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State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 017 - 06435 County Doddridge District Greenbrier
Quad Big Isaac 7.5' Pad Name Wagner Pad Field/Pool Name ----------
Farm name Perine, Junior Well Number Lettie Unit 2H
Operator (as registered with the OOG) Antero Resources Corporation
Address 1615 Wynkoop Street City Denver State CO Zip 80202

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey

Top hole	Northing	4,340,231m	Easting	534,187m
Landing Point of Curve	Northing	4,340,351.71m	Easting	534,016.43m
Bottom Hole	Northing	4,343,270m	Easting	533,085m

Elevation (ft) 1,270' GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine ■Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air ■ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Air- Foam & 4% KCL
Mud- Polymer

Date permit issued 01/22/2014 Date drilling commenced 02/28/2014 Date drilling ceased 06/18/2014
Date completion activities began 08/18/2014 Date completion activities ceased 11/24/2014
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 49' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1,692' Void(s) encountered (Y/N) depths None
Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths None
Is coal being mined in area (Y/N) No

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Reviewed by:
JK 7/24/15
√

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API 47- 017 - 06435 Farm name Perine, Junior Well number Lettie Unit 2H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	40'	New	94#; J-55	N/A	Yes
Surface	17 1/2"	13 3/8"	447'	New	48#; H-40	N/A	Yes
Coal							
Intermediate 1	12 1/4"	9 5/8"	2,548'	New	36#; J-55	N/A	Yes
Intermediate 2							
Intermediate 3							
Production	8 3/4" & 8 1/2"	5 1/2"	17,792'	New	23#; P-110	N/A	Yes
Tubing		2 3/8"	7,439'		4.7#; N-80	N/A	
Packer type and depth set		N/A					

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	200 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	534 sx	15.6	1.18	310	0'	8 Hrs.
Coal							
Intermediate 1	Class A	992 sx	15.6	1.18	498	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	1,062 sx (Lead); 1,651 sx (Tail)	14.5 (Lead); 15.2 (Tail)	1.3 (Lead); 1.86 (Tail)	3,607	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 17,792' MD, 7,312' TVD (BHL) 7,325' TVD (Deepest Point Drilled) Loggers TD (ft) 17,742'

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6,506'

**This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Downs Unit 1H, API #47-017-06433). Please reference the wireline logs submitted with Form WR-35 for the Downs Unit 1H. A Cement Bond Log has been included with this submittal.

Check all wireline logs run ** ☐ caliper ☐ density ☐ deviated/directional ☐ induction ☐ neutron ☐ resistivity ☐ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ■ No Conventional Sidewall Were cuttings collected ■ Yes ☐ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

Conductor- 0

Surface- 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface

Intermediate- 1 above float joint, 1 above float collar, 1 every 4th joint to surface

Production- 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

WERE TRACERS USED ☐ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 017 - 06435 Farm name Perine, Junior Well number Lettie Unit 2H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)

* PLEASE SEE ATTACHED EXHIBIT 1

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)

* PLEASE SEE ATTACHED EXHIBIT 2

Please insert additional pages as applicable.

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PRODUCING FORMATION(S)	DEPTHS			
Marcellus	7,236' (top)	TVD	7,515' (top)	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ■ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface 3950 psi Bottom Hole ---------- psi DURATION OF TEST ---------- hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	6,958 mcfpd	---------- bpd	---------- bpd	1,479 bpd	☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITYAND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		

*** PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling Company, LP
Address 2640 Reach Road City Williamsport State PA Zip 17701

Logging Company Rush Wellsite Services
Address 600 Alpha Drive City Canonsburg State PA Zip 15317

Cementing Company Nabors Completion & Production Services, Co.
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

Stimulating Company US Well Services
Address 533 Industrial Park Drive City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

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Completed by Megan Darling Telephone 303-357-7230
Signature Megan C. Darling Title Permitting Agent Date 07/02/2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

API 47-017-06435 Farm Name Perine, Junior Well Number Lettie Unit 2H

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	18-Aug-14	17,533	17,701	60	Marcellus
2	30-Sep-14	17,334	17,502	60	Marcellus
3	30-Sep-14	17,135	17,303	60	Marcellus
4	30-Sep-14	16,936	17,104	60	Marcellus
5	1-Oct-14	16,737	16,905	60	Marcellus
6	1-Oct-14	16,538	16,706	60	Marcellus
7	1-Oct-14	16,339	16,506	60	Marcellus
8	2-Oct-14	16,139	16,307	60	Marcellus
9	2-Oct-14	15,940	16,108	60	Marcellus
10	2-Oct-14	15,741	15,909	60	Marcellus
11	3-Oct-14	15,542	15,710	60	Marcellus
12	3-Oct-14	15,343	15,511	60	Marcellus
13	3-Oct-14	15,144	15,312	60	Marcellus
14	4-Oct-14	14,945	15,113	60	Marcellus
15	4-Oct-14	14,746	14,914	60	Marcellus
16	4-Oct-14	14,547	14,715	60	Marcellus
17	5-Oct-14	14,348	14,516	60	Marcellus
18	5-Oct-14	14,149	14,317	60	Marcellus
19	5-Oct-14	13,950	14,117	60	Marcellus
20	5-Oct-14	13,750	13,918	60	Marcellus
21	6-Oct-14	13,551	13,719	60	Marcellus
22	6-Oct-14	13,352	13,520	60	Marcellus
23	6-Oct-14	13,153	13,321	60	Marcellus
24	7-Oct-14	12,954	13,122	60	Marcellus
25	7-Oct-14	12,755	12,923	60	Marcellus
26	7-Oct-14	12,556	12,724	60	Marcellus
27	7-Oct-14	12,357	12,525	60	Marcellus
28	8-Oct-14	12,158	12,326	60	Marcellus
29	8-Oct-14	11,959	12,127	60	Marcellus
30	8-Oct-14	11,760	11,928	60	Marcellus
31	8-Oct-14	11,561	11,728	60	Marcellus
32	9-Oct-14	11,362	11,529	60	Marcellus
33	9-Oct-14	11,162	11,330	60	Marcellus
34	9-Oct-14	10,963	11,131	60	Marcellus
35	9-Oct-14	10,764	10,932	60	Marcellus
36	10-Oct-14	10,565	10,733	60	Marcellus
37	10-Oct-14	10,366	10,534	60	Marcellus
38	10-Oct-14	10,167	10,335	60	Marcellus
39	10-Oct-14	9,968	10,136	60	Marcellus
40	11-Oct-14	9,769	9,937	60	Marcellus
41	11-Oct-14	9,570	9,738	60	Marcellus
42	11-Oct-14	9,371	9,539	60	Marcellus
43	11-Oct-14	9,172	9,340	60	Marcellus
44	11-Oct-14	8,973	9,140	60	Marcellus
45	12-Oct-14	8,773	8,941	60	Marcellus
46	12-Oct-14	8,574	8,742	60	Marcellus
47	12-Oct-14	8,375	8,543	60	Marcellus
48	12-Oct-14	8,176	8,344	60	Marcellus
49	13-Oct-14	7,977	8,145	60	Marcellus
50	13-Oct-14	7,778	7,946	60	Marcellus
51	13-Oct-14	7,579	7,747	60	Marcellus

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API 47-017-06435 Farm Name Perine, Junior Well Number Lettie Unit 2H

EXHIBIT 2

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	29-Sep-14	63.6	7,896	N/A	5,316	81,640	7,258	N/A
2	30-Sep-14	60.0	7,757	7,475	5,333	157,720	6,671	N/A
3	30-Sep-14	63.0	7,645	7,152	4,845	181,408	6,732	N/A
4	30-Sep-14	65.7	7,368	6,622	5,589	234,685	7,037	N/A
5	1-Oct-14	62.0	7,297	6,473	5,301	195,693	7,133	N/A
6	1-Oct-14	65.0	7,308	6,259	5,336	235,325	6,736	N/A
7	1-Oct-14	65.8	7,285	6,395	6,159	232,885	6,885	N/A
8	2-Oct-14	67.3	7,276	5,971	5,835	230,982	6,745	N/A
9	2-Oct-14	73.0	7,423	6,081	5,591	234,200	6,656	N/A
10	2-Oct-14	71.1	7,484	6,226	5,039	228,330	6,661	N/A
11	3-Oct-14	70.0	7,402	6,541	5,393	233,790	6,623	N/A
12	3-Oct-14	68.0	7,385	6,039	5,988	233,990	6,602	N/A
13	3-Oct-14	68.4	7,074	6,033	6,071	231,025	6,589	N/A
14	4-Oct-14	68.8	7,273	6,379	5,628	219,715	6,476	N/A
15	4-Oct-14	65.0	7,306	6,036	5,653	234,920	6,585	N/A
16	4-Oct-14	67.1	7,024	5,810	5,920	236,980	6,512	N/A
17	5-Oct-14	66.0	7,112	289	5,694	204,095	6,491	N/A
18	5-Oct-14	73.0	7,289	5,811	5,456	224,041	6,405	N/A
19	5-Oct-14	72.0	7,314	6,188	5,411	234,110	6,460	N/A
20	5-Oct-14	65.9	7,210	6,556	5,928	232,835	6,433	N/A
21	6-Oct-14	68.5	7,197	5,980	5,766	234,855	6,415	N/A
22	6-Oct-14	65.0	7,430	6,379	5,464	235,424	6,383	N/A
23	6-Oct-14	76.0	7,400	5,773	5,498	234,800	6,388	N/A
24	7-Oct-14	73.0	7,099	5,550	5,328	232,050	6,406	N/A
25	7-Oct-14	66.0	6,890	5,785	5,598	233,624	6,356	N/A
26	7-Oct-14	68.0	6,903	6,234	5,494	232,595	6,333	N/A
27	7-Oct-14	72.0	7,098	5,871	5,426	232,440	6,296	N/A
28	8-Oct-14	70.0	6,979	5,927	5,467	232,874	6,274	N/A
29	8-Oct-14	65.0	7,014	6,132	5,841	233,370	6,240	N/A
30	8-Oct-14	66.0	6,779	5,677	5,573	232,180	6,233	N/A
31	8-Oct-14	65.0	6,938	6,016	5,526	232,820	6,207	N/A
32	9-Oct-14	66.0	6,777	5,725	5,889	232,460	6,190	N/A
33	9-Oct-14	66.0	6,828	5,592	5,781	232,870	6,192	N/A
34	9-Oct-14	68.0	6,872	5,931	5,582	233,705	6,236	N/A
35	9-Oct-14	65.0	6,671	5,878	5,509	233,380	6,112	N/A
36	10-Oct-14	67.0	6,816	5,610	5,663	236,120	6,095	N/A
37	10-Oct-14	66.0	6,995	5,842	5,682	234,425	6,067	N/A
38	10-Oct-14	67.0	7,000	6,141	5,521	234,970	6,062	N/A
39	10-Oct-14	66.0	6,671	6,063	5,630	234,960	6,026	N/A
40	11-Oct-14	66.0	6,734	6,140	5,607	235,940	6,000	N/A
41	11-Oct-14	67.0	6,800	5,947	5,751	234,275	6,014	N/A
42	11-Oct-14	68.0	6,913	6,148	5,871	221,475	5,801	N/A
43	11-Oct-14	69.0	6,945	6,019	5,329	235,160	5,894	N/A
44	11-Oct-14	68.0	6,730	6,746	5,438	231,800	5,947	N/A
45	12-Oct-14	66.0	6,835	6,329	5,752	233,055	6,425	N/A
46	12-Oct-14	67.0	6,742	7,043	5,539	233,605	5,883	N/A
47	12-Oct-14	65.0	6,608	7,117	5,631	231,620	5,872	N/A
48	12-Oct-14	67.0	6,519	6,541	5,522	232,020	5,967	N/A
49	13-Oct-14	65.9	6,808	6,080	5,455	230,810	5,833	N/A
50	13-Oct-14	67.2	6,690	5,835	5,822	228,365	5,797	N/A
51	13-Oct-14	68.1	6,873	6,165	5,786	230,885	5,783	N/A
	AVG=	**67.3**	**7,072**	**6,051**	**5,593**	**11,517,301**	**323,417**	TOTAL

