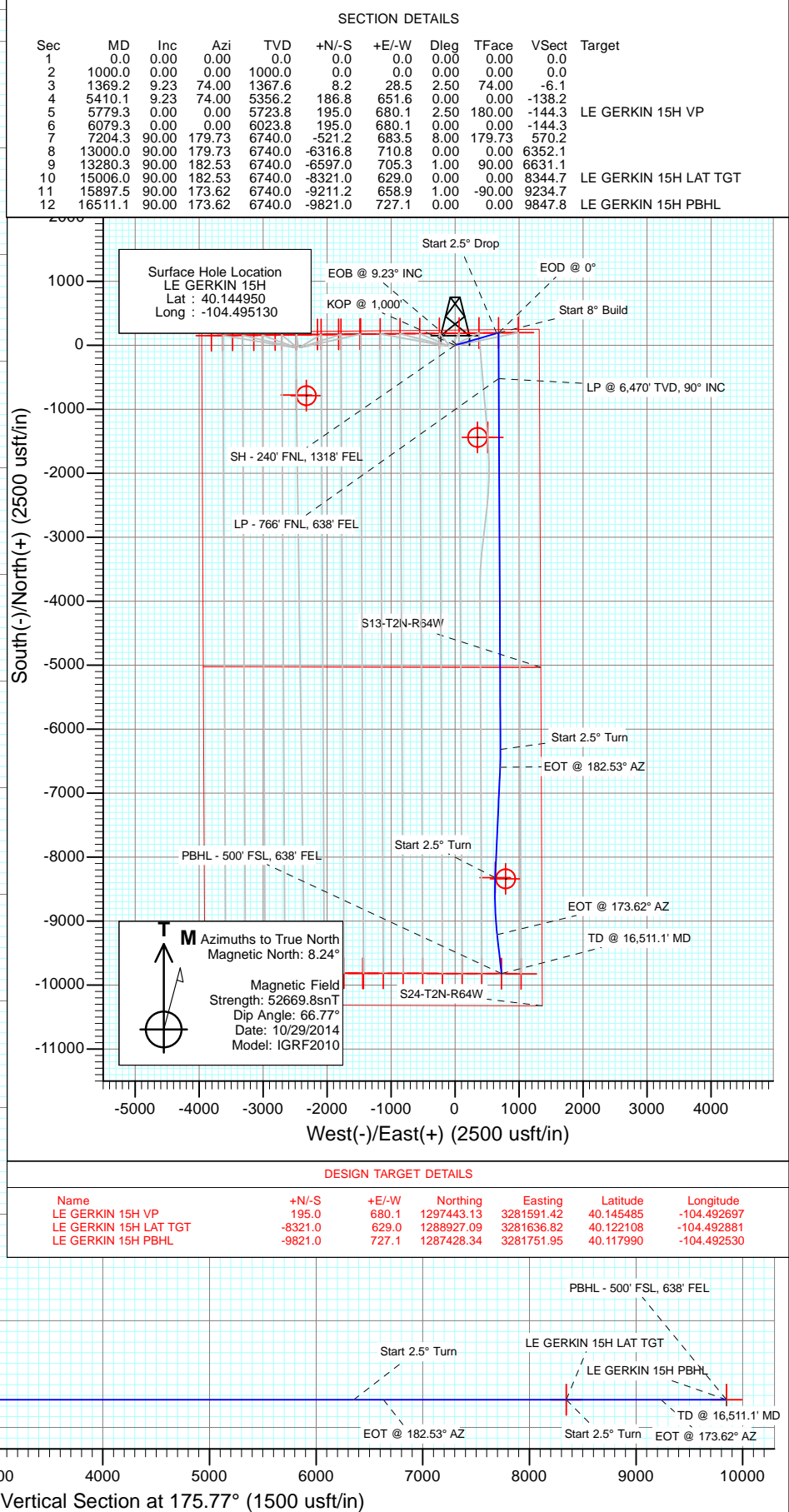
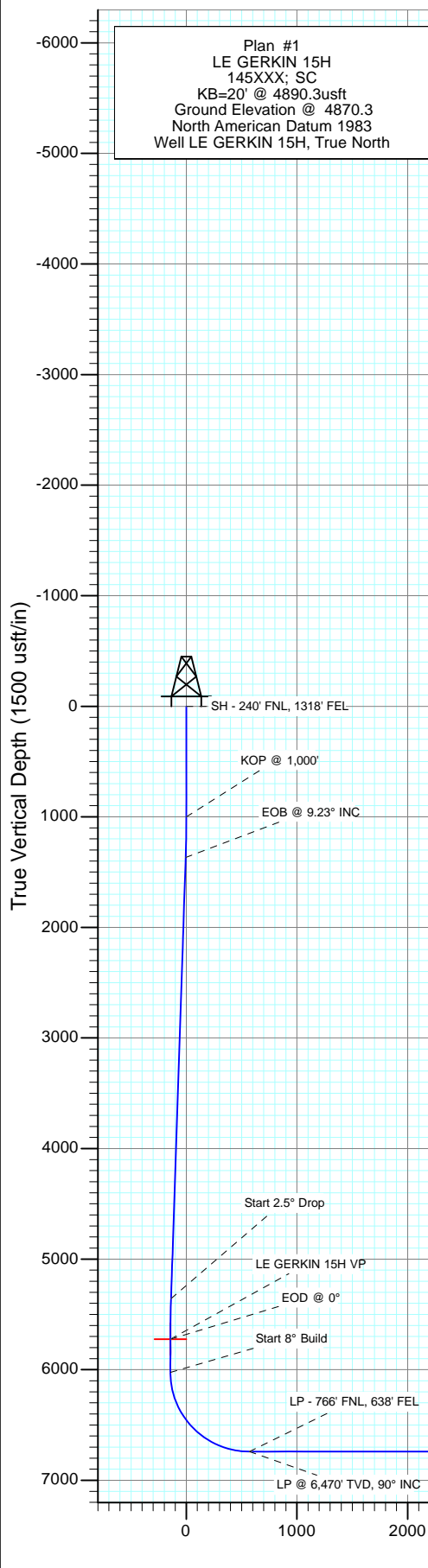
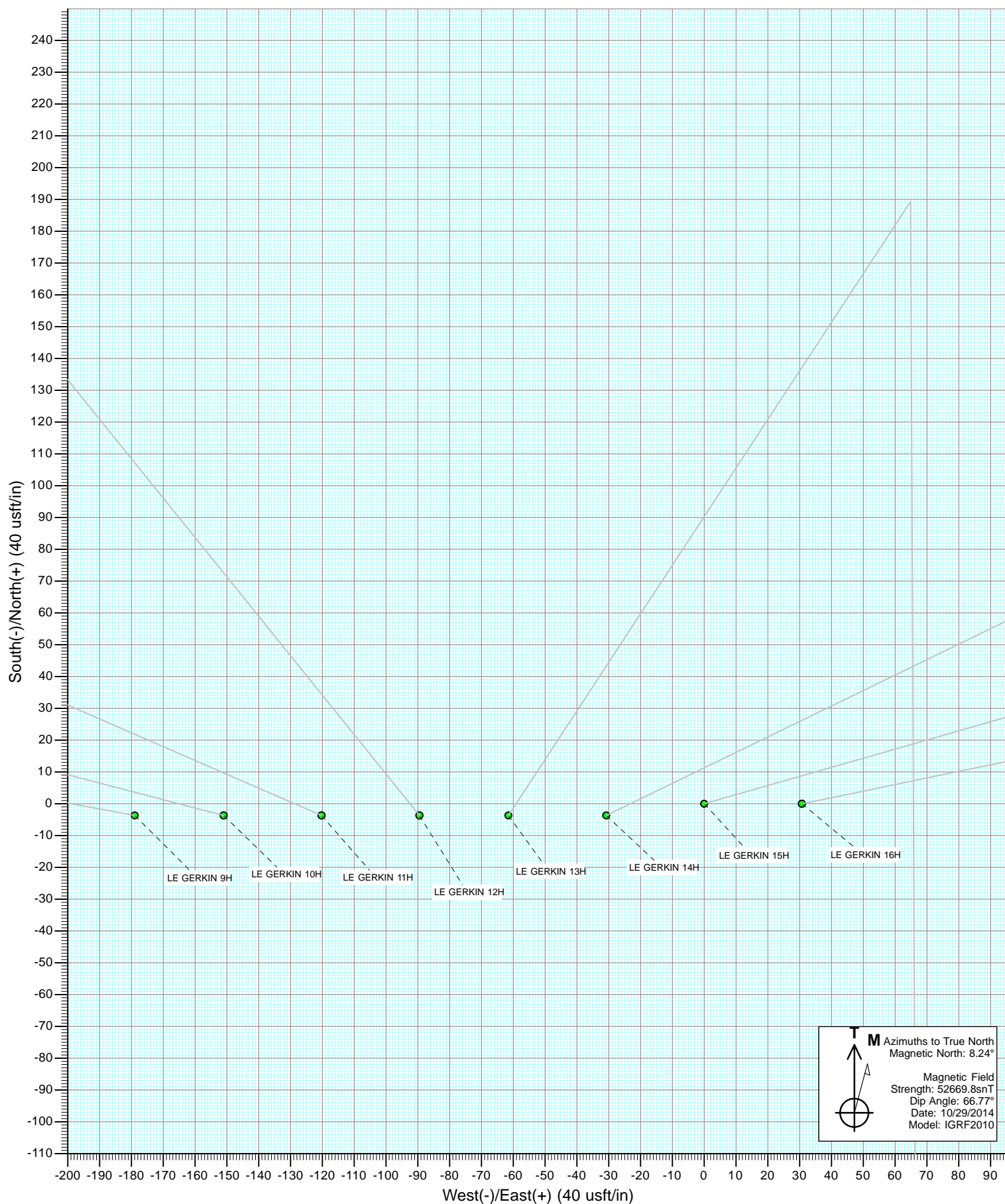
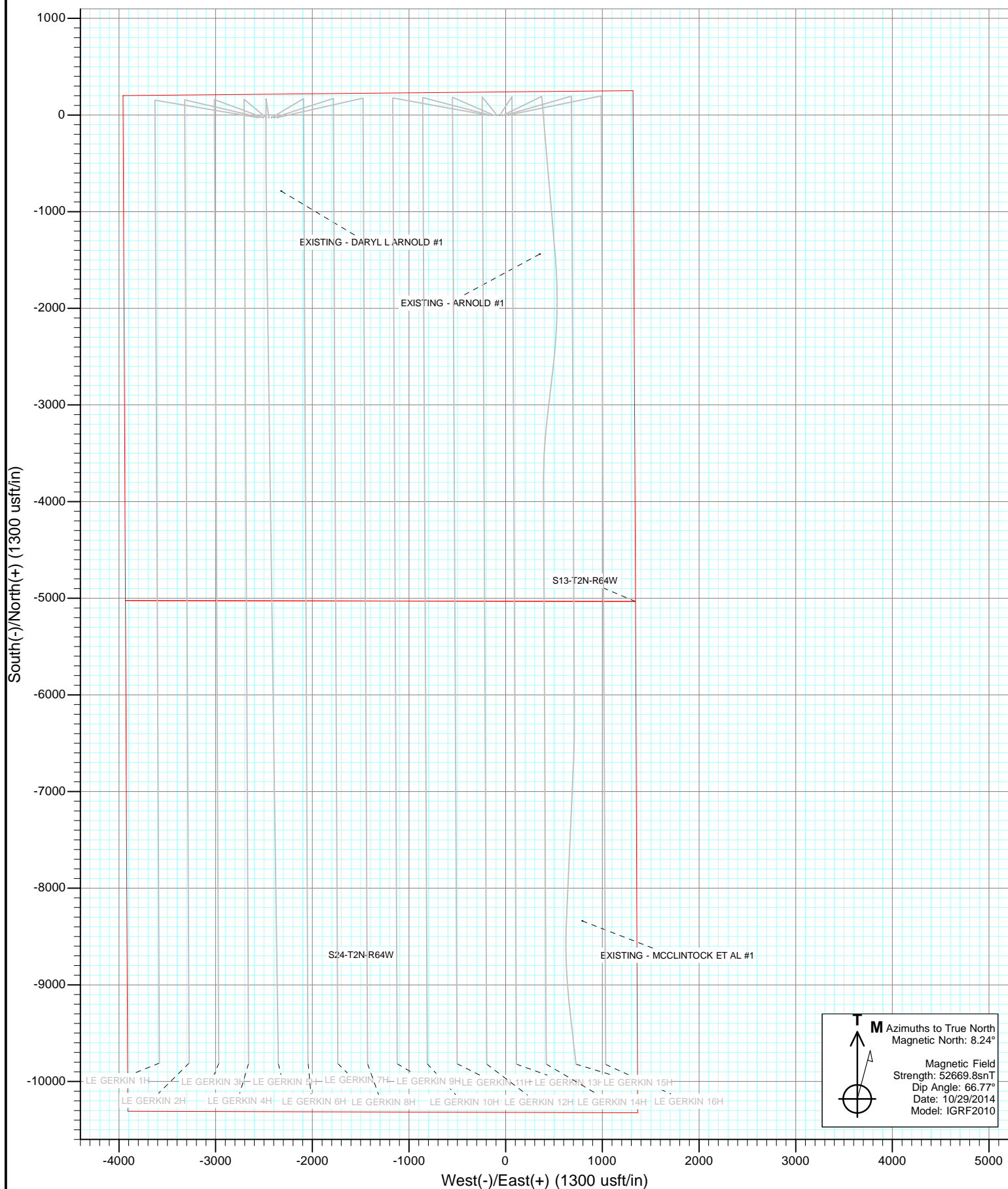




