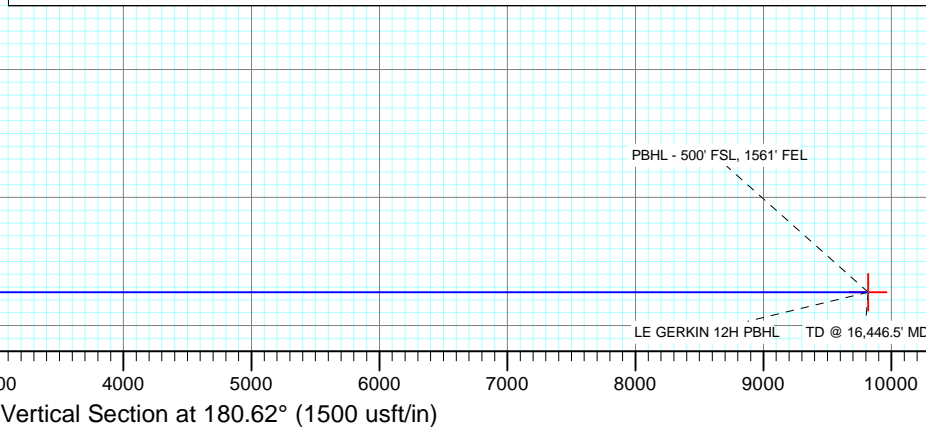
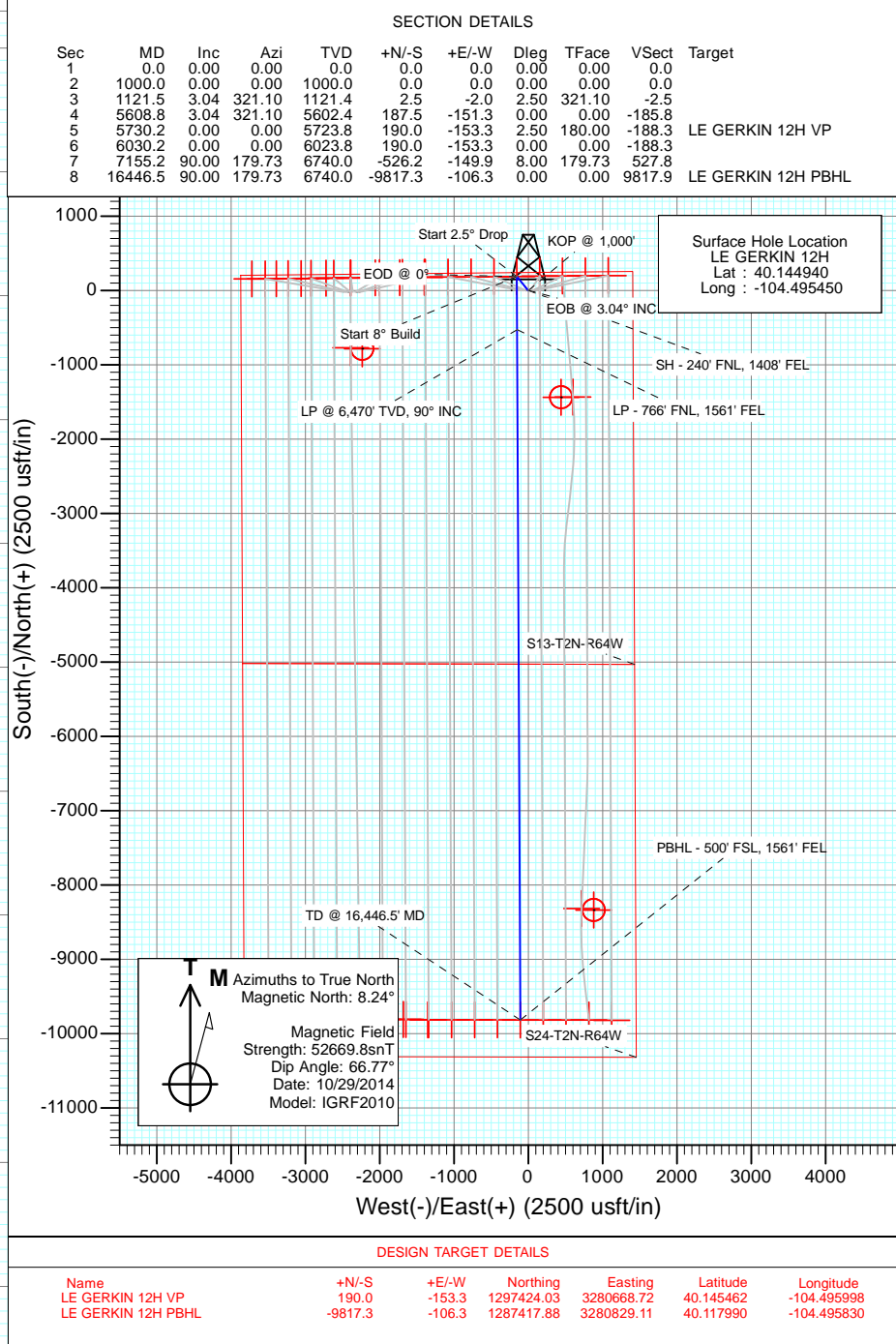
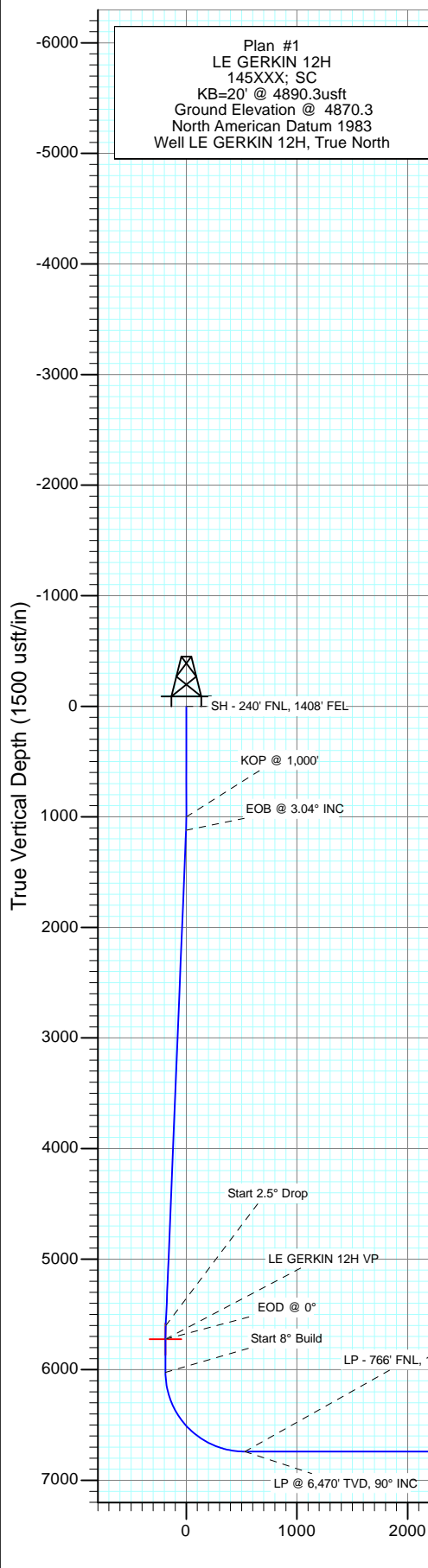
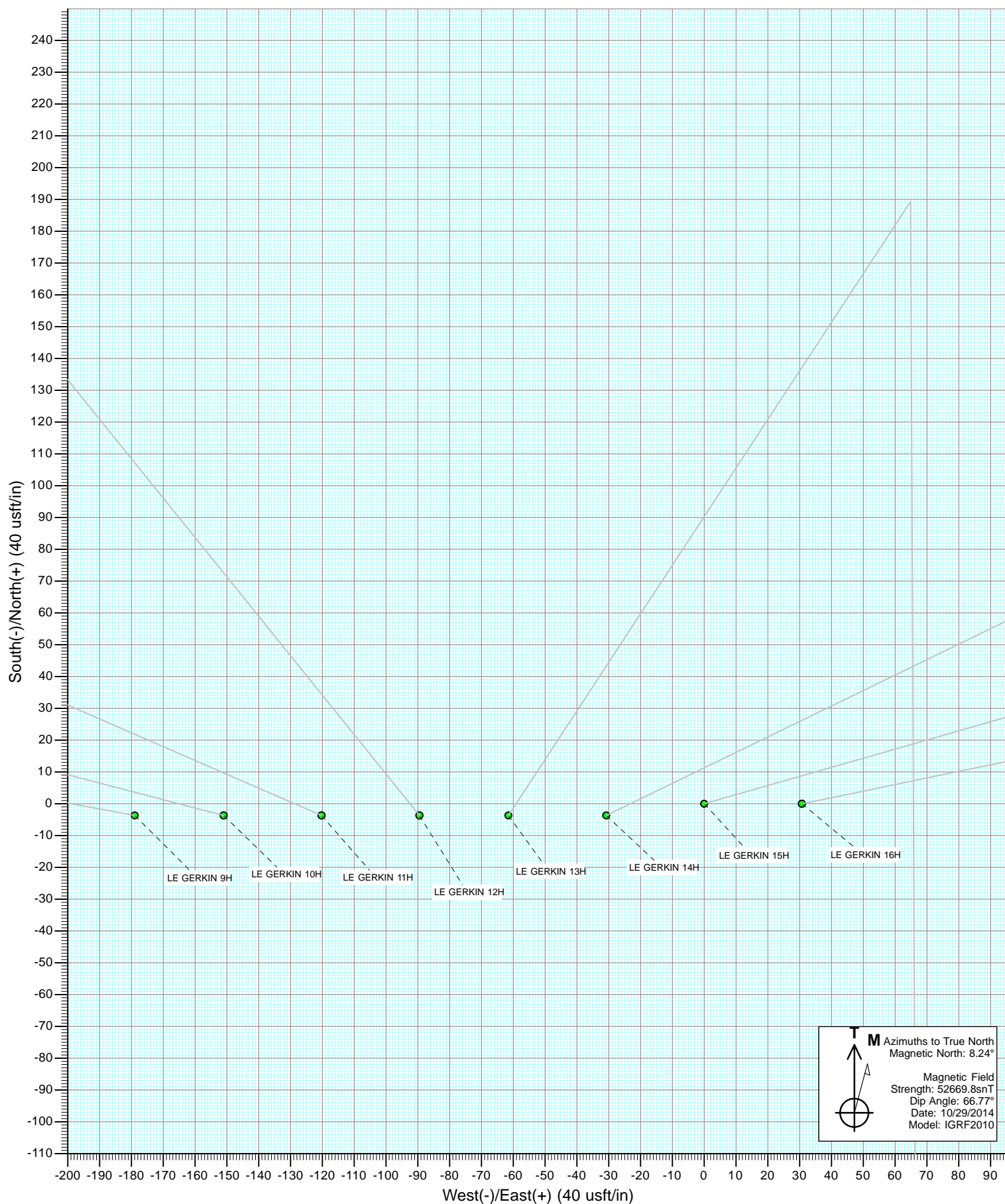
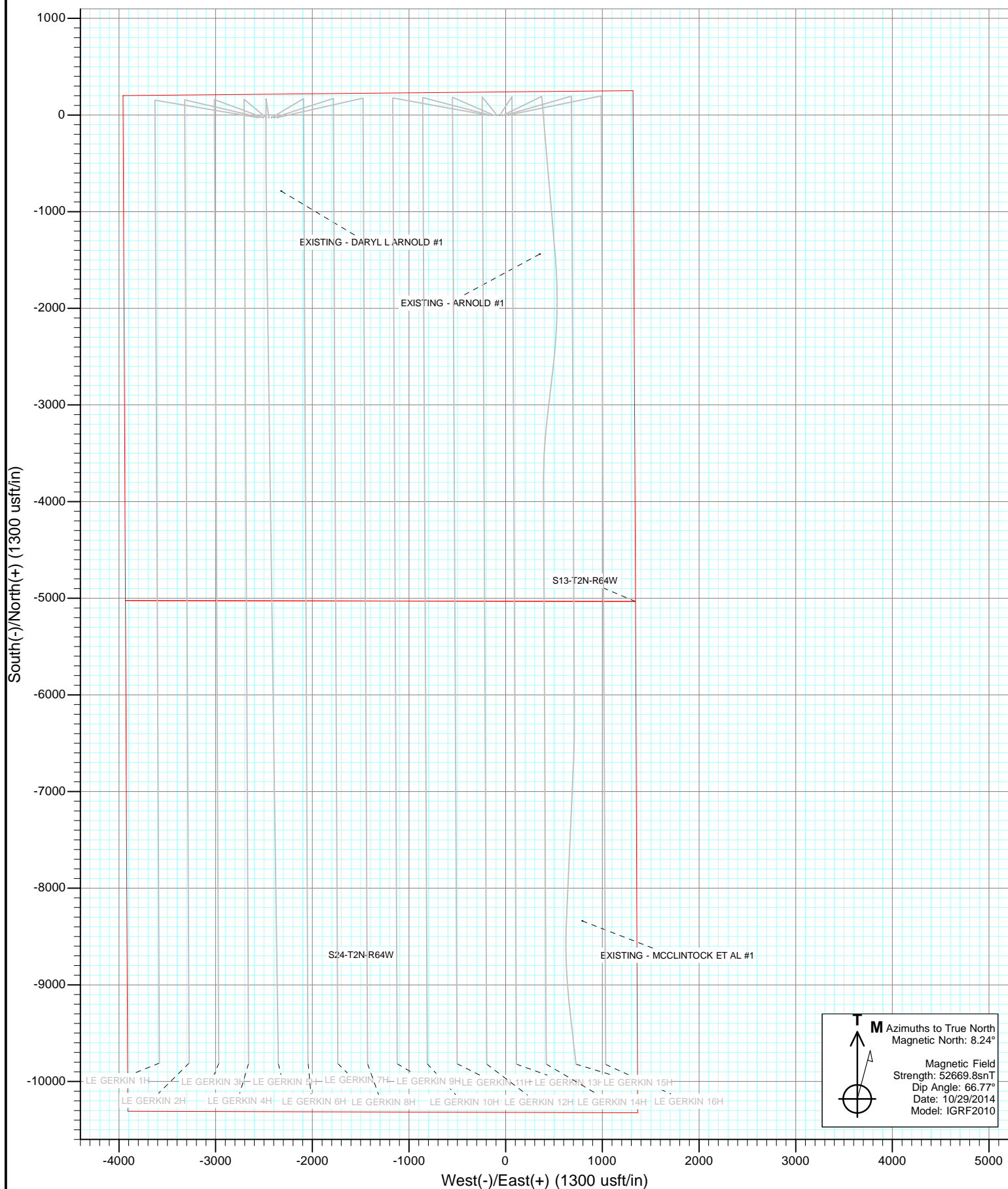




