



# **Antero Resources**

**Speakman  
Speakman A Pad  
BAT 32C-24-07-96 (JOB# 112050)**

**BAT 32C  
UWI:**

**Plan: PROPOSAL#1**

## **Standard Planning Report - Geographic**

**22 March, 2013**





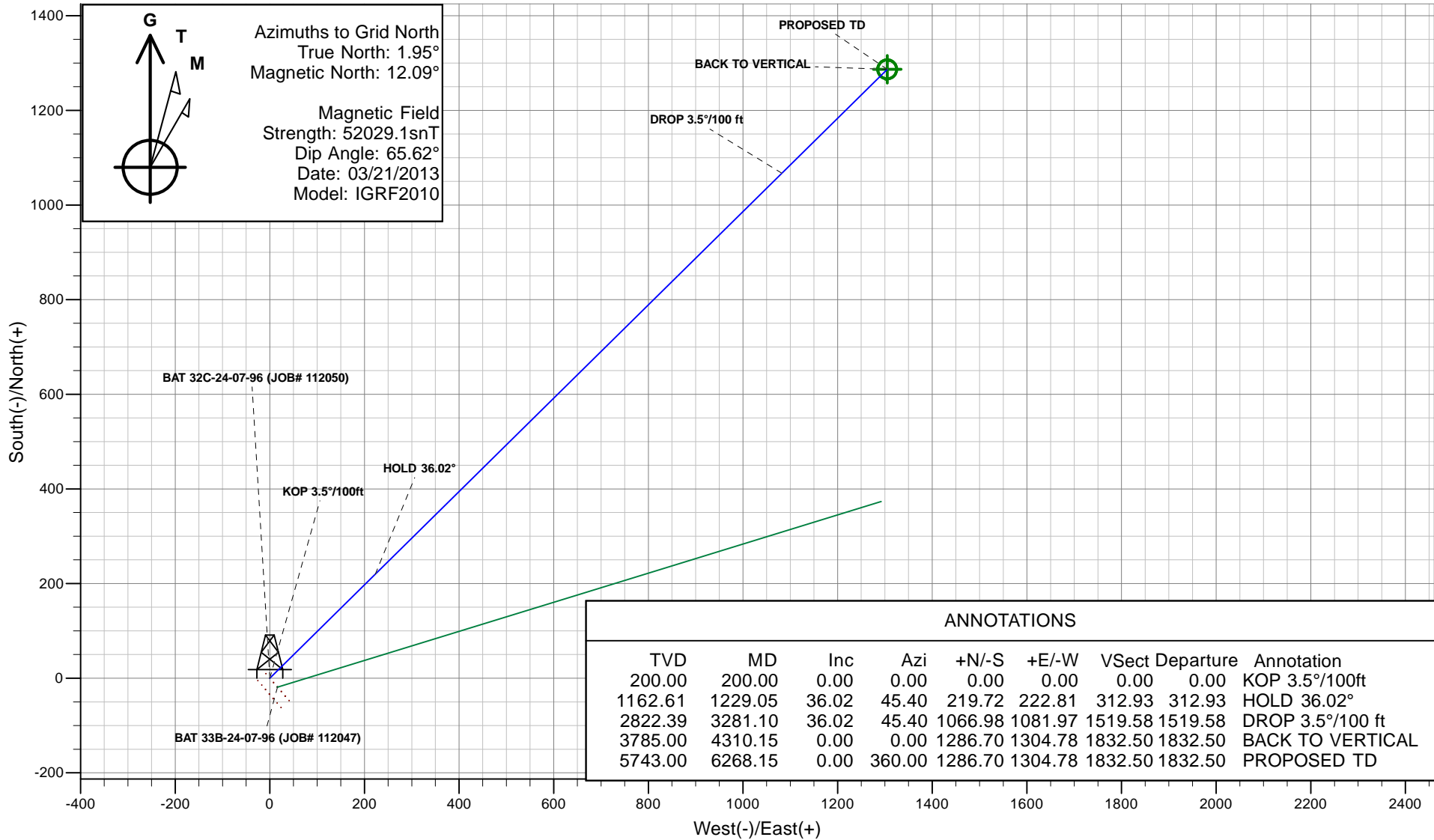
# Antero Resources

BAT 32C-24-07-96 (JOB# 112050)

Project: Speakman  
Site: Speakman A Pad  
Well: BAT 32C-24-07-96 (JOB# 112050)  
Wellbore: BAT 32C  
Design: PROPOSAL#1



## PLAN SECTION VIEW



Plan: PROPOSAL#1  
Created By: ARK Directional Services  
Date: 14:58, March 22 2013

PROJECT DETAILS: Speakman  
Geodetic System: Universal Transverse Mercator  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Zone 13N (108 W to 102 W)  
System Datum: Mean Sea Level

REFERENCE INFORMATION  
Co-ordinate (N/E) Reference: Well BAT 32C-24-07-96 (JOB# 112050), Grid North  
Vertical (TVD) Reference: KB @ 5203.00ft (Original Well Elev)  
Section (VS) Reference: Slot - (0.00N, 0.00E)  
Measured Depth Reference: KB @ 5203.00ft (Original Well Elev)  
Calculation Method: Minimum Curvature