Project: Weld County, Colorado
 Site: S13-T2N-R64W (LE GERKIN PADS)
 Well: LE GERKIN 15H
 Wellbore: HZ
 Design: Plan #1







Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well LE GERKIN 15H
Company:	Red Hawk Petroleum	TVD Reference:	KB=20' @ 4890.3usft
Project:	Weld County, Colorado	MD Reference:	KB=20' @ 4890.3usft
Site:	S13-T2N-R64W (LE GERKIN PADS)	North Reference:	True
Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Project	Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		S13-T2N-R64W (LE GERKIN PADS)			
Site Position:		Northing:	1,297,185.96 usft	Latitude:	40.144880
From:	Lat/Long	Easting:	3,278,344.88 usft	Longitude:	-104.504320
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.64 °

Well	LE GERKIN 15H					
Well Position	+N/-S	0.0 usft	Northing:	1,297,240.43 usft	Latitude:	40.144950
	+E/-W	0.0 usft	Easting:	3,280,913.57 usft	Longitude:	-104.495130
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,870.3 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	10/29/2014	8.24	66.77	52,670

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	175.77

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,369.2	9.23	74.00	1,367.6	8.2	28.5	2.50	2.50	0.00	74.00	
5,410.1	9.23	74.00	5,356.2	186.8	651.6	0.00	0.00	0.00	0.00	
5,779.3	0.00	0.00	5,723.8	195.0	680.1	2.50	-2.50	0.00	180.00	LE GERKIN 15H VP
6,079.3	0.00	0.00	6,023.8	195.0	680.1	0.00	0.00	0.00	0.00	
7,204.3	90.00	179.73	6,740.0	-521.2	683.5	8.00	8.00	0.00	179.73	
13,000.0	90.00	179.73	6,740.0	-6,316.8	710.8	0.00	0.00	0.00	0.00	
13,280.3	90.00	182.53	6,740.0	-6,597.0	705.3	1.00	0.00	1.00	90.00	
15,006.0	90.00	182.53	6,740.0	-8,321.0	629.0	0.00	0.00	0.00	0.00	LE GERKIN 15H LAT
15,897.5	90.00	173.62	6,740.0	-9,211.2	658.9	1.00	0.00	-1.00	-90.00	
16,511.1	90.00	173.62	6,740.0	-9,821.0	727.1	0.00	0.00	0.00	0.00	LE GERKIN 15H PBH

