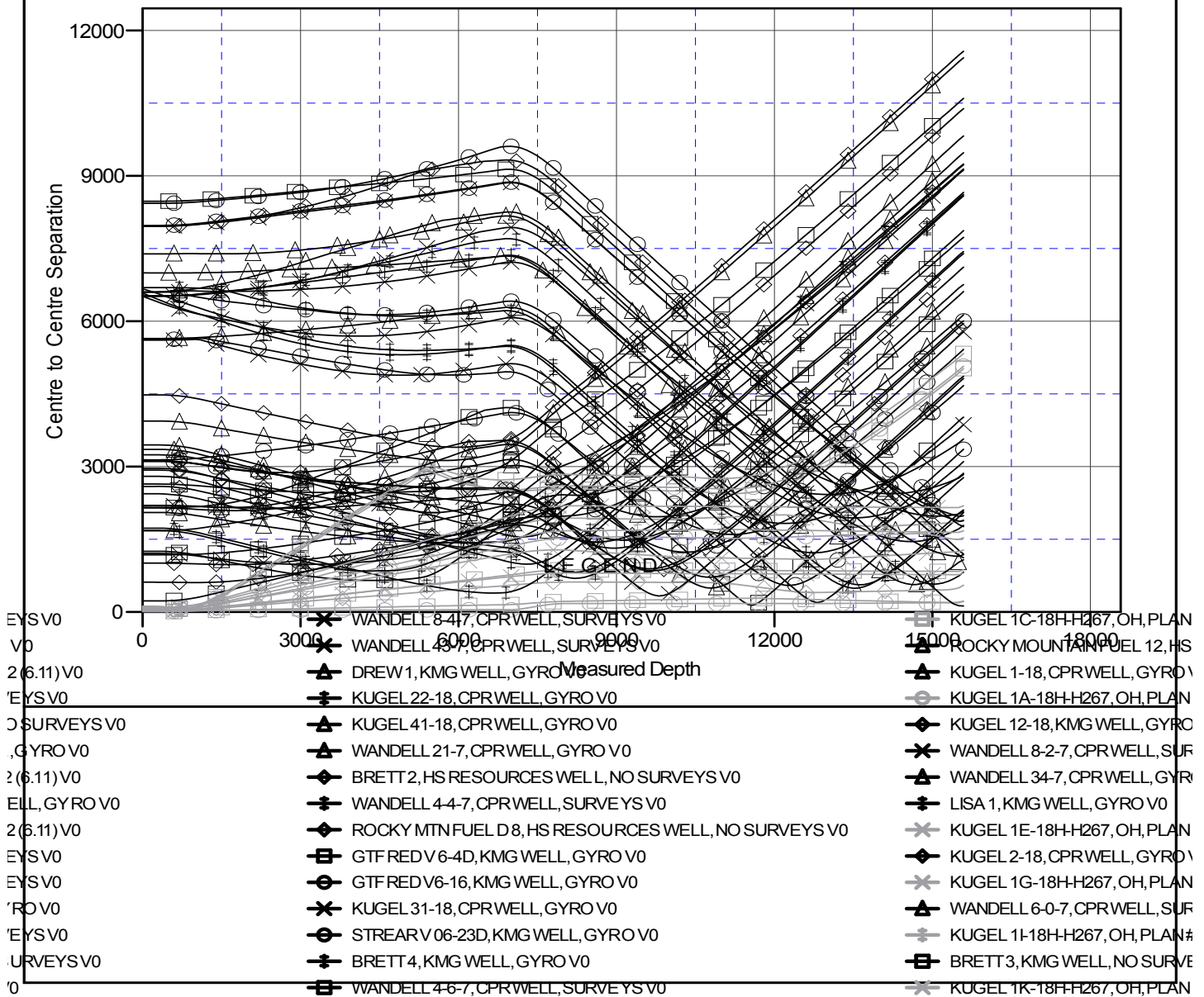
Cathedral Energy Services
Anticollision Summary Report

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well KUGEL 1B-18H-H267 - Slot KUGEL 1B
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 1B-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 #3 (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 1B-18H-H267 - Slot KUGEL 1B
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.37°

Ladder Plot



Cathedral Energy Services

Anticollision Summary Report

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well KUGEL 1B-18H-H267 - Slot KUGEL 1B
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 1B-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 #3 (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 1B-18H-H267 - Slot KUGEL 1B
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.37°