Project: Weld County, Colorado  
Site: S13-T2N-R64W (LE GERKIN PADS)  
Well: LE GERKIN 12H  
Design: Plan #1







# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Company:</b>	Red Hawk Petroleum	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Project:</b>	Weld County, Colorado	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>North Reference:</b>	True
<b>Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	Plan #1		

<b>Project</b>	Weld County, Colorado		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	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 12H					
Well Position	+N/-S	0.0 usft	Northing:	1,297,235.78 usft	Latitude:	40.144940
	+E/-W	0.0 usft	Easting:	3,280,824.16 usft	Longitude:	-104.495450
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,870.3 usft

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

<b>Design</b>	Plan #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	180.62

<b>Plan Sections</b>										
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	
1,121.5	3.04	321.10	1,121.4	2.5	-2.0	2.50	2.50	0.00	321.10	
5,608.8	3.04	321.10	5,602.4	187.5	-151.3	0.00	0.00	0.00	0.00	
5,730.2	0.00	0.00	5,723.8	190.0	-153.3	2.50	-2.50	0.00	180.00	LE GERKIN 12H VP
6,030.2	0.00	0.00	6,023.8	190.0	-153.3	0.00	0.00	0.00	0.00	
7,155.2	90.00	179.73	6,740.0	-526.2	-149.9	8.00	8.00	15.98	179.73	
16,446.5	90.00	179.73	6,740.0	-9,817.3	-106.3	0.00	0.00	0.00	0.00	LE GERKIN 12H PBH