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API 47-017-06435 Farm Name Perine, Junior Well Number Lettie Unit 2H				
EXHIBIT 3				
LITHOLOGY/ FORMATION	**TOP DEPTH (TVD) From Surface**	**BOTTOM DEPTH (TVD) From Surface**	**TOP DEPTH (MD) From Surface**	**BOTTOM DEPTH (MD) From Surface**
Fresh Water	49'	N/A	49'	N/A
Shale	0	29	0	29
Siltstone	29	289	29	289
Siltstone/ Trace Coal	289	449	289	449
Siltstone/ Sandstone	449	649	449	649
Sandy Shale/ Trace Coal	649	669	649	669
Siltstone	669	829	669	829
Limestone/ Coal	829	889	829	889
Siltstone	889	1,269	889	1,269
Sandstone	1,269	1,389	1,269	1,389
Siltstone	1,389	1,469	1,389	1,469
Sandstone	1,469	1,509	1,469	1,509
Limestone/ Siltstone	1,509	1,589	1,509	1,589
Sandstone/ Trace Coal	1,589	1,649	1,589	1,649
Siltstone/ Trace Coal	1,649	1,789	1,649	1,789
Sandstone	1,789	1,909	1,789	1,909
Shale/ Trace Coal	1,909	2,049	1,909	2,049
Siltstone/ Shale	2,049	2,249	2,049	2,249
Big Lime	2,249	2,352	2,249	2,352
Big Injun	2,352	2,581	2,352	2,581
Gantz Sand	2,581	2,676	2,581	2,676
Fifty Foot Sandstone	2,676	2,880	2,676	2,880
Gordon	2,880	3,203	2,880	3,203
Fifth Sandstone	3,203	3,247	3,203	3,247
Bayard	3,247	3,572	3,247	3,572
Warren	3,572	3,857	3,572	3,857
Speechley	3,857	4,060	3,857	4,060
Baltown	4,060	4,676	4,060	4,676
Bradford	4,676	5,178	4,676	5,178
Benson	5,178	5,487	5,178	5,487
Alexander	5,487	5,683	5,487	5,683
Elk	5,683	6,213	5,683	6,213
Rhinestreet	6,213	6,766	6,213	6,788
Sycamore	6,766	6,929	6,788	6,994
Middlesex	6,929	7,080	6,994	7,200
Burkett	7,080	7,110	7,200	7,244
Tully	7,110	7,236	7,244	7,515
Marcellus	7,236	NA	7,515	NA

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Antero Resources

Lettie Unit 2H
Doddridge County WV
Northing: 14238857.81
Easting: 1752529.29
As Drilled

Scientific Drilling

To convert Magnetic North to Grid, Subtract 8.82°
To convert True North to Grid, Subtract 0.25°

Azimuths to Grid North
True North: -0.25°
Magnetic North: -8.82°

Magnetic Field
Strength: 52266.7snT
Dip Angle: 66.75°
Date: 3/7/2014
Model: IGRF2010

WELL DETAILS Lettie Unit 2H
Ground Level: 1270.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14238857.81	1752529.29	39° 12' 38.122 N	80° 36' 15.125 W

SITE DETAILS: Wagner Pad
Site Center: Lettie Unit 1H
Site Centre Northing: 14238847.81
Easting: 1752529.46
Positional Uncertainity: 2.0
Convergence: 0.25
Local North: Grid

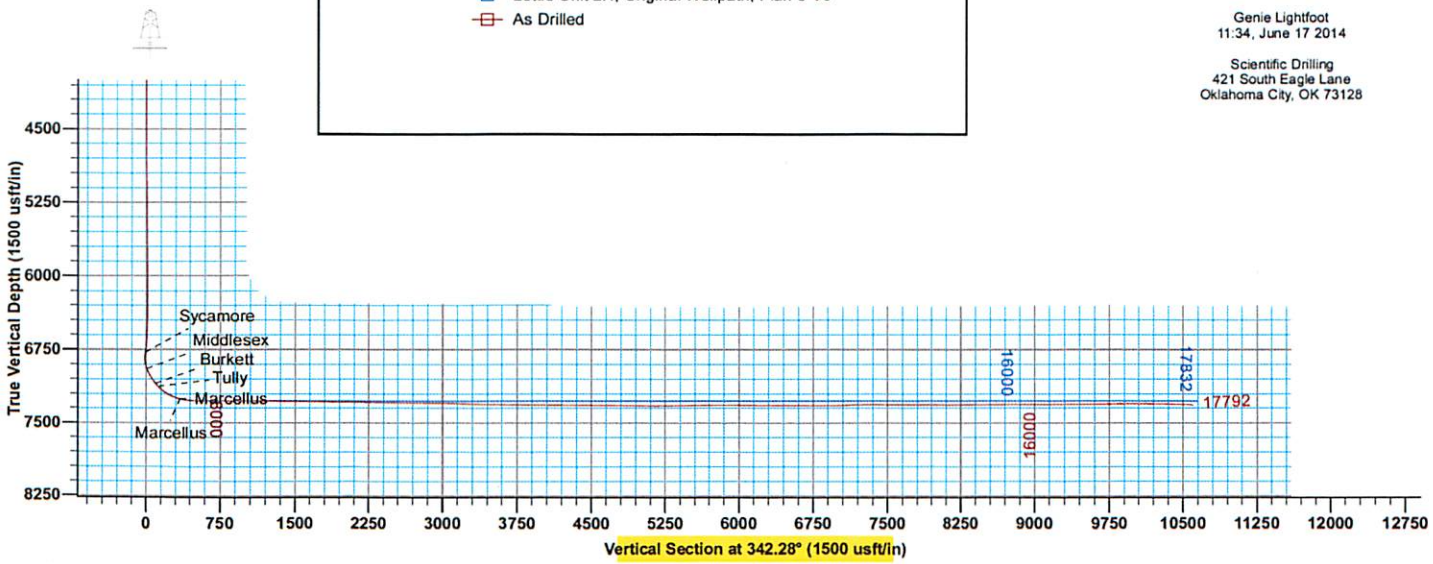
PROJECT DETAILS: Doddridge County WV
Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: Zone 17N (84 W to 78 W)
System Datum: Mean Sea Level

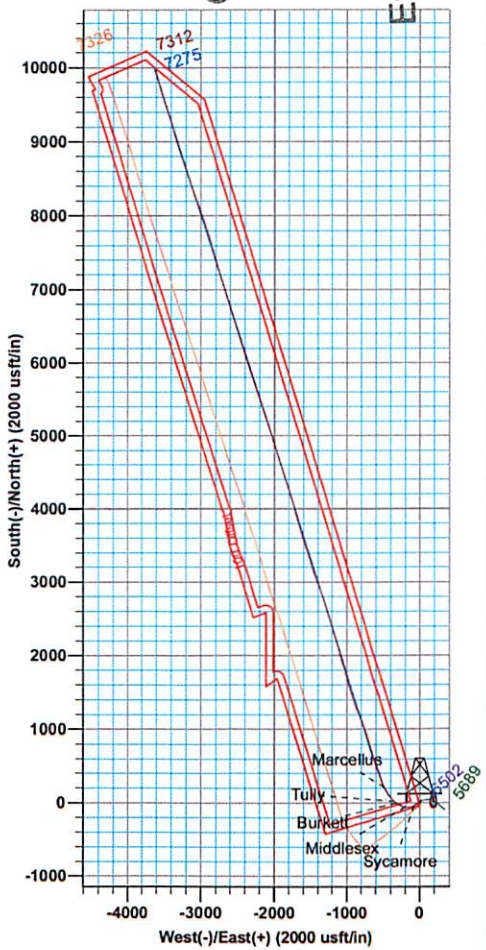
Precision 523: 1270' + 19' RKB @ 1289.0usft
Gr: 1270.0

LEGEND
- Downs Unit 1H, Original Wellpath, As Drilled V0
- Lettie Unit 1H, Original Wellpath, As Drilled V0
- Downs Unit 2H, Original Wellpath, As Drilled V0
- Lettie Unit 2H, Original Wellpath, Plan 6 V0
- As Drilled

Genie Lightfoot
11:34, June 17 2014

Scientific Drilling
421 South Eagle Lane
Oklahoma City, OK 73128





Antero Resources

Doddridge County WV
Wagner Pad : Lettie/Downs/Bolte/Mason/McQuire
Lettie Unit 2H
Original Wellpath

Design: As Drilled

EOW Completion Report

17 June, 2014

Scientific Drilling

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Lettie Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Site:	Wagner Pad : Lettie/Downs/Bolte/Mason/McQuire	**MD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Well:	Lettie Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Project Doddridge County WV, McClellan District

Map System:	Universal Transverse Mercator (US Survey Fee	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Zone 17N (84 W to 78 W)		

Site Wagner Pad : Lettie/Downs/Bolte/Mason/McQuire

Site Position:		**Northing:**	14,238,847.81 usft	**Latitude:**	39° 12' 38.023 N
From:	Map	**Easting:**	1,752,529.46 usft	**Longitude:**	80° 36' 15.124 W
Position Uncertainty:	2.0 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	0.25 °

Well Lettie Unit 2H, Marcellus

Well Position	**+N/-S**	0.0 usft	**Northing:**	14,238,857.81 usft	**Latitude:**	39° 12' 38.122 N
	+E/-W	0.0 usft	**Easting:**	1,752,529.29 usft	**Longitude:**	80° 36' 15.125 W
Position Uncertainty		2.0 usft	**Wellhead Elevation:**	1,289.0 usft	**Ground Level:**	1,270.0 usft