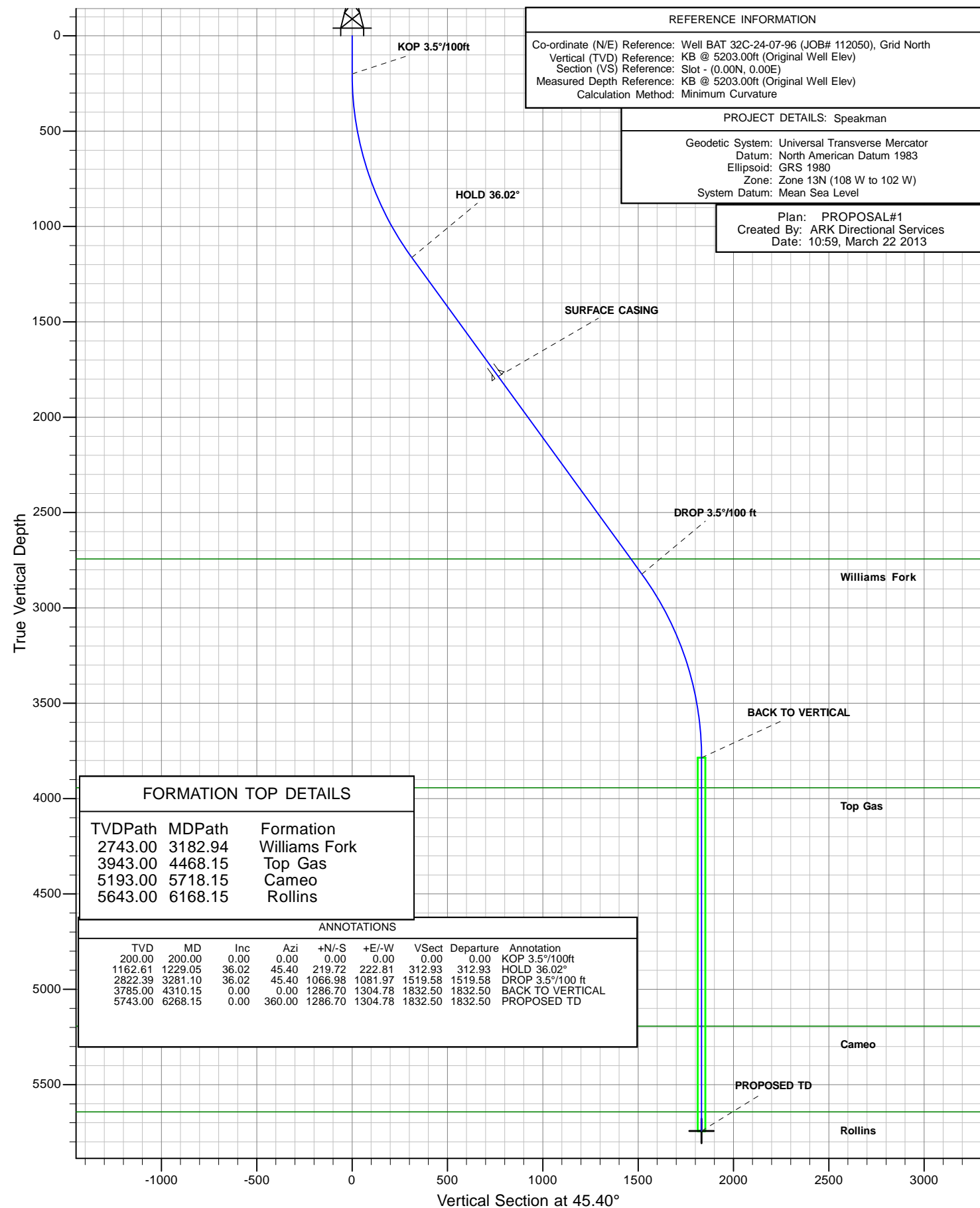


# Antero Resources

BAT 32C-24-07-96 (JOB# 112050)



## VERTICAL SECTION VIEW





# ARK Directional Services

## Planning Report - Geographic



Database:	EDM5000	Local Co-ordinate Reference:	Well BAT 32C-24-07-96 (JOB# 112050)
Company:	Antero Resources	TVD Reference:	KB @ 5203.00ft (Original Well Elev)
Project:	Speakman	MD Reference:	KB @ 5203.00ft (Original Well Elev)
Site:	Speakman A Pad	North Reference:	Grid
Well:	BAT 32C-24-07-96 (JOB# 112050)	Survey Calculation Method:	Minimum Curvature
Wellbore:	BAT 32C		
Design:	PROPOSAL#1		

Project	Speakman		
Map System:	Universal Transverse Mercator	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Zone 13N (108 W to 102 W)		

Site		Speakman A Pad			
Site Position:		Northing:	14,330,542.67 usft	Latitude:	39.420918160°N
From:	Map	Easting:	776,091.31 usft	Longitude:	108.060333667°W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.94 °

Well	BAT 32C-24-07-96 (JOB# 112050)					
Well Position	+N/-S	0.00 ft	Northing:	14,330,533.20 usft	Latitude:	39.420892941°N
	+E/-W	0.00 ft	Easting:	776,099.46 usft	Longitude:	108.060303690°W
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,183.00 ft

Wellbore UWI	BAT 32C				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	03/21/13	10.15	65.62	52,029

Design	PROPOSAL#1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	45.40

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,229.05	36.02	45.40	1,162.61	219.72	222.81	3.50	3.50	0.00	45.40	
3,281.10	36.02	45.40	2,822.39	1,066.98	1,081.97	0.00	0.00	0.00	0.00	
4,310.15	0.00	360.00	3,785.00	1,286.70	1,304.79	3.50	-3.50	0.00	180.00	
6,268.15	0.00	360.00	5,743.00	1,286.70	1,304.79	0.00	0.00	0.00	360.00	BAT 32C BH



