

Well Name: Markham 33-32D

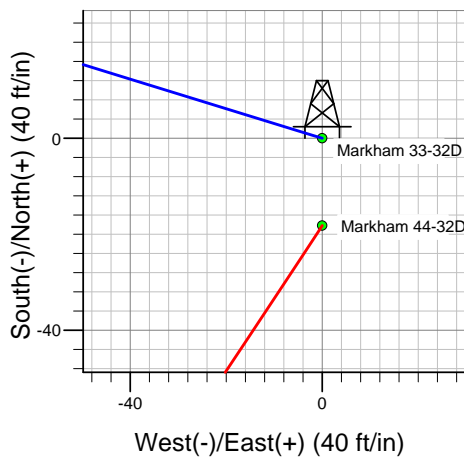
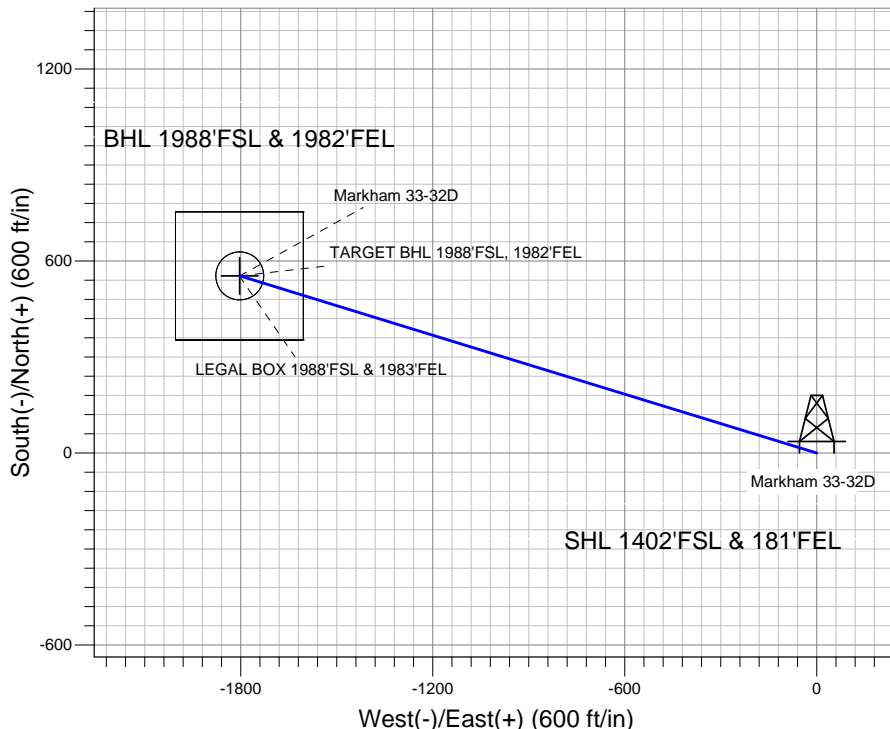
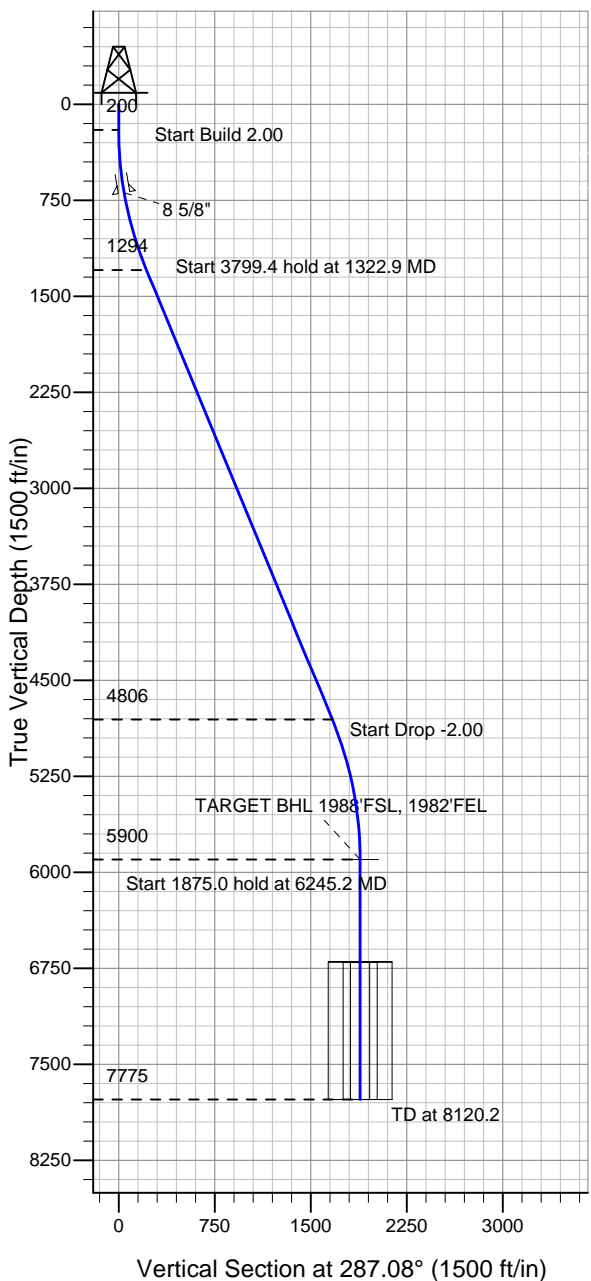
Surface Location: Markham 44-32D Pad Sec.32-T4N-R68W
 North American Datum 1983 US State Plane 1983 Colorado Northern Zone

Ground Elevation: 5061.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1340164.96	3134411.49	40.266150	-105.018340	

Original Well Elev WELL @ 5074.0ft (Original Well Elev)

Apollo Operating, LLC.