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well LE GERKIN 15H
Company:	Red Hawk Petroleum	TVD Reference:	KB=20' @ 4890.3usft
Project:	Weld County, Colorado	MD Reference:	KB=20' @ 4890.3usft
Site:	S13-T2N-R64W (LE GERKIN PADS)	North Reference:	True
Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
0.5	0.00	0.00	0.5	0.0	0.0	0.0	0.00	0.00	SH - 240' FNL, 1318' FEL
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	KOP @ 1,000'
1,100.0	2.50	74.00	1,100.0	0.6	2.1	-0.4	2.50	2.50	
1,200.0	5.00	74.00	1,199.7	2.4	8.4	-1.8	2.50	2.50	
1,300.0	7.50	74.00	1,299.1	5.4	18.8	-4.0	2.50	2.50	
1,369.2	9.23	74.00	1,367.6	8.2	28.5	-6.1	2.50	2.50	EOB @ 9.23° INC
1,400.0	9.23	74.00	1,398.0	9.5	33.3	-7.1	0.00	0.00	
1,500.0	9.23	74.00	1,496.7	14.0	48.7	-10.3	0.00	0.00	
1,600.0	9.23	74.00	1,595.4	18.4	64.1	-13.6	0.00	0.00	
1,700.0	9.23	74.00	1,694.1	22.8	79.5	-16.9	0.00	0.00	
1,800.0	9.23	74.00	1,792.8	27.2	94.9	-20.1	0.00	0.00	
1,900.0	9.23	74.00	1,891.5	31.6	110.4	-23.4	0.00	0.00	
2,000.0	9.23	74.00	1,990.2	36.1	125.8	-26.7	0.00	0.00	
2,100.0	9.23	74.00	2,088.9	40.5	141.2	-29.9	0.00	0.00	
2,200.0	9.23	74.00	2,187.6	44.9	156.6	-33.2	0.00	0.00	
2,300.0	9.23	74.00	2,286.4	49.3	172.0	-36.5	0.00	0.00	
2,400.0	9.23	74.00	2,385.1	53.7	187.5	-39.8	0.00	0.00	
2,500.0	9.23	74.00	2,483.8	58.2	202.9	-43.0	0.00	0.00	
2,600.0	9.23	74.00	2,582.5	62.6	218.3	-46.3	0.00	0.00	
2,700.0	9.23	74.00	2,681.2	67.0	233.7	-49.6	0.00	0.00	
2,800.0	9.23	74.00	2,779.9	71.4	249.1	-52.8	0.00	0.00	
2,900.0	9.23	74.00	2,878.6	75.9	264.6	-56.1	0.00	0.00	
3,000.0	9.23	74.00	2,977.3	80.3	280.0	-59.4	0.00	0.00	
3,100.0	9.23	74.00	3,076.0	84.7	295.4	-62.7	0.00	0.00	
3,200.0	9.23	74.00	3,174.7	89.1	310.8	-65.9	0.00	0.00	
3,300.0	9.23	74.00	3,273.4	93.5	326.2	-69.2	0.00	0.00	
3,400.0	9.23	74.00	3,372.1	98.0	341.6	-72.5	0.00	0.00	
3,500.0	9.23	74.00	3,470.8	102.4	357.1	-75.7	0.00	0.00	
3,600.0	9.23	74.00	3,569.5	106.8	372.5	-79.0	0.00	0.00	
3,700.0	9.23	74.00	3,668.2	111.2	387.9	-82.3	0.00	0.00	
3,800.0	9.23	74.00	3,766.9	115.6	403.3	-85.5	0.00	0.00	
3,900.0	9.23	74.00	3,865.6	120.1	418.7	-88.8	0.00	0.00	
4,000.0	9.23	74.00	3,964.3	124.5	434.2	-92.1	0.00	0.00	
4,100.0	9.23	74.00	4,063.0	128.9	449.6	-95.4	0.00	0.00	
4,200.0	9.23	74.00	4,161.8	133.3	465.0	-98.6	0.00	0.00	
4,300.0	9.23	74.00	4,260.5	137.7	480.4	-101.9	0.00	0.00	
4,400.0	9.23	74.00	4,359.2	142.2	495.8	-105.2	0.00	0.00	
4,500.0	9.23	74.00	4,457.9	146.6	511.2	-108.4	0.00	0.00	
4,600.0	9.23	74.00	4,556.6	151.0	526.7	-111.7	0.00	0.00	
4,700.0	9.23	74.00	4,655.3	155.4	542.1	-115.0	0.00	0.00	
4,800.0	9.23	74.00	4,754.0	159.8	557.5	-118.2	0.00	0.00	
4,900.0	9.23	74.00	4,852.7	164.3	572.9	-121.5	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well LE GERKIN 15H
Company:	Red Hawk Petroleum	TVD Reference:	KB=20' @ 4890.3usft
Project:	Weld County, Colorado	MD Reference:	KB=20' @ 4890.3usft
Site:	S13-T2N-R64W (LE GERKIN PADS)	North Reference:	True
Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
5,000.0	9.23	74.00	4,951.4	168.7	588.3	-124.8	0.00	0.00	
5,100.0	9.23	74.00	5,050.1	173.1	603.8	-128.1	0.00	0.00	
5,200.0	9.23	74.00	5,148.8	177.5	619.2	-131.3	0.00	0.00	
5,300.0	9.23	74.00	5,247.5	182.0	634.6	-134.6	0.00	0.00	
5,400.0	9.23	74.00	5,346.2	186.4	650.0	-137.9	0.00	0.00	
5,410.1	9.23	74.00	5,356.2	186.8	651.6	-138.2	0.00	0.00	Start 2.5° Drop
5,500.0	6.98	74.00	5,445.2	190.3	663.8	-140.8	2.50	-2.50	
5,600.0	4.48	74.00	5,544.7	193.1	673.4	-142.8	2.50	-2.50	
5,700.0	1.98	74.00	5,644.5	194.6	678.8	-144.0	2.50	-2.50	
5,779.3	0.00	0.00	5,723.8	195.0	680.1	-144.3	2.50	-2.50	EOD @ 0°
5,800.0	0.00	0.00	5,744.5	195.0	680.1	-144.3	0.00	0.00	
5,900.0	0.00	0.00	5,844.5	195.0	680.1	-144.3	0.00	0.00	
6,000.0	0.00	0.00	5,944.5	195.0	680.1	-144.3	0.00	0.00	
6,079.3	0.00	0.00	6,023.8	195.0	680.1	-144.3	0.00	0.00	Start 8° Build
6,100.0	1.66	179.73	6,044.5	194.7	680.1	-144.0	8.00	8.00	
6,150.0	5.66	179.73	6,094.4	191.5	680.1	-140.8	8.00	8.00	
6,200.0	9.66	179.73	6,143.9	184.9	680.1	-134.1	8.00	8.00	
6,250.0	13.66	179.73	6,192.9	174.8	680.2	-124.1	8.00	8.00	
6,300.0	17.66	179.73	6,241.0	161.3	680.3	-110.6	8.00	8.00	
6,350.0	21.66	179.73	6,288.1	144.5	680.3	-93.8	8.00	8.00	
6,400.0	25.66	179.73	6,333.9	124.4	680.4	-73.8	8.00	8.00	
6,450.0	29.66	179.73	6,378.2	101.2	680.5	-50.7	8.00	8.00	
6,500.0	33.66	179.73	6,420.7	75.0	680.7	-24.5	8.00	8.00	
6,550.0	37.66	179.73	6,461.3	45.8	680.8	4.6	8.00	8.00	
6,600.0	41.66	179.73	6,499.8	13.9	681.0	36.4	8.00	8.00	
6,650.0	45.66	179.73	6,536.0	-20.6	681.1	70.8	8.00	8.00	
6,700.0	49.66	179.73	6,569.7	-57.5	681.3	107.7	8.00	8.00	
6,750.0	53.66	179.73	6,600.7	-96.7	681.5	146.8	8.00	8.00	
6,800.0	57.66	179.73	6,628.9	-138.0	681.7	188.0	8.00	8.00	
6,850.0	61.66	179.73	6,654.1	-181.2	681.9	231.0	8.00	8.00	
6,900.0	65.66	179.73	6,676.3	-226.0	682.1	275.7	8.00	8.00	
6,950.0	69.66	179.73	6,695.3	-272.2	682.3	321.8	8.00	8.00	
7,000.0	73.66	179.73	6,711.1	-319.6	682.5	369.2	8.00	8.00	
7,050.0	77.66	179.73	6,723.4	-368.1	682.8	417.5	8.00	8.00	
7,100.0	81.66	179.73	6,732.4	-417.2	683.0	466.5	8.00	8.00	
7,150.0	85.66	179.73	6,737.9	-466.9	683.2	516.1	8.00	8.00	
7,204.3	90.00	179.73	6,740.0	-521.2	683.5	570.2	8.00	8.00	LP - 766' FNL, 638' FEL - LP @ 6,470' TVD, 90
7,300.0	90.00	179.73	6,740.0	-616.9	683.9	665.7	0.00	0.00	
7,400.0	90.00	179.73	6,740.0	-716.9	684.4	765.5	0.00	0.00	
7,500.0	90.00	179.73	6,740.0	-816.9	684.9	865.2	0.00	0.00	
7,600.0	90.00	179.73	6,740.0	-916.9	685.3	965.0	0.00	0.00	
7,700.0	90.00	179.73	6,740.0	-1,016.9	685.8	1,064.7	0.00	0.00	
7,800.0	90.00	179.73	6,740.0	-1,116.9	686.3	1,164.5	0.00	0.00	
7,900.0	90.00	179.73	6,740.0	-1,216.9	686.8	1,264.3	0.00	0.00	
8,000.0	90.00	179.73	6,740.0	-1,316.9	687.2	1,364.0	0.00	0.00	
8,100.0	90.00	179.73	6,740.0	-1,416.9	687.7	1,463.8	0.00	0.00	
8,200.0	90.00	179.73	6,740.0	-1,516.9	688.2	1,563.5	0.00	0.00	
8,300.0	90.00	179.73	6,740.0	-1,616.9	688.6	1,663.3	0.00	0.00	
8,400.0	90.00	179.73	6,740.0	-1,716.9	689.1	1,763.1	0.00	0.00	
8,500.0	90.00	179.73	6,740.0	-1,816.9	689.6	1,862.8	0.00	0.00	