# ARK Directional Services

## Planning Report - Geographic



Database:	EDM5000	Local Co-ordinate Reference:	Well BAT 32C-24-07-96 (JOB# 112050)
Company:	Antero Resources	TVD Reference:	KB @ 5203.00ft (Original Well Elev)
Project:	Speakman	MD Reference:	KB @ 5203.00ft (Original Well Elev)
Site:	Speakman A Pad	North Reference:	Grid
Well:	BAT 32C-24-07-96 (JOB# 112050)	Survey Calculation Method:	Minimum Curvature
Wellbore:	BAT 32C		
Design:	PROPOSAL#1		

Planned Survey										
Measured Depth (ft)	Inc. (°)	Az. (°)	Vertical Depth (ft)	Subsea (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	-5,203.00	0.00	0.00	14,330,533.20	776,099.46	39.420892941°N	108.060303690°W
100.00	0.00	0.00	100.00	-5,103.00	0.00	0.00	14,330,533.20	776,099.46	39.420892941°N	108.060303690°W
KOP 3.5°/100ft										
200.00	0.00	0.00	200.00	-5,003.00	0.00	0.00	14,330,533.20	776,099.46	39.420892941°N	108.060303690°W
300.00	3.50	45.40	299.94	-4,903.06	2.14	2.17	14,330,535.34	776,101.64	39.420899023°N	108.060296260°W
400.00	7.00	45.40	399.50	-4,803.50	8.57	8.69	14,330,541.77	776,108.15	39.420917247°N	108.060273997°W
500.00	10.50	45.40	498.32	-4,704.68	19.25	19.52	14,330,552.45	776,118.98	39.420947545°N	108.060236985°W
600.00	14.00	45.40	596.03	-4,606.97	34.14	34.62	14,330,567.34	776,134.08	39.420989804°N	108.060185362°W
700.00	17.50	45.40	692.26	-4,510.74	53.20	53.95	14,330,586.40	776,153.41	39.421043866°N	108.060119319°W
800.00	21.00	45.40	786.66	-4,416.34	76.35	77.42	14,330,609.55	776,176.88	39.421109529°N	108.060039104°W
900.00	24.50	45.40	878.86	-4,324.14	103.49	104.95	14,330,636.69	776,204.41	39.421186549°N	108.059945015°W
1,000.00	28.00	45.40	968.54	-4,234.46	134.55	136.44	14,330,667.74	776,235.90	39.421274638°N	108.059837404°W
1,100.00	31.50	45.40	1,055.34	-4,147.66	169.38	171.76	14,330,702.58	776,271.22	39.421373468°N	108.059716671°W
1,200.00	35.00	45.40	1,138.96	-4,064.04	207.87	210.80	14,330,741.07	776,310.26	39.421482669°N	108.059583268°W
HOLD 36.02°										
1,229.05	36.02	45.40	1,162.61	-4,040.39	219.72	222.81	14,330,752.92	776,322.27	39.421516280°N	108.059542208°W
1,300.00	36.02	45.40	1,219.99	-3,983.01	249.02	252.52	14,330,782.21	776,351.98	39.421599384°N	108.059440685°W
1,400.00	36.02	45.40	1,300.88	-3,902.12	290.30	294.38	14,330,823.50	776,393.85	39.421716516°N	108.059297592°W
1,500.00	36.02	45.40	1,381.76	-3,821.24	331.59	336.25	14,330,864.79	776,435.71	39.421833648°N	108.059154498°W
1,600.00	36.02	45.40	1,462.65	-3,740.35	372.88	378.12	14,330,906.08	776,477.58	39.421950780°N	108.059011404°W
1,700.00	36.02	45.40	1,543.53	-3,659.47	414.17	419.99	14,330,947.37	776,519.45	39.422067911°N	108.058868309°W
1,800.00	36.02	45.40	1,624.41	-3,578.59	455.46	461.86	14,330,988.66	776,561.32	39.422185042°N	108.058725214°W
1,900.00	36.02	45.40	1,705.30	-3,497.70	496.75	503.73	14,331,029.94	776,603.19	39.422302173°N	108.058582119°W
SURFACE CASING										
2,000.00	36.02	45.40	1,786.18	-3,416.82	538.03	545.60	14,331,071.23	776,645.06	39.422419304°N	108.058439023°W
2,100.00	36.02	45.40	1,867.07	-3,335.93	579.32	587.46	14,331,112.52	776,686.92	39.422536435°N	108.058295927°W
2,200.00	36.02	45.40	1,947.95	-3,255.05	620.61	629.33	14,331,153.81	776,728.79	39.422653566°N	108.058152830°W
2,300.00	36.02	45.40	2,028.84	-3,174.16	661.90	671.20	14,331,195.10	776,770.66	39.422770696°N	108.058009732°W
2,400.00	36.02	45.40	2,109.72	-3,093.28	703.19	713.07	14,331,236.39	776,812.53	39.422887826°N	108.057866634°W
2,500.00	36.02	45.40	2,190.61	-3,012.39	744.47	754.94	14,331,277.67	776,854.40	39.423004957°N	108.057723536°W
2,600.00	36.02	45.40	2,271.49	-2,931.51	785.76	796.81	14,331,318.96	776,896.27	39.423122087°N	108.057580437°W
2,700.00	36.02	45.40	2,352.37	-2,850.63	827.05	838.68	14,331,360.25	776,938.14	39.423239216°N	108.057437338°W
2,800.00	36.02	45.40	2,433.26	-2,769.74	868.34	880.54	14,331,401.54	776,980.00	39.423356346°N	108.057294238°W
2,900.00	36.02	45.40	2,514.14	-2,688.86	909.63	922.41	14,331,442.83	777,021.87	39.423473476°N	108.057151138°W
3,000.00	36.02	45.40	2,595.03	-2,607.97	950.92	964.28	14,331,484.11	777,063.74	39.423590605°N	108.057008037°W
3,100.00	36.02	45.40	2,675.91	-2,527.09	992.20	1,006.15	14,331,525.40	777,105.61	39.423707734°N	108.056864936°W
Williams Fork										
3,182.94	36.02	45.40	2,743.00	-2,460.00	1,026.45	1,040.88	14,331,559.65	777,140.34	39.423804883°N	108.056746245°W
3,200.00	36.02	45.40	2,756.80	-2,446.20	1,033.49	1,048.02	14,331,566.69	777,147.48	39.423824863°N	108.056721834°W
DROP 3.5°/100 ft										
3,281.10	36.02	45.40	2,822.39	-2,380.61	1,066.98	1,081.97	14,331,600.18	777,181.43	39.423919855°N	108.056605778°W
3,300.00	35.36	45.40	2,837.75	-2,365.25	1,074.72	1,089.82	14,331,607.92	777,189.28	39.423941816°N	108.056578947°W
3,400.00	31.86	45.40	2,921.02	-2,281.98	1,113.58	1,129.23	14,331,646.77	777,228.69	39.424052045°N	108.056444275°W
3,500.00	28.36	45.40	3,007.52	-2,195.48	1,148.79	1,164.94	14,331,681.99	777,264.39	39.424151941°N	108.056322225°W
3,600.00	24.86	45.40	3,096.91	-2,106.09	1,180.23	1,196.82	14,331,713.43	777,296.28	39.424241133°N	108.056213254°W
3,700.00	21.36	45.40	3,188.88	-2,014.12	1,207.78	1,224.76	14,331,740.98	777,324.21	39.424319288°N	108.056117767°W
3,800.00	17.86	45.40	3,283.07	-1,919.93	1,231.34	1,248.64	14,331,764.53	777,348.10	39.424386113°N	108.056036121°W
3,900.00	14.36	45.40	3,379.13	-1,823.87	1,250.81	1,268.39	14,331,784.01	777,367.85	39.424441361°N	108.055968621°W
4,000.00	10.86	45.40	3,476.70	-1,726.30	1,266.13	1,283.93	14,331,799.33	777,383.39	39.424484824°N	108.055915519°W
4,100.00	7.36	45.40	3,575.43	-1,627.57	1,277.24	1,295.19	14,331,810.44	777,394.65	39.424516340°N	108.055877013°W