Markham 44-32D Pad Sec.32-T4N-R68W
 Markham 33-32D
 Plan #1 (2-26-13)



Azimuths to True North
 Magnetic North: 8.76°

Magnetic Field
 Strength: 52852.7nT
 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 1988'FSL, 1982'FEL	5900.0	553.8	-1802.8	40.267670	-105.024800	Point
LEGAL BOX 1988'FSL & 1983'FEL	6700.0	553.8	-1803.8	40.267670	-105.024804	Rectangle (Sides: L400.0 W400.0)
TARGET CIRCLE 1988'FSL & 1982'FEL	6700.0	553.8	-1802.8	40.267670	-105.024800	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	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	1322.9	22.46	287.08	1294.4	63.8	-207.7	2.00	287.08	217.3	
4	5122.3	22.46	287.08	4805.6	490.0	-1595.1	0.00	0.00	1668.7	
5	6245.2	0.00	0.00	5900.0	553.8	-1802.8	2.00	180.00	1885.9	TARGET BHL 1988'FSL, 1982'FEL
6	8120.2	0.00	0.00	7775.0	553.8	-1802.8	0.00	0.00	1885.9	



Directional

Apollo Operating, LLC.

SEC.32-T4N-R68W

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

Markham 33-32D

Wellbore #1

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

Standard Planning Report

26 February, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Markham 33-32D
Company:	Apollo Operating, LLC.	TVD Reference:	WELL @ 5074.0ft (Original Well Elev)
Project:	SEC.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site:	Markham 44-32D Pad Sec.32-T4N-R68W	North Reference:	True
Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-26-13)		

Project	SEC.32-T4N-R68W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Markham 44-32D Pad Sec.32-T4N-R68W				
Site Position:		Northing:	1,340,146.76ft	Latitude:	40.266100
From:	Lat/Long	Easting:	3,134,411.59ft	Longitude:	-105.018340
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.31 °

Well	Markham 33-32D					
Well Position	+N-S	18.2 ft	Northing:	1,340,164.96 ft	Latitude:	40.266150
	+E-W	0.0 ft	Easting:	3,134,411.49 ft	Longitude:	-105.018340
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,061.0ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/26/2013	8.76	66.84	52,853

Design	Plan #1 (2-26-13)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	287.08

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,322.9	22.46	287.08	1,294.4	63.8	-207.7	2.00	2.00	0.00	287.08	
5,122.3	22.46	287.08	4,805.6	490.0	-1,595.1	0.00	0.00	0.00	0.00	
6,245.2	0.00	0.00	5,900.0	553.8	-1,802.8	2.00	-2.00	0.00	180.00	TARGET BHL 1988
8,120.2	0.00	0.00	7,775.0	553.8	-1,802.8	0.00	0.00	0.00	0.00	

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Project:	SEC.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site:	Markham 44-32D Pad Sec.32-T4N-R68W	North Reference:	True
Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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	0.80	287.08	240.0	0.1	-0.3	0.3	2.00	2.00	0.00
280.0	1.60	287.08	280.0	0.3	-1.1	1.1	2.00	2.00	0.00
320.0	2.40	287.08	320.0	0.7	-2.4	2.5	2.00	2.00	0.00
360.0	3.20	287.08	359.9	1.3	-4.3	4.5	2.00	2.00	0.00
400.0	4.00	287.08	399.8	2.0	-6.7	7.0	2.00	2.00	0.00
440.0	4.80	287.08	439.7	3.0	-9.6	10.0	2.00	2.00	0.00
480.0	5.60	287.08	479.6	4.0	-13.1	13.7	2.00	2.00	0.00
520.0	6.40	287.08	519.3	5.2	-17.1	17.9	2.00	2.00	0.00
560.0	7.20	287.08	559.1	6.6	-21.6	22.6	2.00	2.00	0.00
600.0	8.00	287.08	598.7	8.2	-26.7	27.9	2.00	2.00	0.00
640.0	8.80	287.08	638.3	9.9	-32.2	33.7	2.00	2.00	0.00
680.0	9.60	287.08	677.8	11.8	-38.3	40.1	2.00	2.00	0.00
692.4	9.85	287.08	690.0	12.4	-40.4	42.2	2.00	2.00	0.00
8 5/8"									
720.0	10.40	287.08	717.1	13.8	-45.0	47.1	2.00	2.00	0.00
760.0	11.20	287.08	756.4	16.0	-52.2	54.6	2.00	2.00	0.00
800.0	12.00	287.08	795.6	18.4	-59.8	62.6	2.00	2.00	0.00
840.0	12.80	287.08	834.7	20.9	-68.1	71.2	2.00	2.00	0.00
880.0	13.60	287.08	873.6	23.6	-76.8	80.3	2.00	2.00	0.00
920.0	14.40	287.08	912.4	26.4	-86.0	90.0	2.00	2.00	0.00
960.0	15.20	287.08	951.1	29.4	-95.8	100.2	2.00	2.00	0.00
1,000.0	16.00	287.08	989.6	32.6	-106.1	111.0	2.00	2.00	0.00
1,040.0	16.80	287.08	1,028.0	35.9	-116.9	122.3	2.00	2.00	0.00
1,080.0	17.60	287.08	1,066.2	39.4	-128.2	134.1	2.00	2.00	0.00
1,120.0	18.40	287.08	1,104.3	43.0	-140.0	146.5	2.00	2.00	0.00
1,160.0	19.20	287.08	1,142.1	46.8	-152.3	159.3	2.00	2.00	0.00
1,200.0	20.00	287.08	1,179.8	50.7	-165.2	172.8	2.00	2.00	0.00
1,240.0	20.80	287.08	1,217.3	54.8	-178.5	186.7	2.00	2.00	0.00
1,280.0	21.60	287.08	1,254.6	59.1	-192.3	201.2	2.00	2.00	0.00
1,320.0	22.40	287.08	1,291.7	63.5	-206.6	216.2	2.00	2.00	0.00
1,322.9	22.46	287.08	1,294.4	63.8	-207.7	217.3	2.00	2.00	0.00
1,360.0	22.46	287.08	1,328.7	68.0	-221.2	231.4	0.00	0.00	0.00
1,400.0	22.46	287.08	1,365.6	72.5	-235.8	246.7	0.00	0.00	0.00
1,440.0	22.46	287.08	1,402.6	76.9	-250.4	262.0	0.00	0.00	0.00
1,480.0	22.46	287.08	1,439.6	81.4	-265.1	277.3	0.00	0.00	0.00
1,520.0	22.46	287.08	1,476.5	85.9	-279.7	292.6	0.00	0.00	0.00
1,560.0	22.46	287.08	1,513.5	90.4	-294.3	307.8	0.00	0.00	0.00
1,600.0	22.46	287.08	1,550.5	94.9	-308.9	323.1	0.00	0.00	0.00
1,640.0	22.46	287.08	1,587.4	99.4	-323.5	338.4	0.00	0.00	0.00
1,680.0	22.46	287.08	1,624.4	103.9	-338.1	353.7	0.00	0.00	0.00
1,720.0	22.46	287.08	1,661.4	108.3	-352.7	369.0	0.00	0.00	0.00
1,760.0	22.46	287.08	1,698.3	112.8	-367.3	384.2	0.00	0.00	0.00
1,800.0	22.46	287.08	1,735.3	117.3	-381.9	399.5	0.00	0.00	0.00
1,840.0	22.46	287.08	1,772.3	121.8	-396.5	414.8	0.00	0.00	0.00
1,880.0	22.46	287.08	1,809.2	126.3	-411.1	430.1	0.00	0.00	0.00
1,920.0	22.46	287.08	1,846.2	130.8	-425.7	445.4	0.00	0.00	0.00
1,960.0	22.46	287.08	1,883.1	135.3	-440.3	460.6	0.00	0.00	0.00
2,000.0	22.46	287.08	1,920.1	139.8	-454.9	475.9	0.00	0.00	0.00

