

# ENSIGN

## Directional

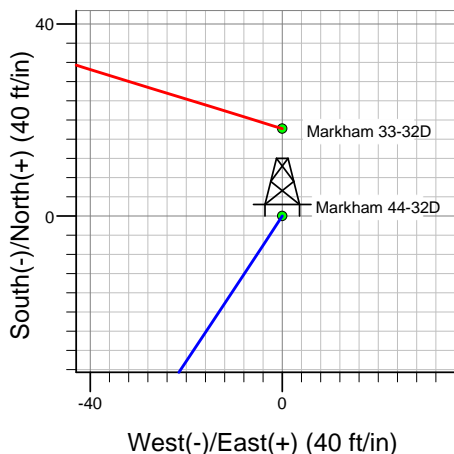
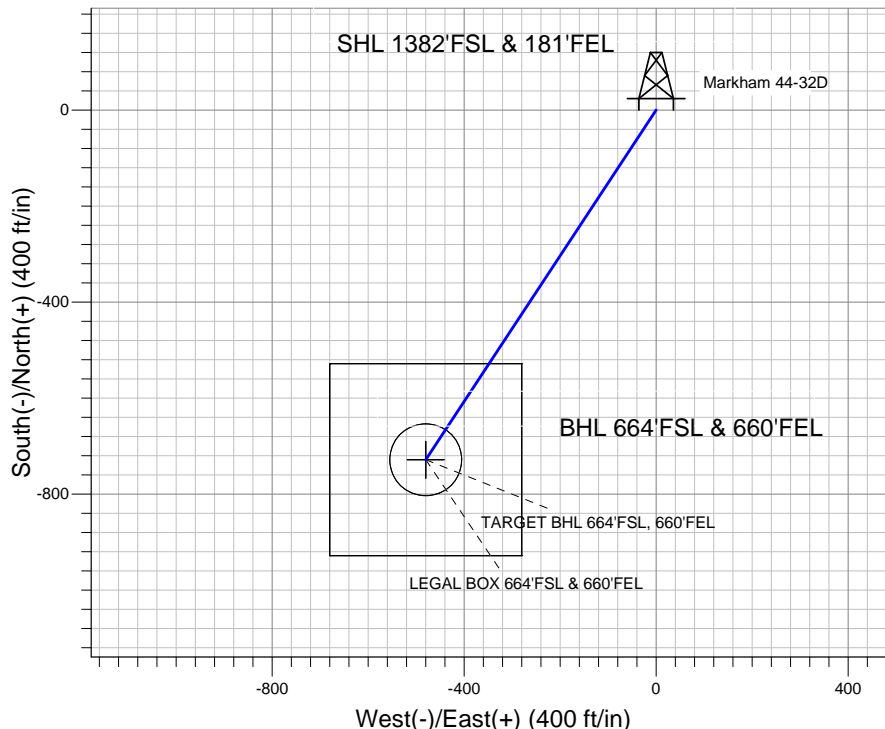
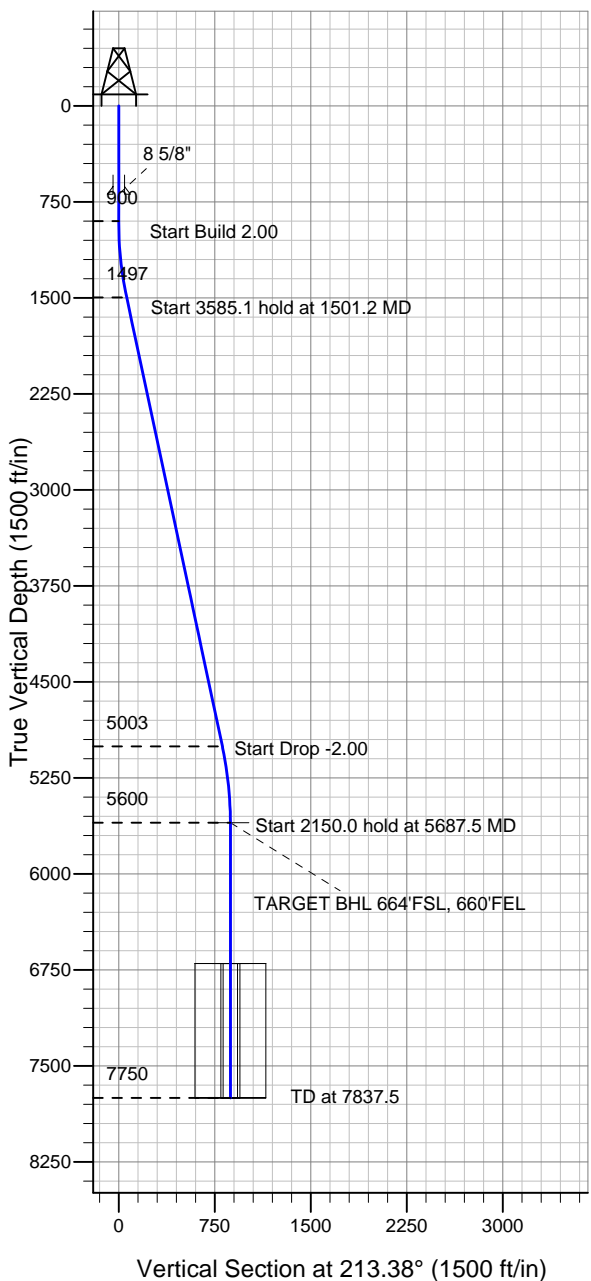
### Well Name: Markham 44-32D

Surface Location: Markham 44-32D Pad Sec.32-T4N-R68W  
North American Datum 1983 US State Plane 1983 Colorado Northern Zone

Ground Elevation: 5061.0

+N/-S +E/-W Northing Easting Latitude Longitude Slot  
0.0 0.0 1340146.75 3134411.59 40.266100 -105.018340  
Original Well Elev WELL @ 5074.0ft (Original Well Elev)

## Apollo Operating, LLC.



Markham 44-32D Pad Sec.32-T4N-R68W  
Markham 44-32D  
Plan #1 (2-26-13)