# ARK Directional Services

## Planning Report - Geographic



<b>Database:</b>	EDM5000	<b>Local Co-ordinate Reference:</b>	Well BAT 32C-24-07-96 (JOB# 112050)
<b>Company:</b>	Antero Resources	<b>TVD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Project:</b>	Speakman	<b>MD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Site:</b>	Speakman A Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	BAT 32C-24-07-96 (JOB# 112050)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	BAT 32C		
<b>Design:</b>	PROPOSAL#1		

Planned Survey										
Measured Depth (ft)	Inc. (°)	Az. (°)	Vertical Depth (ft)	Subsea (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,200.00	3.86	45.40	3,674.93	-1,528.07	1,284.10	1,302.15	14,331,817.30	777,401.61	39.424535793°N	108.055853245°W
4,300.00	0.36	45.40	3,774.85	-1,428.15	1,286.68	1,304.76	14,331,819.87	777,404.22	39.424543109°N	108.055844307°W
BACK TO VERTICAL										
<b>4,310.15</b>	<b>0.00</b>	<b>0.00</b>	<b>3,785.00</b>	<b>-1,418.00</b>	<b>1,286.70</b>	<b>1,304.79</b>	<b>14,331,819.90</b>	<b>777,404.24</b>	<b>39.424543172°N</b>	<b>108.055844230°W</b>
4,400.00	0.00	360.00	3,874.85	-1,328.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
Top Gas										
<b>4,468.15</b>	<b>0.00</b>	<b>360.00</b>	<b>3,943.00</b>	<b>-1,260.00</b>	<b>1,286.70</b>	<b>1,304.79</b>	<b>14,331,819.90</b>	<b>777,404.24</b>	<b>39.424543172°N</b>	<b>108.055844230°W</b>
4,500.00	0.00	360.00	3,974.85	-1,228.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
4,600.00	0.00	360.00	4,074.85	-1,128.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
4,700.00	0.00	360.00	4,174.85	-1,028.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
4,800.00	0.00	360.00	4,274.85	-928.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
4,900.00	0.00	360.00	4,374.85	-828.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,000.00	0.00	360.00	4,474.85	-728.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,100.00	0.00	360.00	4,574.85	-628.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,200.00	0.00	360.00	4,674.85	-528.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,300.00	0.00	360.00	4,774.85	-428.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,400.00	0.00	360.00	4,874.85	-328.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,500.00	0.00	360.00	4,974.85	-228.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,600.00	0.00	360.00	5,074.85	-128.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,700.00	0.00	360.00	5,174.85	-28.15	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
Cameo										
<b>5,718.15</b>	<b>0.00</b>	<b>360.00</b>	<b>5,193.00</b>	<b>-10.00</b>	<b>1,286.70</b>	<b>1,304.79</b>	<b>14,331,819.90</b>	<b>777,404.24</b>	<b>39.424543172°N</b>	<b>108.055844230°W</b>
5,800.00	0.00	360.00	5,274.85	71.85	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
5,900.00	0.00	360.00	5,374.85	171.85	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
6,000.00	0.00	360.00	5,474.85	271.85	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
6,100.00	0.00	360.00	5,574.85	371.85	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
Rollins										
<b>6,168.15</b>	<b>0.00</b>	<b>360.00</b>	<b>5,643.00</b>	<b>440.00</b>	<b>1,286.70</b>	<b>1,304.79</b>	<b>14,331,819.90</b>	<b>777,404.24</b>	<b>39.424543172°N</b>	<b>108.055844230°W</b>
6,200.00	0.00	360.00	5,674.85	471.85	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W
PROPOSED TD										
<b>6,268.15</b>	<b>0.00</b>	<b>360.00</b>	<b>5,743.00</b>	<b>540.00</b>	<b>1,286.70</b>	<b>1,304.79</b>	<b>14,331,819.90</b>	<b>777,404.24</b>	<b>39.424543172°N</b>	<b>108.055844230°W</b>