8,600.0	90.00	179.73	6,740.0	-1,916.9	690.1	1,962.6	0.00	0.00	
8,700.0	90.00	179.73	6,740.0	-2,016.9	690.5	2,062.3	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well LE GERKIN 15H
Company:	Red Hawk Petroleum	TVD Reference:	KB=20' @ 4890.3usft
Project:	Weld County, Colorado	MD Reference:	KB=20' @ 4890.3usft
Site:	S13-T2N-R64W (LE GERKIN PADS)	North Reference:	True
Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
8,800.0	90.00	179.73	6,740.0	-2,116.9	691.0	2,162.1	0.00	0.00	
8,900.0	90.00	179.73	6,740.0	-2,216.9	691.5	2,261.9	0.00	0.00	
9,000.0	90.00	179.73	6,740.0	-2,316.9	691.9	2,361.6	0.00	0.00	
9,100.0	90.00	179.73	6,740.0	-2,416.9	692.4	2,461.4	0.00	0.00	
9,200.0	90.00	179.73	6,740.0	-2,516.9	692.9	2,561.1	0.00	0.00	
9,300.0	90.00	179.73	6,740.0	-2,616.9	693.4	2,660.9	0.00	0.00	
9,400.0	90.00	179.73	6,740.0	-2,716.9	693.8	2,760.7	0.00	0.00	
9,500.0	90.00	179.73	6,740.0	-2,816.9	694.3	2,860.4	0.00	0.00	
9,600.0	90.00	179.73	6,740.0	-2,916.9	694.8	2,960.2	0.00	0.00	
9,700.0	90.00	179.73	6,740.0	-3,016.9	695.2	3,060.0	0.00	0.00	
9,800.0	90.00	179.73	6,740.0	-3,116.9	695.7	3,159.7	0.00	0.00	
9,900.0	90.00	179.73	6,740.0	-3,216.8	696.2	3,259.5	0.00	0.00	
10,000.0	90.00	179.73	6,740.0	-3,316.8	696.6	3,359.2	0.00	0.00	
10,100.0	90.00	179.73	6,740.0	-3,416.8	697.1	3,459.0	0.00	0.00	
10,200.0	90.00	179.73	6,740.0	-3,516.8	697.6	3,558.8	0.00	0.00	
10,300.0	90.00	179.73	6,740.0	-3,616.8	698.1	3,658.5	0.00	0.00	
10,400.0	90.00	179.73	6,740.0	-3,716.8	698.5	3,758.3	0.00	0.00	
10,500.0	90.00	179.73	6,740.0	-3,816.8	699.0	3,858.0	0.00	0.00	
10,600.0	90.00	179.73	6,740.0	-3,916.8	699.5	3,957.8	0.00	0.00	
10,700.0	90.00	179.73	6,740.0	-4,016.8	699.9	4,057.6	0.00	0.00	
10,800.0	90.00	179.73	6,740.0	-4,116.8	700.4	4,157.3	0.00	0.00	
10,900.0	90.00	179.73	6,740.0	-4,216.8	700.9	4,257.1	0.00	0.00	
11,000.0	90.00	179.73	6,740.0	-4,316.8	701.4	4,356.8	0.00	0.00	
11,100.0	90.00	179.73	6,740.0	-4,416.8	701.8	4,456.6	0.00	0.00	
11,200.0	90.00	179.73	6,740.0	-4,516.8	702.3	4,556.4	0.00	0.00	
11,300.0	90.00	179.73	6,740.0	-4,616.8	702.8	4,656.1	0.00	0.00	
11,400.0	90.00	179.73	6,740.0	-4,716.8	703.2	4,755.9	0.00	0.00	
11,500.0	90.00	179.73	6,740.0	-4,816.8	703.7	4,855.6	0.00	0.00	
11,600.0	90.00	179.73	6,740.0	-4,916.8	704.2	4,955.4	0.00	0.00	
11,700.0	90.00	179.73	6,740.0	-5,016.8	704.7	5,055.2	0.00	0.00	
11,800.0	90.00	179.73	6,740.0	-5,116.8	705.1	5,154.9	0.00	0.00	
11,900.0	90.00	179.73	6,740.0	-5,216.8	705.6	5,254.7	0.00	0.00	
12,000.0	90.00	179.73	6,740.0	-5,316.8	706.1	5,354.4	0.00	0.00	
12,100.0	90.00	179.73	6,740.0	-5,416.8	706.5	5,454.2	0.00	0.00	
12,200.0	90.00	179.73	6,740.0	-5,516.8	707.0	5,554.0	0.00	0.00	
12,300.0	90.00	179.73	6,740.0	-5,616.8	707.5	5,653.7	0.00	0.00	
12,400.0	90.00	179.73	6,740.0	-5,716.8	708.0	5,753.5	0.00	0.00	
12,500.0	90.00	179.73	6,740.0	-5,816.8	708.4	5,853.3	0.00	0.00	
12,600.0	90.00	179.73	6,740.0	-5,916.8	708.9	5,953.0	0.00	0.00	
12,700.0	90.00	179.73	6,740.0	-6,016.8	709.4	6,052.8	0.00	0.00	
12,800.0	90.00	179.73	6,740.0	-6,116.8	709.8	6,152.5	0.00	0.00	
12,900.0	90.00	179.73	6,740.0	-6,216.8	710.3	6,252.3	0.00	0.00	
13,000.0	90.00	179.73	6,740.0	-6,316.8	710.8	6,352.1	0.00	0.00	Start 2.5° Turn
13,100.0	90.00	180.73	6,740.0	-6,416.8	710.4	6,451.7	1.00	0.00	
13,200.0	90.00	181.73	6,740.0	-6,516.8	708.2	6,551.3	1.00	0.00	
13,280.3	90.00	182.53	6,740.0	-6,597.0	705.3	6,631.1	1.00	0.00	EOT @ 182.53° AZ
13,300.0	90.00	182.53	6,740.0	-6,616.7	704.4	6,650.7	0.00	0.00	
13,400.0	90.00	182.53	6,740.0	-6,716.6	700.0	6,750.0	0.00	0.00	
13,500.0	90.00	182.53	6,740.0	-6,816.5	695.5	6,849.3	0.00	0.00	
13,600.0	90.00	182.53	6,740.0	-6,916.4	691.1	6,948.6	0.00	0.00	
13,700.0	90.00	182.53	6,740.0	-7,016.3	686.7	7,047.9	0.00	0.00	
13,800.0	90.00	182.53	6,740.0	-7,116.2	682.3	7,147.2	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well LE GERKIN 15H
Company:	Red Hawk Petroleum	TVD Reference:	KB=20' @ 4890.3usft
Project:	Weld County, Colorado	MD Reference:	KB=20' @ 4890.3usft
Site:	S13-T2N-R64W (LE GERKIN PADS)	North Reference:	True
Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
13,900.0	90.00	182.53	6,740.0	-7,216.1	677.9	7,246.5	0.00	0.00	
14,000.0	90.00	182.53	6,740.0	-7,316.0	673.5	7,345.8	0.00	0.00	
14,100.0	90.00	182.53	6,740.0	-7,415.9	669.0	7,445.1	0.00	0.00	
14,200.0	90.00	182.53	6,740.0	-7,515.8	664.6	7,544.4	0.00	0.00	
14,300.0	90.00	182.53	6,740.0	-7,615.7	660.2	7,643.7	0.00	0.00	
14,400.0	90.00	182.53	6,740.0	-7,715.6	655.8	7,743.0	0.00	0.00	
14,500.0	90.00	182.53	6,740.0	-7,815.5	651.4	7,842.3	0.00	0.00	
14,600.0	90.00	182.53	6,740.0	-7,915.4	646.9	7,941.6	0.00	0.00	
14,700.0	90.00	182.53	6,740.0	-8,015.3	642.5	8,040.9	0.00	0.00	
14,800.0	90.00	182.53	6,740.0	-8,115.2	638.1	8,140.2	0.00	0.00	
14,900.0	90.00	182.53	6,740.0	-8,215.2	633.7	8,239.5	0.00	0.00	
15,006.0	90.00	182.53	6,740.0	-8,321.0	629.0	8,344.8	0.00	0.00	Start 2.5° Turn
15,100.0	90.00	181.59	6,740.0	-8,415.0	625.6	8,438.2	1.00	0.00	
15,200.0	90.00	180.59	6,740.0	-8,515.0	623.7	8,537.8	1.00	0.00	
15,300.0	90.00	179.59	6,740.0	-8,615.0	623.5	8,637.5	1.00	0.00	
15,400.0	90.00	178.59	6,740.0	-8,715.0	625.1	8,737.3	1.00	0.00	
15,500.0	90.00	177.59	6,740.0	-8,814.9	628.5	8,837.2	1.00	0.00	
15,600.0	90.00	176.59	6,740.0	-8,914.8	633.5	8,937.2	1.00	0.00	
15,700.0	90.00	175.59	6,740.0	-9,014.5	640.4	9,037.2	1.00	0.00	
15,800.0	90.00	174.59	6,740.0	-9,114.2	648.9	9,137.2	1.00	0.00	
15,897.5	90.00	173.62	6,740.0	-9,211.1	658.9	9,234.7	1.00	0.00	EOT @ 173.62° AZ
15,900.0	90.00	173.62	6,740.0	-9,213.6	659.2	9,237.2	0.00	0.00	
16,000.0	90.00	173.62	6,740.0	-9,313.0	670.3	9,337.1	0.00	0.00	
16,100.0	90.00	173.62	6,740.0	-9,412.4	681.4	9,437.0	0.00	0.00	
16,200.0	90.00	173.62	6,740.0	-9,511.8	692.6	9,536.9	0.00	0.00	
16,300.0	90.00	173.62	6,740.0	-9,611.1	703.7	9,636.9	0.00	0.00	
16,400.0	90.00	173.62	6,740.0	-9,710.5	714.8	9,736.8	0.00	0.00	
16,500.0	90.00	173.62	6,740.0	-9,809.9	725.9	9,836.7	0.00	0.00	
16,511.1	90.00	173.62	6,740.0	-9,820.9	727.1	9,847.8	0.00	0.00	TD @ 16,511.1' MD - PBHL - 500' FSL, 638' FE