Azimuths to True North  
Magnetic North: 8.76°

Magnetic Field  
Strength: 52852.6snT  
Dip Angle: 66.84°  
Date: 2/26/2013  
Model: IGRF2010

### WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
TARGET BHL 664'FSL, 660'FEL	5600.0	-728.6	-480.0	40.264100	-105.020060	Point
LEGAL BOX 664'FSL & 660'FEL	6700.0	-728.6	-480.0	40.264100	-105.020060	Rectangle (Sides: L400.0 W400.0)
TARGET CIRCLE 664'FSL & 660'FEL	6700.0	-728.6	-480.0	40.264100	-105.020060	Circle (Radius: 75.0)

### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	900.0	0.00	0.00	900.0	0.0	0.0	0.00	0.00	0.0	
3	1501.2	12.02	213.38	1496.8	-52.5	-34.6	2.00	213.38	62.8	
4	5086.3	12.02	213.38	5003.2	-676.1	-445.4	0.00	0.00	809.7	
5	5687.5	0.00	0.00	5600.0	-728.6	-480.0	2.00	180.00	872.5	TARGET BHL 664'FSL, 660'FEL
6	7837.5	0.00	0.00	7750.0	-728.6	-480.0	0.00	0.00	872.5	



## **Directional**

### **Apollo Operating, LLC.**

**SEC.32-T4N-R68W**

**Markham 44-32D Pad Sec.32-T4N-R68W**

**Markham 44-32D**

**Wellbore #1**

**Plan: Plan #1 (2-26-13)**

### **Standard Planning Report**

**26 February, 2013**

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,501.2	12.02	213.38	1,496.8	-52.5	-34.6	2.00	2.00	0.00	213.38	
5,086.3	12.02	213.38	5,003.2	-676.1	-445.4	0.00	0.00	0.00	0.00	
5,687.5	0.00	0.00	5,600.0	-728.6	-480.0	2.00	-2.00	0.00	180.00	TARGET BHL 664'
7,837.5	0.00	0.00	7,750.0	-728.6	-480.0	0.00	0.00	0.00	0.00	