Wellbore Original Wellpath

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/4/2014	-8.57	66.75	52,267

Design As Drilled

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	342.28

Survey Program Date 6/17/2014

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
108.0	6,470.5	Survey #4 Final Gyro (Original Wellpath)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper
6,485.0	17,792.0	Survey #5 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	0.89	270.24	108.0	0.0	-0.8	0.3	0.82
208.0	0.60	272.42	208.0	0.0	-2.1	0.7	0.29
308.0	0.23	241.90	308.0	0.0	-2.8	0.8	0.42
408.0	0.15	256.62	408.0	-0.2	-3.1	0.8	0.09
508.0	0.08	70.78	508.0	-0.2	-3.2	0.8	0.23
608.0	0.09	274.20	608.0	-0.1	-3.2	0.8	0.17
708.0	0.06	275.88	708.0	-0.1	-3.3	0.9	0.03
808.0	0.14	280.91	808.0	-0.1	-3.5	1.0	0.08
908.0	0.14	300.66	908.0	0.0	-3.7	1.1	0.05
1,008.0	0.19	333.52	1,008.0	0.2	-3.9	1.4	0.10

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Lettie Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Site:	Wagner Pad : Lettie/Downs/Bolte/Mason/McQuire	**MD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Well:	Lettie Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,108.0	0.10	18.39	1,108.0	0.4	-4.0	1.6	0.14
1,208.0	0.13	304.62	1,208.0	0.6	-4.0	1.8	0.14
1,308.0	0.16	301.94	1,308.0	0.7	-4.2	2.0	0.03
1,408.0	0.10	49.07	1,408.0	0.8	-4.3	2.1	0.21
1,508.0	0.19	351.99	1,508.0	1.1	-4.3	2.3	0.16
1,608.0	0.17	7.38	1,608.0	1.4	-4.3	2.6	0.05
1,708.0	0.27	61.07	1,708.0	1.6	-4.0	2.8	0.22
1,808.0	0.17	133.61	1,808.0	1.6	-3.7	2.7	0.27
1,908.0	0.23	107.59	1,908.0	1.5	-3.4	2.5	0.11
2,008.0	0.25	146.68	2,008.0	1.2	-3.1	2.1	0.16
2,108.0	0.33	118.62	2,108.0	0.9	-2.7	1.7	0.16
2,208.0	0.26	128.35	2,208.0	0.6	-2.3	1.3	0.09
2,308.0	0.04	140.09	2,308.0	0.5	-2.1	1.1	0.22
2,408.0	0.13	102.69	2,408.0	0.4	-2.0	1.0	0.10
2,508.0	0.24	126.46	2,508.0	0.3	-1.7	0.8	0.13
2,608.0	0.22	175.72	2,608.0	0.0	-1.5	0.4	0.19
2,708.0	0.31	190.09	2,708.0	-0.5	-1.5	0.0	0.11
2,808.0	0.33	200.97	2,808.0	-1.0	-1.7	-0.5	0.06
2,908.0	0.28	206.82	2,908.0	-1.5	-1.9	-0.9	0.06
3,008.0	0.34	219.22	3,008.0	-2.0	-2.2	-1.2	0.09
3,108.0	0.35	228.31	3,108.0	-2.4	-2.6	-1.5	0.06
3,208.0	0.33	213.99	3,208.0	-2.9	-3.0	-1.8	0.09
3,308.0	0.34	206.13	3,308.0	-3.4	-3.3	-2.2	0.05
3,408.0	0.32	209.48	3,408.0	-3.9	-3.6	-2.6	0.03
3,508.0	0.26	229.81	3,508.0	-4.3	-3.9	-2.9	0.12
3,608.0	0.26	237.56	3,608.0	-4.5	-4.2	-3.0	0.04
3,708.0	0.25	237.56	3,708.0	-4.8	-4.6	-3.1	0.01
3,808.0	0.06	269.19	3,808.0	-4.9	-4.9	-3.2	0.20
3,908.0	0.08	227.83	3,908.0	-4.9	-5.0	-3.2	0.05
4,008.0	0.06	319.77	4,008.0	-4.9	-5.1	-3.2	0.10
4,108.0	0.06	273.85	4,108.0	-4.9	-5.1	-3.1	0.05
4,208.0	0.09	35.24	4,208.0	-4.8	-5.1	-3.0	0.13
4,308.0	0.25	57.81	4,308.0	-4.6	-4.9	-2.9	0.17
4,408.0	0.35	66.07	4,408.0	-4.4	-4.4	-2.8	0.11
4,508.0	0.54	58.95	4,508.0	-4.0	-3.8	-2.7	0.20
4,608.0	0.75	45.99	4,607.9	-3.3	-2.9	-2.3	0.25
4,708.0	0.76	40.40	4,707.9	-2.4	-2.0	-1.7	0.07
4,808.0	0.82	28.95	4,807.9	-1.2	-1.2	-0.8	0.17
4,908.0	0.85	24.40	4,907.9	0.1	-0.6	0.2	0.07
5,008.0	0.87	27.10	5,007.9	1.4	0.1	1.3	0.05
5,108.0	0.79	24.86	5,107.9	2.7	0.7	2.4	0.09
5,208.0	0.87	28.10	5,207.9	4.0	1.4	3.4	0.09
5,308.0	0.69	28.96	5,307.9	5.2	2.0	4.3	0.18
5,408.0	0.68	27.35	5,407.9	6.3	2.6	5.2	0.02

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Lettie Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Site:	Wagner Pad : Lettie/Downs/Bolte/Mason/McQuire	**MD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Well:	Lettie Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
5,508.0	0.68	18.33	5,507.9	7.3	3.0	6.1	0.11
5,608.0	0.72	24.50	5,607.9	8.5	3.5	7.0	0.09
5,708.0	0.86	30.90	5,707.8	9.7	4.1	8.0	0.17
5,808.0	0.54	30.92	5,807.8	10.7	4.8	8.8	0.32
5,908.0	0.60	33.36	5,907.8	11.6	5.3	9.4	0.06
6,008.0	0.43	50.85	6,007.8	12.3	5.9	9.9	0.23
6,108.0	0.30	78.78	6,107.8	12.5	6.4	10.0	0.22
6,208.0	0.38	84.69	6,207.8	12.6	7.0	9.9	0.09
6,308.0	0.38	91.71	6,307.8	12.6	7.7	9.7	0.05
6,408.0	0.38	92.29	6,407.8	12.6	8.3	9.5	0.00
6,470.5	0.25	84.77	6,470.3	12.6	8.7	9.4	0.22
6,506.0	2.11	228.22	6,505.8	12.2	8.3	9.1	6.52
6,551.0	7.01	234.13	6,550.7	10.0	5.4	7.9	10.92
6,596.0	12.93	238.24	6,595.0	5.8	-1.1	5.8	13.24
6,641.0	17.65	239.23	6,638.4	-0.4	-11.2	3.1	10.50
6,686.0	22.42	239.56	6,680.6	-8.2	-24.5	-0.4	10.60
6,730.0	27.53	239.24	6,720.5	-17.7	-40.5	-4.5	11.62
6,775.0	33.59	237.89	6,759.2	-29.6	-60.0	-10.0	13.55
6,807.0	36.14	239.68	6,785.5	-39.1	-75.6	-14.2	8.58
Sycamore							
6,820.0	37.18	240.34	6,795.9	-43.0	-82.4	-15.9	8.58
6,865.0	37.02	252.74	6,831.8	-53.7	-107.1	-18.6	16.60
6,909.0	38.04	261.83	6,866.8	-59.6	-133.2	-16.2	12.79
6,954.0	38.95	270.85	6,902.0	-61.4	-161.1	-9.4	12.63
6,999.0	39.73	277.94	6,936.8	-59.2	-189.5	1.3	10.13
7,013.0	40.02	279.57	6,947.6	-57.8	-198.4	5.3	7.72
Middlesex							
7,043.0	40.71	282.98	6,970.4	-54.0	-217.4	14.8	7.72
7,088.0	42.27	288.83	7,004.2	-45.8	-246.1	31.3	9.28
7,133.0	42.82	294.83	7,037.3	-34.5	-274.3	50.6	9.10
7,177.0	43.57	301.12	7,069.4	-20.4	-300.9	72.2	9.93
7,219.0	45.74	306.44	7,099.3	-3.9	-325.4	95.3	10.28
Burkett							
7,222.0	45.90	306.80	7,101.4	-2.7	-327.1	97.0	10.28
7,263.0	48.41	311.45	7,129.3	16.3	-350.4	122.2	10.33
Tully							
7,267.0	48.67	311.88	7,131.9	18.3	-352.6	124.8	10.33
7,312.0	52.41	317.52	7,160.5	42.8	-377.3	155.6	12.75
7,356.0	56.93	320.91	7,186.0	69.9	-400.7	188.6	12.04
7,401.0	62.43	323.85	7,208.7	100.7	-424.4	225.1	13.46
7,446.0	67.38	327.03	7,227.8	134.3	-447.4	264.1	12.72
7,490.0	71.75	330.35	7,243.1	169.5	-468.8	304.1	12.19
7,534.0	76.22	333.31	7,255.3	206.8	-488.8	345.7	12.04
Marcellus							
7,535.0	76.32	333.38	7,255.5	207.6	-489.2	346.7	12.04