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
BAT 32C BH	0.00	0.00	5,743.00	1,286.70	1,304.79	14,331,819.90	777,404.24	39.424543172°N	108.055844230°W	
- plan hits target center										
- Circle (radius 20.00)										

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
2,000.00	1,786.18	SURFACE CASING	5.500	6.000	

<b>Database:</b>	EDM5000	<b>Local Co-ordinate Reference:</b>	Well BAT 32C-24-07-96 (JOB# 112050)
<b>Company:</b>	Antero Resources	<b>TVD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Project:</b>	Speakman	<b>MD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Site:</b>	Speakman A Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	BAT 32C-24-07-96 (JOB# 112050)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	BAT 32C		
<b>Design:</b>	PROPOSAL#1		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Subsea Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,182.94	2,743.00	2,460.00	Williams Fork			
4,468.15	3,943.00	1,260.00	Top Gas			
5,718.15	5,193.00	10.00	Cameo			
6,168.15	5,643.00	-440.00	Rollins			

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
200.00	200.00	0.00	0.00	KOP 3.5°/100ft	
1,229.05	1,162.61	219.72	222.81	HOLD 36.02°	
3,281.10	2,822.39	1,066.98	1,081.97	DROP 3.5°/100 ft	
4,310.15	3,785.00	1,286.70	1,304.79	BACK TO VERTICAL	
6,268.15	5,743.00	1,286.70	1,304.79	PROPOSED TD	



# **Antero Resources**

**Speakman**

**Speakman A Pad**

**BAT 32C-24-07-96 (JOB# 112050)**

**BAT 32C**

**PROPOSAL#1**

## **Anticollision Report**

**22 March, 2013**







# ARK Directional Services

## Anticollision Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well BAT 32C-24-07-96 (JOB# 112050)
<b>Project:</b>	Speakman	<b>TVD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Reference Site:</b>	Speakman A Pad	<b>MD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	BAT 32C-24-07-96 (JOB# 112050)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	BAT 32C	<b>Database:</b>	EDM5000
<b>Reference Design:</b>	PROPOSAL#1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	PROPOSAL#1		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD Interval 100.00ft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Travelling Cylinder
<b>Results Limited by:</b>	Maximum center-center distance of 9,842.52 ft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	<b>Date</b>	03/22/13		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.00	6,268.15	PROPOSAL#1 (BAT 32C)	MWD	MWD - Standard

Summary						
Site Name	Reference	Offset	Distance		Separation	Warning
	Measured	Measured	Between	Between		
Offset Well - Wellbore - Design	Depth	Depth	Centres	Ellipses	Factor	
	(ft)	(ft)	(ft)	(ft)		
Speakman A Pad						
BAT 33B-24-07-96 (JOB# 112047) - 33B - PROPOSAL #	200.00	200.00	25.00	24.37	39.724	CC, ES
BAT 33B-24-07-96 (JOB# 112047) - 33B - PROPOSAL #	2,428.55	2,500.00	523.81	481.62	12.417	SF

<b>Offset Design</b>	Speakman A Pad - BAT 33B-24-07-96 (JOB# 112047) - 33B - PROPOSAL #3											<b>Offset Site Error:</b>	0.00 ft
<b>Survey Program:</b>	0-MWD											<b>Offset Well Error:</b>	0.00 ft
<b>Reference</b>	<b>Offset</b>	<b>Semi Major Axis</b>											
<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>	<b>Warning</b>
0.00	0.00	0.00	0.00	0.00	0.00	139.27	-18.94	16.31	25.00				
100.00	100.00	100.00	100.00	0.09	0.09	139.27	-18.94	16.31	25.00	24.82	0.18	139.033	
200.00	200.00	200.00	200.00	0.31	0.31	139.27	-18.94	16.31	25.00	24.37	0.63	39.724 CC, ES	
299.88	299.81	300.00	299.94	0.54	0.54	94.40	-18.05	19.23	26.43	25.36	1.07	24.613	
399.63	399.13	400.00	399.50	0.80	0.79	95.69	-15.36	27.98	30.73	29.16	1.57	19.578	
499.13	497.47	500.00	498.32	1.09	1.09	97.14	-10.89	42.51	37.90	35.71	2.18	17.353	
598.27	594.35	600.00	596.03	1.48	1.50	98.37	-4.66	62.79	47.92	44.95	2.96	16.165	
696.93	689.34	700.00	692.26	1.97	2.01	99.27	3.32	88.73	60.73	56.80	3.94	15.418	
795.03	782.01	800.00	786.66	2.57	2.64	99.86	13.01	120.24	76.30	71.17	5.12	14.890	
892.47	872.00	900.00	878.86	3.26	3.39	100.19	24.37	157.20	94.52	88.00	6.52	14.488	
989.17	958.96	1,000.00	968.54	4.06	4.27	100.32	37.36	199.47	115.32	107.18	8.14	14.166	
1,085.09	1,042.59	1,100.00	1,055.34	4.96	5.29	100.29	51.94	246.89	138.61	128.63	9.97	13.897	
1,180.18	1,122.65	1,200.00	1,138.96	5.95	6.43	100.14	68.05	299.29	164.27	152.25	12.02	13.669	
1,275.36	1,200.12	1,300.00	1,219.99	7.03	7.69	100.12	85.27	355.31	191.75	177.51	14.24	13.462	
1,371.51	1,277.84	1,400.00	1,300.86	8.15	8.96	100.28	102.55	411.53	219.46	202.92	16.54	13.269	
1,467.60	1,355.56	1,500.00	1,381.73	9.27	10.24	100.38	119.84	467.75	247.15	228.30	18.85	13.112	
1,563.69	1,433.28	1,600.00	1,462.61	10.40	11.52	100.46	137.12	523.97	274.84	253.67	21.17	12.982	
1,659.78	1,511.00	1,700.00	1,543.48	11.53	12.81	100.52	154.40	580.19	302.53	279.03	23.50	12.874	
1,755.87	1,588.72	1,800.00	1,624.36	12.67	14.11	100.58	171.68	636.41	330.22	304.39	25.83	12.782	
1,851.96	1,666.44	1,900.00	1,705.23	13.80	15.40	100.62	188.97	692.62	357.91	329.74	28.17	12.704	
1,948.05	1,744.16	2,000.00	1,786.11	14.94	16.70	100.66	206.25	748.84	385.61	355.09	30.52	12.636	
2,044.14	1,821.88	2,100.00	1,866.98	16.08	18.00	100.69	223.53	805.06	413.30	380.44	32.86	12.577	
2,140.23	1,899.60	2,200.00	1,947.86	17.22	19.30	100.72	240.82	861.28	440.99	405.78	35.21	12.525	
2,236.31	1,977.33	2,300.00	2,028.73	18.36	20.60	100.75	258.10	917.50	468.68	431.12	37.56	12.479	
2,332.40	2,055.05	2,400.00	2,109.61	19.50	21.90	100.77	275.38	973.72	496.37	456.47	39.91	12.438	