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Company:</b>	Apollo Operating, LLC.	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Project:</b>	SEC.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>North Reference:</b>	True
<b>Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1 (2-26-13)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
40.0	0.00	0.00	40.0	0.0	0.0	0.0	0.00	0.00	0.00
80.0	0.00	0.00	80.0	0.0	0.0	0.0	0.00	0.00	0.00
120.0	0.00	0.00	120.0	0.0	0.0	0.0	0.00	0.00	0.00
160.0	0.00	0.00	160.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
240.0	0.00	0.00	240.0	0.0	0.0	0.0	0.00	0.00	0.00
280.0	0.00	0.00	280.0	0.0	0.0	0.0	0.00	0.00	0.00
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	0.00
360.0	0.00	0.00	360.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
440.0	0.00	0.00	440.0	0.0	0.0	0.0	0.00	0.00	0.00
480.0	0.00	0.00	480.0	0.0	0.0	0.0	0.00	0.00	0.00
520.0	0.00	0.00	520.0	0.0	0.0	0.0	0.00	0.00	0.00
560.0	0.00	0.00	560.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
640.0	0.00	0.00	640.0	0.0	0.0	0.0	0.00	0.00	0.00
680.0	0.00	0.00	680.0	0.0	0.0	0.0	0.00	0.00	0.00
690.0	0.00	0.00	690.0	0.0	0.0	0.0	0.00	0.00	0.00
8 5/8"									
720.0	0.00	0.00	720.0	0.0	0.0	0.0	0.00	0.00	0.00
760.0	0.00	0.00	760.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
840.0	0.00	0.00	840.0	0.0	0.0	0.0	0.00	0.00	0.00
880.0	0.00	0.00	880.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
920.0	0.40	213.38	920.0	-0.1	0.0	0.1	2.00	2.00	0.00
960.0	1.20	213.38	960.0	-0.5	-0.3	0.6	2.00	2.00	0.00
1,000.0	2.00	213.38	1,000.0	-1.5	-1.0	1.7	2.00	2.00	0.00
1,040.0	2.80	213.38	1,039.9	-2.9	-1.9	3.4	2.00	2.00	0.00
1,080.0	3.60	213.38	1,079.9	-4.7	-3.1	5.7	2.00	2.00	0.00
1,120.0	4.40	213.38	1,119.8	-7.1	-4.6	8.4	2.00	2.00	0.00
1,160.0	5.20	213.38	1,159.6	-9.8	-6.5	11.8	2.00	2.00	0.00
1,200.0	6.00	213.38	1,199.5	-13.1	-8.6	15.7	2.00	2.00	0.00
1,240.0	6.80	213.38	1,239.2	-16.8	-11.1	20.2	2.00	2.00	0.00
1,280.0	7.60	213.38	1,278.9	-21.0	-13.8	25.2	2.00	2.00	0.00
1,320.0	8.40	213.38	1,318.5	-25.7	-16.9	30.7	2.00	2.00	0.00
1,360.0	9.20	213.38	1,358.0	-30.8	-20.3	36.9	2.00	2.00	0.00
1,400.0	10.00	213.38	1,397.5	-36.3	-23.9	43.5	2.00	2.00	0.00
1,440.0	10.80	213.38	1,436.8	-42.4	-27.9	50.7	2.00	2.00	0.00
1,480.0	11.60	213.38	1,476.0	-48.9	-32.2	58.5	2.00	2.00	0.00
1,501.2	12.02	213.38	1,496.8	-52.5	-34.6	62.8	2.00	2.00	0.00
1,520.0	12.02	213.38	1,515.2	-55.8	-36.7	66.8	0.00	0.00	0.00
1,560.0	12.02	213.38	1,554.3	-62.7	-41.3	75.1	0.00	0.00	0.00
1,600.0	12.02	213.38	1,593.4	-69.7	-45.9	83.4	0.00	0.00	0.00
1,640.0	12.02	213.38	1,632.6	-76.6	-50.5	91.8	0.00	0.00	0.00
1,680.0	12.02	213.38	1,671.7	-83.6	-55.1	100.1	0.00	0.00	0.00
1,720.0	12.02	213.38	1,710.8	-90.5	-59.7	108.4	0.00	0.00	0.00
1,760.0	12.02	213.38	1,749.9	-97.5	-64.2	116.8	0.00	0.00	0.00
1,800.0	12.02	213.38	1,789.0	-104.5	-68.8	125.1	0.00	0.00	0.00
1,840.0	12.02	213.38	1,828.2	-111.4	-73.4	133.4	0.00	0.00	0.00
1,880.0	12.02	213.38	1,867.3	-118.4	-78.0	141.8	0.00	0.00	0.00
1,920.0	12.02	213.38	1,906.4	-125.3	-82.6	150.1	0.00	0.00	0.00
1,960.0	12.02	213.38	1,945.5	-132.3	-87.2	158.4	0.00	0.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Company:</b>	Apollo Operating, LLC.	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Project:</b>	SEC.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>North Reference:</b>	True
<b>Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1 (2-26-13)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,000.0	12.02	213.38	1,984.7	-139.3	-91.7	166.8	0.00	0.00	0.00
2,040.0	12.02	213.38	2,023.8	-146.2	-96.3	175.1	0.00	0.00	0.00
2,080.0	12.02	213.38	2,062.9	-153.2	-100.9	183.4	0.00	0.00	0.00
2,120.0	12.02	213.38	2,102.0	-160.1	-105.5	191.8	0.00	0.00	0.00
2,160.0	12.02	213.38	2,141.1	-167.1	-110.1	200.1	0.00	0.00	0.00
2,200.0	12.02	213.38	2,180.3	-174.0	-114.7	208.4	0.00	0.00	0.00
2,240.0	12.02	213.38	2,219.4	-181.0	-119.2	216.8	0.00	0.00	0.00
2,280.0	12.02	213.38	2,258.5	-188.0	-123.8	225.1	0.00	0.00	0.00
2,320.0	12.02	213.38	2,297.6	-194.9	-128.4	233.4	0.00	0.00	0.00
2,360.0	12.02	213.38	2,336.8	-201.9	-133.0	241.7	0.00	0.00	0.00
2,400.0	12.02	213.38	2,375.9	-208.8	-137.6	250.1	0.00	0.00	0.00
2,440.0	12.02	213.38	2,415.0	-215.8	-142.2	258.4	0.00	0.00	0.00
2,480.0	12.02	213.38	2,454.1	-222.7	-146.8	266.7	0.00	0.00	0.00
2,520.0	12.02	213.38	2,493.2	-229.7	-151.3	275.1	0.00	0.00	0.00
2,560.0	12.02	213.38	2,532.4	-236.7	-155.9	283.4	0.00	0.00	0.00
2,600.0	12.02	213.38	2,571.5	-243.6	-160.5	291.7	0.00	0.00	0.00
2,640.0	12.02	213.38	2,610.6	-250.6	-165.1	300.1	0.00	0.00	0.00
2,680.0	12.02	213.38	2,649.7	-257.5	-169.7	308.4	0.00	0.00	0.00
2,720.0	12.02	213.38	2,688.9	-264.5	-174.3	316.7	0.00	0.00	0.00
2,760.0	12.02	213.38	2,728.0	-271.5	-178.8	325.1	0.00	0.00	0.00
2,800.0	12.02	213.38	2,767.1	-278.4	-183.4	333.4	0.00	0.00	0.00
2,840.0	12.02	213.38	2,806.2	-285.4	-188.0	341.7	0.00	0.00	0.00
2,880.0	12.02	213.38	2,845.3	-292.3	-192.6	350.1	0.00	0.00	0.00
2,920.0	12.02	213.38	2,884.5	-299.3	-197.2	358.4	0.00	0.00	0.00
2,960.0	12.02	213.38	2,923.6	-306.2	-201.8	366.7	0.00	0.00	0.00
3,000.0	12.02	213.38	2,962.7	-313.2	-206.3	375.1	0.00	0.00	0.00
3,040.0	12.02	213.38	3,001.8	-320.2	-210.9	383.4	0.00	0.00	0.00
3,080.0	12.02	213.38	3,041.0	-327.1	-215.5	391.7	0.00	0.00	0.00
3,120.0	12.02	213.38	3,080.1	-334.1	-220.1	400.1	0.00	0.00	0.00
3,160.0	12.02	213.38	3,119.2	-341.0	-224.7	408.4	0.00	0.00	0.00
3,200.0	12.02	213.38	3,158.3	-348.0	-229.3	416.7	0.00	0.00	0.00
3,240.0	12.02	213.38	3,197.5	-355.0	-233.9	425.1	0.00	0.00	0.00
3,280.0	12.02	213.38	3,236.6	-361.9	-238.4	433.4	0.00	0.00	0.00
3,320.0	12.02	213.38	3,275.7	-368.9	-243.0	441.7	0.00	0.00	0.00
3,360.0	12.02	213.38	3,314.8	-375.8	-247.6	450.1	0.00	0.00	0.00
3,400.0	12.02	213.38	3,353.9	-382.8	-252.2	458.4	0.00	0.00	0.00
3,440.0	12.02	213.38	3,393.1	-389.7	-256.8	466.7	0.00	0.00	0.00
3,480.0	12.02	213.38	3,432.2	-396.7	-261.4	475.1	0.00	0.00	0.00
3,520.0	12.02	213.38	3,471.3	-403.7	-265.9	483.4	0.00	0.00	0.00
3,560.0	12.02	213.38	3,510.4	-410.6	-270.5	491.7	0.00	0.00	0.00
3,600.0	12.02	213.38	3,549.6	-417.6	-275.1	500.1	0.00	0.00	0.00
3,640.0	12.02	213.38	3,588.7	-424.5	-279.7	508.4	0.00	0.00	0.00
3,680.0	12.02	213.38	3,627.8	-431.5	-284.3	516.7	0.00	0.00	0.00
3,720.0	12.02	213.38	3,666.9	-438.5	-288.9	525.1	0.00	0.00	0.00
3,760.0	12.02	213.38	3,706.0	-445.4	-293.4	533.4	0.00	0.00	0.00
3,800.0	12.02	213.38	3,745.2	-452.4	-298.0	541.7	0.00	0.00	0.00
3,840.0	12.02	213.38	3,784.3	-459.3	-302.6	550.1	0.00	0.00	0.00
3,880.0	12.02	213.38	3,823.4	-466.3	-307.2	558.4	0.00	0.00	0.00
3,920.0	12.02	213.38	3,862.5	-473.2	-311.8	566.7	0.00	0.00	0.00
3,960.0	12.02	213.38	3,901.7	-480.2	-316.4	575.0	0.00	0.00	0.00
4,000.0	12.02	213.38	3,940.8	-487.2	-321.0	583.4	0.00	0.00	0.00
4,040.0	12.02	213.38	3,979.9	-494.1	-325.5	591.7	0.00	0.00	0.00
4,080.0	12.02	213.38	4,019.0	-501.1	-330.1	600.0	0.00	0.00	0.00
4,120.0	12.02	213.38	4,058.1	-508.0	-334.7	608.4	0.00	0.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Company:</b>	Apollo Operating, LLC.	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Project:</b>	SEC.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>North Reference:</b>	True