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Lettie Unit 2H
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Site:	Wagner Pad : Lettie/Downs/Bolte/Mason/McQuire	**MD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Well:	Lettie Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
7,580.0	80.20	336.68	7,264.7	247.6	-507.8	390.4	11.22
7,625.0	84.24	340.55	7,270.8	289.1	-524.1	434.9	12.38
7,684.0	88.59	343.09	7,274.5	345.0	-542.4	493.7	8.53
7,738.0	89.43	342.83	7,275.4	396.6	-558.2	547.7	1.63
7,774.0	89.80	342.20	7,275.6	430.9	-569.1	583.7	2.03
7,863.0	89.50	342.62	7,276.2	515.8	-595.9	672.7	0.58
7,953.0	90.94	342.13	7,275.8	601.6	-623.2	762.7	1.69
8,042.0	90.67	342.23	7,274.6	686.3	-650.4	851.7	0.32
8,132.0	89.09	342.45	7,274.8	772.0	-677.7	941.7	1.77
8,221.0	89.56	341.56	7,275.8	856.7	-705.2	1,030.7	1.13
8,311.0	89.60	340.76	7,276.5	941.8	-734.3	1,120.7	0.89
8,400.0	89.53	339.14	7,277.2	1,025.4	-764.8	1,209.6	1.82
8,490.0	89.50	337.72	7,277.9	1,109.1	-797.9	1,299.4	1.58
8,579.0	89.39	337.55	7,278.8	1,191.4	-831.7	1,388.1	0.23
8,668.0	88.82	338.75	7,280.2	1,274.0	-864.9	1,476.8	1.49
8,758.0	89.36	340.40	7,281.6	1,358.4	-896.3	1,566.7	1.93
8,847.0	89.53	341.54	7,282.5	1,442.5	-925.3	1,655.7	1.30
8,937.0	89.60	343.00	7,283.1	1,528.2	-952.7	1,745.7	1.62
9,026.0	88.83	343.67	7,284.4	1,613.5	-978.2	1,834.7	1.15
9,116.0	89.33	343.94	7,285.8	1,699.9	-1,003.3	1,924.6	0.63
9,205.0	89.43	344.06	7,286.8	1,785.4	-1,027.8	2,013.6	0.18
9,295.0	89.09	344.01	7,287.9	1,872.0	-1,052.6	2,103.5	0.38
9,385.0	89.19	343.68	7,289.3	1,958.4	-1,077.6	2,193.5	0.38
9,474.0	88.22	343.83	7,291.3	2,043.8	-1,102.5	2,282.4	1.10
9,564.0	89.77	344.57	7,292.9	2,130.4	-1,127.0	2,372.3	1.91
9,653.0	89.60	343.95	7,293.4	2,216.1	-1,151.2	2,461.3	0.72
9,743.0	89.36	343.56	7,294.2	2,302.5	-1,176.3	2,551.3	0.51
9,832.0	89.02	342.26	7,295.4	2,387.5	-1,202.5	2,640.2	1.51
9,922.0	90.33	342.73	7,295.9	2,473.3	-1,229.6	2,730.2	1.55
10,011.0	89.97	341.81	7,295.7	2,558.1	-1,256.7	2,819.2	1.11
10,101.0	89.87	341.82	7,295.8	2,643.6	-1,284.8	2,909.2	0.11
10,190.0	89.43	341.95	7,296.4	2,728.2	-1,312.4	2,998.2	0.52
10,279.0	88.42	340.80	7,298.1	2,812.5	-1,340.8	3,087.2	1.72
10,369.0	87.81	340.23	7,301.0	2,897.3	-1,370.9	3,177.1	0.93
10,458.0	88.35	340.71	7,304.0	2,981.2	-1,400.6	3,266.0	0.81
10,547.0	87.95	340.45	7,306.9	3,065.1	-1,430.2	3,354.9	0.54
10,637.0	88.49	340.43	7,309.7	3,149.8	-1,460.3	3,444.8	0.60
10,726.0	90.23	342.75	7,310.7	3,234.3	-1,488.4	3,533.8	3.26
10,816.0	89.09	341.85	7,311.2	3,320.0	-1,515.7	3,623.8	1.61
10,905.0	89.63	342.73	7,312.2	3,404.8	-1,542.8	3,712.8	1.16
10,995.0	88.86	341.52	7,313.4	3,490.4	-1,570.4	3,802.8	1.59
11,084.0	89.06	339.96	7,315.0	3,574.4	-1,599.8	3,891.7	1.77
11,174.0	89.97	342.85	7,315.7	3,659.7	-1,628.5	3,981.7	3.37
11,263.0	90.07	343.49	7,315.7	3,744.9	-1,654.3	4,070.7	0.73
11,353.0	89.43	344.31	7,316.1	3,831.4	-1,679.2	4,160.7	1.16

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Project:	Doddridge County WV	**TVD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Site:	Wagner Pad : Lettie/Downs/Bolte/Mason/McQuire	**MD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Well:	Lettie Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
11,442.0	89.63	345.15	7,316.8	3,917.2	-1,702.6	4,249.6	0.97
11,532.0	89.03	344.86	7,317.9	4,004.1	-1,725.9	4,339.5	0.74
11,622.0	89.87	345.07	7,318.8	4,091.1	-1,749.3	4,429.4	0.96
11,711.0	90.54	343.09	7,318.4	4,176.6	-1,773.7	4,518.3	2.35
11,801.0	89.87	341.87	7,318.1	4,262.5	-1,800.8	4,608.3	1.55
11,895.0	89.53	342.48	7,318.6	4,351.9	-1,829.6	4,702.3	0.74
11,989.0	88.82	341.34	7,320.0	4,441.3	-1,858.7	4,796.3	1.43
12,084.0	88.12	340.89	7,322.5	4,531.1	-1,889.5	4,891.3	0.88
12,179.0	89.20	341.61	7,324.7	4,621.1	-1,920.0	4,986.2	1.37
12,273.0	90.40	343.90	7,325.0	4,710.8	-1,947.9	5,080.2	2.75
12,368.0	89.63	343.59	7,325.0	4,802.0	-1,974.5	5,175.2	0.87
12,462.0	91.65	343.75	7,324.0	4,892.2	-2,000.9	5,269.1	2.16
12,556.0	91.21	342.47	7,321.6	4,982.2	-2,028.2	5,363.1	1.44
12,650.0	90.74	342.03	7,320.0	5,071.7	-2,056.8	5,457.1	0.68
12,743.0	90.67	341.19	7,318.9	5,159.9	-2,086.2	5,550.1	0.91
12,837.0	89.76	340.11	7,318.5	5,248.6	-2,117.3	5,644.0	1.50
12,931.0	90.34	341.97	7,318.4	5,337.5	-2,147.9	5,738.0	2.07
13,021.0	90.64	341.83	7,317.7	5,423.0	-2,175.8	5,828.0	0.37
13,110.0	90.20	341.99	7,317.0	5,507.6	-2,203.5	5,917.0	0.53
13,200.0	89.83	341.55	7,317.0	5,593.1	-2,231.6	6,007.0	0.64
13,289.0	89.77	341.19	7,317.3	5,677.4	-2,260.0	6,096.0	0.41
13,379.0	89.03	340.78	7,318.3	5,762.5	-2,289.4	6,185.9	0.94
13,469.0	89.70	342.37	7,319.3	5,847.9	-2,317.8	6,275.9	1.92
13,558.0	89.90	342.11	7,319.6	5,932.7	-2,345.0	6,364.9	0.37
13,648.0	90.50	341.36	7,319.2	6,018.1	-2,373.2	6,454.9	1.07
13,738.0	89.97	342.77	7,318.9	6,103.8	-2,400.9	6,544.9	1.67
13,827.0	89.25	341.34	7,319.5	6,188.4	-2,428.3	6,633.9	1.80
13,917.0	89.60	343.19	7,320.4	6,274.1	-2,455.7	6,723.9	2.09
14,007.0	89.90	342.65	7,320.8	6,360.2	-2,482.1	6,813.9	0.69
14,096.0	90.07	342.80	7,320.8	6,445.2	-2,508.6	6,902.9	0.25
14,186.0	90.74	342.21	7,320.2	6,531.0	-2,535.6	6,992.9	0.99
14,276.0	92.86	342.74	7,317.3	6,616.8	-2,562.7	7,082.8	2.43
14,365.0	92.24	343.18	7,313.4	6,701.8	-2,588.8	7,171.7	0.85
14,455.0	90.47	342.79	7,311.3	6,787.8	-2,615.1	7,261.7	2.01
14,545.0	89.52	342.13	7,311.3	6,873.6	-2,642.2	7,351.7	1.29
14,634.0	89.76	343.31	7,311.8	6,958.6	-2,668.7	7,440.7	1.35
14,724.0	89.76	342.81	7,312.2	7,044.7	-2,694.9	7,530.7	0.56
14,813.0	90.13	343.45	7,312.3	7,129.9	-2,720.7	7,619.7	0.83
14,903.0	89.70	344.13	7,312.4	7,216.3	-2,745.8	7,709.6	0.89
14,993.0	89.93	344.50	7,312.7	7,302.9	-2,770.2	7,799.6	0.48
15,082.0	89.97	343.76	7,312.8	7,388.5	-2,794.5	7,888.5	0.83
15,172.0	89.33	343.58	7,313.3	7,474.9	-2,819.8	7,978.5	0.74
15,262.0	89.70	344.55	7,314.1	7,561.4	-2,844.5	8,068.5	1.15
15,351.0	89.53	343.29	7,314.7	7,647.0	-2,869.2	8,157.4	1.43

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Lettie Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Site:	Wagner Pad : Lettie/Downs/Bolte/Mason/McQuire	**MD Reference:**	Precision 523: 1270' + 19' RKB @ 1289.0usft
Well:	Lettie Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
15,441.0	91.08	343.56	7,314.2	7,733.2	-2,894.8	8,247.4	1.75
15,530.0	90.98	342.41	7,312.6	7,818.3	-2,920.9	8,336.4	1.30
15,620.0	90.30	340.66	7,311.6	7,903.7	-2,949.4	8,426.4	2.09
15,710.0	89.60	339.71	7,311.7	7,988.3	-2,979.9	8,516.3	1.31
15,799.0	90.57	340.73	7,311.6	8,072.1	-3,010.0	8,605.2	1.58
15,889.0	90.67	340.80	7,310.6	8,157.0	-3,039.6	8,695.2	0.14
15,978.0	89.66	338.57	7,310.3	8,240.5	-3,070.5	8,784.1	2.75
16,068.0	90.07	339.95	7,310.5	8,324.7	-3,102.4	8,874.0	1.60
16,158.0	90.37	341.57	7,310.2	8,409.6	-3,132.1	8,963.9	1.83
16,248.0	90.03	341.43	7,309.9	8,495.0	-3,160.6	9,053.9	0.41
16,337.0	90.87	341.70	7,309.2	8,579.4	-3,188.8	9,142.9	0.99
16,427.0	89.16	340.73	7,309.2	8,664.6	-3,217.7	9,232.9	2.18
16,517.0	90.07	341.65	7,309.8	8,749.8	-3,246.8	9,322.9	1.44
16,606.0	90.44	342.94	7,309.4	8,834.6	-3,273.8	9,411.9	1.51
16,696.0	89.78	341.51	7,309.2	8,920.3	-3,301.3	9,501.9	1.75
16,786.0	90.77	342.42	7,308.8	9,005.9	-3,329.2	9,591.9	1.49
16,875.0	91.71	345.62	7,306.8	9,091.4	-3,353.7	9,680.8	3.75
16,965.0	91.74	345.07	7,304.1	9,178.4	-3,376.4	9,770.6	0.61
17,055.0	90.81	342.92	7,302.1	9,264.9	-3,401.2	9,860.6	2.60
17,145.0	88.81	341.07	7,302.4	9,350.5	-3,429.0	9,950.5	3.03
17,234.0	90.17	340.73	7,303.2	9,434.6	-3,458.2	10,039.5	1.58
17,324.0	90.13	342.47	7,303.0	9,520.0	-3,486.6	10,129.5	1.93
17,414.0	89.50	344.18	7,303.3	9,606.2	-3,512.4	10,219.5	2.02
17,503.0	89.03	344.60	7,304.4	9,691.9	-3,536.3	10,308.4	0.71
17,593.0	88.79	344.10	7,306.1	9,778.5	-3,560.6	10,398.3	0.62
17,682.0	88.22	344.52	7,308.4	9,864.2	-3,584.7	10,487.3	0.80
17,739.0	87.85	344.32	7,310.4	9,919.1	-3,600.0	10,544.2	0.74
17,792.0	87.85	344.32	7,312.4	9,970.1	-3,614.3	10,597.1	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
6,807.0	6,785.5	-39.1	-75.6	Sycamore
7,013.0	6,947.6	-57.8	-198.4	Middlesex
7,219.0	7,099.3	-3.9	-325.4	Burkett
7,263.0	7,129.3	16.3	-350.4	Tully
7,534.0	7,255.3	206.8	-488.8	Marcellus