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



# ARK Directional Services

## Anticollision Report



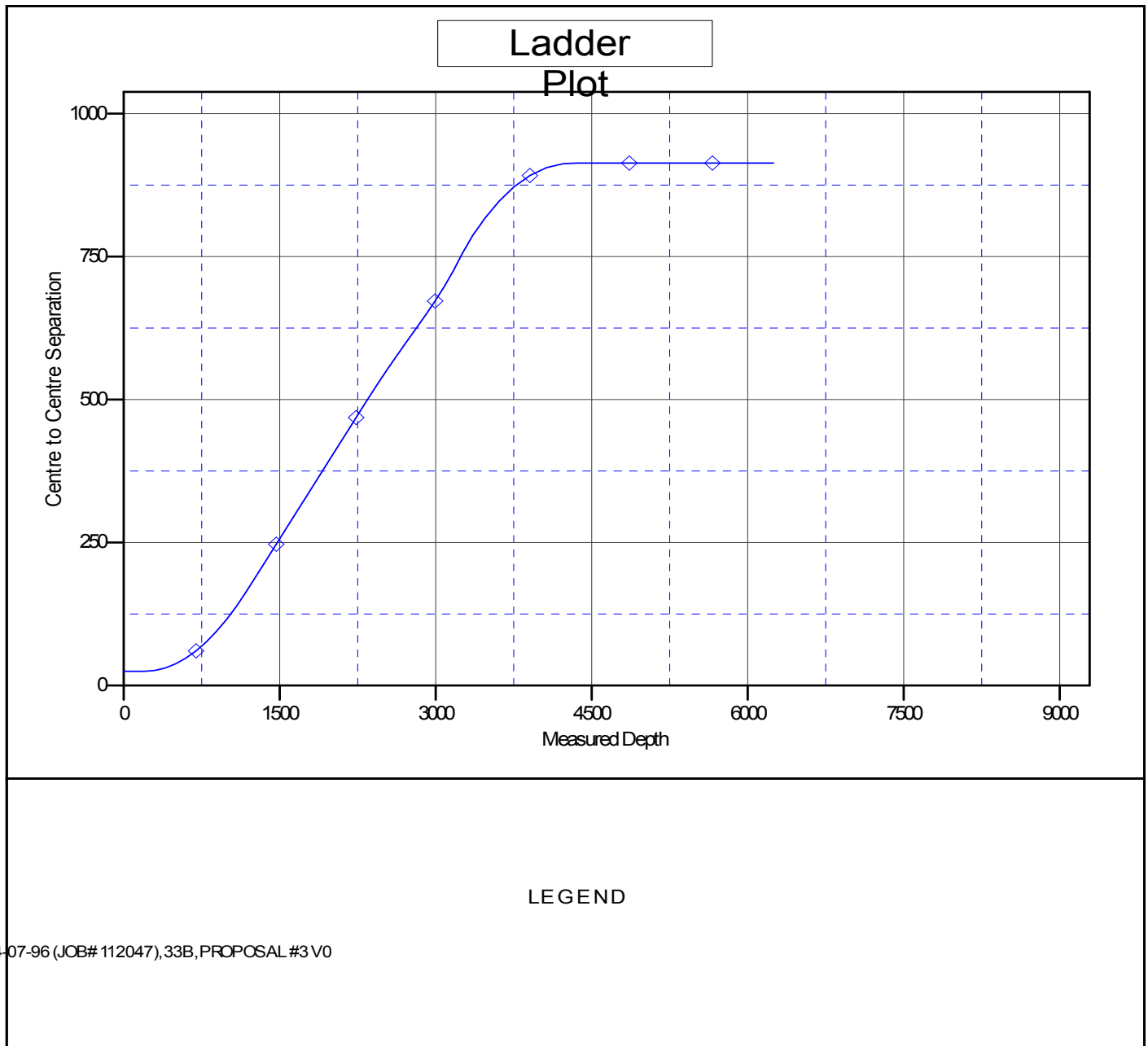
<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well BAT 32C-24-07-96 (JOB# 112050)
<b>Project:</b>	Speakman	<b>TVD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Reference Site:</b>	Speakman A Pad	<b>MD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	BAT 32C-24-07-96 (JOB# 112050)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	BAT 32C	<b>Database:</b>	EDM5000
<b>Reference Design:</b>	PROPOSAL#1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
2,428.55	2,132.81	2,500.00	2,191.25	20.64	23.11	100.94	292.35	1,028.90	523.81	481.62	42.18	12.417 SF		
2,524.76	2,210.63	2,600.00	2,276.07	21.79	24.10	101.67	307.90	1,079.51	550.12	505.86	44.26	12.431		
2,620.71	2,288.24	2,700.00	2,363.96	22.93	24.98	102.93	321.91	1,125.06	575.36	529.15	46.21	12.451		
2,716.04	2,365.35	2,800.00	2,454.60	24.06	25.75	104.66	334.31	1,165.41	599.78	551.77	48.02	12.491		
2,810.38	2,441.66	2,900.00	2,547.65	25.19	26.40	106.80	345.06	1,200.39	623.77	574.14	49.64	12.567		
2,903.40	2,516.89	3,000.00	2,642.75	26.29	26.95	109.29	354.13	1,229.87	647.80	596.77	51.03	12.695		
2,994.73	2,590.77	3,100.00	2,739.57	27.38	27.39	112.11	361.47	1,253.75	672.39	620.24	52.15	12.893		
3,084.05	2,663.01	3,200.00	2,837.72	28.44	27.72	115.19	367.06	1,271.94	698.12	645.15	52.97	13.179		
3,171.01	2,733.35	3,300.00	2,936.86	29.48	27.95	118.49	370.88	1,284.36	725.60	672.14	53.46	13.573		
3,256.01	2,802.06	3,400.00	3,036.60	30.48	28.10	121.96	372.91	1,290.97	755.44	701.87	53.58	14.100		
3,358.38	2,885.95	3,500.00	3,136.59	31.52	28.16	125.43	373.27	1,292.15	787.28	733.59	53.69	14.664		
3,479.68	2,989.69	3,600.00	3,236.59	32.56	28.21	128.39	373.27	1,292.15	818.41	764.53	53.88	15.189		
3,611.85	3,107.68	3,700.00	3,336.59	33.54	28.27	130.78	373.27	1,292.15	847.12	793.01	54.11	15.656		
3,754.46	3,239.92	3,800.00	3,436.59	34.42	28.32	132.64	373.27	1,292.15	872.01	817.68	54.33	16.050		
3,906.39	3,385.32	3,900.00	3,536.59	35.16	28.38	134.00	373.27	1,292.15	891.86	837.33	54.52	16.357		