<b>Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1 (2-26-13)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,160.0	12.02	213.38	4,097.3	-515.0	-339.3	616.7	0.00	0.00	0.00
4,200.0	12.02	213.38	4,136.4	-521.9	-343.9	625.0	0.00	0.00	0.00
4,240.0	12.02	213.38	4,175.5	-528.9	-348.5	633.4	0.00	0.00	0.00
4,280.0	12.02	213.38	4,214.6	-535.9	-353.0	641.7	0.00	0.00	0.00
4,320.0	12.02	213.38	4,253.8	-542.8	-357.6	650.0	0.00	0.00	0.00
4,360.0	12.02	213.38	4,292.9	-549.8	-362.2	658.4	0.00	0.00	0.00
4,400.0	12.02	213.38	4,332.0	-556.7	-366.8	666.7	0.00	0.00	0.00
4,440.0	12.02	213.38	4,371.1	-563.7	-371.4	675.0	0.00	0.00	0.00
4,480.0	12.02	213.38	4,410.2	-570.7	-376.0	683.4	0.00	0.00	0.00
4,520.0	12.02	213.38	4,449.4	-577.6	-380.5	691.7	0.00	0.00	0.00
4,560.0	12.02	213.38	4,488.5	-584.6	-385.1	700.0	0.00	0.00	0.00
4,600.0	12.02	213.38	4,527.6	-591.5	-389.7	708.4	0.00	0.00	0.00
4,640.0	12.02	213.38	4,566.7	-598.5	-394.3	716.7	0.00	0.00	0.00
4,680.0	12.02	213.38	4,605.9	-605.4	-398.9	725.0	0.00	0.00	0.00
4,720.0	12.02	213.38	4,645.0	-612.4	-403.5	733.4	0.00	0.00	0.00
4,760.0	12.02	213.38	4,684.1	-619.4	-408.1	741.7	0.00	0.00	0.00
4,800.0	12.02	213.38	4,723.2	-626.3	-412.6	750.0	0.00	0.00	0.00
4,840.0	12.02	213.38	4,762.4	-633.3	-417.2	758.4	0.00	0.00	0.00
4,880.0	12.02	213.38	4,801.5	-640.2	-421.8	766.7	0.00	0.00	0.00
4,920.0	12.02	213.38	4,840.6	-647.2	-426.4	775.0	0.00	0.00	0.00
4,960.0	12.02	213.38	4,879.7	-654.2	-431.0	783.4	0.00	0.00	0.00
5,000.0	12.02	213.38	4,918.8	-661.1	-435.6	791.7	0.00	0.00	0.00
5,040.0	12.02	213.38	4,958.0	-668.1	-440.1	800.0	0.00	0.00	0.00
5,080.0	12.02	213.38	4,997.1	-675.0	-444.7	808.4	0.00	0.00	0.00
5,086.3	12.02	213.38	5,003.2	-676.1	-445.4	809.7	0.00	0.00	0.00
5,120.0	11.35	213.38	5,036.3	-681.8	-449.2	816.5	2.00	-2.00	0.00
5,160.0	10.55	213.38	5,075.5	-688.2	-453.4	824.1	2.00	-2.00	0.00
5,200.0	9.75	213.38	5,114.9	-694.1	-457.3	831.1	2.00	-2.00	0.00
5,240.0	8.95	213.38	5,154.4	-699.5	-460.8	837.6	2.00	-2.00	0.00
5,280.0	8.15	213.38	5,193.9	-704.4	-464.1	843.6	2.00	-2.00	0.00
5,320.0	7.35	213.38	5,233.6	-708.9	-467.1	849.0	2.00	-2.00	0.00
5,360.0	6.55	213.38	5,273.3	-713.0	-469.7	853.8	2.00	-2.00	0.00
5,400.0	5.75	213.38	5,313.0	-716.6	-472.1	858.1	2.00	-2.00	0.00
5,440.0	4.95	213.38	5,352.9	-719.7	-474.1	861.8	2.00	-2.00	0.00
5,480.0	4.15	213.38	5,392.7	-722.3	-475.9	865.0	2.00	-2.00	0.00
5,520.0	3.35	213.38	5,432.6	-724.5	-477.3	867.6	2.00	-2.00	0.00
5,560.0	2.55	213.38	5,472.6	-726.2	-478.5	869.7	2.00	-2.00	0.00
5,600.0	1.75	213.38	5,512.6	-727.5	-479.3	871.2	2.00	-2.00	0.00
5,640.0	0.95	213.38	5,552.5	-728.3	-479.8	872.1	2.00	-2.00	0.00
5,680.0	0.15	213.38	5,592.5	-728.6	-480.0	872.5	2.00	-2.00	0.00
5,687.5	0.00	0.00	5,600.0	-728.6	-480.0	872.5	2.00	-2.00	0.00
5,720.0	0.00	0.00	5,632.5	-728.6	-480.0	872.5	0.00	0.00	0.00
5,760.0	0.00	0.00	5,672.5	-728.6	-480.0	872.5	0.00	0.00	0.00
5,800.0	0.00	0.00	5,712.5	-728.6	-480.0	872.5	0.00	0.00	0.00
5,840.0	0.00	0.00	5,752.5	-728.6	-480.0	872.5	0.00	0.00	0.00
5,880.0	0.00	0.00	5,792.5	-728.6	-480.0	872.5	0.00	0.00	0.00
5,920.0	0.00	0.00	5,832.5	-728.6	-480.0	872.5	0.00	0.00	0.00
5,960.0	0.00	0.00	5,872.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,000.0	0.00	0.00	5,912.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,040.0	0.00	0.00	5,952.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,080.0	0.00	0.00	5,992.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,120.0	0.00	0.00	6,032.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,160.0	0.00	0.00	6,072.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,200.0	0.00	0.00	6,112.5	-728.6	-480.0	872.5	0.00	0.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Company:</b>	Apollo Operating, LLC.	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Project:</b>	SEC.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>North Reference:</b>	True
<b>Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1 (2-26-13)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,240.0	0.00	0.00	6,152.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,280.0	0.00	0.00	6,192.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,320.0	0.00	0.00	6,232.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,360.0	0.00	0.00	6,272.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,400.0	0.00	0.00	6,312.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,440.0	0.00	0.00	6,352.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,480.0	0.00	0.00	6,392.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,520.0	0.00	0.00	6,432.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,560.0	0.00	0.00	6,472.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,600.0	0.00	0.00	6,512.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,640.0	0.00	0.00	6,552.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,680.0	0.00	0.00	6,592.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,720.0	0.00	0.00	6,632.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,760.0	0.00	0.00	6,672.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,800.0	0.00	0.00	6,712.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,840.0	0.00	0.00	6,752.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,880.0	0.00	0.00	6,792.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,920.0	0.00	0.00	6,832.5	-728.6	-480.0	872.5	0.00	0.00	0.00
6,960.0	0.00	0.00	6,872.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,000.0	0.00	0.00	6,912.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,040.0	0.00	0.00	6,952.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,080.0	0.00	0.00	6,992.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,120.0	0.00	0.00	7,032.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,160.0	0.00	0.00	7,072.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,200.0	0.00	0.00	7,112.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,240.0	0.00	0.00	7,152.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,280.0	0.00	0.00	7,192.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,320.0	0.00	0.00	7,232.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,360.0	0.00	0.00	7,272.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,400.0	0.00	0.00	7,312.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,440.0	0.00	0.00	7,352.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,480.0	0.00	0.00	7,392.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,520.0	0.00	0.00	7,432.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,560.0	0.00	0.00	7,472.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,600.0	0.00	0.00	7,512.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,640.0	0.00	0.00	7,552.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,680.0	0.00	0.00	7,592.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,720.0	0.00	0.00	7,632.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,760.0	0.00	0.00	7,672.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,800.0	0.00	0.00	7,712.5	-728.6	-480.0	872.5	0.00	0.00	0.00
7,837.5	0.00	0.00	7,750.0	-728.6	-480.0	872.5	0.00	0.00	0.00

