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WV GEOLOGICAL SURVEY  
MORGANTOWN, WV



Antero Resources  
Doddridge County WV  
Northing: 14280128.17  
Easting: 1727999.38  
As Drilled

**WELL DETAILS:** Mt Salem Revival Unit 1H  
Ground Level: 1377.0  
Easting: 1727999.3839° 19' 27.1307600" 41' 25.064" W  
Northing: 14280128.17  
Longitude: 81° 19' 02.1307600" 41' 25.064" W  
Slot

**PROJECT DETAILS:** Doddridge County WV  
Geoidic System: Universal Transverse Mercator (US Survey Feet)  
Datum: NAD 83 (NAD 83 CONUS)  
Ellipsoid: Clarke 1866  
Zone: Zone 17N (84 W to 78 W)  
System Datum: Mean Sea Level

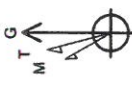
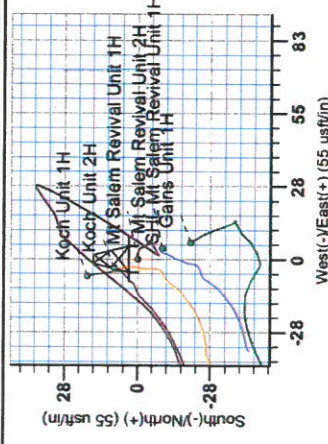
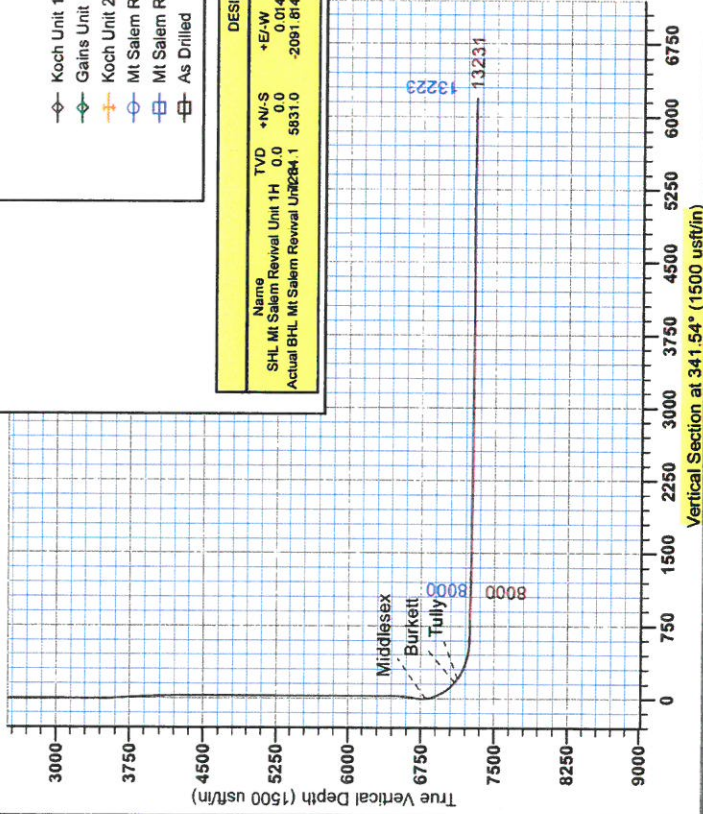
Genie Lightfoot  
Scientific Drilling  
421 South Eagle Lane  
Oklahoma City Oklahoma  
405-787-3663



- LEGEND**
- Koch Unit 1H, Original Wellpath, As Drilled V0
  - Gains Unit 1H, Original Wellpath, As Drilled V0
  - Koch Unit 2H, Original Wellpath, As Drilled V0
  - Mt Salem Revival Unit 2H, Original Wellpath, As Drilled V0
  - Mt Salem Revival Unit 1H, Original Wellpath, Plan 5 V0
  - As Drilled