4,065.75	3,541.50	4,000.00	3,636.59	35.69	28.44	134.90	373.27	1,292.15	905.65	851.02	54.62	16.580		
4,229.89	3,704.77	4,100.00	3,736.59	36.00	28.50	135.34	373.27	1,292.15	912.67	858.05	54.62	16.708		
4,362.02	3,836.87	4,200.00	3,836.59	36.10	28.56	-44.60	373.27	1,292.15	913.56	858.91	54.65	16.717		
4,461.74	3,936.59	4,300.00	3,936.59	36.14	28.62	-179.21	373.27	1,292.15	913.52	858.73	54.78	16.675		
4,561.74	4,036.59	4,400.00	4,036.59	36.19	28.69	-179.21	373.27	1,292.15	913.52	858.60	54.92	16.634		
4,661.74	4,136.59	4,500.00	4,136.59	36.24	28.76	-179.21	373.27	1,292.15	913.52	858.46	55.05	16.593		
4,761.74	4,236.59	4,600.00	4,236.59	36.29	28.82	-179.21	373.27	1,292.15	913.52	858.32	55.19	16.552		
4,861.74	4,336.59	4,700.00	4,336.59	36.35	28.89	-179.21	373.27	1,292.15	913.52	858.18	55.33	16.509		
4,961.74	4,436.59	4,800.00	4,436.59	36.40	28.97	-179.21	373.27	1,292.15	913.52	858.04	55.48	16.466		
5,061.74	4,536.59	4,900.00	4,536.59	36.46	29.04	-179.21	373.27	1,292.15	913.52	857.89	55.63	16.422		
5,161.74	4,636.59	5,000.00	4,636.59	36.51	29.11	-179.21	373.27	1,292.15	913.52	857.73	55.78	16.377		
5,261.74	4,736.59	5,100.00	4,736.59	36.57	29.19	-179.21	373.27	1,292.15	913.52	857.58	55.94	16.331		
5,361.74	4,836.59	5,200.00	4,836.59	36.63	29.27	-179.21	373.27	1,292.15	913.52	857.42	56.09	16.285		
5,461.74	4,936.59	5,300.00	4,936.59	36.69	29.35	-179.21	373.27	1,292.15	913.52	857.26	56.26	16.238		
5,561.74	5,036.59	5,400.00	5,036.59	36.75	29.43	-179.21	373.27	1,292.15	913.52	857.09	56.42	16.191		
5,661.74	5,136.59	5,500.00	5,136.59	36.82	29.51	-179.21	373.27	1,292.15	913.52	856.93	56.59	16.143		
5,761.74	5,236.59	5,600.00	5,236.59	36.88	29.59	-179.21	373.27	1,292.15	913.52	856.76	56.76	16.094		
5,861.74	5,336.59	5,700.00	5,336.59	36.95	29.68	-179.21	373.27	1,292.15	913.52	856.58	56.93	16.045		
5,961.74	5,436.59	5,800.00	5,436.59	37.01	29.76	-179.21	373.27	1,292.15	913.52	856.40	57.11	15.996		
6,061.74	5,536.59	5,900.00	5,536.59	37.08	29.85	-179.21	373.27	1,292.15	913.52	856.22	57.29	15.945		
6,161.74	5,636.59	6,000.00	5,636.59	37.15	29.94	-179.21	373.27	1,292.15	913.52	856.04	57.47	15.895		
6,250.15	5,725.00	6,088.41	5,725.00	37.21	30.02	-179.21	373.27	1,292.15	913.52	855.88	57.64	15.849		