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Project:	SEC.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site:	Markham 44-32D Pad Sec.32-T4N-R68W	North Reference:	True
Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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)
2,040.0	22.46	287.08	1,957.1	144.2	-469.5	491.2	0.00	0.00	0.00
2,080.0	22.46	287.08	1,994.0	148.7	-484.2	506.5	0.00	0.00	0.00
2,120.0	22.46	287.08	2,031.0	153.2	-498.8	521.8	0.00	0.00	0.00
2,160.0	22.46	287.08	2,068.0	157.7	-513.4	537.0	0.00	0.00	0.00
2,200.0	22.46	287.08	2,104.9	162.2	-528.0	552.3	0.00	0.00	0.00
2,240.0	22.46	287.08	2,141.9	166.7	-542.6	567.6	0.00	0.00	0.00
2,280.0	22.46	287.08	2,178.9	171.2	-557.2	582.9	0.00	0.00	0.00
2,320.0	22.46	287.08	2,215.8	175.7	-571.8	598.2	0.00	0.00	0.00
2,360.0	22.46	287.08	2,252.8	180.1	-586.4	613.4	0.00	0.00	0.00
2,400.0	22.46	287.08	2,289.8	184.6	-601.0	628.7	0.00	0.00	0.00
2,440.0	22.46	287.08	2,326.7	189.1	-615.6	644.0	0.00	0.00	0.00
2,480.0	22.46	287.08	2,363.7	193.6	-630.2	659.3	0.00	0.00	0.00
2,520.0	22.46	287.08	2,400.7	198.1	-644.8	674.6	0.00	0.00	0.00
2,560.0	22.46	287.08	2,437.6	202.6	-659.4	689.8	0.00	0.00	0.00
2,600.0	22.46	287.08	2,474.6	207.1	-674.0	705.1	0.00	0.00	0.00
2,640.0	22.46	287.08	2,511.6	211.6	-688.6	720.4	0.00	0.00	0.00
2,680.0	22.46	287.08	2,548.5	216.0	-703.2	735.7	0.00	0.00	0.00
2,720.0	22.46	287.08	2,585.5	220.5	-717.9	751.0	0.00	0.00	0.00
2,760.0	22.46	287.08	2,622.5	225.0	-732.5	766.2	0.00	0.00	0.00
2,800.0	22.46	287.08	2,659.4	229.5	-747.1	781.5	0.00	0.00	0.00
2,840.0	22.46	287.08	2,696.4	234.0	-761.7	796.8	0.00	0.00	0.00
2,880.0	22.46	287.08	2,733.4	238.5	-776.3	812.1	0.00	0.00	0.00
2,920.0	22.46	287.08	2,770.3	243.0	-790.9	827.4	0.00	0.00	0.00
2,960.0	22.46	287.08	2,807.3	247.4	-805.5	842.6	0.00	0.00	0.00
3,000.0	22.46	287.08	2,844.3	251.9	-820.1	857.9	0.00	0.00	0.00
3,040.0	22.46	287.08	2,881.2	256.4	-834.7	873.2	0.00	0.00	0.00
3,080.0	22.46	287.08	2,918.2	260.9	-849.3	888.5	0.00	0.00	0.00
3,120.0	22.46	287.08	2,955.2	265.4	-863.9	903.8	0.00	0.00	0.00
3,160.0	22.46	287.08	2,992.1	269.9	-878.5	919.0	0.00	0.00	0.00
3,200.0	22.46	287.08	3,029.1	274.4	-893.1	934.3	0.00	0.00	0.00
3,240.0	22.46	287.08	3,066.1	278.9	-907.7	949.6	0.00	0.00	0.00
3,280.0	22.46	287.08	3,103.0	283.3	-922.3	964.9	0.00	0.00	0.00
3,320.0	22.46	287.08	3,140.0	287.8	-936.9	980.2	0.00	0.00	0.00
3,360.0	22.46	287.08	3,177.0	292.3	-951.6	995.4	0.00	0.00	0.00
3,400.0	22.46	287.08	3,213.9	296.8	-966.2	1,010.7	0.00	0.00	0.00
3,440.0	22.46	287.08	3,250.9	301.3	-980.8	1,026.0	0.00	0.00	0.00
3,480.0	22.46	287.08	3,287.9	305.8	-995.4	1,041.3	0.00	0.00	0.00
3,520.0	22.46	287.08	3,324.8	310.3	-1,010.0	1,056.6	0.00	0.00	0.00
3,560.0	22.46	287.08	3,361.8	314.8	-1,024.6	1,071.8	0.00	0.00	0.00
3,600.0	22.46	287.08	3,398.8	319.2	-1,039.2	1,087.1	0.00	0.00	0.00
3,640.0	22.46	287.08	3,435.7	323.7	-1,053.8	1,102.4	0.00	0.00	0.00
3,680.0	22.46	287.08	3,472.7	328.2	-1,068.4	1,117.7	0.00	0.00	0.00
3,720.0	22.46	287.08	3,509.7	332.7	-1,083.0	1,133.0	0.00	0.00	0.00
3,760.0	22.46	287.08	3,546.6	337.2	-1,097.6	1,148.2	0.00	0.00	0.00
3,800.0	22.46	287.08	3,583.6	341.7	-1,112.2	1,163.5	0.00	0.00	0.00
3,840.0	22.46	287.08	3,620.6	346.2	-1,126.8	1,178.8	0.00	0.00	0.00
3,880.0	22.46	287.08	3,657.5	350.7	-1,141.4	1,194.1	0.00	0.00	0.00
3,920.0	22.46	287.08	3,694.5	355.1	-1,156.0	1,209.4	0.00	0.00	0.00
3,960.0	22.46	287.08	3,731.5	359.6	-1,170.7	1,224.6	0.00	0.00	0.00
4,000.0	22.46	287.08	3,768.4	364.1	-1,185.3	1,239.9	0.00	0.00	0.00
4,040.0	22.46	287.08	3,805.4	368.6	-1,199.9	1,255.2	0.00	0.00	0.00
4,080.0	22.46	287.08	3,842.4	373.1	-1,214.5	1,270.5	0.00	0.00	0.00
4,120.0	22.46	287.08	3,879.3	377.6	-1,229.1	1,285.8	0.00	0.00	0.00
4,160.0	22.46	287.08	3,916.3	382.1	-1,243.7	1,301.0	0.00	0.00	0.00