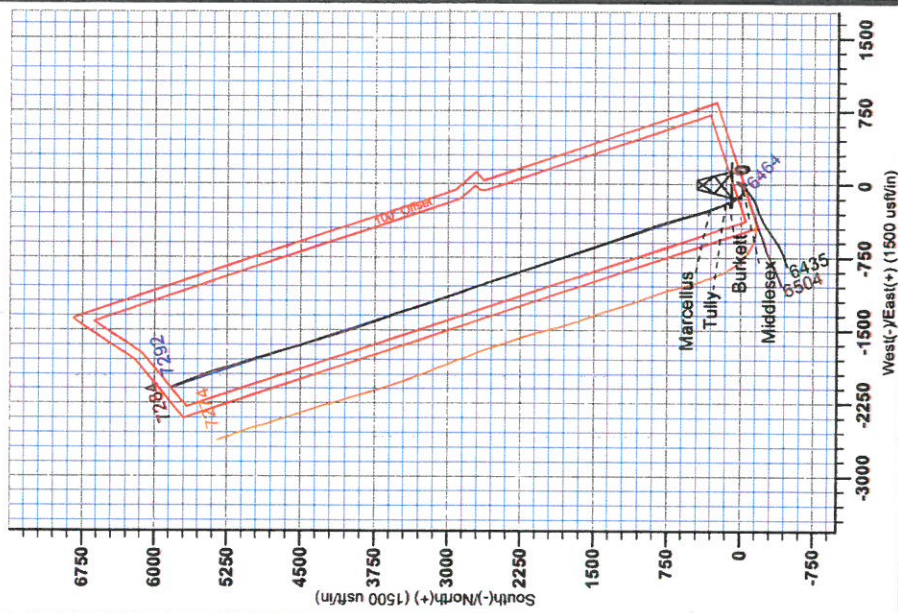
**DESIGN TARGET DETAILS**

Name	TVD	+N/S	+E/W	Northing	Easting	Latitude	Longitude
SHL Mt Salem Revival Unit 1H	0.0	0.0	0.0	0.014280128 17	1727999.3839° 19' 27.1307600" 41' 25.064" W	39° 19' 27.1307600" 41' 25.064" W	81° 19' 02.1307600" 41' 25.064" W
Actual BHL Mt Salem Revival Unit 1H	59331.0	-2091.814285558 17	-2091.814285558 17	1725507.5439° 20' 24.8541900" 41' 51.465" W	20° 24.8541900" 41' 51.465" W	41° 51.465" W	81° 19' 02.1307600" 41' 25.064" W



To convert Magnetic North to Grid, Subtract 8.72°  
To convert True North to Grid, Subtract 0.20°

Adm. to Grid North: -8.72°  
Magnetic North: -9.72°  
Magnetic Field Strength: 52374.3nT  
Dip Angle: 66.89°  
Date: 11/4/2013  
Model: IGRF2010





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MORGANTOWN, WV

## **Antero Resources**

**Doddridge County WV  
Koch/Gains/McCue/Mt Salem Revival  
Mt Salem Revival Unit 1H  
Original Wellpath**

**Design: As Drilled**

## **EOW Completion Report**

**26 March, 2014**





AUG 03 2015



WV GEOLOGICAL SURVEY  
MORGANTOWN, WV

EOW Completion Report



Scientific Drilling

<b>Company:</b> Antero Resources	<b>Local Co-ordinate Reference:</b> Well Mt Salem Revival Unit 1H
<b>Project:</b> Doddridge County WV	<b>TVD Reference:</b> Mt Salem 1H 1377 GL + 19 KB @ 1396.0usft
<b>Site:</b> Koch/Gains/McCue/Mt Salem Revival	<b>MD Reference:</b> Mt Salem 1H 1377 GL + 19 KB @ 1396.0usft
<b>Well:</b> Mt Salem Revival Unit 1H	<b>North Reference:</b> Grid
<b>Wellbore:</b> Original Wellpath	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> As Drilled	<b>Database:</b> Oklahoma District

<b>Project</b>	Doddridge County WV, McClellan District		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	Zone 17N (84 W to 78 W)		

<b>Site</b>	Koch/Gains/McCue/Mt Salem Revival				
<b>Site Position:</b>		<b>Northing:</b>	14,280,147.06 usft	<b>Latitude:</b>	39° 19' 27.317 N
<b>From:</b>	Map	<b>Easting:</b>	1,727,993.07 usft	<b>Longitude:</b>	80° 41' 25.164 W
<b>Position Uncertainty:</b>	2.0 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b>	0.20 °

<b>Well</b>	Mt Salem Revival Unit 1H, Marcellus					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,280,128.17 usft	<b>Latitude:</b>	39° 19' 27.130 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,727,999.38 usft	<b>Longitude:</b>	80° 41' 25.084 W
<b>Position Uncertainty</b>	2.0 usft		<b>Wellhead Elevation:</b>	1,388.0 usft	<b>Ground Level:</b>	1,377.0 usft