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
690.0	690.0	8 5/8"	8-5/8	12-1/4	



## **Directional**

### **Apollo Operating, LLC.**

**SEC.32-T4N-R68W**

**Markham 44-32D Pad Sec.32-T4N-R68W**

**Markham 44-32D**

**Wellbore #1**

**Plan #1 (2-26-13)**

## **Anticollision Report**

**26 February, 2013**



<b>Company:</b>	Apollo Operating, LLC.	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Project:</b>	SEC.32-T4N-R68W	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Reference Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (2-26-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #1 (2-26-13)		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD Interval 100.0ft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 10,000.0ft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma		

<b>Survey Tool Program</b>	<b>Date</b> 2/26/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	7,837.5	Plan #1 (2-26-13) (Wellbore #1)	MWD	MWD - Standard

<b>Summary</b>						
<b>Site Name</b>	<b>Reference Measured Depth (ft)</b>	<b>Offset Measured Depth (ft)</b>	<b>Distance Between Centres (ft)</b>	<b>Distance Between Ellipses (ft)</b>	<b>Separation Factor</b>	<b>Warning</b>
<b>Offset Well - Wellbore - Design</b>						
Markham 44-32D Pad Sec.32-T4N-R68W						
Markham 33-32D - Wellbore #1 - Plan #1 (2-26-13)	200.0	200.0	18.2	17.5	27.007	CC, ES
Markham 33-32D - Wellbore #1 - Plan #1 (2-26-13)	500.0	498.4	27.3	25.2	13.444	SF