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LE GERKIN 15H PBHL - plan hits target center - Point	0.00	0.00	6,740.0	-9,821.0	727.1	1,287,428.34	3,281,751.95	40.117990	-104.492530
LE GERKIN 15H LAT TC - plan hits target center - Point	0.00	0.00	6,740.0	-8,321.0	629.0	1,288,927.09	3,281,636.82	40.122108	-104.492881
LE GERKIN 15H VP - plan hits target center - Point	0.00	0.00	5,723.8	195.0	680.1	1,297,443.13	3,281,591.42	40.145485	-104.492697

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well LE GERKIN 15H
Company:	Red Hawk Petroleum	TVD Reference:	KB=20' @ 4890.3usft
Project:	Weld County, Colorado	MD Reference:	KB=20' @ 4890.3usft
Site:	S13-T2N-R64W (LE GERKIN PADS)	North Reference:	True
Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.5	0.5	0.0	0.0	SH - 240' FNL, 1318' FEL
1,000.0	1,000.0	0.0	0.0	KOP @ 1,000'
1,369.2	1,367.6	8.2	28.5	EOB @ 9.23° INC
5,410.1	5,356.2	186.8	651.6	Start 2.5° Drop
5,779.3	5,723.8	195.0	680.1	EOD @ 0°
6,079.3	6,023.8	195.0	680.1	Start 8° Build
7,204.3	6,740.0	-521.2	683.5	LP - 766' FNL, 638' FEL
7,204.3	6,740.0	-521.2	683.5	LP @ 6,470' TVD, 90° INC
13,000.0	6,740.0	-6,316.8	710.8	Start 2.5° Turn
13,280.3	6,740.0	-6,597.0	705.3	EOT @ 182.53° AZ
15,006.0	6,740.0	-8,321.0	629.0	Start 2.5° Turn
15,897.5	6,740.0	-9,211.1	658.9	EOT @ 173.62° AZ
16,511.1	6,740.0	-9,820.9	727.1	TD @ 16,511.1' MD
16,511.1	6,740.0	-9,820.9	727.1	PBHL - 500' FSL, 638' FEL

Red Hawk Petroleum

Weld County, Colorado

S13-T2N-R64W (LE GERKIN PADS)

LE GERKIN 15H

HZ

Plan #1

Anticollision Report

30 October, 2014

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 200.0usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date	10/30/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	16,511.1	Plan #1 (HZ)	Geolink MWD	Geolink MWD	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
S13-T2N-R64W (LE GERKIN PADS)						
EXISTING - ARNOLD #1 - EXISTING - NO S						Out of range
EXISTING - DARYL L ARNOLD #1 - EXISTING - EXISTI						Out of range
EXISTING - MCCLINTOCK ET AL #1 - EXISTING - EXIS	15,016.9	6,752.7	162.7	3.4	1.021	Level 2, CC, ES, SF
LE GERKIN 10H - HZ - Plan #1	1,000.0	1,000.0	151.0	147.6	44.143	CC, ES
LE GERKIN 10H - HZ - Plan #1	1,200.0	1,186.9	167.3	163.2	40.919	SF
LE GERKIN 11H - HZ - Plan #1	1,000.0	1,000.0	120.3	116.8	35.157	CC, ES
LE GERKIN 11H - HZ - Plan #1	1,100.0	1,095.3	124.3	120.5	33.049	SF
LE GERKIN 12H - HZ - Plan #1	1,000.0	1,000.0	89.5	86.1	26.173	CC, ES
LE GERKIN 12H - HZ - Plan #1	1,100.0	1,097.6	92.9	89.2	24.685	SF
LE GERKIN 13H - HZ - Plan #1	1,000.0	1,000.0	61.6	58.2	18.010	CC, ES
LE GERKIN 13H - HZ - Plan #1	1,200.0	1,201.7	66.0	61.8	16.013	SF
LE GERKIN 14H - HZ - Plan #1	1,000.0	1,000.0	31.0	27.5	9.052	CC
LE GERKIN 14H - HZ - Plan #1	1,200.0	1,202.6	31.3	27.1	7.594	ES
LE GERKIN 14H - HZ - Plan #1	9,000.0	8,959.0	173.2	85.8	1.981	SF
LE GERKIN 16H - HZ - Plan #1	1,000.0	1,000.0	30.8	27.3	8.989	CC
LE GERKIN 16H - HZ - Plan #1	1,331.3	1,327.0	31.0	26.4	6.796	ES
LE GERKIN 16H - HZ - Plan #1	1,400.0	1,394.8	31.2	26.4	6.501	SF
LE GERKIN 1H - HZ - Plan #3						Out of range
LE GERKIN 2H - HZ - Plan #3						Out of range
LE GERKIN 3H - HZ - Plan #3						Out of range
LE GERKIN 4H - HZ - Plan #3						Out of range
LE GERKIN 5H - HZ - Plan #3						Out of range
LE GERKIN 6H - HZ - Plan #3						Out of range
LE GERKIN 7H - HZ - Plan #3						Out of range
LE GERKIN 8H - HZ - Plan #3						Out of range
LE GERKIN 9H - HZ - Plan #1	1,000.0	1,000.0	179.0	175.5	52.313	CC, ES
LE GERKIN 9H - HZ - Plan #1	1,200.0	1,184.6	195.3	191.2	47.818	SF

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design		S13-T2N-R64W (LE GERKIN PADS) - EXISTING - MCCLINTOCK ET AL #1 - EXISTING - EXISTING -										Offset Site Error:		0.0 usft
Survey Program:		7460-Geolink MWD										Offset Well Error:		0.0 usft
Offset				Semi Major Axis				Distance						
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)	Total Uncertainty Axis	Separation Factor	Warning	
15,000.0	6,740.0	6,752.7	6,752.7	148.3	11.8	-90.00	-8,338.7	791.1	163.6	4.6	159.03	1.029	Level 2	
15,016.9	6,740.0	6,752.7	6,752.7	148.6	11.8	-90.00	-8,338.7	791.1	162.7	3.4	159.38	1.021	Level 2, CC, ES, SF	
15,100.0	6,740.0	6,752.7	6,752.7	150.0	11.8	-90.00	-8,338.7	791.1	182.2	21.2	161.05	1.132	Level 2	