**Wellbore** Original Wellpath

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/4/2013	-8.52	66.89	52,374

**Design** As Drilled

**Audit Notes:**

<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
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Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	341.54

Survey Program	From (usft)	To (usft)	Date	Survey (Wellbore)	Tool Name	Description
	108.0	6,367.6	3/26/2014	Survey #4 Final (Original Wellpath)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper
	6,429.0	13,231.0		Survey #5 SDI MWD (Original Wellpath)	SDI MWD	Scientific Drilling Intl. MWD - Standard ver 1.0.1

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00
	108.0	0.29	75.54	108.0	0.1	0.3	0.0	0.27
	208.0	0.30	70.03	208.0	0.2	0.8	0.0	0.03
	308.0	0.29	93.06	308.0	0.3	1.3	-0.1	0.12
	408.0	0.28	100.55	408.0	0.2	1.7	-0.3	0.04
	508.0	0.28	102.85	508.0	0.1	2.2	-0.6	0.01
	608.0	0.19	121.98	608.0	0.0	2.6	-0.8	0.12
	708.0	0.11	126.12	708.0	-0.1	2.8	-1.0	0.08
	808.0	0.24	102.46	808.0	-0.2	3.1	-1.2	0.15
	908.0	0.26	117.93	908.0	-0.4	3.5	-1.5	0.07
	1,008.0	0.34	136.61	1,008.0	-0.7	3.9	-1.9	0.13



EOW Completion Report



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**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Mt Salem Revival Unit 1H  
**TVD Reference:** Mt Salem 1H 1377 GL + 19 KB @ 1396.0usft  
**MD Reference:** Mt Salem 1H 1377 GL + 19 KB @ 1396.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	EW (usft)	V. Sec (usft)	DLeg (°/100usft)
1,108.0	0.30	136.53	1,108.0	-1.1	4.3	-2.4	0.04
1,208.0	0.25	167.54	1,208.0	-1.5	4.5	-2.9	0.15
1,308.0	0.18	153.94	1,308.0	-1.9	4.6	-3.3	0.09
1,408.0	0.18	131.47	1,408.0	-2.1	4.8	-3.5	0.07
1,508.0	0.18	131.32	1,508.0	-2.3	5.1	-3.8	0.00
1,608.0	0.31	142.69	1,608.0	-2.7	5.3	-4.2	0.14
1,708.0	0.22	167.06	1,708.0	-3.1	5.6	-4.7	0.14
1,808.0	0.20	156.53	1,808.0	-3.4	5.7	-5.0	0.04
1,908.0	0.21	162.35	1,908.0	-3.7	5.8	-5.4	0.02
2,008.0	0.22	176.58	2,008.0	-4.1	5.9	-5.8	0.05
2,108.0	0.16	145.35	2,108.0	-4.4	5.9	-6.1	0.12
2,208.0	0.26	115.13	2,208.0	-4.6	6.2	-6.4	0.15
2,308.0	0.10	186.07	2,308.0	-4.8	6.4	-6.6	0.25
2,408.0	0.05	235.39	2,408.0	-4.9	6.4	-6.7	0.08
2,508.0	0.16	211.69	2,508.0	-5.1	6.3	-6.8	0.12
2,608.0	0.30	228.65	2,608.0	-5.4	6.0	-7.0	0.15
2,708.0	0.39	239.94	2,708.0	-5.7	5.5	-7.2	0.11
2,808.0	0.32	247.71	2,808.0	-6.0	5.0	-7.2	0.08
2,908.0	0.47	236.81	2,908.0	-6.3	4.4	-7.4	0.17
3,008.0	0.47	243.51	3,008.0	-6.7	3.6	-7.5	0.05
3,108.0	0.40	239.14	3,108.0	-7.1	3.0	-7.7	0.08
3,208.0	0.34	242.20	3,208.0	-7.4	2.4	-7.8	0.06
3,308.0	0.37	237.52	3,308.0	-7.7	1.9	-7.9	0.04
3,408.0	0.31	247.43	3,408.0	-8.0	1.4	-8.0	0.08
3,508.0	3.14	34.14	3,507.9	-5.8	2.7	-6.4	3.40
3,608.0	5.34	33.69	3,607.6	0.3	6.8	-1.8	2.20
3,708.0	5.01	31.50	3,707.2	7.9	11.6	3.8	0.38
3,808.0	4.55	29.82	3,806.9	15.1	15.9	9.3	0.48
3,908.0	4.35	29.28	3,906.6	21.8	19.7	14.5	0.20
4,008.0	3.27	28.61	4,006.4	27.6	22.9	19.0	1.08
4,108.0	2.35	26.11	4,106.2	32.0	25.2	22.4	0.93
4,208.0	1.79	24.05	4,206.2	35.3	26.7	25.0	0.56
4,308.0	0.82	21.84	4,306.1	37.3	27.6	26.7	0.97
4,408.0	0.26	349.21	4,406.1	38.2	27.9	27.4	0.62
4,508.0	0.28	262.22	4,506.1	38.4	27.6	27.7	0.37
4,608.0	0.24	247.53	4,606.1	38.3	27.1	27.7	0.08
4,708.0	0.48	242.36	4,706.1	38.0	26.6	27.7	0.24
4,808.0	0.66	236.41	4,806.1	37.5	25.7	27.4	0.19
4,908.0	0.85	230.46	4,906.1	36.7	24.7	27.0	0.21
5,008.0	0.90	241.47	5,006.1	35.9	23.4	26.6	0.18
5,108.0	0.95	231.00	5,106.1	35.0	22.1	26.2	0.18
5,208.0	0.92	239.13	5,206.1	34.1	20.8	25.7	0.14
5,308.0	0.90	234.10	5,306.1	33.2	19.4	25.3	0.08
5,408.0	0.75	232.06	5,406.1	32.3	18.3	24.9	0.15