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Site:	Markham 44-32D Pad Sec.32-T4N-R68W	North Reference:	True
Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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)
4,200.0	22.46	287.08	3,953.3	386.6	-1,258.3	1,316.3	0.00	0.00	0.00
4,240.0	22.46	287.08	3,990.2	391.0	-1,272.9	1,331.6	0.00	0.00	0.00
4,280.0	22.46	287.08	4,027.2	395.5	-1,287.5	1,346.9	0.00	0.00	0.00
4,320.0	22.46	287.08	4,064.2	400.0	-1,302.1	1,362.2	0.00	0.00	0.00
4,360.0	22.46	287.08	4,101.1	404.5	-1,316.7	1,377.4	0.00	0.00	0.00
4,400.0	22.46	287.08	4,138.1	409.0	-1,331.3	1,392.7	0.00	0.00	0.00
4,440.0	22.46	287.08	4,175.1	413.5	-1,345.9	1,408.0	0.00	0.00	0.00
4,480.0	22.46	287.08	4,212.0	418.0	-1,360.5	1,423.3	0.00	0.00	0.00
4,520.0	22.46	287.08	4,249.0	422.4	-1,375.1	1,438.6	0.00	0.00	0.00
4,560.0	22.46	287.08	4,286.0	426.9	-1,389.7	1,453.8	0.00	0.00	0.00
4,600.0	22.46	287.08	4,322.9	431.4	-1,404.4	1,469.1	0.00	0.00	0.00
4,640.0	22.46	287.08	4,359.9	435.9	-1,419.0	1,484.4	0.00	0.00	0.00
4,680.0	22.46	287.08	4,396.9	440.4	-1,433.6	1,499.7	0.00	0.00	0.00
4,720.0	22.46	287.08	4,433.8	444.9	-1,448.2	1,515.0	0.00	0.00	0.00
4,760.0	22.46	287.08	4,470.8	449.4	-1,462.8	1,530.2	0.00	0.00	0.00
4,800.0	22.46	287.08	4,507.8	453.9	-1,477.4	1,545.5	0.00	0.00	0.00
4,840.0	22.46	287.08	4,544.7	458.3	-1,492.0	1,560.8	0.00	0.00	0.00
4,880.0	22.46	287.08	4,581.7	462.8	-1,506.6	1,576.1	0.00	0.00	0.00
4,920.0	22.46	287.08	4,618.7	467.3	-1,521.2	1,591.4	0.00	0.00	0.00
4,960.0	22.46	287.08	4,655.6	471.8	-1,535.8	1,606.7	0.00	0.00	0.00
5,000.0	22.46	287.08	4,692.6	476.3	-1,550.4	1,621.9	0.00	0.00	0.00
5,040.0	22.46	287.08	4,729.6	480.8	-1,565.0	1,637.2	0.00	0.00	0.00
5,080.0	22.46	287.08	4,766.5	485.3	-1,579.6	1,652.5	0.00	0.00	0.00
5,120.0	22.46	287.08	4,803.5	489.8	-1,594.2	1,667.8	0.00	0.00	0.00
5,122.3	22.46	287.08	4,805.6	490.0	-1,595.1	1,668.7	0.00	0.00	0.00
5,160.0	21.70	287.08	4,840.6	494.2	-1,608.6	1,682.8	2.00	-2.00	0.00
5,200.0	20.90	287.08	4,877.8	498.4	-1,622.5	1,697.4	2.00	-2.00	0.00
5,240.0	20.10	287.08	4,915.3	502.6	-1,635.9	1,711.4	2.00	-2.00	0.00
5,280.0	19.30	287.08	4,952.9	506.5	-1,648.8	1,724.9	2.00	-2.00	0.00
5,320.0	18.50	287.08	4,990.8	510.3	-1,661.2	1,737.8	2.00	-2.00	0.00
5,360.0	17.70	287.08	5,028.8	514.0	-1,673.1	1,750.2	2.00	-2.00	0.00
5,400.0	16.90	287.08	5,067.0	517.5	-1,684.4	1,762.1	2.00	-2.00	0.00
5,440.0	16.10	287.08	5,105.4	520.8	-1,695.3	1,773.5	2.00	-2.00	0.00
5,480.0	15.30	287.08	5,143.9	524.0	-1,705.7	1,784.3	2.00	-2.00	0.00
5,520.0	14.50	287.08	5,182.5	527.0	-1,715.5	1,794.6	2.00	-2.00	0.00
5,560.0	13.70	287.08	5,221.3	529.9	-1,724.8	1,804.4	2.00	-2.00	0.00
5,600.0	12.90	287.08	5,260.2	532.6	-1,733.6	1,813.6	2.00	-2.00	0.00
5,640.0	12.10	287.08	5,299.3	535.1	-1,741.9	1,822.2	2.00	-2.00	0.00
5,680.0	11.30	287.08	5,338.4	537.5	-1,749.6	1,830.3	2.00	-2.00	0.00
5,720.0	10.50	287.08	5,377.7	539.7	-1,756.9	1,837.9	2.00	-2.00	0.00
5,760.0	9.70	287.08	5,417.1	541.8	-1,763.6	1,844.9	2.00	-2.00	0.00
5,800.0	8.90	287.08	5,456.6	543.7	-1,769.8	1,851.4	2.00	-2.00	0.00
5,840.0	8.10	287.08	5,496.1	545.4	-1,775.4	1,857.3	2.00	-2.00	0.00
5,880.0	7.30	287.08	5,535.8	547.0	-1,780.5	1,862.7	2.00	-2.00	0.00
5,920.0	6.50	287.08	5,575.5	548.4	-1,785.1	1,867.5	2.00	-2.00	0.00
5,960.0	5.70	287.08	5,615.3	549.6	-1,789.2	1,871.7	2.00	-2.00	0.00
6,000.0	4.90	287.08	5,655.1	550.7	-1,792.7	1,875.4	2.00	-2.00	0.00
6,040.0	4.10	287.08	5,695.0	551.7	-1,795.7	1,878.6	2.00	-2.00	0.00
6,080.0	3.30	287.08	5,734.9	552.4	-1,798.2	1,881.2	2.00	-2.00	0.00
6,120.0	2.50	287.08	5,774.8	553.0	-1,800.2	1,883.2	2.00	-2.00	0.00
6,160.0	1.70	287.08	5,814.8	553.4	-1,801.6	1,884.7	2.00	-2.00	0.00
6,200.0	0.90	287.08	5,854.8	553.7	-1,802.4	1,885.6	2.00	-2.00	0.00
6,240.0	0.10	287.08	5,894.8	553.8	-1,802.8	1,885.9	2.00	-2.00	0.00
6,245.2	0.00	0.00	5,900.0	553.8	-1,802.8	1,885.9	2.00	-2.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Markham 33-32D
Company:	Apollo Operating, LLC.	TVD Reference:	WELL @ 5074.0ft (Original Well Elev)
Project:	SEC.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site:	Markham 44-32D Pad Sec.32-T4N-R68W	North Reference:	True
Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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)
6,280.0	0.00	0.00	5,934.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,320.0	0.00	0.00	5,974.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,360.0	0.00	0.00	6,014.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,400.0	0.00	0.00	6,054.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,440.0	0.00	0.00	6,094.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,480.0	0.00	0.00	6,134.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,520.0	0.00	0.00	6,174.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,560.0	0.00	0.00	6,214.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,600.0	0.00	0.00	6,254.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,640.0	0.00	0.00	6,294.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,680.0	0.00	0.00	6,334.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,720.0	0.00	0.00	6,374.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,760.0	0.00	0.00	6,414.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,800.0	0.00	0.00	6,454.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,840.0	0.00	0.00	6,494.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,880.0	0.00	0.00	6,534.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,920.0	0.00	0.00	6,574.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
6,960.0	0.00	0.00	6,614.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,000.0	0.00	0.00	6,654.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,040.0	0.00	0.00	6,694.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,080.0	0.00	0.00	6,734.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,120.0	0.00	0.00	6,774.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,160.0	0.00	0.00	6,814.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,200.0	0.00	0.00	6,854.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,240.0	0.00	0.00	6,894.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,280.0	0.00	0.00	6,934.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,320.0	0.00	0.00	6,974.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,360.0	0.00	0.00	7,014.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,400.0	0.00	0.00	7,054.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,440.0	0.00	0.00	7,094.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,480.0	0.00	0.00	7,134.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,520.0	0.00	0.00	7,174.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,560.0	0.00	0.00	7,214.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,600.0	0.00	0.00	7,254.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,640.0	0.00	0.00	7,294.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,680.0	0.00	0.00	7,334.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,720.0	0.00	0.00	7,374.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,760.0	0.00	0.00	7,414.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,800.0	0.00	0.00	7,454.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,840.0	0.00	0.00	7,494.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,880.0	0.00	0.00	7,534.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,920.0	0.00	0.00	7,574.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
7,960.0	0.00	0.00	7,614.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
8,000.0	0.00	0.00	7,654.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
8,040.0	0.00	0.00	7,694.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
8,080.0	0.00	0.00	7,734.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
8,120.0	0.00	0.00	7,774.8	553.8	-1,802.8	1,885.9	0.00	0.00	0.00
8,120.2	0.00	0.00	7,775.0	553.8	-1,802.8	1,885.9	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Markham 33-32D
Company:	Apollo Operating, LLC.	TVD Reference:	WELL @ 5074.0ft (Original Well Elev)
Project:	SEC.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site:	Markham 44-32D Pad Sec.32-T4N-R68W	North Reference:	True
Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-26-13)		