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 10H - HZ - Plan #1													Offset Site Error: 0.0 usft
Survey Program: 0-Geolink MWD													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)	Total Uncertainty Axis	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	-91.38	-3.6	-151.0	151.0				
100.0	100.0	100.0	100.0	0.1	0.1	-91.38	-3.6	-151.0	151.0	150.7	0.28	540.747	
200.0	200.0	200.0	200.0	0.3	0.3	-91.38	-3.6	-151.0	151.0	150.4	0.63	240.332	
300.0	300.0	300.0	300.0	0.5	0.5	-91.38	-3.6	-151.0	151.0	150.0	0.98	154.499	
400.0	400.0	400.0	400.0	0.7	0.7	-91.38	-3.6	-151.0	151.0	149.7	1.33	113.842	
500.0	500.0	500.0	500.0	0.8	0.8	-91.38	-3.6	-151.0	151.0	149.3	1.68	90.125	
600.0	600.0	600.0	600.0	1.0	1.0	-91.38	-3.6	-151.0	151.0	149.0	2.02	74.586	
700.0	700.0	700.0	700.0	1.2	1.2	-91.38	-3.6	-151.0	151.0	148.6	2.37	63.617	
800.0	800.0	800.0	800.0	1.4	1.4	-91.38	-3.6	-151.0	151.0	148.3	2.72	55.461	
900.0	900.0	900.0	900.0	1.5	1.5	-91.38	-3.6	-151.0	151.0	147.9	3.07	49.159	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-91.38	-3.6	-151.0	151.0	147.6	3.42	44.143 CC, ES	
1,100.0	1,100.0	1,093.9	1,093.9	1.9	1.9	-165.35	-3.2	-152.8	155.1	151.3	3.76	41.277	
1,200.0	1,199.7	1,186.9	1,186.6	2.1	2.0	-165.27	-1.7	-158.3	167.3	163.2	4.09	40.919 SF	
1,300.0	1,299.1	1,278.0	1,277.3	2.3	2.2	-165.13	0.6	-167.3	187.4	183.0	4.41	42.483	

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 11H - HZ - Plan #1													Offset Site Error: 0.0 usft
Survey Program: 0-Geolink MWD													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)	Total Uncertainty Axis	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	-91.74	-3.6	-120.2	120.3				
100.0	100.0	100.0	100.0	0.1	0.1	-91.74	-3.6	-120.2	120.3	120.0	0.28	430.667	
200.0	200.0	200.0	200.0	0.3	0.3	-91.74	-3.6	-120.2	120.3	119.6	0.63	191.408	
300.0	300.0	300.0	300.0	0.5	0.5	-91.74	-3.6	-120.2	120.3	119.3	0.98	123.048	
400.0	400.0	400.0	400.0	0.7	0.7	-91.74	-3.6	-120.2	120.3	118.9	1.33	90.667	
500.0	500.0	500.0	500.0	0.8	0.8	-91.74	-3.6	-120.2	120.3	118.6	1.68	71.778	
600.0	600.0	600.0	600.0	1.0	1.0	-91.74	-3.6	-120.2	120.3	118.2	2.02	59.402	
700.0	700.0	700.0	700.0	1.2	1.2	-91.74	-3.6	-120.2	120.3	117.9	2.37	50.667	
800.0	800.0	800.0	800.0	1.4	1.4	-91.74	-3.6	-120.2	120.3	117.5	2.72	44.171	
900.0	900.0	900.0	900.0	1.5	1.5	-91.74	-3.6	-120.2	120.3	117.2	3.07	39.152	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-91.74	-3.6	-120.2	120.3	116.8	3.42	35.157 CC, ES	
1,100.0	1,100.0	1,095.3	1,095.3	1.9	1.9	-165.56	-2.9	-122.0	124.3	120.5	3.76	33.049 SF	
1,200.0	1,199.7	1,189.7	1,189.5	2.1	2.1	-165.08	-0.5	-127.4	136.2	132.1	4.09	33.268	
1,300.0	1,299.1	1,285.1	1,284.4	2.3	2.2	-164.49	3.2	-136.0	155.6	151.2	4.43	35.141	
1,400.0	1,398.0	1,382.2	1,381.0	2.5	2.4	-164.30	7.3	-145.3	179.4	174.6	4.77	37.626	

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 12H - HZ - Plan #1												Offset Site Error:	0.0 usft
Survey Program: 0-Geolink MWD												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)	Total Uncertainty Axis	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	-92.33	-3.6	-89.5	89.5				
100.0	100.0	100.0	100.0	0.1	0.1	-92.33	-3.6	-89.5	89.5	89.3	0.28	320.615	
200.0	200.0	200.0	200.0	0.3	0.3	-92.33	-3.6	-89.5	89.5	88.9	0.63	142.496	
300.0	300.0	300.0	300.0	0.5	0.5	-92.33	-3.6	-89.5	89.5	88.6	0.98	91.604	
400.0	400.0	400.0	400.0	0.7	0.7	-92.33	-3.6	-89.5	89.5	88.2	1.33	67.498	
500.0	500.0	500.0	500.0	0.8	0.8	-92.33	-3.6	-89.5	89.5	87.9	1.68	53.436	
600.0	600.0	600.0	600.0	1.0	1.0	-92.33	-3.6	-89.5	89.5	87.5	2.02	44.223	
700.0	700.0	700.0	700.0	1.2	1.2	-92.33	-3.6	-89.5	89.5	87.2	2.37	37.719	
800.0	800.0	800.0	800.0	1.4	1.4	-92.33	-3.6	-89.5	89.5	86.8	2.72	32.884	
900.0	900.0	900.0	900.0	1.5	1.5	-92.33	-3.6	-89.5	89.5	86.5	3.07	29.147	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-92.33	-3.6	-89.5	89.5	86.1	3.42	26.173	CC, ES
1,100.0	1,100.0	1,097.6	1,097.6	1.9	1.9	-165.59	-2.0	-90.8	92.9	89.2	3.76	24.685	SF
1,200.0	1,199.7	1,196.5	1,196.4	2.1	2.1	-164.15	2.0	-94.0	102.4	98.3	4.11	24.928	
1,300.0	1,299.1	1,295.6	1,295.3	2.3	2.2	-163.48	6.0	-97.3	116.2	111.7	4.45	26.105	
1,400.0	1,398.0	1,394.0	1,393.5	2.5	2.4	-163.47	10.1	-100.5	133.9	129.1	4.80	27.920	
1,500.0	1,496.7	1,492.2	1,491.6	2.8	2.6	-163.64	14.1	-103.8	152.6	147.4	5.15	29.601	
1,600.0	1,595.4	1,590.4	1,589.7	3.1	2.8	-163.78	18.2	-107.1	171.3	165.8	5.52	31.052	
1,700.0	1,694.1	1,688.7	1,687.8	3.3	3.0	-163.89	22.2	-110.3	190.0	184.1	5.88	32.316	

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 13H - HZ - Plan #1													Offset Site Error: 0.0 usft
Survey Program: 0-Geolink MWD													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)	Total Uncertainty Axis	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	-93.39	-3.6	-61.5	61.6				
100.0	100.0	100.0	100.0	0.1	0.1	-93.39	-3.6	-61.5	61.6	61.3	0.28	220.626	
200.0	200.0	200.0	200.0	0.3	0.3	-93.39	-3.6	-61.5	61.6	61.0	0.63	98.056	
300.0	300.0	300.0	300.0	0.5	0.5	-93.39	-3.6	-61.5	61.6	60.6	0.98	63.036	
400.0	400.0	400.0	400.0	0.7	0.7	-93.39	-3.6	-61.5	61.6	60.3	1.33	46.448	
500.0	500.0	500.0	500.0	0.8	0.8	-93.39	-3.6	-61.5	61.6	59.9	1.68	36.771	
600.0	600.0	600.0	600.0	1.0	1.0	-93.39	-3.6	-61.5	61.6	59.6	2.02	30.431	
700.0	700.0	700.0	700.0	1.2	1.2	-93.39	-3.6	-61.5	61.6	59.2	2.37	25.956	
800.0	800.0	800.0	800.0	1.4	1.4	-93.39	-3.6	-61.5	61.6	58.9	2.72	22.628	
900.0	900.0	900.0	900.0	1.5	1.5	-93.39	-3.6	-61.5	61.6	58.5	3.07	20.057	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-93.39	-3.6	-61.5	61.6	58.2	3.42	18.010 CC, ES	
1,100.0	1,100.0	1,101.6	1,101.6	1.9	1.9	-166.17	-1.8	-60.3	62.4	58.7	3.77	16.553	
1,200.0	1,199.7	1,201.7	1,201.6	2.1	2.1	-163.99	2.4	-57.5	66.0	61.8	4.12	16.013 SF	
1,300.0	1,299.1	1,301.4	1,301.1	2.3	2.3	-163.02	6.6	-54.8	73.7	69.2	4.46	16.509	
1,400.0	1,398.0	1,400.7	1,400.3	2.5	2.4	-163.08	10.7	-52.1	85.4	80.6	4.81	17.744	
1,500.0	1,496.7	1,499.9	1,499.4	2.8	2.6	-163.34	14.9	-49.4	98.1	92.9	5.18	18.956	
1,600.0	1,595.4	1,599.1	1,598.4	3.1	2.8	-163.54	19.0	-46.7	110.8	105.3	5.54	20.002	
1,700.0	1,694.1	1,698.3	1,697.5	3.3	3.0	-163.70	23.2	-43.9	123.5	117.6	5.91	20.914	
1,800.0	1,792.8	1,797.5	1,796.6	3.6	3.2	-163.84	27.3	-41.2	136.2	130.0	6.27	21.715	
1,900.0	1,891.5	1,896.6	1,895.6	3.9	3.4	-163.94	31.5	-38.5	148.9	142.3	6.64	22.425	
2,000.0	1,990.2	1,995.8	1,994.7	4.2	3.6	-164.04	35.6	-35.8	161.6	154.6	7.01	23.057	
2,100.0	2,088.9	2,095.0	2,093.8	4.5	3.7	-164.12	39.8	-33.1	174.4	167.0	7.38	23.624	
2,200.0	2,187.6	2,194.2	2,192.8	4.8	3.9	-164.18	43.9	-30.4	187.1	179.3	7.75	24.134	
2,300.0	2,286.4	2,293.4	2,291.9	5.2	4.1	-164.24	48.1	-27.6	199.8	191.6	8.12	24.597	