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## EOW Completion Report



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**Site:** Koch/Gains/McCue/Mt Salem Revival  
**Well:** Mt Salem Revival Unit 1H  
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**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Oklahoma District

### Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	EW (usft)	V. Sec (usft)	DLeg (°/100usft)
5,508.0	0.66	239.11	5,506.1	31.6	17.3	24.5	0.12
5,608.0	0.66	247.34	5,606.0	31.1	16.2	24.4	0.09
5,708.0	0.77	256.35	5,706.0	30.7	15.1	24.4	0.16
5,808.0	0.76	253.81	5,806.0	30.4	13.8	24.5	0.04
5,908.0	0.83	248.43	5,906.0	29.9	12.5	24.4	0.10
6,008.0	0.42	247.63	6,006.0	29.5	11.4	24.4	0.41
6,108.0	0.40	274.48	6,106.0	29.4	10.8	24.5	0.19
6,208.0	0.64	250.68	6,206.0	29.3	9.9	24.6	0.32
6,308.0	0.30	202.02	6,306.0	28.8	9.3	24.4	0.50
6,367.6	0.38	265.00	6,365.6	28.7	9.0	24.3	0.61
6,429.0	0.44	216.95	6,427.0	28.5	8.7	24.3	0.55
6,473.0	0.27	209.70	6,471.0	28.2	8.5	24.1	0.40
6,518.0	2.41	221.34	6,516.0	27.4	7.8	23.5	4.77
6,563.0	7.91	222.47	6,560.8	24.4	5.1	21.6	12.22
6,608.0	13.55	221.73	6,605.0	18.2	-0.5	17.4	12.54
6,653.0	17.87	217.01	6,648.3	8.8	-8.2	10.9	10.00
6,698.0	19.27	222.39	6,690.9	-2.2	-17.3	3.4	4.91
6,743.0	20.36	240.64	6,733.3	-11.6	-29.2	-1.7	13.90
6,787.0	22.34	258.57	6,774.3	-17.0	-44.1	-2.2	15.44
6,815.0	23.46	268.48	6,800.2	-18.2	-54.8	0.1	14.32
<b>Middlesex</b>							
6,832.0	24.42	273.99	6,815.7	-18.0	-61.7	2.4	14.32
6,877.0	26.79	289.05	6,856.3	-14.1	-80.6	12.2	15.35
6,922.0	28.40	301.61	6,896.2	-5.2	-99.3	26.6	13.39
6,967.0	30.30	315.02	6,935.5	8.5	-116.5	45.0	15.17
7,012.0	32.67	324.95	6,973.9	26.5	-131.5	66.8	12.65
7,057.0	37.46	329.34	7,010.7	48.2	-145.5	91.8	12.02
7,102.0	42.70	330.89	7,045.1	73.3	-159.9	120.2	11.85
7,146.0	47.31	332.81	7,076.2	100.8	-174.5	150.9	10.92
7,171.0	49.74	334.21	7,092.8	117.5	-182.9	169.4	10.60
<b>Burkett</b>							
7,191.0	51.70	335.26	7,105.5	131.5	-189.5	184.8	10.60
7,220.0	54.68	336.81	7,122.8	152.8	-198.9	207.9	11.13
<b>Tully</b>							
7,236.0	56.33	337.62	7,131.9	164.9	-204.0	221.0	11.13
7,281.0	62.12	337.78	7,154.9	200.7	-218.7	259.6	12.87
7,326.0	67.03	338.88	7,174.2	238.4	-233.7	300.2	11.13
7,371.0	69.80	340.24	7,190.8	277.6	-248.3	342.0	6.77
7,410.0	72.61	341.47	7,203.3	312.5	-260.4	378.9	7.79
<b>Marcellus</b>							
7,416.0	73.04	341.65	7,205.1	318.0	-262.2	384.6	7.79
7,461.0	75.73	343.05	7,217.2	359.2	-275.3	427.9	6.69
7,505.0	78.61	343.98	7,227.0	400.4	-287.5	470.8	6.86
7,550.0	82.76	344.26	7,234.3	443.1	-299.7	515.2	9.24
7,594.0	85.65	344.32	7,238.7	485.2	-311.5	558.9	6.57