Checked By: _____ Approved By: _____ Date: _____

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/29/2014
Job End Date:	10/13/2014
State:	West Virginia
County:	Doddridge
API Number:	47-017-06435-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Lettie Unit 2H
Longitude:	-80.60401700
Latitude:	39.21068100
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	7,325
Total Base Water Volume (gal):	13,583,514
Total Base Non Water Volume:	586,731

FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

Interstate Oil & Gas Compact Commission

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Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Antero Resources	Base Fluid					
			Water	7732-18-5	100.00000	90.43961	
Sand	U.S. Well Services, LLC	Proppant					
			Crystalline Silica, quartz	14808-60-7	100.00000	9.19457	
LGC-15	U.S. Well Services, LLC	Gelling Agents					
			Guar Gum	9000-30-0	50.00000	0.06589	
			Petroleum Distillates	64742-47-8	60.00000	0.06240	
			Suspending agent (solid)	14808-60-7	3.00000	0.01008	
			Surfactant	68439-51-0	3.00000	0.00395	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid					
			Water	7732-18-5	87.50000	0.08439	
			Hydrogen Chloride	7647-01-1	18.00000	0.02016	
WFRA-405	U.S. Well Services, LLC	Friction Reducer					
			Anionic Polyacrylamide	Proprietary	40.00000	0.02754	
			Water	7732-18-5	40.00000	0.02754	
			Petroleum Distillates	64742-47-8	40.00000	0.02217	
			Crystalline Salt	12125-02-9	5.00000	0.00344	

			Ethoxylated alcohol blend	Proprietary	5.00000	0.00344	
SI-1100	U.S. Well Services	Scale Inhibitor					
			Di Water	7732-18-5	80.00000	0.01061	
			Ethylene Glycol	107-21-1	40.00000	0.00599	
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00179	
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00171	
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00166	
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00157	
			bis (hexamethylene) tramine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00153	
			Acrylic polymer	52255-49-9	5.00000	0.00066	
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent					
			2,2-dibromo-3-nitrilopropionamide	10222-01-2	20.00000	0.00462	
			Deionized Water	7732-18-5	28.00000	0.00264	
AP One	U.S. Well Services, LLC	Gel Breakers					
			Ammonium Persulfate	7727-54-0	100.00000	0.00171	
AI-301	U.S. Well Services, LLC	Acid Corrosion Inhibitors					
			Diethylene Glycol	111-46-6	30.00000	0.00013	
			Methenamine	100-97-0	20.00000	0.00010	
			Hydrogen Chloride	7647-01-0	10.00000	0.00004	
			Polyethylene polyamine	68603-67-8	10.00000	0.00004	
			Coco amine	61791-14-8	5.00000	0.00002	

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

* Total Water Volume sources may include fresh water, produced water, and/or recycled water
** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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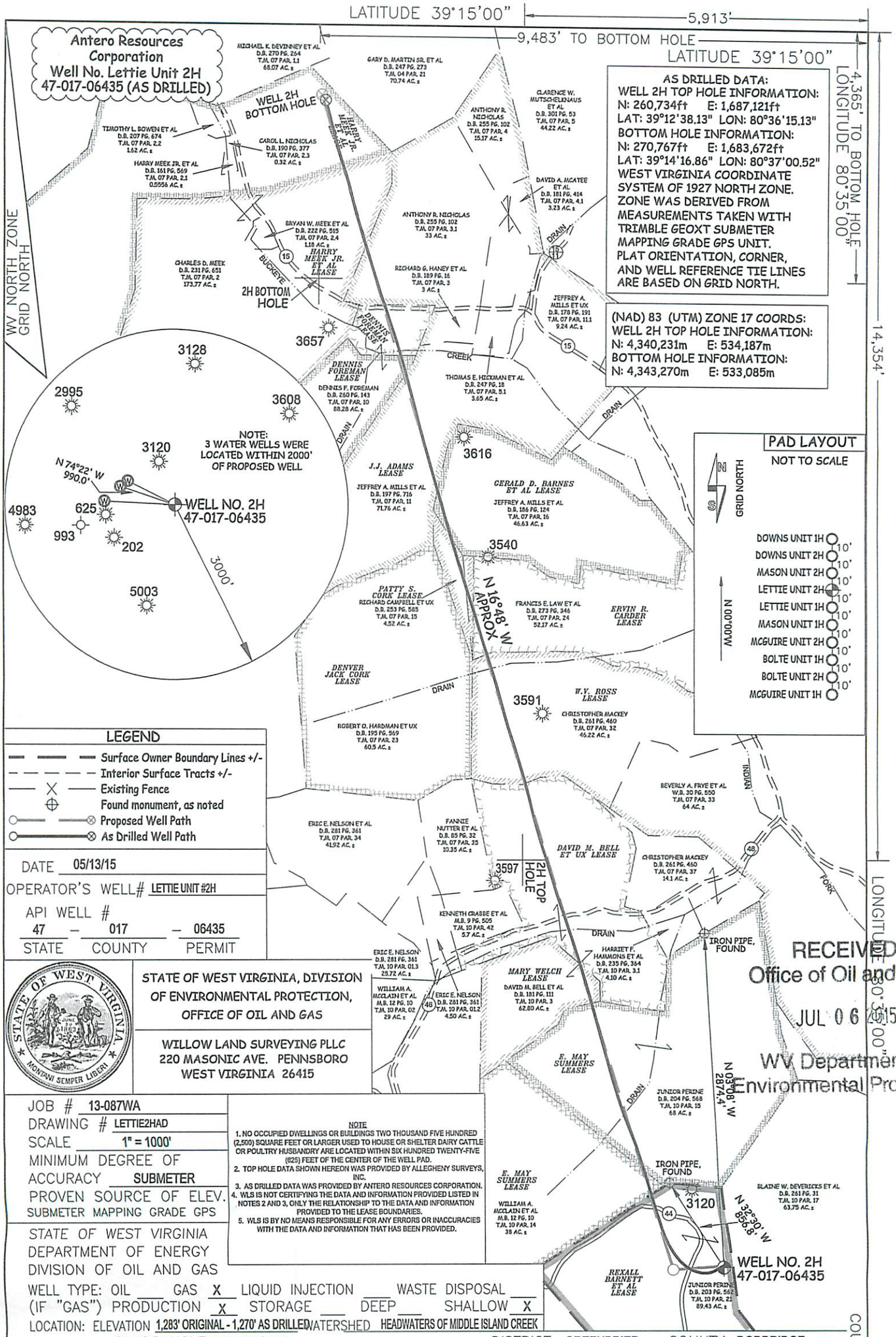

AS DRILLED DATA:
WELL 2H TOP HOLE INFORMATION:
N: 260,734ft E: 1,687,121ft
LAT: 39°12'38.13" LON: 80°36'15.13"
BOTTOM HOLE INFORMATION:
N: 270,767ft E: 1,683,672ft
LAT: 39°14'16.86" LON: 80°37'00.52"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
N: 4,340,231m E: 534,187m
BOTTOM HOLE INFORMATION:
N: 4,343,270m E: 533,085m

PAD LAYOUT
NOT TO SCALE
GRID NORTH
N 00°00'W
DOWNS UNIT 1H
DOWNS UNIT 2H
MASON UNIT 2H
LETTIE UNIT 2H
LETTIE UNIT 1H
MASON UNIT 1H
MCGUIRE UNIT 2H
BOLTE UNIT 1H
BOLTE UNIT 2H
MCGUIRE UNIT 1H
10'

LEGEND
- Surface Owner Boundary Lines +/-
- Interior Surface Tracts +/-
- Existing Fence
- Found monument, as noted
- Proposed Well Path
- As Drilled Well Path

DATE 05/13/15
OPERATOR'S WELL# LETTIE UNIT #2H
API WELL # 47 – 017 – 06435
STATE COUNTY PERMIT

STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26415

JOB # 13-087WA
DRAWING # LETTIE2HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

NOTE
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.
2. TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY ALLEGHENY SURVEYS, INC.
3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
4. WLS IS NOT CERTIFYING THE DATA AND INFORMATION PROVIDED LISTED IN NOTES 2 AND 3, ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LEASE BOUNDARIES.
5. WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,283' ORIGINAL - 1,270' AS DRILLED WATERSHED HEADWATERS OF MIDDLE ISLAND CREEK
QUADRANGLE BIG ISSAC 7.5' DISTRICT GREENBRIER COUNTY DODDRIDGE
SURFACE OWNER JUNIOR PERINE ACREAGE 89.43 ACRES +/-
OIL & GAS ROYALTY OWNER REXALL BARNETT ET AL; E. MAY SUMMERS; E. MAY SUMMERS; MARY WELCH; DAVID M. BELL ET UX; W.V. ROSS; ERVIN R. CARDER; PATTY S. CORK; GERALD D. BARNES ET AL; J.J. ADAMS; DENNIS FOREMAN; DENNIS FOREMAN; HARRY H. MEEK JR. ET AL; HARRY H. MEEK JR. ET AL LEASE ACREAGE 81.4 AC±; 38 AC±; 68 AC±; 15.6 AC±; 47.2 AC±; 132 AC±; 52.2 AC±; 4.52 AC±; 46.5 AC±; 136.3 AC±; 46 AC±; 5.4179 AC±; 96 AC±; 80 AC±
PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE ___
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE IN WELL (SPECIFY) (X) AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,312' TVD 17,792' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM
DENVER, CO 80202 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

COUNTY NAME PERMIT

FORM WW-6

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State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 017 - 6458 County DODDRIDGE District WEST UNION
Quad OXFORD 7.5' Pad Name OXFORD 157 Field/Pool Name
Farm name JUSTIN L. HENDERSON ET AL Well Number 513144
Operator (as registered with the OOG) EQT Production Company
Address 625 Liberty Ave. EQT Plaza, Suite 1700 City Pittsburgh State PA Zip 15222

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey

Top hole	Northing	4,343,012	Easting	520,179
Landing Point of Curve	Northing	4,343,048	Easting	520,023
Bottom Hole	Northing	4,344,139	Easting	519,492