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Company:</b>	Red Hawk Petroleum	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Project:</b>	Weld County, Colorado	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>North Reference:</b>	True
<b>Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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, 1408' 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	321.10	1,100.0	1.7	-1.4	-1.7	2.50	2.50	
1,121.5	3.04	321.10	1,121.4	2.5	-2.0	-2.5	2.50	2.50	EOB @ 3.04° INC
1,200.0	3.04	321.10	1,199.8	5.7	-4.6	-5.7	0.00	0.00	
1,300.0	3.04	321.10	1,299.7	9.9	-8.0	-9.8	0.00	0.00	
1,400.0	3.04	321.10	1,399.6	14.0	-11.3	-13.9	0.00	0.00	
1,500.0	3.04	321.10	1,499.4	18.1	-14.6	-18.0	0.00	0.00	
1,600.0	3.04	321.10	1,599.3	22.2	-17.9	-22.0	0.00	0.00	
1,700.0	3.04	321.10	1,699.1	26.4	-21.3	-26.1	0.00	0.00	
1,800.0	3.04	321.10	1,799.0	30.5	-24.6	-30.2	0.00	0.00	
1,900.0	3.04	321.10	1,898.9	34.6	-27.9	-34.3	0.00	0.00	
2,000.0	3.04	321.10	1,998.7	38.7	-31.2	-38.4	0.00	0.00	
2,100.0	3.04	321.10	2,098.6	42.8	-34.6	-42.5	0.00	0.00	
2,200.0	3.04	321.10	2,198.4	47.0	-37.9	-46.6	0.00	0.00	
2,300.0	3.04	321.10	2,298.3	51.1	-41.2	-50.6	0.00	0.00	
2,400.0	3.04	321.10	2,398.1	55.2	-44.5	-54.7	0.00	0.00	
2,500.0	3.04	321.10	2,498.0	59.3	-47.9	-58.8	0.00	0.00	
2,600.0	3.04	321.10	2,597.9	63.5	-51.2	-62.9	0.00	0.00	
2,700.0	3.04	321.10	2,697.7	67.6	-54.5	-67.0	0.00	0.00	
2,800.0	3.04	321.10	2,797.6	71.7	-57.9	-71.1	0.00	0.00	
2,900.0	3.04	321.10	2,897.4	75.8	-61.2	-75.2	0.00	0.00	
3,000.0	3.04	321.10	2,997.3	79.9	-64.5	-79.2	0.00	0.00	
3,100.0	3.04	321.10	3,097.2	84.1	-67.8	-83.3	0.00	0.00	
3,200.0	3.04	321.10	3,197.0	88.2	-71.2	-87.4	0.00	0.00	
3,300.0	3.04	321.10	3,296.9	92.3	-74.5	-91.5	0.00	0.00	
3,400.0	3.04	321.10	3,396.7	96.4	-77.8	-95.6	0.00	0.00	
3,500.0	3.04	321.10	3,496.6	100.6	-81.1	-99.7	0.00	0.00	
3,600.0	3.04	321.10	3,596.5	104.7	-84.5	-103.8	0.00	0.00	
3,700.0	3.04	321.10	3,696.3	108.8	-87.8	-107.8	0.00	0.00	
3,800.0	3.04	321.10	3,796.2	112.9	-91.1	-111.9	0.00	0.00	
3,900.0	3.04	321.10	3,896.0	117.1	-94.4	-116.0	0.00	0.00	
4,000.0	3.04	321.10	3,995.9	121.2	-97.8	-120.1	0.00	0.00	
4,100.0	3.04	321.10	4,095.8	125.3	-101.1	-124.2	0.00	0.00	
4,200.0	3.04	321.10	4,195.6	129.4	-104.4	-128.3	0.00	0.00	
4,300.0	3.04	321.10	4,295.5	133.5	-107.7	-132.4	0.00	0.00	
4,400.0	3.04	321.10	4,395.3	137.7	-111.1	-136.5	0.00	0.00	
4,500.0	3.04	321.10	4,495.2	141.8	-114.4	-140.5	0.00	0.00	
4,600.0	3.04	321.10	4,595.1	145.9	-117.7	-144.6	0.00	0.00	
4,700.0	3.04	321.10	4,694.9	150.0	-121.1	-148.7	0.00	0.00	
4,800.0	3.04	321.10	4,794.8	154.2	-124.4	-152.8	0.00	0.00	
4,900.0	3.04	321.10	4,894.6	158.3	-127.7	-156.9	0.00	0.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Company:</b>	Red Hawk Petroleum	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Project:</b>	Weld County, Colorado	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>North Reference:</b>	True
<b>Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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	3.04	321.10	4,994.5	162.4	-131.0	-161.0	0.00	0.00	
5,100.0	3.04	321.10	5,094.4	166.5	-134.4	-165.1	0.00	0.00	
5,200.0	3.04	321.10	5,194.2	170.6	-137.7	-169.1	0.00	0.00	
5,300.0	3.04	321.10	5,294.1	174.8	-141.0	-173.2	0.00	0.00	
5,400.0	3.04	321.10	5,393.9	178.9	-144.3	-177.3	0.00	0.00	
5,500.0	3.04	321.10	5,493.8	183.0	-147.7	-181.4	0.00	0.00	
5,608.8	3.04	321.10	5,602.4	187.5	-151.3	-185.8	0.00	0.00	Start 2.5° Drop
5,700.0	0.76	321.10	5,693.6	189.8	-153.2	-188.2	2.50	-2.50	
5,730.2	0.00	0.00	5,723.8	190.0	-153.3	-188.3	2.50	-2.50	EOD @ 0°
5,800.0	0.00	0.00	5,793.6	190.0	-153.3	-188.3	0.00	0.00	
5,900.0	0.00	0.00	5,893.6	190.0	-153.3	-188.3	0.00	0.00	
6,000.0	0.00	0.00	5,993.6	190.0	-153.3	-188.3	0.00	0.00	
6,030.2	0.00	0.00	6,023.8	190.0	-153.3	-188.3	0.00	0.00	Start 8° Build
6,050.0	1.58	179.73	6,043.6	189.7	-153.3	-188.1	8.00	8.00	
6,100.0	5.58	179.73	6,093.5	186.6	-153.3	-184.9	8.00	8.00	
6,150.0	9.58	179.73	6,143.0	180.0	-153.3	-178.3	8.00	8.00	
6,200.0	13.58	179.73	6,192.0	170.0	-153.2	-168.3	8.00	8.00	
6,250.0	17.58	179.73	6,240.2	156.5	-153.1	-154.9	8.00	8.00	
6,300.0	21.58	179.73	6,287.3	139.8	-153.1	-138.1	8.00	8.00	
6,350.0	25.58	179.73	6,333.1	119.8	-153.0	-118.1	8.00	8.00	
6,400.0	29.58	179.73	6,377.4	96.6	-152.9	-95.0	8.00	8.00	
6,450.0	33.58	179.73	6,420.0	70.5	-152.7	-68.8	8.00	8.00	
6,500.0	37.58	179.73	6,460.6	41.4	-152.6	-39.7	8.00	8.00	
6,550.0	41.58	179.73	6,499.1	9.5	-152.5	-7.9	8.00	8.00	
6,600.0	45.58	179.73	6,535.4	-24.9	-152.3	26.6	8.00	8.00	
6,650.0	49.58	179.73	6,569.1	-61.9	-152.1	63.5	8.00	8.00	
6,700.0	53.58	179.73	6,600.1	-101.0	-151.9	102.7	8.00	8.00	
6,750.0	57.58	179.73	6,628.4	-142.3	-151.7	143.9	8.00	8.00	
6,800.0	61.58	179.73	6,653.7	-185.4	-151.5	187.0	8.00	8.00	
6,850.0	65.58	179.73	6,675.9	-230.1	-151.3	231.8	8.00	8.00	
6,900.0	69.58	179.73	6,695.0	-276.3	-151.1	278.0	8.00	8.00	
6,950.0	73.58	179.73	6,710.8	-323.8	-150.9	325.4	8.00	8.00	
7,000.0	77.58	179.73	6,723.2	-372.2	-150.7	373.8	8.00	8.00	
7,050.0	81.58	179.73	6,732.3	-421.4	-150.4	423.0	8.00	8.00	
7,100.0	85.58	179.73	6,737.9	-471.0	-150.2	472.6	8.00	8.00	
7,150.0	89.58	179.73	6,740.0	-521.0	-150.0	522.6	8.00	8.00	
7,155.2	90.00	179.73	6,740.0	-526.2	-149.9	527.8	8.00	8.00	LP - 766' FNL, 1561' FEL - LP @ 6,470' TVD, 9
7,200.0	90.00	179.73	6,740.0	-571.0	-149.7	572.6	0.00	0.00	
7,300.0	90.00	179.73	6,740.0	-671.0	-149.3	672.6	0.00	0.00	
7,400.0	90.00	179.73	6,740.0	-771.0	-148.8	772.5	0.00	0.00	
7,500.0	90.00	179.73	6,740.0	-871.0	-148.3	872.5	0.00	0.00	
7,600.0	90.00	179.73	6,740.0	-971.0	-147.8	972.5	0.00	0.00	
7,700.0	90.00	179.73	6,740.0	-1,071.0	-147.4	1,072.5	0.00	0.00	
7,800.0	90.00	179.73	6,740.0	-1,171.0	-146.9	1,172.5	0.00	0.00	
7,900.0	90.00	179.73	6,740.0	-1,271.0	-146.4	1,272.5	0.00	0.00	
8,000.0	90.00	179.73	6,740.0	-1,371.0	-146.0	1,372.5	0.00	0.00	
8,100.0	90.00	179.73	6,740.0	-1,471.0	-145.5	1,472.5	0.00	0.00	
8,200.0	90.00	179.73	6,740.0	-1,571.0	-145.0	1,572.4	0.00	0.00	
8,300.0	90.00	179.73	6,740.0	-1,671.0	-144.6	1,672.4	0.00	0.00	