<b>Offset Design</b> Markham 44-32D Pad Sec.32-T4N-R68W - Markham 33-32D - Wellbore #1 - Plan #1 (2-26-13)												
Survey Program: 0-MWD												
Reference												
Offset												
Semi Major Axis												
Distance												
<b>Measured Depth (ft)</b>	<b>Vertical Depth (ft)</b>	<b>Measured Depth (ft)</b>	<b>Vertical Depth (ft)</b>	<b>Reference (ft)</b>	<b>Offset (ft)</b>	<b>Highside Toolface (°)</b>	<b>Offset Wellbore Centre +N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Between Centres (ft)</b>	<b>Between Ellipses (ft)</b>	<b>Minimum Separation (ft)</b>	<b>Separation Factor</b>
0.0	0.0	0.0	0.0	0.0	0.0	0.00	18.2	0.0	18.2	18.2	0.00	N/A
100.0	100.0	100.0	100.0	0.1	0.1	0.00	18.2	0.0	18.2	18.0	0.22	81.022
200.0	200.0	200.0	200.0	0.3	0.3	0.00	18.2	0.0	18.2	17.5	0.67	27.007 CC, ES
300.0	300.0	299.8	299.8	0.6	0.6	-5.07	18.7	-1.7	18.8	17.7	1.12	16.816
400.0	400.0	399.3	399.1	0.8	0.8	-18.12	20.2	-6.6	21.3	19.7	1.57	13.581
500.0	500.0	498.4	497.8	1.0	1.0	-33.09	22.8	-14.8	27.3	25.2	2.03	13.444 SF
600.0	600.0	596.7	595.4	1.2	1.3	-44.94	26.3	-26.2	37.4	34.9	2.49	15.024
700.0	700.0	694.1	691.7	1.5	1.6	-52.93	30.7	-40.6	51.6	48.6	2.96	17.443
800.0	800.0	790.4	786.2	1.7	2.0	-58.14	36.0	-57.9	69.6	66.2	3.44	20.210
900.0	900.0	885.3	878.8	1.9	2.4	-61.60	42.2	-78.0	91.2	87.2	3.95	23.077
1,000.0	1,000.0	978.9	969.3	2.1	2.9	82.99	49.1	-100.6	115.9	111.5	4.38	26.458
1,100.0	1,099.8	1,070.9	1,057.6	2.3	3.4	82.63	56.8	-125.6	143.3	138.4	4.83	29.693
1,200.0	1,199.5	1,161.3	1,143.4	2.5	4.0	83.11	65.1	-152.7	173.3	168.0	5.30	32.689
1,300.0	1,298.7	1,250.0	1,226.6	2.7	4.6	84.00	74.1	-181.9	205.9	200.1	5.82	35.401
1,400.0	1,397.5	1,337.8	1,308.1	3.0	5.2	85.08	83.7	-213.1	241.2	234.8	6.39	37.743
1,500.0	1,495.6	1,430.6	1,393.9	3.3	6.0	86.45	94.1	-247.0	277.4	270.4	7.03	39.434
1,600.0	1,593.4	1,523.2	1,479.5	3.6	6.7	88.45	104.5	-280.8	313.9	306.1	7.76	40.463
1,700.0	1,691.2	1,615.8	1,565.1	4.0	7.4	90.04	114.9	-314.6	350.6	342.0	8.52	41.160
1,800.0	1,789.0	1,708.4	1,650.7	4.4	8.2	91.32	125.3	-348.5	387.5	378.2	9.31	41.634
1,900.0	1,886.8	1,801.1	1,736.3	4.8	8.9	92.39	135.7	-382.3	424.5	414.4	10.12	41.958
2,000.0	1,984.7	1,893.7	1,821.9	5.2	9.7	93.29	146.0	-416.1	461.6	450.7	10.95	42.177
2,100.0	2,082.5	1,986.3	1,907.5	5.6	10.4	94.05	156.4	-449.9	498.9	487.1	11.79	42.326
2,200.0	2,180.3	2,078.9	1,993.1	6.0	11.2	94.70	166.8	-483.8	536.2	523.5	12.64	42.425
2,300.0	2,278.1	2,171.5	2,078.7	6.5	11.9	95.28	177.2	-517.6	573.5	560.0	13.50	42.490
2,400.0	2,375.9	2,264.2	2,164.2	6.9	12.7	95.78	187.6	-551.4	610.9	596.5	14.36	42.530

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

<b>Company:</b>	Apollo Operating, LLC.	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Project:</b>	SEC.32-T4N-R68W	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Reference Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (2-26-13)	<b>Offset TVD Reference:</b>	Offset Datum