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)		Name	Casing Diameter (")	Hole Diameter (")
692.4	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 33-32D

Wellbore #1

Plan #1 (2-26-13)

Anticollision Report

26 February, 2013

Company:	Apollo Operating, LLC.	Local Co-ordinate Reference:	Well Markham 33-32D
Project:	SEC.32-T4N-R68W	TVD Reference:	WELL @ 5074.0ft (Original Well Elev)
Reference Site:	Markham 44-32D Pad Sec.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (2-26-13)	Offset TVD Reference:	Offset Datum

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

Survey Tool Program	Date 2/26/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	8,120.2	Plan #1 (2-26-13) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Markham 44-32D Pad Sec.32-T4N-R68W						
Markham 44-32D - Wellbore #1 - Plan #1 (2-26-13)	200.0	200.0	18.2	17.5	27.007	CC, ES
Markham 44-32D - Wellbore #1 - Plan #1 (2-26-13)	500.0	499.5	27.3	25.3	13.378	SF

Offset Design Markham 44-32D Pad Sec.32-T4N-R68W - Markham 44-32D - Wellbore #1 - Plan #1 (2-26-13)												
Survey Program: 0-MWD												
Offset Site Error: 0.0 ft												
Offset Well Error: 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
0.0	0.0	0.0	0.0	0.0	0.0	-180.00	-18.2	0.0	18.2	18.2	0.00	N/A
100.0	100.0	100.0	100.0	0.1	0.1	-180.00	-18.2	0.0	18.2	18.0	0.22	81.022
200.0	200.0	200.0	200.0	0.3	0.3	-180.00	-18.2	0.0	18.2	17.5	0.67	27.007 CC, ES
300.0	300.0	300.0	300.0	0.6	0.6	-112.16	-18.2	0.0	18.8	17.7	1.12	16.810
400.0	399.8	399.8	399.8	0.8	0.8	-125.24	-18.2	0.0	21.3	19.8	1.57	13.568
500.0	499.5	499.5	499.5	1.0	1.0	-140.24	-18.2	0.0	27.3	25.3	2.04	13.378 SF
600.0	598.7	598.7	598.7	1.3	1.2	-152.12	-18.2	0.0	37.5	35.0	2.51	14.934
700.0	697.5	697.5	697.5	1.7	1.5	-160.11	-18.2	0.0	51.9	48.9	2.98	17.415
800.0	795.6	795.6	795.6	2.0	1.7	-165.32	-18.2	0.0	70.1	66.7	3.44	20.365
900.0	893.1	893.1	893.1	2.5	1.9	-168.78	-18.2	0.0	92.1	88.2	3.91	23.556
1,000.0	989.6	990.1	990.1	3.0	2.1	-170.45	-19.4	-0.8	117.4	113.1	4.36	26.936
1,100.0	1,085.3	1,086.6	1,086.4	3.6	2.3	-170.39	-23.3	-3.3	145.7	140.9	4.81	30.306
1,200.0	1,179.8	1,182.2	1,181.7	4.2	2.5	-169.41	-29.8	-7.6	176.9	171.6	5.29	33.454
1,300.0	1,273.2	1,276.7	1,275.6	4.9	2.7	-167.96	-38.9	-13.6	211.1	205.3	5.82	36.297
1,400.0	1,365.6	1,370.3	1,368.2	5.7	2.9	-166.35	-50.4	-21.2	247.3	240.9	6.42	38.537
1,500.0	1,458.0	1,463.6	1,459.9	6.5	3.2	-164.54	-64.4	-30.4	283.6	276.6	7.10	39.970
1,600.0	1,550.5	1,556.3	1,550.7	7.3	3.5	-162.67	-80.3	-40.9	320.2	312.3	7.84	40.821
1,700.0	1,642.9	1,648.9	1,641.3	8.1	3.8	-161.14	-96.4	-51.5	356.9	348.3	8.63	41.359
1,800.0	1,735.3	1,741.6	1,731.9	8.9	4.2	-159.89	-112.5	-62.1	393.8	384.4	9.44	41.704
1,900.0	1,827.7	1,834.2	1,822.5	9.7	4.5	-158.86	-128.6	-72.7	430.9	420.6	10.27	41.947
2,000.0	1,920.1	1,926.8	1,913.1	10.5	4.9	-157.99	-144.7	-83.4	468.0	456.9	11.12	42.090
2,100.0	2,012.5	2,019.4	2,003.6	11.3	5.3	-157.25	-160.8	-94.0	505.3	493.3	11.98	42.181
2,200.0	2,104.9	2,112.0	2,094.2	12.2	5.7	-156.61	-177.0	-104.6	542.6	529.7	12.85	42.234
2,300.0	2,197.4	2,204.7	2,184.8	13.0	6.1	-156.05	-193.1	-115.2	579.9	566.2	13.72	42.261
2,400.0	2,289.8	2,297.3	2,275.4	13.8	6.5	-155.56	-209.2	-125.8	617.3	602.7	14.60	42.268

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

Company:	Apollo Operating, LLC.	Local Co-ordinate Reference:	Well Markham 33-32D
Project:	SEC.32-T4N-R68W	TVD Reference:	WELL @ 5074.0ft (Original Well Elev)
Reference Site:	Markham 44-32D Pad Sec.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (2-26-13)	Offset TVD Reference:	Offset Datum