8,400.0	90.00	179.73	6,740.0	-1,771.0	-144.1	1,772.4	0.00	0.00	
8,500.0	90.00	179.73	6,740.0	-1,871.0	-143.6	1,872.4	0.00	0.00	
8,600.0	90.00	179.73	6,740.0	-1,971.0	-143.1	1,972.4	0.00	0.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Company:</b>	Red Hawk Petroleum	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Project:</b>	Weld County, Colorado	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>North Reference:</b>	True
<b>Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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
8,700.0	90.00	179.73	6,740.0	-2,071.0	-142.7	2,072.4	0.00	0.00	
8,800.0	90.00	179.73	6,740.0	-2,171.0	-142.2	2,172.4	0.00	0.00	
8,900.0	90.00	179.73	6,740.0	-2,271.0	-141.7	2,272.4	0.00	0.00	
9,000.0	90.00	179.73	6,740.0	-2,371.0	-141.3	2,372.3	0.00	0.00	
9,100.0	90.00	179.73	6,740.0	-2,471.0	-140.8	2,472.3	0.00	0.00	
9,200.0	90.00	179.73	6,740.0	-2,571.0	-140.3	2,572.3	0.00	0.00	
9,300.0	90.00	179.73	6,740.0	-2,671.0	-139.9	2,672.3	0.00	0.00	
9,400.0	90.00	179.73	6,740.0	-2,771.0	-139.4	2,772.3	0.00	0.00	
9,500.0	90.00	179.73	6,740.0	-2,870.9	-138.9	2,872.3	0.00	0.00	
9,600.0	90.00	179.73	6,740.0	-2,970.9	-138.4	2,972.3	0.00	0.00	
9,700.0	90.00	179.73	6,740.0	-3,070.9	-138.0	3,072.3	0.00	0.00	
9,800.0	90.00	179.73	6,740.0	-3,170.9	-137.5	3,172.2	0.00	0.00	
9,900.0	90.00	179.73	6,740.0	-3,270.9	-137.0	3,272.2	0.00	0.00	
10,000.0	90.00	179.73	6,740.0	-3,370.9	-136.6	3,372.2	0.00	0.00	
10,100.0	90.00	179.73	6,740.0	-3,470.9	-136.1	3,472.2	0.00	0.00	
10,200.0	90.00	179.73	6,740.0	-3,570.9	-135.6	3,572.2	0.00	0.00	
10,300.0	90.00	179.73	6,740.0	-3,670.9	-135.2	3,672.2	0.00	0.00	
10,400.0	90.00	179.73	6,740.0	-3,770.9	-134.7	3,772.2	0.00	0.00	
10,500.0	90.00	179.73	6,740.0	-3,870.9	-134.2	3,872.2	0.00	0.00	
10,600.0	90.00	179.73	6,740.0	-3,970.9	-133.7	3,972.2	0.00	0.00	
10,700.0	90.00	179.73	6,740.0	-4,070.9	-133.3	4,072.1	0.00	0.00	
10,800.0	90.00	179.73	6,740.0	-4,170.9	-132.8	4,172.1	0.00	0.00	
10,900.0	90.00	179.73	6,740.0	-4,270.9	-132.3	4,272.1	0.00	0.00	
11,000.0	90.00	179.73	6,740.0	-4,370.9	-131.9	4,372.1	0.00	0.00	
11,100.0	90.00	179.73	6,740.0	-4,470.9	-131.4	4,472.1	0.00	0.00	
11,200.0	90.00	179.73	6,740.0	-4,570.9	-130.9	4,572.1	0.00	0.00	
11,300.0	90.00	179.73	6,740.0	-4,670.9	-130.5	4,672.1	0.00	0.00	
11,400.0	90.00	179.73	6,740.0	-4,770.9	-130.0	4,772.1	0.00	0.00	
11,500.0	90.00	179.73	6,740.0	-4,870.9	-129.5	4,872.0	0.00	0.00	
11,600.0	90.00	179.73	6,740.0	-4,970.9	-129.0	4,972.0	0.00	0.00	
11,700.0	90.00	179.73	6,740.0	-5,070.9	-128.6	5,072.0	0.00	0.00	
11,800.0	90.00	179.73	6,740.0	-5,170.9	-128.1	5,172.0	0.00	0.00	
11,900.0	90.00	179.73	6,740.0	-5,270.9	-127.6	5,272.0	0.00	0.00	
12,000.0	90.00	179.73	6,740.0	-5,370.9	-127.2	5,372.0	0.00	0.00	
12,100.0	90.00	179.73	6,740.0	-5,470.9	-126.7	5,472.0	0.00	0.00	
12,200.0	90.00	179.73	6,740.0	-5,570.9	-126.2	5,572.0	0.00	0.00	
12,300.0	90.00	179.73	6,740.0	-5,670.9	-125.8	5,671.9	0.00	0.00	
12,400.0	90.00	179.73	6,740.0	-5,770.9	-125.3	5,771.9	0.00	0.00	
12,500.0	90.00	179.73	6,740.0	-5,870.9	-124.8	5,871.9	0.00	0.00	
12,600.0	90.00	179.73	6,740.0	-5,970.9	-124.3	5,971.9	0.00	0.00	
12,700.0	90.00	179.73	6,740.0	-6,070.9	-123.9	6,071.9	0.00	0.00	
12,800.0	90.00	179.73	6,740.0	-6,170.9	-123.4	6,171.9	0.00	0.00	
12,900.0	90.00	179.73	6,740.0	-6,270.9	-122.9	6,271.9	0.00	0.00	
13,000.0	90.00	179.73	6,740.0	-6,370.9	-122.5	6,371.9	0.00	0.00	
13,100.0	90.00	179.73	6,740.0	-6,470.9	-122.0	6,471.9	0.00	0.00	
13,200.0	90.00	179.73	6,740.0	-6,570.9	-121.5	6,571.8	0.00	0.00	
13,300.0	90.00	179.73	6,740.0	-6,670.9	-121.1	6,671.8	0.00	0.00	
13,400.0	90.00	179.73	6,740.0	-6,770.9	-120.6	6,771.8	0.00	0.00	
13,500.0	90.00	179.73	6,740.0	-6,870.9	-120.1	6,871.8	0.00	0.00	
13,600.0	90.00	179.73	6,740.0	-6,970.9	-119.6	6,971.8	0.00	0.00	
13,700.0	90.00	179.73	6,740.0	-7,070.9	-119.2	7,071.8	0.00	0.00	
13,800.0	90.00	179.73	6,740.0	-7,170.9	-118.7	7,171.8	0.00	0.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Company:</b>	Red Hawk Petroleum	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Project:</b>	Weld County, Colorado	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>North Reference:</b>	True
<b>Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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	179.73	6,740.0	-7,270.9	-118.2	7,271.8	0.00	0.00	
14,000.0	90.00	179.73	6,740.0	-7,370.9	-117.8	7,371.7	0.00	0.00	
14,100.0	90.00	179.73	6,740.0	-7,470.9	-117.3	7,471.7	0.00	0.00	
14,200.0	90.00	179.73	6,740.0	-7,570.9	-116.8	7,571.7	0.00	0.00	
14,300.0	90.00	179.73	6,740.0	-7,670.9	-116.4	7,671.7	0.00	0.00	
14,400.0	90.00	179.73	6,740.0	-7,770.9	-115.9	7,771.7	0.00	0.00	
14,500.0	90.00	179.73	6,740.0	-7,870.9	-115.4	7,871.7	0.00	0.00	
14,600.0	90.00	179.73	6,740.0	-7,970.9	-115.0	7,971.7	0.00	0.00	
14,700.0	90.00	179.73	6,740.0	-8,070.9	-114.5	8,071.7	0.00	0.00	
14,800.0	90.00	179.73	6,740.0	-8,170.9	-114.0	8,171.6	0.00	0.00	
14,900.0	90.00	179.73	6,740.0	-8,270.9	-113.5	8,271.6	0.00	0.00	
15,000.0	90.00	179.73	6,740.0	-8,370.9	-113.1	8,371.6	0.00	0.00	
15,100.0	90.00	179.73	6,740.0	-8,470.9	-112.6	8,471.6	0.00	0.00	
15,200.0	90.00	179.73	6,740.0	-8,570.9	-112.1	8,571.6	0.00	0.00	
15,300.0	90.00	179.73	6,740.0	-8,670.9	-111.7	8,671.6	0.00	0.00	
15,400.0	90.00	179.73	6,740.0	-8,770.9	-111.2	8,771.6	0.00	0.00	
15,500.0	90.00	179.73	6,740.0	-8,870.9	-110.7	8,871.6	0.00	0.00	
15,600.0	90.00	179.73	6,740.0	-8,970.9	-110.3	8,971.6	0.00	0.00	
15,700.0	90.00	179.73	6,740.0	-9,070.9	-109.8	9,071.5	0.00	0.00	
15,800.0	90.00	179.73	6,740.0	-9,170.9	-109.3	9,171.5	0.00	0.00	
15,900.0	90.00	179.73	6,740.0	-9,270.9	-108.8	9,271.5	0.00	0.00	
16,000.0	90.00	179.73	6,740.0	-9,370.9	-108.4	9,371.5	0.00	0.00	
16,100.0	90.00	179.73	6,740.0	-9,470.9	-107.9	9,471.5	0.00	0.00	
16,200.0	90.00	179.73	6,740.0	-9,570.9	-107.4	9,571.5	0.00	0.00	
16,300.0	90.00	179.73	6,740.0	-9,670.9	-107.0	9,671.5	0.00	0.00	
16,400.0	90.00	179.73	6,740.0	-9,770.9	-106.5	9,771.5	0.00	0.00	
16,446.5	90.00	179.73	6,740.0	-9,817.3	-106.3	9,817.9	0.00	0.00	PBHL - 500' FSL, 1561' FEL - TD @ 16,446.5' M

### Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LE GERKIN 12H VP - hit/miss target - Shape - Point	0.00	0.00	5,723.8	190.0	-153.3	1,297,424.03	3,280,668.72	40.145462	-104.495998
LE GERKIN 12H PBHL - plan hits target center - Point	0.00	0.00	6,740.0	-9,817.3	-106.3	1,287,417.88	3,280,829.11	40.117990	-104.495830



# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Company:</b>	Red Hawk Petroleum	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Project:</b>	Weld County, Colorado	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>North Reference:</b>	True
<b>Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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, 1408' FEL
1,000.0	1,000.0	0.0	0.0	KOP @ 1,000'
1,121.5	1,121.4	2.5	-2.0	EOB @ 3.04° INC
5,608.8	5,602.4	187.5	-151.3	Start 2.5° Drop
5,730.2	5,723.8	190.0	-153.3	EOD @ 0°
6,030.2	6,023.8	190.0	-153.3	Start 8° Build
7,155.2	6,740.0	-526.2	-149.9	LP - 766' FNL, 1561' FEL
7,155.2	6,740.0	-526.2	-149.9	LP @ 6,470' TVD, 90° INC
16,446.5	6,740.0	-9,817.3	-106.3	PBHL - 500' FSL, 1561' FEL
16,446.5	6,740.0	-9,817.3	-106.3	TD @ 16,446.5' MD

# **Red Hawk Petroleum**

**Weld County, Colorado**

**S13-T2N-R64W (LE GERKIN PADS)**

**LE GERKIN 12H**

**HZ**

**Plan #1**

## **Anticollision Report**

**30 October, 2014**

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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	16,446.5	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 - EXISTING - NO S						Out of range
EXISTING - DARYL L ARNOLD #1 - EXISTING - EXISTI						Out of range
EXISTING - MCCLINTOCK ET AL #1 - EXISTING - EXIS						Out of range
LE GERKIN 10H - HZ - Plan #1	1,000.0	1,000.0	61.5	58.1	17.979	CC, ES
LE GERKIN 10H - HZ - Plan #1	1,200.0	1,194.8	65.2	61.1	15.844	SF
LE GERKIN 11H - HZ - Plan #1	1,000.0	1,000.0	30.8	27.3	8.989	CC, ES
LE GERKIN 11H - HZ - Plan #1	1,200.0	1,197.5	34.1	30.0	8.274	SF
LE GERKIN 13H - HZ - Plan #1	1,000.0	1,000.0	28.0	24.5	8.172	CC, ES
LE GERKIN 13H - HZ - Plan #1	1,100.0	1,099.3	30.5	26.7	8.094	SF
LE GERKIN 14H - HZ - Plan #1	1,000.0	1,000.0	58.7	55.3	17.162	CC, ES
LE GERKIN 14H - HZ - Plan #1	1,100.0	1,097.6	62.0	58.2	16.462	SF
LE GERKIN 15H - HZ - Plan #1	1,000.0	1,000.0	89.5	86.1	26.173	CC, ES
LE GERKIN 15H - HZ - Plan #1	1,100.0	1,096.2	92.9	89.1	24.679	SF
LE GERKIN 16H - HZ - Plan #1	1,000.0	1,000.0	120.3	116.8	35.157	CC, ES
LE GERKIN 16H - HZ - Plan #1	1,200.0	1,189.3	132.9	128.8	32.395	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	89.5	86.0	26.151	CC, ES
LE GERKIN 9H - HZ - Plan #1	1,300.0	1,288.3	100.3	95.8	22.485	SF