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 14H - HZ - Plan #1													Offset Site Error: 0.0 usft	
Survey Program: 0-Geolink MWD													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)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-96.76	-3.6	-30.8	31.0					
100.0	100.0	100.0	100.0	0.1	0.1	-96.76	-3.6	-30.8	31.0	30.7	0.28	110.890		
200.0	200.0	200.0	200.0	0.3	0.3	-96.76	-3.6	-30.8	31.0	30.3	0.63	49.285		
300.0	300.0	300.0	300.0	0.5	0.5	-96.76	-3.6	-30.8	31.0	30.0	0.98	31.683		
400.0	400.0	400.0	400.0	0.7	0.7	-96.76	-3.6	-30.8	31.0	29.6	1.33	23.345		
500.0	500.0	500.0	500.0	0.8	0.8	-96.76	-3.6	-30.8	31.0	29.3	1.68	18.482		
600.0	600.0	600.0	600.0	1.0	1.0	-96.76	-3.6	-30.8	31.0	28.9	2.02	15.295		
700.0	700.0	700.0	700.0	1.2	1.2	-96.76	-3.6	-30.8	31.0	28.6	2.37	13.046		
800.0	800.0	800.0	800.0	1.4	1.4	-96.76	-3.6	-30.8	31.0	28.2	2.72	11.373		
900.0	900.0	900.0	900.0	1.5	1.5	-96.76	-3.6	-30.8	31.0	27.9	3.07	10.081		
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-96.76	-3.6	-30.8	31.0	27.5	3.42	9.052 CC		
1,100.0	1,100.0	1,101.3	1,101.3	1.9	1.9	-170.06	-2.7	-28.7	31.0	27.3	3.77	8.232		
1,200.0	1,199.7	1,202.6	1,202.3	2.1	2.1	-167.97	0.3	-22.7	31.3	27.1	4.12	7.594 ES		
1,300.0	1,299.1	1,302.9	1,302.1	2.3	2.3	-165.53	4.6	-13.9	32.9	28.4	4.46	7.365		
1,400.0	1,398.0	1,402.7	1,401.5	2.5	2.5	-165.01	8.9	-5.0	38.4	33.6	4.81	7.979		
1,500.0	1,496.7	1,502.5	1,500.8	2.8	2.7	-164.98	13.2	3.9	44.9	39.8	5.18	8.683		
1,600.0	1,595.4	1,602.3	1,600.1	3.1	2.9	-164.96	17.5	12.8	51.5	45.9	5.54	9.291		
1,700.0	1,694.1	1,702.1	1,699.3	3.3	3.1	-164.95	21.9	21.8	58.0	52.1	5.91	9.820		
1,800.0	1,792.8	1,801.8	1,798.6	3.6	3.4	-164.94	26.2	30.7	64.6	58.3	6.28	10.286		
1,900.0	1,891.5	1,901.6	1,897.9	3.9	3.6	-164.93	30.5	39.6	71.1	64.4	6.65	10.698		
2,000.0	1,990.2	2,001.4	1,997.2	4.2	3.8	-164.92	34.9	48.5	77.6	70.6	7.02	11.065		
2,100.0	2,088.9	2,101.2	2,096.5	4.5	4.1	-164.92	39.2	57.4	84.2	76.8	7.39	11.394		
2,200.0	2,187.6	2,201.0	2,195.8	4.8	4.3	-164.91	43.5	66.3	90.7	82.9	7.76	11.690		
2,300.0	2,286.4	2,300.8	2,295.1	5.2	4.5	-164.91	47.8	75.2	97.2	89.1	8.13	11.958		
2,400.0	2,385.1	2,400.6	2,394.4	5.5	4.8	-164.90	52.2	84.1	103.8	95.3	8.51	12.202		
2,500.0	2,483.8	2,500.3	2,493.7	5.8	5.0	-164.90	56.5	93.0	110.3	101.4	8.88	12.425		
2,600.0	2,582.5	2,600.1	2,593.0	6.1	5.2	-164.90	60.8	101.9	116.9	107.6	9.25	12.629		
2,700.0	2,681.2	2,699.9	2,692.3	6.4	5.5	-164.89	65.2	110.8	123.4	113.8	9.63	12.817		
2,800.0	2,779.9	2,799.7	2,791.6	6.8	5.7	-164.89	69.5	119.7	129.9	119.9	10.00	12.990		
2,900.0	2,878.6	2,899.5	2,890.9	7.1	5.9	-164.89	73.8	128.6	136.5	126.1	10.38	13.151		
3,000.0	2,977.3	2,999.3	2,990.2	7.4	6.2	-164.89	78.2	137.6	143.0	132.3	10.75	13.300		
3,100.0	3,076.0	3,099.1	3,089.5	7.7	6.4	-164.88	82.5	146.5	149.6	138.4	11.13	13.438		
3,200.0	3,174.7	3,198.9	3,188.7	8.1	6.7	-164.88	86.8	155.4	156.1	144.6	11.50	13.567		
3,300.0	3,273.4	3,298.6	3,288.0	8.4	6.9	-164.88	91.1	164.3	162.6	150.7	11.88	13.688		
3,400.0	3,372.1	3,398.4	3,387.3	8.7	7.2	-164.88	95.5	173.2	169.2	156.9	12.26	13.802		
3,500.0	3,470.8	3,498.2	3,486.6	9.0	7.4	-164.88	99.8	182.1	175.7	163.1	12.63	13.908		
3,600.0	3,569.5	3,598.0	3,585.9	9.4	7.6	-164.88	104.1	191.0	182.2	169.2	13.01	14.008		
3,700.0	3,668.2	3,697.8	3,685.2	9.7	7.9	-164.87	108.5	199.9	188.8	175.4	13.39	14.102		
3,800.0	3,766.9	3,797.6	3,784.5	10.0	8.1	-164.87	112.8	208.8	195.3	181.6	13.76	14.191		
7,900.0	6,740.0	7,885.3	6,740.0	28.3	27.5	90.00	-1,233.3	493.9	193.6	142.0	51.61	3.751		
8,000.0	6,740.0	7,985.0	6,740.0	29.8	29.0	90.00	-1,332.6	502.3	185.6	130.8	54.77	3.388		
8,100.0	6,740.0	8,084.7	6,740.0	31.2	30.6	90.00	-1,431.9	510.8	177.6	119.6	57.97	3.063		
8,200.0	6,740.0	8,181.7	6,740.0	32.7	32.1	90.00	-1,528.6	518.3	170.3	109.2	61.16	2.785		
8,300.0	6,740.0	8,278.7	6,740.0	34.3	33.7	90.00	-1,625.4	524.1	164.7	100.4	64.37	2.559		
8,400.0	6,740.0	8,375.8	6,740.0	35.8	35.2	90.00	-1,722.5	528.4	160.9	93.2	67.61	2.379		
8,500.0	6,740.0	8,473.1	6,740.0	37.4	36.8	90.00	-1,819.7	530.9	158.7	87.8	70.88	2.239		
8,578.8	6,740.0	8,549.8	6,740.0	38.6	38.0	90.00	-1,896.4	531.8	158.1	84.7	73.46	2.153		
8,600.0	6,740.0	8,570.4	6,740.0	39.0	38.3	90.00	-1,917.0	531.9	158.2	84.0	74.16	2.133		
8,700.0	6,740.0	8,667.7	6,740.0	40.5	39.9	90.00	-2,014.3	531.2	159.4	81.9	77.45	2.058		
8,800.0	6,740.0	8,764.9	6,740.0	42.2	41.5	90.00	-2,111.5	528.8	162.3	81.5	80.76	2.010		
8,900.0	6,740.0	8,862.0	6,740.0	43.8	43.0	90.00	-2,208.6	524.8	166.9	82.8	84.08	1.985		
9,000.0	6,740.0	8,959.0	6,740.0	45.4	44.6	90.00	-2,305.3	519.1	173.2	85.8	87.41	1.981 SF		