Offset Design Markham 44-32D Pad Sec.32-T4N-R68W - Markham 44-32D - Wellbore #1 - Plan #1 (2-26-13)												Offset Site Error:	0.0 ft
Survey Program: 0-MWDD												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	2,382.2	2,389.9	2,366.0	14.6	6.9	-155.12	-225.3	-136.4	654.8	639.3	15.49	42.263	
2,600.0	2,474.6	2,482.5	2,456.6	15.4	7.3	-154.73	-241.4	-147.0	692.2	675.8	16.38	42.249	
2,700.0	2,567.0	2,575.2	2,547.2	16.2	7.7	-154.38	-257.5	-157.7	729.7	712.4	17.28	42.229	
2,800.0	2,659.4	2,667.8	2,637.8	17.0	8.1	-154.07	-273.6	-168.3	767.2	749.0	18.18	42.206	
2,900.0	2,751.9	2,760.4	2,728.4	17.9	8.5	-153.79	-289.7	-178.9	804.7	785.7	19.08	42.179	
3,000.0	2,844.3	2,853.0	2,819.0	18.7	8.9	-153.53	-305.8	-189.5	842.3	822.3	19.98	42.151	
3,100.0	2,936.7	2,945.6	2,909.6	19.5	9.3	-153.29	-322.0	-200.1	879.8	858.9	20.89	42.122	
3,200.0	3,029.1	3,038.3	3,000.1	20.3	9.7	-153.07	-338.1	-210.7	917.4	895.6	21.79	42.093	
3,300.0	3,121.5	3,130.9	3,090.7	21.1	10.2	-152.87	-354.2	-221.3	955.0	932.3	22.70	42.064	
3,400.0	3,213.9	3,223.5	3,181.3	22.0	10.6	-152.68	-370.3	-232.0	992.5	968.9	23.61	42.035	
3,500.0	3,306.4	3,316.1	3,271.9	22.8	11.0	-152.51	-386.4	-242.6	1,030.1	1,005.6	24.52	42.006	
3,600.0	3,398.8	3,408.8	3,362.5	23.6	11.4	-152.35	-402.5	-253.2	1,067.7	1,042.3	25.44	41.978	
3,700.0	3,491.2	3,501.4	3,453.1	24.4	11.8	-152.20	-418.6	-263.8	1,105.3	1,079.0	26.35	41.950	
3,800.0	3,583.6	3,594.0	3,543.7	25.2	12.2	-152.06	-434.7	-274.4	1,143.0	1,115.7	27.26	41.924	
3,900.0	3,676.0	3,686.6	3,634.3	26.1	12.7	-151.93	-450.9	-285.0	1,180.6	1,152.4	28.18	41.897	
4,000.0	3,768.4	3,779.2	3,724.9	26.9	13.1	-151.81	-467.0	-295.7	1,218.2	1,189.1	29.09	41.872	
4,100.0	3,860.9	3,871.9	3,815.5	27.7	13.5	-151.69	-483.1	-306.3	1,255.8	1,225.8	30.01	41.848	
4,200.0	3,953.3	3,964.5	3,906.0	28.5	13.9	-151.59	-499.2	-316.9	1,293.5	1,262.5	30.93	41.824	
4,300.0	4,045.7	4,057.1	3,996.6	29.3	14.4	-151.48	-515.3	-327.5	1,331.1	1,299.2	31.84	41.801	
4,400.0	4,138.1	4,149.7	4,087.2	30.2	14.8	-151.39	-531.4	-338.1	1,368.7	1,336.0	32.76	41.779	
4,500.0	4,230.5	4,242.4	4,177.8	31.0	15.2	-151.30	-547.5	-348.7	1,406.4	1,372.7	33.68	41.757	
4,600.0	4,322.9	4,335.0	4,268.4	31.8	15.6	-151.21	-563.6	-359.3	1,444.0	1,409.4	34.60	41.736	
4,700.0	4,415.4	4,427.6	4,359.0	32.6	16.0	-151.13	-579.7	-370.0	1,481.7	1,446.1	35.52	41.716	
4,800.0	4,507.8	4,520.2	4,449.6	33.4	16.5	-151.05	-595.9	-380.6	1,519.3	1,482.9	36.44	41.696	
4,900.0	4,600.2	4,612.8	4,540.2	34.3	16.9	-150.97	-612.0	-391.2	1,557.0	1,519.6	37.36	41.677	
5,000.0	4,692.6	4,705.5	4,630.8	35.1	17.3	-150.90	-628.1	-401.8	1,594.6	1,556.3	38.28	41.659	
5,100.0	4,785.0	4,798.1	4,721.4	35.9	17.7	-150.83	-644.2	-412.4	1,632.3	1,593.1	39.20	41.641	
5,200.0	4,877.8	4,891.0	4,812.3	36.6	18.2	-151.05	-660.4	-423.1	1,669.1	1,628.9	40.13	41.588	
5,300.0	4,971.8	4,985.0	4,904.2	37.2	18.6	-151.26	-676.7	-433.8	1,703.1	1,662.1	41.01	41.527	
5,400.0	5,067.0	5,079.9	4,996.9	37.8	19.0	-151.38	-693.2	-444.7	1,734.2	1,692.4	41.87	41.419	
5,500.0	5,163.2	5,187.8	5,102.9	38.2	19.4	-151.44	-710.5	-456.1	1,762.2	1,719.6	42.62	41.346	
5,600.0	5,260.2	5,298.3	5,212.1	38.6	19.7	-151.55	-724.8	-465.5	1,786.4	1,743.2	43.26	41.298	
5,700.0	5,358.1	5,410.2	5,323.2	39.0	19.9	-151.69	-735.6	-472.6	1,806.9	1,763.2	43.78	41.270	
5,800.0	5,456.6	5,523.1	5,435.7	39.3	20.2	-151.87	-742.9	-477.4	1,823.7	1,779.5	44.20	41.264	
5,900.0	5,555.6	5,636.6	5,549.2	39.5	20.3	-152.09	-746.4	-479.8	1,836.6	1,792.1	44.50	41.276	
6,000.0	5,655.1	5,742.5	5,655.1	39.7	20.5	-152.32	-746.8	-480.0	1,845.8	1,801.1	44.69	41.297	
6,100.0	5,754.9	5,842.3	5,754.9	39.9	20.6	-152.48	-746.8	-480.0	1,851.8	1,807.0	44.84	41.294	
6,200.0	5,854.8	5,942.2	5,854.8	40.0	20.7	-152.55	-746.8	-480.0	1,854.8	1,809.8	44.96	41.249	
6,300.0	5,954.8	6,042.2	5,954.8	40.1	20.8	-134.52	-746.8	-480.0	1,855.1	1,809.9	45.13	41.104	
6,400.0	6,054.8	6,142.2	6,054.8	40.1	20.9	-134.52	-746.8	-480.0	1,855.1	1,809.7	45.36	40.898	
6,500.0	6,154.8	6,242.2	6,154.8	40.2	21.0	-134.52	-746.8	-480.0	1,855.1	1,809.5	45.59	40.691	
6,600.0	6,254.8	6,342.2	6,254.8	40.3	21.1	-134.52	-746.8	-480.0	1,855.1	1,809.3	45.82	40.484	
6,700.0	6,354.8	6,442.2	6,354.8	40.4	21.3	-134.52	-746.8	-480.0	1,855.1	1,809.0	46.06	40.276	
6,800.0	6,454.8	6,542.2	6,454.8	40.4	21.4	-134.52	-746.8	-480.0	1,855.1	1,808.8	46.30	40.067	
6,900.0	6,554.8	6,642.2	6,554.8	40.5	21.5	-134.52	-746.8	-480.0	1,855.1	1,808.5	46.54	39.858	
7,000.0	6,654.8	6,742.2	6,654.8	40.6	21.6	-134.52	-746.8	-480.0	1,855.1	1,808.3	46.79	39.648	
7,100.0	6,754.8	6,842.2	6,754.8	40.7	21.8	-134.52	-746.8	-480.0	1,855.1	1,808.0	47.04	39.438	
7,200.0	6,854.8	6,942.2	6,854.8	40.7	21.9	-134.52	-746.8	-480.0	1,855.1	1,807.8	47.29	39.228	
7,300.0	6,954.8	7,042.2	6,954.8	40.8	22.0	-134.52	-746.8	-480.0	1,855.1	1,807.5	47.54	39.018	
7,400.0	7,054.8	7,142.2	7,054.8	40.9	22.2	-134.52	-746.8	-480.0	1,855.1	1,807.3	47.80	38.807	
7,500.0	7,154.8	7,242.2	7,154.8	41.0	22.3	-134.52	-746.8	-480.0	1,855.1	1,807.0	48.06	38.597	
7,600.0	7,254.8	7,342.2	7,254.8	41.1	22.4	-134.52	-746.8	-480.0	1,855.1	1,806.7	48.33	38.387	