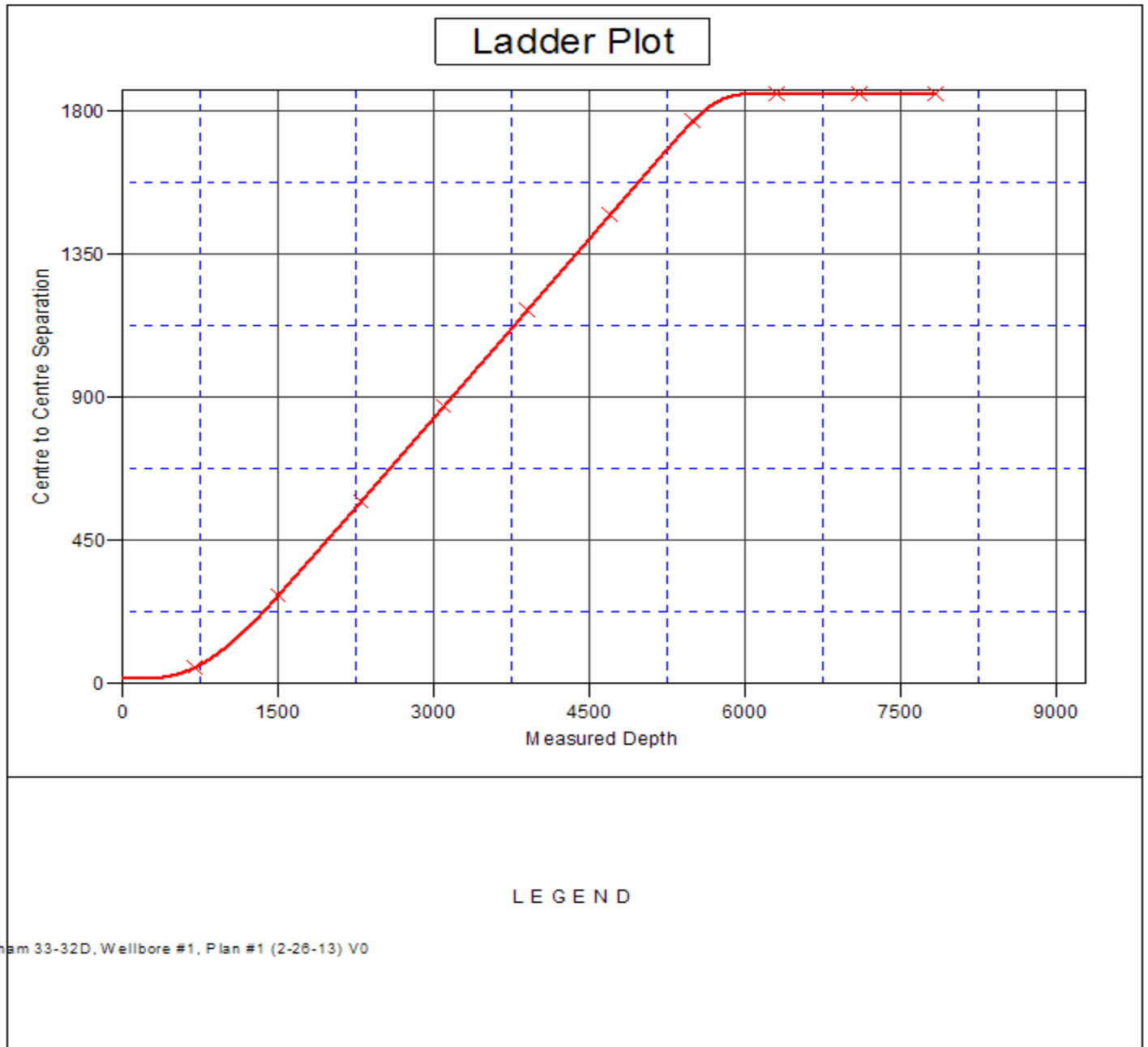
Offset Design Markham 44-32D Pad Sec.32-T4N-R68W - Markham 33-32D - Wellbore #1 - Plan #1 (2-26-13)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
2,500.0	2,473.7	2,356.8	2,249.8	7.3	13.4	96.22	198.0	-585.2	648.3	633.1	15.24	42.552	
2,600.0	2,571.5	2,449.4	2,335.4	7.8	14.2	96.62	208.4	-619.0	685.8	669.7	16.11	42.561	
2,700.0	2,669.3	2,542.0	2,421.0	8.2	14.9	96.97	218.8	-652.9	723.3	706.3	16.99	42.560	
2,800.0	2,767.1	2,634.7	2,506.6	8.7	15.7	97.29	229.2	-686.7	760.8	742.9	17.88	42.553	
2,900.0	2,864.9	2,727.3	2,592.2	9.1	16.5	97.58	239.6	-720.5	798.3	779.5	18.76	42.542	
3,000.0	2,962.7	2,819.9	2,677.8	9.6	17.2	97.84	249.9	-754.3	835.8	816.2	19.65	42.526	
3,100.0	3,060.5	2,912.5	2,763.4	10.0	18.0	98.09	260.3	-788.2	873.4	852.8	20.55	42.509	
3,200.0	3,158.3	3,005.1	2,849.0	10.5	18.7	98.31	270.7	-822.0	910.9	889.5	21.44	42.489	
3,300.0	3,256.1	3,097.8	2,934.6	10.9	19.5	98.51	281.1	-855.8	948.5	926.2	22.33	42.469	
3,400.0	3,353.9	3,190.4	3,020.2	11.4	20.2	98.70	291.5	-889.6	986.1	962.8	23.23	42.448	
3,500.0	3,451.7	3,283.0	3,105.8	11.8	21.0	98.87	301.9	-923.4	1,023.7	999.5	24.13	42.426	
3,600.0	3,549.6	3,375.6	3,191.4	12.3	21.8	99.04	312.3	-957.3	1,061.3	1,036.2	25.03	42.404	
3,700.0	3,647.4	3,468.3	3,277.0	12.7	22.5	99.19	322.7	-991.1	1,098.9	1,072.9	25.93	42.383	
3,800.0	3,745.2	3,560.9	3,362.6	13.2	23.3	99.33	333.1	-1,024.9	1,136.5	1,109.7	26.83	42.361	
3,900.0	3,843.0	3,653.5	3,448.2	13.6	24.0	99.46	343.5	-1,058.7	1,174.1	1,146.4	27.73	42.340	
4,000.0	3,940.8	3,746.1	3,533.8	14.1	24.8	99.58	353.8	-1,092.6	1,211.7	1,183.1	28.63	42.320	
4,100.0	4,038.6	3,838.7	3,619.4	14.5	25.6	99.70	364.2	-1,126.4	1,249.4	1,219.8	29.54	42.299	
4,200.0	4,136.4	3,931.4	3,705.0	15.0	26.3	99.81	374.6	-1,160.2	1,287.0	1,256.5	30.44	42.280	
4,300.0	4,234.2	4,024.0	3,790.6	15.5	27.1	99.91	385.0	-1,194.0	1,324.6	1,293.3	31.34	42.260	
4,400.0	4,332.0	4,116.6	3,876.2	15.9	27.8	100.01	395.4	-1,227.8	1,362.3	1,330.0	32.25	42.241	
4,500.0	4,429.8	4,209.2	3,961.8	16.4	28.6	100.10	405.8	-1,261.7	1,399.9	1,366.7	33.15	42.223	
4,600.0	4,527.6	4,301.9	4,047.4	16.8	29.4	100.19	416.2	-1,295.5	1,437.5	1,403.5	34.06	42.205	
4,700.0	4,625.4	4,394.5	4,133.0	17.3	30.1	100.27	426.6	-1,329.3	1,475.2	1,440.2	34.97	42.188	
4,800.0	4,723.2	4,487.1	4,218.6	17.7	30.9	100.35	437.0	-1,363.1	1,512.8	1,477.0	35.87	42.171	
4,900.0	4,821.0	4,579.7	4,304.2	18.2	31.6	100.43	447.4	-1,397.0	1,550.5	1,513.7	36.78	42.154	
5,000.0	4,918.8	4,672.3	4,389.8	18.7	32.4	100.50	457.7	-1,430.8	1,588.1	1,550.5	37.69	42.138	
5,100.0	5,016.7	4,765.0	4,475.4	19.1	33.2	100.68	468.1	-1,464.6	1,625.8	1,587.2	38.62	42.093	
5,200.0	5,114.9	4,857.8	4,561.1	19.4	33.9	101.45	478.5	-1,498.5	1,663.1	1,623.4	39.63	41.963	
5,300.0	5,213.7	4,950.7	4,647.1	19.7	34.7	102.08	489.0	-1,532.4	1,699.7	1,659.1	40.58	41.887	
5,400.0	5,313.0	5,043.8	4,733.0	19.9	35.4	102.58	499.4	-1,566.4	1,735.7	1,694.2	41.46	41.864	
5,500.0	5,412.7	5,133.8	4,834.8	20.1	36.3	102.88	511.7	-1,606.4	1,770.9	1,728.6	42.31	41.851	
5,600.0	5,512.6	5,233.0	4,931.6	20.3	37.6	102.67	532.4	-1,673.9	1,801.6	1,758.4	43.21	41.691	
5,700.0	5,612.5	5,331.5	5,029.1	20.4	38.6	-44.35	549.5	-1,729.6	1,825.5	1,781.6	43.90	41.586	
5,800.0	5,712.5	5,430.9	5,126.5	20.5	39.3	-45.00	562.2	-1,770.9	1,842.4	1,798.0	44.32	41.565	
5,900.0	5,812.5	5,530.9	5,226.5	20.6	39.8	-45.38	569.9	-1,795.7	1,852.3	1,807.6	44.71	41.431	
6,000.0	5,912.5	5,630.9	5,326.5	20.7	40.0	-45.48	572.0	-1,802.8	1,855.1	1,810.0	45.04	41.188	
6,100.0	6,012.5	5,730.9	5,426.5	20.9	40.1	-45.48	572.0	-1,802.8	1,855.1	1,809.8	45.26	40.985	
6,200.0	6,112.5	5,830.9	5,526.5	21.0	40.2	-45.48	572.0	-1,802.8	1,855.1	1,809.6	45.49	40.779	
6,300.0	6,212.5	5,930.9	5,626.5	21.1	40.2	-45.48	572.0	-1,802.8	1,855.1	1,809.3	45.72	40.572	
6,400.0	6,312.5	6,030.9	5,726.5	21.2	40.3	-45.48	572.0	-1,802.8	1,855.1	1,809.1	45.96	40.364	
6,500.0	6,412.5	6,130.9	5,826.5	21.3	40.4	-45.48	572.0	-1,802.8	1,855.1	1,808.9	46.20	40.155	
6,600.0	6,512.5	6,230.9	5,926.5	21.5	40.5	-45.48	572.0	-1,802.8	1,855.1	1,808.6	46.44	39.946	
6,700.0	6,612.5	6,330.9	6,026.5	21.6	40.6	-45.48	572.0	-1,802.8	1,855.1	1,808.4	46.68	39.737	
6,800.0	6,712.5	6,430.9	6,126.5	21.7	40.6	-45.48	572.0	-1,802.8	1,855.1	1,808.1	46.93	39.527	
6,900.0	6,812.5	6,530.9	6,226.5	21.8	40.7	-45.48	572.0	-1,802.8	1,855.1	1,807.9	47.18	39.317	
7,000.0	6,912.5	6,630.9	6,326.5	22.0	40.8	-45.48	572.0	-1,802.8	1,855.1	1,807.6	47.44	39.107	
7,100.0	7,012.5	6,730.9	6,426.5	22.1	40.9	-45.48	572.0	-1,802.8	1,855.1	1,807.4	47.69	38.896	
7,200.0	7,112.5	6,830.9	6,526.5	22.2	41.0	-45.48	572.0	-1,802.8	1,855.1	1,807.1	47.95	38.686	
7,300.0	7,212.5	6,930.9	6,626.5	22.4	41.0	-45.48	572.0	-1,802.8	1,855.1	1,806.9	48.21	38.475	
7,400.0	7,312.5	7,030.9	6,726.5	22.5	41.1	-45.48	572.0	-1,802.8	1,855.1	1,806.6	48.48	38.265	
7,500.0	7,412.5	7,130.9	6,826.5	22.7	41.2	-45.48	572.0	-1,802.8	1,855.1	1,806.3	48.75	38.055	
7,600.0	7,512.5	7,230.9	6,926.5	22.8	41.3	-45.48	572.0	-1,802.8	1,855.1	1,806.1	49.02	37.845	