Elevation (ft) 968 GL Type of Well ■New □ Existing Type of Report ■Interim □Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep □ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine □Gas □ NGL □ Oil ■ Other w/o Flowback
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air □ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Water base Mud 12.5 ppg barium sulfate, sodium chloride, xanthan gum, polyanionic cellulose, modified starch, sodium hydroxide, phosphonates and alkyl phophates, glutaraldehyde solution, calcium hydroxide, partially hydrolyzed polyacrylamide/polyacrylate, potassium chloride, sodium carbonate, ground walnut shells, alcohol and modified fatty acid, ferrochrome lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 04/18/2014 Date drilling commenced 08/18/2014 Date drilling ceased 12/10/2014
Date completion activities began 4/13/2015 Date completion activities ceased 4/18/2015
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 144 Open mine(s) (Y/N) depths N
Salt water depth(s) ft - Void(s) encountered (Y/N) depths N
Coal depth(s) ft 351 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

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JK - 7/24/15

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API 47- 017 - 6458 Farm name JUSTIN L. HENDERSON ET AL Well number 513144

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	63'	NEW	A-500 40LB/FT	None	Y
Surface	17.5"	13.375"	943'	NEW	J-55 54.5LB/FT	None	Y
Coal							
Intermediate 1	12.375"	9.625"	5,064'	NEW	P-110 40LB/FT	1418', 2937', 3689'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	10,725'	NEW	P-110 20LB/FT	None.	N
Tubing							
Packer type and depth set							

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	62	15.6	1.18	73.16	0	8
Surface	CLASS A	790	15.6	1.19	940.1	0	8
Coal							
Intermediate 1	CLASS A / CLASS A	375 / 340	14.2 / 15.6	1.28 /1.18	881.2	0	8
Intermediate 2							
Intermediate 3							
Production	CLASS A / CLASS H	305 / 530	14.2 / 15.2	1.26 / 1.97	1392	4,486	72
Tubing							

Drillers TD (ft) 10,738' Loggers TD (ft) 6486'

Deepest formation penetrated Marcellus Plug back to (ft) 5019'

Plug back procedure Pumped isolation plug # 1 with 2 bbls H2O, 42 3 bbls of 14 2 ppg cmt, 2 bbls H2O, Trip out of hole to @ 5250', Pump isolation plug # 2 with 2 bbls H2O, 40 5 bbls (sks 210 and 1 28 yield) of 14 2 ppg cmt, 2 bbls H2O, Trip out of hole to @ 4850', pump kickoff plug with 2 bbls H2O, 32.2 bbls cmt (sks 165 and 1.12 yield) @ 16.0 ppg, Plugcem, 2 bbls H20, Trip out of hole @ 4500' pump 20 bbls H2O.

Kick off depth (ft) 5,147

Check all wireline logs run ■ caliper ■ density ■ deviated/directional ■ induction
■ neutron ■ resistivity ■ gamma ray ■ temperature □ sonic

Well cored □ Yes ■ No □ Conventional □ Sidewall Were cuttings collected ■ Yes □ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING
CONDUCTOR- NONE
SURFACE- 111', 484', 899'
INTERMEDIATE- 85', 584', 1,085', 1,585', 2,085', 2,585', 3,104', 3,606', 4,104', 4,603', 5,062'
PRODUCTION- Composite body centralizers every Jt from 4,545 to bottom'

WAS WELL COMPLETED AS SHOT HOLE □ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? □ Yes ■ No DETAILS

WERE TRACERS USED □ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 017 - 6458 Farm name JUSTIN L. HENDERSON ET AL Well number 513144

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
					Please See Attached

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
						Please	See	Attached

Please insert additional pages as applicable.

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API 47- 017 - 6458 Farm name JUSTIN L. HENDERSON ET AL Well number 513144

PRODUCING FORMATION(S)	DEPTHS	
Marcellus	6361' TVD	6,681' MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ☐ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW Gas _____ mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd GAS MEASURED BY ☐ Estimated ☐ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		

Please insert additional pages as applicable.

Drilling Contractor ALPHA HUNTER DRILLING (RIG 4)
Address P.O. BOX 430 City RENO State OH Zip 45773

Logging Company HOSSCO SERVICES, LLC
Address 614 TROTTERS LANE City CHARLESTON State WV Zip 25312

Cementing Company NABORS CEMENTING SERVICES
Address 2504 SMITH CREEK ROAD City WAYNESBURG State PA Zip 15370

Stimulating Company Keane
Address 2121 Sage Road City Houston State TX Zip 77056

Please insert additional pages as applicable.

Completed by Jim Helmick Telephone 412-395-5518
Signature _____ Title VP Completions Date 7/2/2015

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Office of Oil & Gas
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Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

WR-35
Rev. 8/23/13

Page ___ of ___

API 47- 017 - 6458 Farm name JUSTIN L. HENDERSON ET AL Well number 513144

Drilling Contractor Patterson UTI
Address 207 Carlton Drive City Eighty Four State PA Zip 15330

Logging Company GYRODATA
Address 601 MAYER ST City BRIDGEVILLE State PA Zip 15017

Logging Company WEATHERFORD
Address P.O. BOX 200698 City DALLAS State TX Zip 75320

Cementing Company NABORS CEMENTING SERVICES
Address 2504 SMITH CREEK ROAD City WAYNESBURG State PA Zip 15370

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Formation	Top (ft TVD)	Bottom (ft TVD)
FRESH WATER ZONE	1	154
SAND/SHALE	1	347
PITTSBURGH COAL SEAM	347	351
SAND/SHALE	351	1,599.00
BIG LIME	1,599.00	1,884.00
WEIR	1,884.00	2,089.00
BEREA	2,089.00	2,093.00
GANTZ	2,093.00	2,204.00
50F	2,204.00	2,294.00
30F	2,294.00	2,349.00
GORDON	2,349.00	2,438.00
4TH	2,438.00	2,660.00
BAYARD	2,660.00	2,933.00
WARREN	2,933.00	3,010.00
SPEECHLEY	3,010.00	3,499.00
BALLTOWN A	3,499.00	4,146.00
RILEY	4,146.00	4,596.00
BENSON	4,596.00	4,849.00
ALEXANDER	4,849.00	6,006.10
SONYEA	6,006.10	6,140.10
MIDDLESEX	6,140.10	6,196.60
GENESEE	6,196.60	6,268.70
GENESEO	6,268.70	6,309.90
TULLY	6,309.90	6,337.30
HAMILTON	6,337.30	6,360.50
MARCELLUS	6,360.50	

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EQT Production - Marcellus

Doddridge County, WV Grid
Doddridge County 513144
Well #513144

Main Wellbore

Design: 513144 As Drilled Surveys

Standard Survey Report

13 December, 2014

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Office of Oil & Gas
JUL 06 2015

Phoenix Technologies

Survey Report

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Doddridge County 513144
Company:	EQT Production - Marcellus	**TVD Reference:**	KB 23 ft @ 991.0usft
Project:	Doddridge County, WV Grid	**MD Reference:**	KB 23 ft @ 991.0usft
Site:	Doddridge County 513144	**North Reference:**	Grid
Well:	Well #513144	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513144 As Drilled Surveys		

Project Doddridge County, WV Grid

Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	West Virginia North 4701		Using geodetic scale factor

Site Doddridge County 513144

Site Position:		**Northing:**	270,627.70 usft	**Latitude:**	39.24
From:	Map	**Easting:**	1,641,308.60 usft	**Longitude:**	-80.77
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	-0.81 °

Well Well #513144

Well Position	**+N/-S**	0.0 usft	**Northing:**	270,627.70 usft	**Latitude:**	39° 14' 9.931 N
	+E/-W	0.0 usft	**Easting:**	1,641,308.60 usft	**Longitude:**	80° 45' 58.871 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	968.0 usft

Wellbore Main Wellbore

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	11/24/2014	-8.49	66.73	52,212

Design 513144 As Drilled Surveys

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	329.56

Survey Program Date 12/13/2014

From ()	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	5,110.0	513144 Gyrodata Gyros (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop
0.00	10,737.0	513144 PHX MWD (Main Wellbore)	MWD+IGRF	MWD+IGRF v3:standard declination

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	-991.0	0.0	0.0	0.0	0.00	0.00	0.00
110.0	0.18	2.84	110.0	-881.0	0.2	0.0	0.1	0.16	0.16	0.00
210.0	0.04	43.80	210.0	-781.0	0.4	0.0	0.3	0.15	-0.14	40.96
310.0	0.05	38.03	310.0	-681.0	0.4	0.1	0.3	0.01	0.01	[illegible]
410.0	0.05	305.53	410.0	-581.0	0.5	0.1	0.4	0.07	0.00	-92.50
510.0	0.08	253.41	510.0	-481.0	0.5	0.0	0.4	0.06	0.03	-52.12
610.0	0.08	251.79	610.0	-381.0	0.4	-0.2	0.5	0.00	0.00	[illegible]
710.0	0.08	259.80	710.0	-281.0	0.4	-0.3	0.5	0.01	0.00	8.01

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JUL 06 2015

Phoenix Technologies

Survey Report

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Doddridge County 513144
Company:	EQT Production - Marcellus	**TVD Reference:**	KB 23 ft @ 991.0usft
Project:	Doddridge County, WV Grid	**MD Reference:**	KB 23 ft @ 991.0usft
Site:	Doddridge County 513144	**North Reference:**	Grid
Well:	Well #513144	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513144 As Drilled Surveys		