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### Survey

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7,626.0	87.76	343.97	7,240.6	515.9	-320.2	590.8	6.68
7,657.0	89.43	343.88	7,241.3	545.7	-328.8	621.8	5.39
7,752.0	89.43	343.79	7,242.3	637.0	-355.3	716.7	0.09
7,845.0	89.25	343.53	7,243.3	726.2	-381.4	809.6	0.34
7,935.0	88.46	342.30	7,245.1	812.2	-407.9	899.6	1.62
8,025.0	88.20	341.42	7,247.8	897.7	-435.9	989.5	1.02
8,115.0	89.34	340.28	7,249.7	982.7	-465.4	1,079.5	1.79
8,204.0	88.46	341.07	7,251.4	1,066.7	-494.8	1,168.5	1.33
8,294.0	88.55	340.45	7,253.7	1,151.6	-524.5	1,258.4	0.70
8,384.0	88.81	340.01	7,255.8	1,236.3	-554.9	1,348.4	0.57
8,473.0	89.34	340.37	7,257.3	1,320.0	-585.1	1,437.3	0.72
8,563.0	89.25	340.63	7,258.4	1,404.8	-615.1	1,527.3	0.31
8,653.0	89.96	341.42	7,259.0	1,489.9	-644.4	1,617.3	1.18
8,743.0	89.25	342.12	7,259.6	1,575.4	-672.5	1,707.3	1.11
8,833.0	89.96	341.60	7,260.2	1,660.9	-700.6	1,797.3	0.98
8,922.0	88.81	341.16	7,261.2	1,745.3	-729.0	1,886.3	1.38
9,012.0	88.99	341.68	7,262.9	1,830.6	-757.6	1,976.3	0.61
9,102.0	89.08	342.12	7,264.4	1,916.1	-785.6	2,066.3	0.50
9,192.0	89.25	341.16	7,265.7	2,001.5	-813.9	2,156.3	1.08
9,282.0	89.87	340.72	7,266.4	2,086.6	-843.3	2,246.3	0.84
9,371.0	89.34	341.16	7,267.0	2,170.7	-872.4	2,335.2	0.77
9,461.0	89.60	341.16	7,267.9	2,255.9	-901.5	2,425.2	0.29
9,551.0	88.90	340.98	7,269.1	2,341.0	-930.7	2,515.2	0.80
9,640.0	88.90	342.12	7,270.8	2,425.4	-958.8	2,604.2	1.28
9,730.0	89.25	341.42	7,272.2	2,510.9	-987.0	2,694.2	0.87
9,820.0	90.04	341.86	7,272.8	2,596.3	-1,015.3	2,784.2	1.00
9,909.0	90.22	341.07	7,272.6	2,680.7	-1,043.6	2,873.2	0.91
9,999.0	89.87	338.70	7,272.5	2,765.2	-1,074.6	2,963.1	2.66
10,089.0	89.25	338.34	7,273.2	2,848.9	-1,107.5	3,053.0	0.80
10,178.0	90.22	341.77	7,273.6	2,932.6	-1,137.9	3,142.0	4.00
10,268.0	90.22	343.27	7,273.3	3,018.4	-1,164.9	3,232.0	1.67
10,358.0	89.69	339.14	7,273.3	3,103.6	-1,193.9	3,321.9	4.63
10,448.0	89.96	341.42	7,273.6	3,188.3	-1,224.3	3,411.9	2.55
10,537.0	89.78	342.39	7,273.8	3,272.9	-1,251.9	3,500.9	1.11
10,627.0	89.78	342.83	7,274.1	3,358.8	-1,278.8	3,590.9	0.49
10,717.0	90.04	343.27	7,274.3	3,444.9	-1,305.0	3,680.9	0.57
10,807.0	90.04	341.33	7,274.2	3,530.6	-1,332.4	3,770.8	2.16
10,896.0	89.08	336.94	7,274.9	3,613.8	-1,364.1	3,859.7	5.05
10,986.0	89.96	340.01	7,275.7	3,697.5	-1,397.1	3,949.6	3.55
11,076.0	90.13	342.04	7,275.6	3,782.6	-1,426.4	4,039.6	2.26
11,165.0	90.48	342.39	7,275.1	3,867.3	-1,453.5	4,128.6	0.56
11,255.0	89.60	339.49	7,275.1	3,952.4	-1,482.9	4,218.6	3.37
11,345.0	90.57	341.42	7,274.9	4,037.2	-1,513.0	4,308.5	2.40
11,434.0	91.10	342.74	7,273.6	4,121.9	-1,540.4	4,397.5	1.60