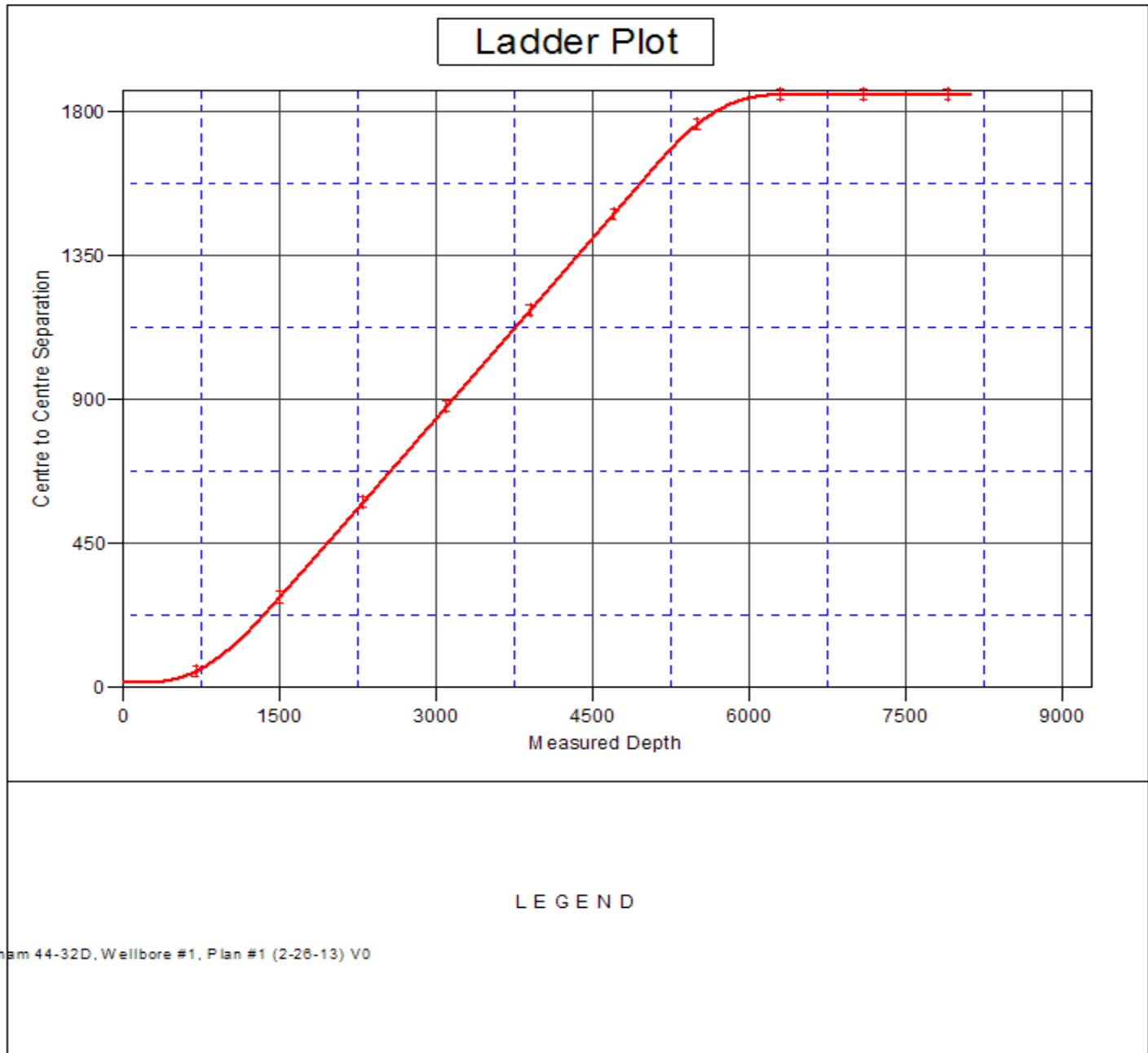
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	Apollo Operating, LLC.	Local Co-ordinate Reference:	Well Markham 33-32D
Project:	SEC.32-T4N-R68W	TVD Reference:	WELL @ 5074.0ft (Original Well Elev)
Reference Site:	Markham 44-32D Pad Sec.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (2-26-13)	Offset TVD Reference:	Offset Datum

Offset Design Markham 44-32D Pad Sec.32-T4N-R68W - Markham 44-32D - 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						
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	7,354.8	7,442.2	7,354.8	41.2	22.6	134.52	-746.8	-480.0	1,855.1	1,806.5	48.59	38.176	
7,800.0	7,454.8	7,542.2	7,454.8	41.3	22.7	134.52	-746.8	-480.0	1,855.1	1,806.2	48.86	37.966	
7,900.0	7,554.8	7,642.2	7,554.8	41.3	22.9	134.52	-746.8	-480.0	1,855.1	1,805.9	49.13	37.756	
8,000.0	7,654.8	7,742.2	7,654.8	41.4	23.0	134.52	-746.8	-480.0	1,855.1	1,805.7	49.41	37.547	
8,065.0	7,719.8	7,807.2	7,719.8	41.5	23.1	134.52	-746.8	-480.0	1,855.1	1,805.5	49.59	37.411	
8,100.0	7,754.8	7,837.5	7,750.0	41.5	23.1	134.52	-746.8	-480.0	1,855.1	1,805.4	49.68	37.343	
8,120.2	7,775.0	7,837.5	7,750.0	41.5	23.1	134.52	-746.8	-480.0	1,855.2	1,805.5	49.70	37.326	

Company:	Apollo Operating, LLC.	Local Co-ordinate Reference:	Well Markham 33-32D
Project:	SEC.32-T4N-R68W	TVD Reference:	WELL @ 5074.0ft (Original Well Elev)
Reference Site:	Markham 44-32D Pad Sec.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (2-26-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 5074.0ft (Original Well Elev) Coordinates are relative to: Markham 33-32D
 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°



Company:	Apollo Operating, LLC.	Local Co-ordinate Reference:	Well Markham 33-32D
Project:	SEC.32-T4N-R68W	TVD Reference:	WELL @ 5074.0ft (Original Well Elev)
Reference Site:	Markham 44-32D Pad Sec.32-T4N-R68W	MD Reference:	WELL @ 5074.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Markham 33-32D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (2-26-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 5074.0ft (Original Well Elev)Coordinates are relative to: Markham 33-32D
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°