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
810.0	0.09	237.28	810.0	-181.0	0.3	-0.4	0.5	0.03	0.01	-22.52
910.0	0.08	242.41	910.0	-81.0	0.3	-0.6	0.5	0.01	-0.01	5.13
1,010.0	0.54	232.36	1,010.0	19.0	0.0	-1.0	0.5	0.46	0.46	-10.05
1,110.0	0.96	237.11	1,110.0	119.0	-0.8	-2.1	0.4	0.42	0.42	4.75
1,210.0	1.00	240.46	1,210.0	219.0	-1.7	-3.5	0.3	0.07	0.04	3.35
1,310.0	1.06	239.71	1,310.0	319.0	-2.6	-5.1	0.4	0.06	0.06	-0.75
1,410.0	1.02	248.23	1,409.9	418.9	-3.4	-6.7	0.5	0.16	-0.04	8.52
1,510.0	0.95	256.80	1,509.9	518.9	-3.9	-8.3	0.9	0.16	-0.07	8.57
1,610.0	0.90	257.50	1,609.9	618.9	-4.2	-9.9	1.4	0.05	-0.05	0.70
1,710.0	0.84	258.72	1,709.9	718.9	-4.6	-11.4	1.8	0.06	-0.06	1.22
1,810.0	0.66	256.90	1,809.9	818.9	-4.8	-12.7	2.3	0.18	-0.18	-1.82
1,910.0	0.62	254.91	1,909.9	918.9	-5.1	-13.8	2.6	0.05	-0.04	-1.99
2,010.0	0.57	251.71	2,009.9	1,018.9	-5.4	-14.8	2.8	0.06	-0.05	-3.20
2,110.0	0.51	250.50	2,109.9	1,118.9	-5.7	-15.7	3.0	0.06	-0.06	-1.21
2,210.0	0.48	251.73	2,209.9	1,218.9	-6.0	-16.5	3.2	0.03	-0.03	1.23
2,310.0	0.39	248.60	2,309.9	1,318.9	-6.2	-17.2	3.3	0.09	-0.09	-3.13
2,410.0	0.41	248.09	2,409.9	1,418.9	-6.5	-17.8	3.4	0.02	0.02	-0.51
2,510.0	0.37	247.61	2,509.9	1,518.9	-6.8	-18.5	3.5	0.04	-0.04	-0.48
2,610.0	0.25	232.82	2,609.9	1,618.9	-7.0	-18.9	3.5	0.14	-0.12	-14.79
2,710.0	0.26	235.66	2,709.9	1,718.9	-7.3	-19.3	3.5	0.02	0.01	2.84
2,810.0	0.22	223.08	2,809.9	1,818.9	-7.5	-19.6	3.4	0.07	-0.04	-12.58
2,910.0	0.26	213.19	2,909.9	1,918.9	-7.9	-19.9	3.3	0.06	0.04	-9.89
3,010.0	0.25	217.10	3,009.9	2,018.9	-8.2	-20.1	3.1	0.02	-0.01	3.91
3,110.0	0.21	224.47	3,109.9	2,118.9	-8.5	-20.4	3.0	0.05	-0.04	7.37
3,210.0	0.20	224.11	3,209.9	2,218.9	-8.8	-20.6	2.9	0.01	-0.01	-0.36
3,310.0	0.19	210.22	3,309.9	2,318.9	-9.1	-20.8	2.7	0.05	-0.01	-13.89
3,410.0	0.19	205.91	3,409.9	2,418.9	-9.4	-21.0	2.6	0.01	0.00	-4.31
3,510.0	0.20	201.18	3,509.9	2,518.9	-9.7	-21.1	2.4	0.02	0.01	-4.73
3,610.0	0.23	208.24	3,609.9	2,618.9	-10.0	-21.3	2.2	0.04	0.03	7.06
3,710.0	0.32	238.82	3,709.9	2,718.9	-10.3	-21.6	2.0	0.17	0.09	30.58
3,810.0	0.50	263.11	3,809.9	2,818.9	-10.5	-22.3	2.2	0.25	0.18	24.29
3,910.0	0.68	274.91	3,909.8	2,918.8	-10.5	-23.3	2.7	0.22	0.18	11.80
4,010.0	0.86	283.42	4,009.8	3,018.8	-10.3	-24.6	3.6	0.21	0.18	8.51
4,110.0	1.00	289.02	4,109.8	3,118.8	-9.8	-26.2	4.8	0.17	0.14	5.60
4,210.0	1.16	291.78	4,209.8	3,218.8	-9.2	-28.0	6.2	0.17	0.16	2.76
4,310.0	1.39	300.10	4,309.8	3,318.8	-8.2	-30.0	8.1	0.29	0.23	8.32
4,410.0	1.54	304.23	4,409.8	3,418.8	-6.8	-32.1	10.4	0.18	0.15	4.13
4,510.0	1.74	309.52	4,509.7	3,518.7	-5.1	-34.4	13.0	0.25	0.20	5.29
4,610.0	1.87	310.88	4,609.7	3,618.7	-3.1	-36.8	16.0	0.14	0.13	1.36
4,710.0	2.01	315.59	4,709.6	3,718.6	-0.8	-39.3	19.2	0.21	0.14	4.72
4,810.0	2.31	316.33	4,809.5	3,818.5	2.0	-41.9	22.9	0.30	0.30	0.74
4,910.0	2.81	322.92	4,909.4	3,918.4	5.4	-44.7	27.3	0.58	0.50	6.59

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Phoenix Technologies

Survey Report

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Doddridge County 513144
Company:	EQT Production - Marcellus	**TVD Reference:**	KB 23 ft @ 991.0usft
Project:	Doddridge County, WV Grid	**MD Reference:**	KB 23 ft @ 991.0usft
Site:	Doddridge County 513144	**North Reference:**	Grid
Well:	Well #513144	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513144 As Drilled Surveys		

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Top of Elks @4950' TVD										
4,950.6	2.87	323.15	4,950.0	3,959.0	7.0	-46.0	29.3	0.14	0.14	0.56
Int. csg pt @5000' TVD										
5,000.7	2.94	323.41	5,000.0	4,009.0	9.0	-47.5	31.8	0.14	0.14	0.53
5,010.0	2.95	323.46	5,009.3	4,018.3	9.4	-47.8	32.3	0.14	0.14	0.52
Gyro Tie In=5110' MD										
5,110.0	2.95	328.70	5,109.2	4,118.2	13.7	-50.6	37.4	0.27	0.00	5.24
5,157.0	1.90	0.10	5,156.1	4,165.1	15.5	-51.3	39.3	3.52	-2.23	66.81
5,188.0	2.60	92.10	5,187.1	4,196.1	16.0	-50.5	39.4	10.56	2.26	296.77
5,219.0	6.20	118.20	5,218.0	4,227.0	15.1	-48.4	37.6	13.00	11.61	84.19
5,251.0	9.40	130.00	5,249.7	4,258.7	12.6	-44.8	33.6	11.13	10.00	36.88
5,282.0	11.60	141.10	5,280.2	4,289.2	8.6	-40.9	28.1	9.61	7.10	35.81
5,314.0	13.80	151.20	5,311.4	4,320.4	2.7	-37.1	21.1	9.74	6.88	31.56
5,345.0	15.60	161.70	5,341.4	4,350.4	-4.5	-34.0	13.4	10.35	5.81	33.87
5,377.0	17.20	170.60	5,372.1	4,381.1	-13.2	-31.9	4.8	9.30	5.00	27.81
5,408.0	19.00	177.30	5,401.6	4,410.6	-22.8	-30.9	-4.0	8.87	5.81	21.61
5,439.0	21.00	184.20	5,430.7	4,439.7	-33.4	-31.1	-13.0	9.97	6.45	22.26
5,471.0	23.00	189.10	5,460.4	4,469.4	-45.3	-32.5	-22.6	8.48	6.25	15.31
5,502.0	25.80	192.30	5,488.6	4,497.6	-57.8	-34.9	-32.2	9.99	9.03	10.32
5,534.0	28.80	193.60	5,517.1	4,526.1	-72.1	-38.2	-42.9	9.56	9.38	4.06
5,566.0	31.40	194.50	5,544.7	4,553.7	-87.7	-42.1	-54.3	8.25	8.13	2.81
5,597.0	35.00	195.50	5,570.7	4,579.7	-104.1	-46.5	-66.2	11.75	11.61	3.23
5,628.0	34.00	197.50	5,596.2	4,605.2	-120.9	-51.4	-78.2	4.87	-3.23	6.45
5,660.0	31.50	198.80	5,623.1	4,632.1	-137.4	-56.8	-89.7	8.12	-7.81	4.06
5,691.0	27.80	201.70	5,650.1	4,659.1	-151.8	-62.1	-99.4	12.80	-11.94	9.35
5,722.0	25.00	205.50	5,677.8	4,686.8	-164.4	-67.6	-107.5	10.55	-9.03	12.26
5,753.0	22.90	207.30	5,706.2	4,715.2	-175.7	-73.2	-114.4	7.17	-6.77	5.81
5,785.0	21.90	210.60	5,735.7	4,744.7	-186.3	-79.1	-120.6	5.02	-3.13	10.31
5,816.0	22.10	214.00	5,764.5	4,773.5	-196.1	-85.3	-125.9	4.16	0.65	10.97
5,848.0	22.00	216.70	5,794.2	4,803.2	-205.9	-92.2	-130.8	3.18	-0.31	8.44
5,879.0	22.70	221.50	5,822.8	4,831.8	-215.1	-99.7	-134.9	6.30	2.26	15.48
5,911.0	23.50	228.70	5,852.3	4,861.3	-223.9	-108.6	-138.1	9.17	2.50	22.50
5,942.0	24.00	236.40	5,880.6	4,889.6	-231.5	-118.5	-139.6	10.13	1.61	24.84
5,974.0	24.00	247.90	5,909.9	4,918.9	-237.5	-129.9	-139.0	14.60	0.00	35.94
6,005.0	24.00	257.80	5,938.2	4,947.2	-241.2	-141.9	-136.1	12.98	0.00	31.94
6,037.0	24.70	265.50	5,967.4	4,976.4	-243.1	-154.9	-131.1	10.15	2.19	24.06
6,068.0	26.50	273.10	5,995.4	5,004.4	-243.3	-168.3	-124.5	12.07	5.81	24.52
6,100.0	28.40	278.70	6,023.8	5,032.8	-241.7	-183.0	-115.7	10.01	5.94	17.50
6,131.0	30.10	283.50	6,050.8	5,059.8	-238.8	-197.8	-105.7	9.34	5.48	15.48
513145 LP										
6,162.0	32.00	289.50	6,077.4	5,086.4	-234.3	-213.1	-94.0	11.71	6.13	19.35
6,194.0	33.90	294.60	6,104.2	5,113.2	-227.7	-229.2	-80.2	10.50	5.94	15.94
6,225.0	35.80	298.60	6,129.7	5,138.7	-219.8	-245.1	-65.3	9.59	6.13	12.90
6,257.0	38.50	302.60	6,155.2	5,164.2	-209.9	-261.7	-48.4	11.32	8.44	12.50

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Phoenix Technologies

Survey Report

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Doddridge County 513144
Company:	EQT Production - Marcellus	**TVD Reference:**	KB 23 ft @ 991.0usft
Project:	Doddridge County, WV Grid	**MD Reference:**	KB 23 ft @ 991.0usft
Site:	Doddridge County 513144	**North Reference:**	Grid
Well:	Well #513144	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513144 As Drilled Surveys		