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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	-90.00	0.0	-61.5	61.5				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-61.5	61.5	61.2	0.28	220.240	
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-61.5	61.5	60.9	0.63	97.885	
300.0	300.0	300.0	300.0	0.5	0.5	-90.00	0.0	-61.5	61.5	60.5	0.98	62.926	
400.0	400.0	400.0	400.0	0.7	0.7	-90.00	0.0	-61.5	61.5	60.2	1.33	46.366	
500.0	500.0	500.0	500.0	0.8	0.8	-90.00	0.0	-61.5	61.5	59.8	1.68	36.707	
600.0	600.0	600.0	600.0	1.0	1.0	-90.00	0.0	-61.5	61.5	59.5	2.02	30.378	
700.0	700.0	700.0	700.0	1.2	1.2	-90.00	0.0	-61.5	61.5	59.1	2.37	25.911	
800.0	800.0	800.0	800.0	1.4	1.4	-90.00	0.0	-61.5	61.5	58.8	2.72	22.589	
900.0	900.0	900.0	900.0	1.5	1.5	-90.00	0.0	-61.5	61.5	58.4	3.07	20.022	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-90.00	0.0	-61.5	61.5	58.1	3.42	17.979 CC, ES	
1,100.0	1,100.0	1,097.5	1,097.4	1.9	1.9	-52.13	0.5	-63.5	62.2	58.4	3.77	16.518	
1,200.0	1,199.8	1,194.8	1,194.6	2.1	2.1	-54.17	2.1	-69.5	65.2	61.1	4.11	15.844 SF	
1,300.0	1,299.7	1,291.8	1,291.0	2.2	2.3	-54.99	4.7	-79.5	72.2	67.7	4.47	16.162	
1,400.0	1,399.6	1,388.3	1,386.4	2.4	2.5	-54.74	8.3	-93.3	83.2	78.4	4.82	17.247	
1,500.0	1,499.4	1,487.5	1,484.3	2.6	2.8	-54.20	12.4	-109.2	95.9	90.8	5.19	18.494	
1,600.0	1,599.3	1,586.7	1,582.1	2.8	3.0	-53.78	16.6	-125.1	108.7	103.1	5.55	19.573	
1,700.0	1,699.1	1,685.8	1,679.9	3.0	3.3	-53.45	20.7	-141.0	121.4	115.5	5.92	20.514	
1,800.0	1,799.0	1,785.0	1,777.7	3.2	3.6	-53.18	24.8	-157.0	134.2	127.9	6.29	21.342	
1,900.0	1,898.9	1,884.2	1,875.5	3.4	3.9	-52.96	29.0	-172.9	147.0	140.3	6.66	22.075	
2,000.0	1,998.7	1,983.4	1,973.3	3.6	4.2	-52.78	33.1	-188.8	159.7	152.7	7.03	22.730	
2,100.0	2,098.6	2,082.6	2,071.1	3.8	4.5	-52.62	37.3	-204.8	172.5	165.1	7.40	23.317	
2,200.0	2,198.4	2,181.7	2,168.9	4.0	4.8	-52.49	41.4	-220.7	185.3	177.5	7.77	23.847	
2,300.0	2,298.3	2,280.9	2,266.7	4.2	5.2	-52.37	45.6	-236.6	198.0	189.9	8.14	24.327	