<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well BAT 32C-24-07-96 (JOB# 112050)
<b>Project:</b>	Speakman	<b>TVD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Reference Site:</b>	Speakman A Pad	<b>MD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	BAT 32C-24-07-96 (JOB# 112050)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	BAT 32C	<b>Database:</b>	EDM5000
<b>Reference Design:</b>	PROPOSAL#1	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to KB @ 5203.00ft (Original Well Elev)  
Offset Depths are relative to Offset Datum  
Central Meridian is 105.000000000°W

Coordinates are relative to: BAT 32C-24-07-96 (JOB# 112050)  
Coordinate System is Universal Transverse Mercator , Zone 13N (108 W to 102 W)  
Grid Convergence at Surface is: -1.94°





# ARK Directional Services

## Anticollision Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well BAT 32C-24-07-96 (JOB# 112050)
<b>Project:</b>	Speakman	<b>TVD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Reference Site:</b>	Speakman A Pad	<b>MD Reference:</b>	KB @ 5203.00ft (Original Well Elev)
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	BAT 32C-24-07-96 (JOB# 112050)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	BAT 32C	<b>Database:</b>	EDM5000
<b>Reference Design:</b>	PROPOSAL#1	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to KB @ 5203.00ft (Original Well Elev)

Offset Depths are relative to Offset Datum

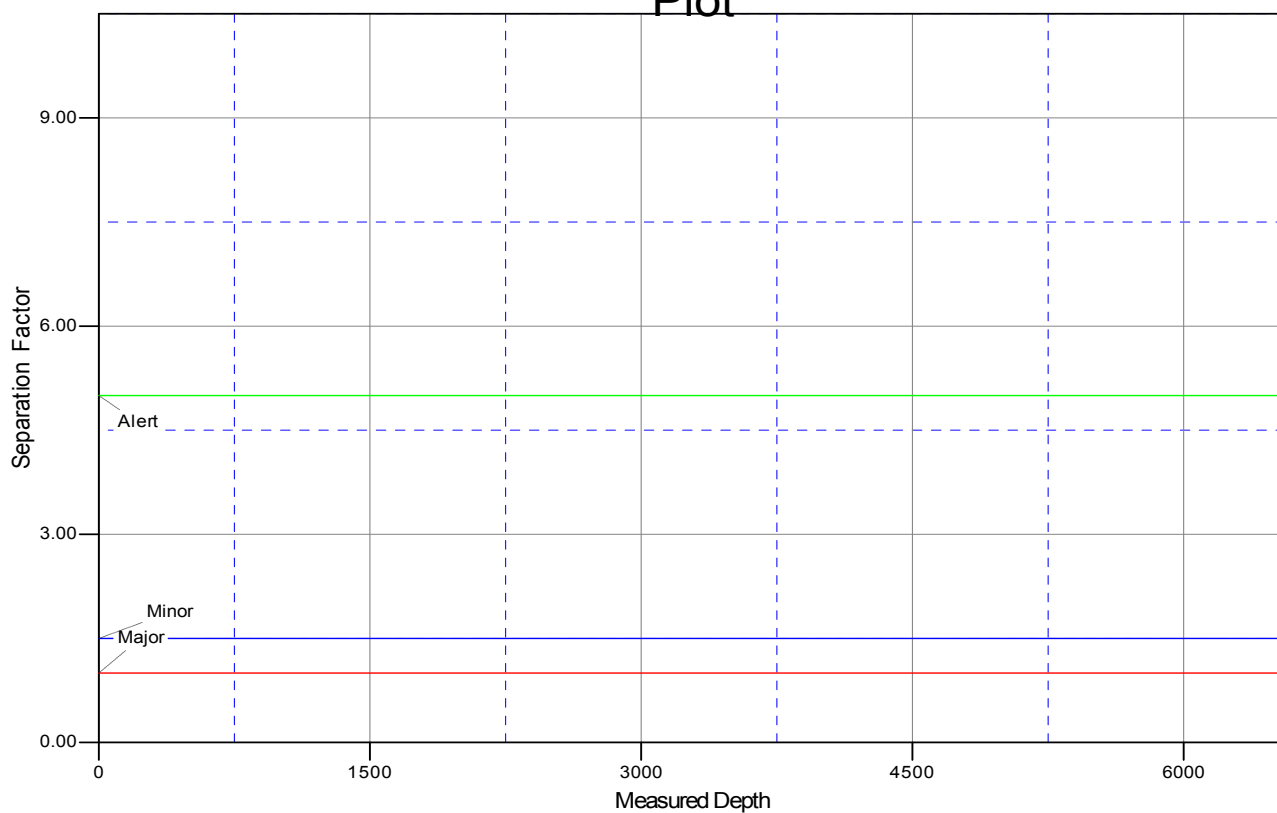
Central Meridian is 105.000000000°W

Coordinates are relative to: BAT 32C-24-07-96 (JOB# 112050)

Coordinate System is Universal Transverse Mercator , Zone 13N (108 W to 102 W

Grid Convergence at Surface is: -1.94°

### Separation Factor Plot



### LEGEND

24-07-96 (JOB# 112047), 33B, PROPOSAL #3 V0