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

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 14H - HZ - Plan #1												Offset Site Error:	0.0 usft
Survey Program: 0-Geolink MWD												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)	Total Uncertainty Axis	Separation Factor	
9,100.0	6,740.0	9,055.7	6,740.0	47.0	46.2	90.00	-2,401.7	511.9	181.2	90.4	90.74	1.996	
9,200.0	6,740.0	9,152.1	6,740.0	48.7	47.7	90.00	-2,497.7	503.0	190.8	96.7	94.08	2.028	

Cathedral Energy Services

Anticollision Report

Company:	Red Hawk Petroleum	Local Co-ordinate Reference:	Well LE GERKIN 15H
Project:	Weld County, Colorado	TVD Reference:	KB=20' @ 4890.3usft
Reference Site:	S13-T2N-R64W (LE GERKIN PADS)	MD Reference:	KB=20' @ 4890.3usft
Site Error:	0.0usft	North Reference:	True
Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 16H - HZ - Plan #1													Offset Site Error: 0.0 usft	
Survey Program: 0-Geolink MWD													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)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	90.00	0.0	30.8	30.8					
100.0	100.0	100.0	100.0	0.1	0.1	90.00	0.0	30.8	30.8	30.5	0.28	110.120		
200.0	200.0	200.0	200.0	0.3	0.3	90.00	0.0	30.8	30.8	30.1	0.63	48.942		
300.0	300.0	300.0	300.0	0.5	0.5	90.00	0.0	30.8	30.8	29.8	0.98	31.463		
400.0	400.0	400.0	400.0	0.7	0.7	90.00	0.0	30.8	30.8	29.4	1.33	23.183		
500.0	500.0	500.0	500.0	0.8	0.8	90.00	0.0	30.8	30.8	29.1	1.68	18.353		
600.0	600.0	600.0	600.0	1.0	1.0	90.00	0.0	30.8	30.8	28.7	2.02	15.189		
700.0	700.0	700.0	700.0	1.2	1.2	90.00	0.0	30.8	30.8	28.4	2.37	12.955		
800.0	800.0	800.0	800.0	1.4	1.4	90.00	0.0	30.8	30.8	28.0	2.72	11.294		
900.0	900.0	900.0	900.0	1.5	1.5	90.00	0.0	30.8	30.8	27.7	3.07	10.011		
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	90.00	0.0	30.8	30.8	27.3	3.42	8.989 CC		
1,100.0	1,100.0	1,098.7	1,098.7	1.9	1.9	16.30	0.4	32.8	30.8	27.0	3.77	8.169		
1,200.0	1,199.7	1,197.4	1,197.2	2.1	2.1	17.21	1.7	39.1	30.8	26.7	4.11	7.499		
1,300.0	1,299.1	1,296.1	1,295.3	2.3	2.3	18.71	3.9	49.5	30.9	26.4	4.45	6.941		
1,331.3	1,330.1	1,327.0	1,325.9	2.4	2.3	19.26	4.7	53.6	31.0	26.4	4.56	6.796 ES		
1,400.0	1,398.0	1,394.8	1,392.9	2.5	2.5	20.67	6.9	64.0	31.2	26.4	4.81	6.501 SF		
1,500.0	1,496.7	1,493.4	1,489.6	2.8	2.8	21.02	10.7	82.6	34.8	29.6	5.18	6.713		
1,600.0	1,595.4	1,592.7	1,586.4	3.1	3.1	19.99	15.2	104.4	41.4	35.9	5.55	7.466		
1,700.0	1,694.1	1,692.5	1,683.5	3.3	3.5	19.17	19.8	126.6	48.3	42.4	5.92	8.159		
1,800.0	1,792.8	1,792.2	1,780.7	3.6	3.9	18.56	24.4	148.7	55.2	48.9	6.29	8.770		
1,900.0	1,891.5	1,892.0	1,877.9	3.9	4.3	18.08	29.0	170.9	62.1	55.4	6.67	9.312		
2,000.0	1,990.2	1,991.8	1,975.0	4.2	4.7	17.70	33.6	193.0	69.0	61.9	7.04	9.797		
2,100.0	2,088.9	2,091.5	2,072.2	4.5	5.1	17.39	38.2	215.2	75.9	68.5	7.42	10.233		
2,200.0	2,187.6	2,191.3	2,169.3	4.8	5.5	17.13	42.7	237.3	82.8	75.0	7.79	10.627		
2,300.0	2,286.4	2,291.0	2,266.5	5.2	5.9	16.91	47.3	259.5	89.7	81.5	8.17	10.985		
2,400.0	2,385.1	2,390.8	2,363.7	5.5	6.3	16.72	51.9	281.6	96.6	88.1	8.54	11.311		
2,500.0	2,483.8	2,490.6	2,460.8	5.8	6.7	16.56	56.5	303.8	103.5	94.6	8.92	11.609		
2,600.0	2,582.5	2,590.3	2,558.0	6.1	7.2	16.41	61.1	326.0	110.4	101.1	9.29	11.884		
2,700.0	2,681.2	2,690.1	2,655.2	6.4	7.6	16.29	65.7	348.1	117.3	107.7	9.67	12.137		
2,800.0	2,779.9	2,789.8	2,752.3	6.8	8.0	16.18	70.2	370.3	124.2	114.2	10.04	12.371		
2,900.0	2,878.6	2,889.6	2,849.5	7.1	8.4	16.08	74.8	392.4	131.1	120.7	10.42	12.588		
3,000.0	2,977.3	2,989.4	2,946.6	7.4	8.9	15.99	79.4	414.6	138.0	127.3	10.79	12.789		
3,100.0	3,076.0	3,089.1	3,043.8	7.7	9.3	15.90	84.0	436.7	145.0	133.8	11.17	12.977		
3,200.0	3,174.7	3,188.9	3,141.0	8.1	9.7	15.83	88.6	458.9	151.9	140.3	11.55	13.153		
3,300.0	3,273.4	3,288.7	3,238.1	8.4	10.2	15.76	93.2	481.0	158.8	146.9	11.92	13.318		
3,400.0	3,372.1	3,388.4	3,335.3	8.7	10.6	15.70	97.7	503.2	165.7	153.4	12.30	13.473		
3,500.0	3,470.8	3,488.2	3,432.5	9.0	11.0	15.64	102.3	525.3	172.6	159.9	12.67	13.618		
3,600.0	3,569.5	3,587.9	3,529.6	9.4	11.5	15.59	106.9	547.5	179.5	166.5	13.05	13.755		
3,700.0	3,668.2	3,687.7	3,626.8	9.7	11.9	15.54	111.5	569.6	186.4	173.0	13.43	13.884		
3,800.0	3,766.9	3,787.5	3,723.9	10.0	12.3	15.50	116.1	591.8	193.3	179.5	13.80	14.006		

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

Cathedral Energy Services

Anticollision Report

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Reference Well:	LE GERKIN 15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 9H - HZ - Plan #1													Offset Site Error: 0.0 usft
Survey Program: 0-Geolink MWD													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)	Total Uncertainty Axis	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	-91.17	-3.6	-178.9	179.0				
100.0	100.0	100.0	100.0	0.1	0.1	-91.17	-3.6	-178.9	179.0	178.7	0.28	640.832	
200.0	200.0	200.0	200.0	0.3	0.3	-91.17	-3.6	-178.9	179.0	178.3	0.63	284.814	
300.0	300.0	300.0	300.0	0.5	0.5	-91.17	-3.6	-178.9	179.0	178.0	0.98	183.095	
400.0	400.0	400.0	400.0	0.7	0.7	-91.17	-3.6	-178.9	179.0	177.6	1.33	134.912	
500.0	500.0	500.0	500.0	0.8	0.8	-91.17	-3.6	-178.9	179.0	177.3	1.68	106.805	
600.0	600.0	600.0	600.0	1.0	1.0	-91.17	-3.6	-178.9	179.0	176.9	2.02	88.391	
700.0	700.0	700.0	700.0	1.2	1.2	-91.17	-3.6	-178.9	179.0	176.6	2.37	75.392	
800.0	800.0	800.0	800.0	1.4	1.4	-91.17	-3.6	-178.9	179.0	176.2	2.72	65.726	
900.0	900.0	900.0	900.0	1.5	1.5	-91.17	-3.6	-178.9	179.0	175.9	3.07	58.258	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-91.17	-3.6	-178.9	179.0	175.5	3.42	52.313 CC, ES	
1,100.0	1,100.0	1,092.7	1,092.7	1.9	1.9	-165.19	-3.3	-180.8	183.0	179.3	3.76	48.745	
1,200.0	1,199.7	1,184.6	1,184.4	2.1	2.0	-165.23	-2.3	-186.2	195.3	191.2	4.08	47.818 SF	

Cathedral Energy Services

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Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=20' @ 4890.3usft
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: LE GERKIN 15H
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.65°