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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		Total		Separation		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)	Uncertainty Axis	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, ES		
1,100.0	1,100.0	1,098.8	1,098.7	1.9	1.9	-52.60	0.8	-32.7	31.4	27.6	3.77	8.325		
1,200.0	1,199.8	1,197.5	1,197.2	2.1	2.1	-54.92	3.4	-38.5	34.1	30.0	4.12	8.274 SF		
1,300.0	1,299.7	1,296.7	1,296.0	2.2	2.3	-54.52	7.4	-47.7	40.0	35.5	4.48	8.923		
1,400.0	1,399.6	1,396.5	1,395.3	2.4	2.5	-54.01	11.5	-57.2	46.2	41.3	4.84	9.538		
1,500.0	1,499.4	1,496.3	1,494.5	2.6	2.7	-53.63	15.6	-66.7	52.4	47.2	5.21	10.063		
1,600.0	1,599.3	1,596.2	1,593.8	2.8	2.9	-53.32	19.8	-76.2	58.6	53.0	5.57	10.516		
1,700.0	1,699.1	1,696.0	1,693.0	3.0	3.1	-53.08	23.9	-85.8	64.8	58.9	5.94	10.911		
1,800.0	1,799.0	1,795.8	1,792.3	3.2	3.4	-52.88	28.1	-95.3	71.0	64.7	6.31	11.259		
1,900.0	1,898.9	1,895.6	1,891.6	3.4	3.6	-52.71	32.2	-104.8	77.3	70.6	6.68	11.566		
2,000.0	1,998.7	1,995.4	1,990.8	3.6	3.8	-52.56	36.3	-114.3	83.5	76.4	7.05	11.840		
2,100.0	2,098.6	2,095.2	2,090.1	3.8	4.1	-52.44	40.5	-123.8	89.7	82.3	7.42	12.085		
2,200.0	2,198.4	2,195.0	2,189.4	4.0	4.3	-52.33	44.6	-133.4	95.9	88.1	7.79	12.306		
2,300.0	2,298.3	2,294.8	2,288.6	4.2	4.6	-52.23	48.7	-142.9	102.1	94.0	8.17	12.507		
2,400.0	2,398.1	2,394.6	2,387.9	4.3	4.8	-52.15	52.9	-152.4	108.4	99.8	8.54	12.689		
2,500.0	2,498.0	2,494.4	2,487.2	4.5	5.0	-52.07	57.0	-161.9	114.6	105.7	8.91	12.856		
2,600.0	2,597.9	2,594.2	2,586.4	4.7	5.3	-52.01	61.2	-171.4	120.8	111.5	9.29	13.008		
2,700.0	2,697.7	2,694.0	2,685.7	4.9	5.5	-51.94	65.3	-181.0	127.0	117.4	9.66	13.149		
2,800.0	2,797.6	2,793.8	2,785.0	5.1	5.8	-51.89	69.4	-190.5	133.2	123.2	10.03	13.279		
2,900.0	2,897.4	2,893.6	2,884.2	5.3	6.0	-51.84	73.6	-200.0	139.5	129.1	10.41	13.399		
3,000.0	2,997.3	2,993.4	2,983.5	5.5	6.3	-51.79	77.7	-209.5	145.7	134.9	10.78	13.511		
3,100.0	3,097.2	3,093.2	3,082.8	5.7	6.5	-51.75	81.9	-219.0	151.9	140.7	11.16	13.614		
3,200.0	3,197.0	3,193.1	3,182.0	5.9	6.8	-51.71	86.0	-228.6	158.1	146.6	11.53	13.711		
3,300.0	3,296.9	3,292.9	3,281.3	6.1	7.0	-51.68	90.1	-238.1	164.3	152.4	11.91	13.802		
3,400.0	3,396.7	3,392.7	3,380.6	6.3	7.2	-51.64	94.3	-247.6	170.6	158.3	12.28	13.887		
3,500.0	3,496.6	3,492.5	3,479.8	6.5	7.5	-51.61	98.4	-257.1	176.8	164.1	12.66	13.967		
3,600.0	3,596.5	3,592.3	3,579.1	6.7	7.7	-51.58	102.6	-266.6	183.0	170.0	13.03	14.042		
3,700.0	3,696.3	3,692.1	3,678.3	6.9	8.0	-51.56	106.7	-276.1	189.2	175.8	13.41	14.113		
3,800.0	3,796.2	3,791.9	3,777.6	7.1	8.2	-51.53	110.8	-285.7	195.4	181.7	13.78	14.180		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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	90.00	0.0	28.0	28.0					
100.0	100.0	100.0	100.0	0.1	0.1	90.00	0.0	28.0	28.0	27.7	0.28	100.109		
200.0	200.0	200.0	200.0	0.3	0.3	90.00	0.0	28.0	28.0	27.3	0.63	44.493		
300.0	300.0	300.0	300.0	0.5	0.5	90.00	0.0	28.0	28.0	27.0	0.98	28.603		
400.0	400.0	400.0	400.0	0.7	0.7	90.00	0.0	28.0	28.0	26.6	1.33	21.076		
500.0	500.0	500.0	500.0	0.8	0.8	90.00	0.0	28.0	28.0	26.3	1.68	16.685		
600.0	600.0	600.0	600.0	1.0	1.0	90.00	0.0	28.0	28.0	25.9	2.02	13.808		
700.0	700.0	700.0	700.0	1.2	1.2	90.00	0.0	28.0	28.0	25.6	2.37	11.778		
800.0	800.0	800.0	800.0	1.4	1.4	90.00	0.0	28.0	28.0	25.2	2.72	10.268		
900.0	900.0	900.0	900.0	1.5	1.5	90.00	0.0	28.0	28.0	24.9	3.07	9.101		
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	90.00	0.0	28.0	28.0	24.5	3.42	8.172 CC, ES		
1,100.0	1,100.0	1,099.3	1,099.2	1.9	1.9	128.64	1.8	29.1	30.5	26.7	3.77	8.094 SF		
1,200.0	1,199.8	1,199.0	1,198.8	2.1	2.1	128.51	5.9	31.8	36.5	32.4	4.12	8.846		
1,300.0	1,299.7	1,298.8	1,298.5	2.2	2.2	128.48	10.1	34.6	42.5	38.1	4.48	9.490		
1,400.0	1,399.6	1,398.6	1,398.2	2.4	2.4	128.45	14.3	37.3	48.6	43.8	4.85	10.033		
1,500.0	1,499.4	1,498.4	1,497.9	2.6	2.6	128.44	18.4	40.0	54.7	49.5	5.21	10.495		
1,600.0	1,599.3	1,598.2	1,597.6	2.8	2.8	128.42	22.6	42.8	60.7	55.2	5.57	10.894		
1,700.0	1,699.1	1,698.1	1,697.3	3.0	3.0	128.41	26.8	45.5	66.8	60.9	5.94	11.241		
1,800.0	1,799.0	1,797.9	1,797.0	3.2	3.2	128.40	31.0	48.2	72.9	66.5	6.31	11.546		
1,900.0	1,898.9	1,897.7	1,896.7	3.4	3.4	128.40	35.1	51.0	78.9	72.2	6.68	11.815		
2,000.0	1,998.7	1,997.5	1,996.4	3.6	3.6	128.39	39.3	53.7	85.0	77.9	7.05	12.054		
2,100.0	2,098.6	2,097.3	2,096.0	3.8	3.7	128.38	43.5	56.4	91.0	83.6	7.42	12.268		
2,200.0	2,198.4	2,197.1	2,195.7	4.0	3.9	128.38	47.7	59.2	97.1	89.3	7.79	12.461		
2,300.0	2,298.3	2,297.0	2,295.4	4.2	4.1	128.37	51.8	61.9	103.2	95.0	8.17	12.636		
2,400.0	2,398.1	2,396.8	2,395.1	4.3	4.3	128.37	56.0	64.6	109.2	100.7	8.54	12.794		
2,500.0	2,498.0	2,496.6	2,494.8	4.5	4.5	128.37	60.2	67.4	115.3	106.4	8.91	12.939		
2,600.0	2,597.9	2,596.4	2,594.5	4.7	4.7	128.36	64.4	70.1	121.4	112.1	9.28	13.072		
2,700.0	2,697.7	2,696.2	2,694.2	4.9	4.9	128.36	68.5	72.8	127.4	117.8	9.66	13.193		
2,800.0	2,797.6	2,796.0	2,793.9	5.1	5.1	128.36	72.7	75.6	133.5	123.5	10.03	13.306		
2,900.0	2,897.4	2,895.9	2,893.6	5.3	5.3	128.36	76.9	78.3	139.5	129.1	10.41	13.410		
3,000.0	2,997.3	2,995.7	2,993.3	5.5	5.5	128.35	81.1	81.0	145.6	134.8	10.78	13.506		
3,100.0	3,097.2	3,095.5	3,093.0	5.7	5.7	128.35	85.2	83.8	151.7	140.5	11.16	13.596		
3,200.0	3,197.0	3,195.3	3,192.6	5.9	5.9	128.35	89.4	86.5	157.7	146.2	11.53	13.680		
3,300.0	3,296.9	3,295.1	3,292.3	6.1	6.1	128.35	93.6	89.2	163.8	151.9	11.91	13.758		
3,400.0	3,396.7	3,394.9	3,392.0	6.3	6.2	128.35	97.8	92.0	169.9	157.6	12.28	13.832		
3,500.0	3,496.6	3,494.7	3,491.7	6.5	6.4	128.34	101.9	94.7	175.9	163.3	12.66	13.901		
3,600.0	3,596.5	3,594.6	3,591.4	6.7	6.6	128.34	106.1	97.4	182.0	169.0	13.03	13.965		
3,700.0	3,696.3	3,694.4	3,691.1	6.9	6.8	128.34	110.3	100.2	188.1	174.6	13.41	14.026		
3,800.0	3,796.2	3,794.2	3,790.8	7.1	7.0	128.34	114.5	102.9	194.1	180.3	13.78	14.084		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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	90.00	0.0	58.7	58.7					
100.0	100.0	100.0	100.0	0.1	0.1	90.00	0.0	58.7	58.7	58.4	0.28	210.229		
200.0	200.0	200.0	200.0	0.3	0.3	90.00	0.0	58.7	58.7	58.1	0.63	93.435		
300.0	300.0	300.0	300.0	0.5	0.5	90.00	0.0	58.7	58.7	57.7	0.98	60.066		
400.0	400.0	400.0	400.0	0.7	0.7	90.00	0.0	58.7	58.7	57.4	1.33	44.259		
500.0	500.0	500.0	500.0	0.8	0.8	90.00	0.0	58.7	58.7	57.0	1.68	35.038		
600.0	600.0	600.0	600.0	1.0	1.0	90.00	0.0	58.7	58.7	56.7	2.02	28.997		
700.0	700.0	700.0	700.0	1.2	1.2	90.00	0.0	58.7	58.7	56.3	2.37	24.733		
800.0	800.0	800.0	800.0	1.4	1.4	90.00	0.0	58.7	58.7	56.0	2.72	21.562		
900.0	900.0	900.0	900.0	1.5	1.5	90.00	0.0	58.7	58.7	55.6	3.07	19.112		
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	90.00	0.0	58.7	58.7	55.3	3.42	17.162 CC, ES		
1,100.0	1,100.0	1,097.6	1,097.6	1.9	1.9	129.53	0.9	60.6	62.0	58.2	3.77	16.462 SF		
1,200.0	1,199.8	1,194.7	1,194.5	2.1	2.1	130.41	3.6	66.1	71.0	66.9	4.11	17.258		
1,300.0	1,299.7	1,293.1	1,292.4	2.2	2.3	130.10	7.8	74.7	83.0	78.5	4.47	18.572		
1,400.0	1,399.6	1,392.3	1,391.1	2.4	2.5	129.80	12.1	83.6	95.2	90.4	4.83	19.719		
1,500.0	1,499.4	1,491.6	1,489.9	2.6	2.7	129.57	16.4	92.4	107.5	102.3	5.19	20.698		
1,600.0	1,599.3	1,590.8	1,588.6	2.8	2.9	129.39	20.7	101.3	119.7	114.1	5.56	21.543		
1,700.0	1,699.1	1,690.1	1,687.4	3.0	3.1	129.24	25.0	110.1	131.9	126.0	5.92	22.277		
1,800.0	1,799.0	1,789.3	1,786.2	3.2	3.3	129.12	29.3	119.0	144.2	137.9	6.29	22.922		
1,900.0	1,898.9	1,888.6	1,884.9	3.4	3.6	129.01	33.6	127.9	156.4	149.7	6.66	23.492		
2,000.0	1,998.7	1,987.8	1,983.7	3.6	3.8	128.92	37.9	136.7	168.6	161.6	7.03	24.000		
2,100.0	2,098.6	2,087.1	2,082.4	3.8	4.0	128.85	42.2	145.6	180.9	173.5	7.40	24.454		
2,200.0	2,198.4	2,186.3	2,181.2	4.0	4.3	128.78	46.5	154.4	193.1	185.3	7.77	24.863		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S13-T2N-R64W (LE GERKIN PADS) - LE GERKIN 15H - 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	87.67	3.6	89.5	89.5				
100.0	100.0	100.0	100.0	0.1	0.1	87.67	3.6	89.5	89.5	89.3	0.28	320.615	
200.0	200.0	200.0	200.0	0.3	0.3	87.67	3.6	89.5	89.5	88.9	0.63	142.496	
300.0	300.0	300.0	300.0	0.5	0.5	87.67	3.6	89.5	89.5	88.6	0.98	91.604	
400.0	400.0	400.0	400.0	0.7	0.7	87.67	3.6	89.5	89.5	88.2	1.33	67.498	
500.0	500.0	500.0	500.0	0.8	0.8	87.67	3.6	89.5	89.5	87.9	1.68	53.436	
600.0	600.0	600.0	600.0	1.0	1.0	87.67	3.6	89.5	89.5	87.5	2.02	44.223	
700.0	700.0	700.0	700.0	1.2	1.2	87.67	3.6	89.5	89.5	87.2	2.37	37.719	
800.0	800.0	800.0	800.0	1.4	1.4	87.67	3.6	89.5	89.5	86.8	2.72	32.884	
900.0	900.0	900.0	900.0	1.5	1.5	87.67	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	87.67	3.6	89.5	89.5	86.1	3.42	26.173	CC, ES
1,100.0	1,100.0	1,096.2	1,096.2	1.9	1.9	127.25	4.2	91.4	92.9	89.1	3.76	24.679	SF
1,200.0	1,199.8	1,191.8	1,191.6	2.1	2.1	128.60	5.9	97.2	102.1	98.0	4.11	24.861	
1,300.0	1,299.7	1,286.6	1,285.9	2.2	2.3	129.22	8.6	106.7	115.5	111.0	4.46	25.916	
1,400.0	1,399.6	1,380.9	1,379.2	2.4	2.5	129.21	12.3	119.8	132.7	127.9	4.80	27.611	
1,500.0	1,499.4	1,479.1	1,476.1	2.6	2.7	129.04	16.7	134.9	151.4	146.2	5.16	29.311	
1,600.0	1,599.3	1,577.4	1,573.1	2.8	3.0	128.90	21.0	150.1	170.1	164.5	5.52	30.780	
1,700.0	1,699.1	1,675.6	1,670.0	3.0	3.3	128.79	25.4	165.2	188.7	182.9	5.89	32.060	



# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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		Highside Toolface (°)	Offset Wellbore Centre		Distance		Total Uncertainty Axis	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.0	0.0	0.0	0.0	0.0	0.0	88.26	3.6	120.2	120.3				
100.0	100.0	100.0	100.0	0.1	0.1	88.26	3.6	120.2	120.3	120.0	0.28	430.667	
200.0	200.0	200.0	200.0	0.3	0.3	88.26	3.6	120.2	120.3	119.6	0.63	191.408	
300.0	300.0	300.0	300.0	0.5	0.5	88.26	3.6	120.2	120.3	119.3	0.98	123.048	
400.0	400.0	400.0	400.0	0.7	0.7	88.26	3.6	120.2	120.3	118.9	1.33	90.667	
500.0	500.0	500.0	500.0	0.8	0.8	88.26	3.6	120.2	120.3	118.6	1.68	71.778	
600.0	600.0	600.0	600.0	1.0	1.0	88.26	3.6	120.2	120.3	118.2	2.02	59.402	
700.0	700.0	700.0	700.0	1.2	1.2	88.26	3.6	120.2	120.3	117.9	2.37	50.667	
800.0	800.0	800.0	800.0	1.4	1.4	88.26	3.6	120.2	120.3	117.5	2.72	44.171	
900.0	900.0	900.0	900.0	1.5	1.5	88.26	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	88.26	3.6	120.2	120.3	116.8	3.42	35.157 CC, ES	
1,100.0	1,100.0	1,095.0	1,094.9	1.9	1.9	127.70	4.0	122.1	123.6	119.9	3.76	32.870	
1,200.0	1,199.8	1,189.3	1,189.1	2.1	2.1	128.89	5.2	127.9	132.9	128.8	4.10	32.395 SF	
1,300.0	1,299.7	1,282.8	1,282.1	2.2	2.2	129.64	7.2	137.3	146.3	141.9	4.45	32.903	
1,400.0	1,399.6	1,375.2	1,373.6	2.4	2.5	129.95	9.9	150.2	163.6	158.8	4.79	34.152	
1,500.0	1,499.4	1,466.2	1,463.0	2.6	2.7	129.94	13.2	166.5	184.8	179.6	5.14	35.974	

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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	-90.00	0.0	-89.5	89.5				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-89.5	89.5	89.2	0.28	320.350	
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-89.5	89.5	88.8	0.63	142.378	
300.0	300.0	300.0	300.0	0.5	0.5	-90.00	0.0	-89.5	89.5	88.5	0.98	91.529	
400.0	400.0	400.0	400.0	0.7	0.7	-90.00	0.0	-89.5	89.5	88.1	1.33	67.442	
500.0	500.0	500.0	500.0	0.8	0.8	-90.00	0.0	-89.5	89.5	87.8	1.68	53.392	
600.0	600.0	600.0	600.0	1.0	1.0	-90.00	0.0	-89.5	89.5	87.4	2.02	44.186	
700.0	700.0	700.0	700.0	1.2	1.2	-90.00	0.0	-89.5	89.5	87.1	2.37	37.688	
800.0	800.0	800.0	800.0	1.4	1.4	-90.00	0.0	-89.5	89.5	86.7	2.72	32.856	
900.0	900.0	900.0	900.0	1.5	1.5	-90.00	0.0	-89.5	89.5	86.4	3.07	29.123	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-90.00	0.0	-89.5	89.5	86.0	3.42	26.151 CC, ES	
1,100.0	1,100.0	1,096.3	1,096.3	1.9	1.9	-51.90	0.4	-91.4	90.2	86.4	3.76	23.957	
1,200.0	1,199.8	1,192.4	1,192.2	2.1	2.1	-53.59	1.5	-97.4	93.2	89.1	4.11	22.672	
1,300.0	1,299.7	1,288.3	1,287.5	2.2	2.3	-54.64	3.3	-107.3	100.3	95.8	4.46	22.485 SF	
1,400.0	1,399.6	1,383.4	1,381.6	2.4	2.5	-55.02	5.8	-120.9	111.4	106.6	4.81	23.153	
1,500.0	1,499.4	1,477.5	1,474.1	2.6	2.8	-54.88	8.9	-138.2	126.5	121.3	5.17	24.488	
1,600.0	1,599.3	1,572.1	1,566.3	2.8	3.1	-54.40	12.8	-159.1	145.3	139.8	5.52	26.309	
1,700.0	1,699.1	1,670.2	1,661.6	3.0	3.4	-53.95	16.9	-181.7	165.0	159.1	5.89	28.027	
1,800.0	1,799.0	1,768.2	1,756.9	3.2	3.8	-53.59	21.0	-204.2	184.8	178.5	6.25	29.540	

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Red Hawk Petroleum	<b>Local Co-ordinate Reference:</b>	Well LE GERKIN 12H
<b>Project:</b>	Weld County, Colorado	<b>TVD Reference:</b>	KB=20' @ 4890.3usft
<b>Reference Site:</b>	S13-T2N-R64W (LE GERKIN PADS)	<b>MD Reference:</b>	KB=20' @ 4890.3usft
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LE GERKIN 12H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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 12H  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.65°