**Company:** Antero Resources  
**Project:** Doddridge County WV  
**Site:** Koch/Gains/McCue/Mt Salem Revival  
**Well:** Mt Salem Revival Unit 1H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Mt Salem Revival Unit 1H  
**TVD Reference:** Mt Salem 1H 1377 GL + 19 KB @ 1396.0usft  
**MD Reference:** Mt Salem 1H 1377 GL + 19 KB @ 1396.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Oklahoma District

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
11,524.0	90.66	343.09	7,272.2	4,207.9	-1,566.9	4,487.5	0.62
11,614.0	90.40	343.09	7,271.4	4,294.0	-1,593.0	4,577.5	0.29
11,704.0	90.31	342.04	7,270.9	4,379.8	-1,620.0	4,667.4	1.17
11,793.0	91.01	342.74	7,269.8	4,464.7	-1,646.9	4,756.4	1.11
11,883.0	90.13	343.88	7,268.9	4,550.9	-1,672.8	4,846.4	1.60
11,973.0	89.78	343.88	7,269.0	4,637.3	-1,697.8	4,936.3	0.39
12,062.0	89.25	344.50	7,269.8	4,723.0	-1,722.0	5,025.2	0.92
12,152.0	90.40	343.53	7,270.0	4,809.5	-1,746.8	5,115.1	1.67
12,242.0	90.48	341.68	7,269.3	4,895.4	-1,773.7	5,205.1	2.06
12,331.0	88.55	343.09	7,270.1	4,980.2	-1,800.6	5,294.1	2.69
12,421.0	88.90	342.74	7,272.1	5,066.2	-1,827.1	5,384.0	0.55
12,511.0	89.43	342.30	7,273.4	5,152.0	-1,854.1	5,474.0	0.77
12,601.0	88.72	343.71	7,274.9	5,238.1	-1,880.4	5,564.0	1.75
12,691.0	88.99	344.58	7,276.7	5,324.6	-1,905.0	5,653.8	1.01
12,780.0	89.34	340.98	7,278.0	5,409.6	-1,931.3	5,742.8	4.06
12,870.0	89.78	338.61	7,278.6	5,494.1	-1,962.4	5,832.7	2.68
12,960.0	90.04	339.05	7,278.8	5,578.0	-1,994.9	5,922.6	0.57
13,050.0	88.64	339.22	7,279.8	5,662.1	-2,026.9	6,012.6	1.57
13,139.0	88.64	339.05	7,281.9	5,745.2	-2,058.6	6,101.5	0.19
13,174.0	88.62	338.79	7,282.8	5,777.9	-2,071.2	6,136.4	0.74
13,231.0	88.62	338.79	7,284.1	5,831.0	-2,091.8	6,193.3	0.00

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,815.0	6,800.2	-18.2	-54.8	Middlesex
7,171.0	7,092.8	117.5	-182.9	Burkett
7,220.0	7,122.8	152.8	-198.9	Tully
7,410.0	7,203.3	312.5	-260.4	Marcellus

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

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 AUG 03 2015  
 WV GEOLOGICAL SURVEY  
 MORGANTOWN, WV