<b>Company:</b>	Apollo Operating, LLC.	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Project:</b>	SEC.32-T4N-R68W	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Reference Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (2-26-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> Markham 44-32D Pad Sec.32-T4N-R68W - Markham 33-32D - Wellbore #1 - Plan #1 (2-26-13)												<b>Offset Site Error:</b>	0.0 ft
Survey Program: 0-MWD												<b>Offset Well Error:</b>	0.0 ft
Reference	Offset	Semi Major Axis		Distance									
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,700.0	7,612.5	7,957.8	7,612.5	22.9	41.4	-45.48	572.0	-1,802.8	1,855.1	1,805.8	49.29	37.635	
7,800.0	7,712.5	8,057.8	7,712.5	23.1	41.5	-45.48	572.0	-1,802.8	1,855.1	1,805.5	49.57	37.426	
7,837.5	7,750.0	8,095.2	7,750.0	23.1	41.5	-45.48	572.0	-1,802.8	1,855.1	1,805.4	49.67	37.348	

<b>Company:</b>	Apollo Operating, LLC.	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Project:</b>	SEC.32-T4N-R68W	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Reference Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (2-26-13)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to WELL @ 5074.0ft (Original Well Elev) Coordinates are relative to: Markham 44-32D  
 Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone  
 Central Meridian is -105.500000 ° Grid Convergence at Surface is: 0.31°



<b>Company:</b>	Apollo Operating, LLC.	<b>Local Co-ordinate Reference:</b>	Well Markham 44-32D
<b>Project:</b>	SEC.32-T4N-R68W	<b>TVD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Reference Site:</b>	Markham 44-32D Pad Sec.32-T4N-R68W	<b>MD Reference:</b>	WELL @ 5074.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Markham 44-32D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (2-26-13)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to WELL @ 5074.0ft (Original Well Elev) Coordinates are relative to: Markham 44-32D  
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone  
Central Meridian is -105.500000 ° Grid Convergence at Surface is: 0.31°