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,289.0	41.60	305.60	6,179.7	5,188.7	-198.4	-278.7	-29.8	11.41	9.69	9.38
6,321.0	44.50	308.00	6,203.1	5,212.1	-185.3	-296.2	-9.7	10.41	9.06	7.50
6,352.0	48.30	310.70	6,224.4	5,233.4	-171.0	-313.5	11.4	13.78	12.26	8.71
6,384.0	51.80	313.40	6,245.0	5,254.0	-154.6	-331.7	34.8	12.71	10.94	8.44
6,415.0	54.60	316.30	6,263.5	5,272.5	-137.1	-349.3	58.8	11.73	9.03	9.35
6,447.0	57.90	320.10	6,281.3	5,290.3	-117.2	-367.0	84.8	14.27	10.31	11.88
6,478.0	61.20	323.50	6,297.0	5,306.0	-96.2	-383.5	111.3	14.24	10.65	10.97
6,510.0	64.50	325.40	6,311.6	5,320.6	-73.1	-400.1	139.7	11.59	10.31	5.94
6,541.0	67.00	326.70	6,324.4	5,333.4	-49.6	-415.9	167.9	8.92	8.06	4.19
6,573.0	69.30	328.10	6,336.3	5,345.3	-24.6	-431.9	197.6	8.26	7.19	4.38
6,605.0	70.60	329.70	6,347.3	5,356.3	1.1	-447.4	227.6	6.21	4.06	5.00
6,636.0	71.40	331.50	6,357.3	5,366.3	26.7	-461.8	256.9	6.07	2.58	5.81
6,668.0	72.80	333.20	6,367.2	5,376.2	53.6	-475.9	287.3	6.69	4.38	5.31
Top of Marcellus @6371' TVD										
6,681.2	73.61	333.54	6,371.0	5,380.0	64.9	-481.6	300.0	6.61	6.13	2.60
6,699.0	74.70	334.00	6,375.9	5,384.9	80.3	-489.1	317.0	6.61	6.13	2.57
513144 LP 341' VS										
6,727.2	76.64	334.35	6,382.8	5,391.8	104.9	-501.0	344.3	6.98	6.87	1.25
6,731.0	76.90	334.40	6,383.7	5,392.7	108.2	-502.6	347.9	6.98	6.88	1.24
513144 Plat LP										
6,755.0	78.84	334.56	6,388.7	5,397.7	129.4	-512.7	371.3	8.09	8.06	0.65
6,762.0	79.40	334.60	6,390.1	5,399.1	135.6	-515.7	378.2	8.09	8.06	0.64
6,794.0	84.00	335.50	6,394.7	5,403.7	164.3	-529.1	409.7	14.64	14.38	2.81
513144 LP 412' VS										
6,796.3	84.16	335.49	6,394.9	5,403.9	166.3	-530.0	411.9	6.90	6.87	-0.63
513144 LP 416' VS										
6,799.9	84.41	335.46	6,395.3	5,404.3	169.7	-531.5	415.5	6.90	6.87	-0.63
6,826.0	86.20	335.30	6,397.4	5,406.4	193.3	-542.3	441.4	6.90	6.88	-0.62
513144 LP 459' VS										
6,843.9	87.81	334.78	6,398.4	5,407.4	209.5	-549.8	459.1	9.49	9.03	-2.91
6,857.0	89.00	334.40	6,398.7	5,407.7	221.3	-555.5	472.2	9.49	9.03	-2.90
6,869.0	89.60	333.90	6,398.9	5,407.9	232.1	-560.7	484.2	6.51	5.00	-4.17
LP=6888' MD/6399' TVD										
6,888.0	89.80	333.40	6,399.0	5,408.0	249.1	-569.1	503.1	2.83	1.05	-2.63
6,983.0	91.10	334.40	6,398.2	5,407.2	334.5	-610.9	597.9	1.73	1.37	1.05
7,077.0	88.70	335.00	6,398.4	5,407.4	419.4	-651.1	691.5	2.63	-2.55	0.64
7,172.0	86.60	335.70	6,402.3	5,411.3	505.7	-690.7	785.9	2.33	-2.21	0.74
7,267.0	86.20	335.10	6,408.2	5,417.2	591.9	-730.2	880.2	0.76	-0.42	-0.63
7,361.0	86.10	336.40	6,414.6	5,423.6	677.4	-768.7	973.5	1.38	-0.11	1.38
7,456.0	88.90	335.00	6,418.7	5,427.7	763.9	-807.7	1,067.8	3.29	2.95	-1.47
7,550.0	90.90	332.40	6,418.9	5,427.9	848.2	-849.4	1,161.6	3.49	2.13	-2.77
7,645.0	91.10	332.10	6,417.2	5,426.2	932.2	-893.6	1,256.4	0.38	0.21	-0.32
7,739.0	91.20	334.30	6,415.3	5,424.3	1,016.1	-936.0	1,350.2	2.34	0.11	2.34

Phoenix Technologies

Survey Report

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Doddridge County 513144
Company:	EQT Production - Marcellus	**TVD Reference:**	KB 23 ft @ 991.0usft
Project:	Doddridge County, WV Grid	**MD Reference:**	KB 23 ft @ 991.0usft
Site:	Doddridge County 513144	**North Reference:**	Grid
Well:	Well #513144	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513144 As Drilled Surveys		

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,833.0	89.20	334.60	6,415.0	5,424.0	1,100.9	-976.5	1,443.9	2.15	-2.13	0.32
7,928.0	88.80	335.50	6,416.6	5,425.6	1,187.0	-1,016.6	1,538.4	1.04	-0.42	0.95
8,023.0	89.00	335.50	6,418.5	5,427.5	1,273.5	-1,056.0	1,632.9	0.21	0.21	0.00
8,117.0	89.20	334.90	6,419.9	5,428.9	1,358.8	-1,095.4	1,726.4	0.67	0.21	-0.64
8,211.0	88.90	335.50	6,421.5	5,430.5	1,444.1	-1,134.8	1,820.0	0.71	-0.32	0.64
8,305.0	88.80	336.50	6,423.4	5,432.4	1,530.0	-1,173.0	1,913.4	1.07	-0.11	1.06
8,400.0	89.00	341.60	6,425.2	5,434.2	1,618.6	-1,207.0	2,007.0	5.37	0.21	5.37
8,495.0	88.20	336.90	6,427.5	5,436.5	1,707.4	-1,240.6	2,100.6	5.02	-0.84	-4.95
Top of Onondaga @6428' TVD										
8,509.7	88.22	336.81	6,428.0	5,437.0	1,720.9	-1,246.4	2,115.2	0.65	0.11	-0.64
8,589.0	88.30	336.30	6,430.4	5,439.4	1,793.6	-1,277.9	2,193.8	0.65	0.11	-0.64
8,683.0	88.30	338.30	6,433.2	5,442.2	1,880.3	-1,314.2	2,286.9	2.13	0.00	2.13
8,778.0	88.50	336.50	6,435.9	5,444.9	1,968.0	-1,350.7	2,381.0	1.91	0.21	-1.89
8,872.0	90.20	334.20	6,436.9	5,445.9	2,053.4	-1,389.9	2,474.5	3.04	1.81	-2.45
8,966.0	90.90	334.00	6,436.0	5,445.0	2,138.0	-1,431.0	2,568.2	0.77	0.74	-0.21
9,060.0	89.40	332.70	6,435.8	5,444.8	2,222.0	-1,473.1	2,662.0	2.11	-1.60	-1.38
9,155.0	89.70	331.70	6,436.5	5,445.5	2,306.0	-1,517.4	2,756.9	1.10	0.32	-1.05
9,249.0	89.10	333.00	6,437.5	5,446.5	2,389.3	-1,561.0	2,850.8	1.52	-0.64	1.38
9,344.0	88.10	335.10	6,439.8	5,448.8	2,474.6	-1,602.6	2,945.5	2.45	-1.05	2.21
9,438.0	88.40	334.00	6,442.7	5,451.7	2,559.5	-1,643.0	3,039.1	1.21	0.32	-1.17
9,531.0	87.00	333.20	6,446.4	5,455.4	2,642.7	-1,684.3	3,131.8	1.73	-1.51	-0.86
9,626.0	87.00	332.90	6,451.4	5,460.4	2,727.3	-1,727.3	3,226.4	0.32	0.00	-0.32
513144 Plat TD										
9,685.9	87.19	333.03	6,454.4	5,463.4	2,780.6	-1,754.5	3,286.2	0.38	0.32	0.21
9,720.0	87.30	333.10	6,456.1	5,465.1	2,810.9	-1,769.9	3,320.2	0.38	0.32	0.21
9,815.0	88.80	334.70	6,459.3	5,468.3	2,896.2	-1,811.7	3,414.8	2.31	1.58	1.68
9,909.0	89.30	335.20	6,460.9	5,469.9	2,981.3	-1,851.5	3,508.4	0.75	0.53	0.53
10,003.0	90.80	335.80	6,460.8	5,469.8	3,066.9	-1,890.4	3,601.9	1.72	1.60	0.64
10,099.0	90.70	336.40	6,459.5	5,468.5	3,154.6	-1,929.3	3,697.3	0.63	-0.10	0.63
10,193.0	90.50	335.50	6,458.5	5,467.5	3,240.5	-1,967.6	3,790.7	0.98	-0.21	-0.96
10,288.0	90.40	335.20	6,457.8	5,466.8	3,326.8	-2,007.3	3,885.2	0.33	-0.11	-0.32
10,383.0	88.40	336.10	6,458.8	5,467.8	3,413.3	-2,046.4	3,979.6	2.31	-2.11	0.95
10,477.0	88.40	334.70	6,461.4	5,470.4	3,498.8	-2,085.5	4,073.1	1.49	0.00	-1.49
10,572.0	88.50	335.20	6,464.0	5,473.0	3,584.8	-2,125.7	4,167.7	0.54	0.11	0.53
10,666.0	88.30	334.50	6,466.6	5,475.6	3,669.9	-2,165.7	4,261.2	0.77	-0.21	-0.74
Final Survey=10682' MD/6467' TVD										
10,682.0	88.20	334.80	6,467.1	5,476.1	3,684.3	-2,172.5	4,277.2	1.98	-0.63	1.88
513144 Plat TD 2										
10,735.2	88.20	334.80	6,468.8	5,477.8	3,732.4	-2,195.2	4,330.1	0.00	0.00	0.00
Projection to TD/ Deepest Point of Well=10737' MD/6469' TVD										
10,737.0	88.20	334.80	6,468.8	5,477.8	3,734.1	-2,195.9	4,331.9	0.00	0.00	0.00

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JUL 06 2015

Phoenix Technologies

Survey Report

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Doddridge County 513144
Company:	EQT Production - Marcellus	**TVD Reference:**	KB 23 ft @ 991.0usft
Project:	Doddridge County, WV Grid	**MD Reference:**	KB 23 ft @ 991.0usft
Site:	Doddridge County 513144	**North Reference:**	Grid
Well:	Well #513144	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513144 As Drilled Surveys		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,950.6	4,950.0	Top of Elks @4950' TVD			
5,000.7	5,000.0	Int. csg pt @5000' TVD			
6,681.2	6,371.0	Top of Marcellus @6371' TVD			
8,509.7	6,428.0	Top of Onondaga @6428' TVD			

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
5,110.0	5,109.2	13.7	-50.6	Gyro Tie In=5110' MD
6,888.0	6,399.0	249.1	-569.1	LP=6888' MD/6399' TVD
10,682.0	6,467.1	3,684.3	-2,172.5	Final Survey=10682' MD/6467' TVD
10,737.0	6,468.8	3,734.1	-2,195.9	Projection to TD/ Deepest Point of Well=10737' MD/6469' TVD

Checked By: _____ Approved By: _____ Date: _____

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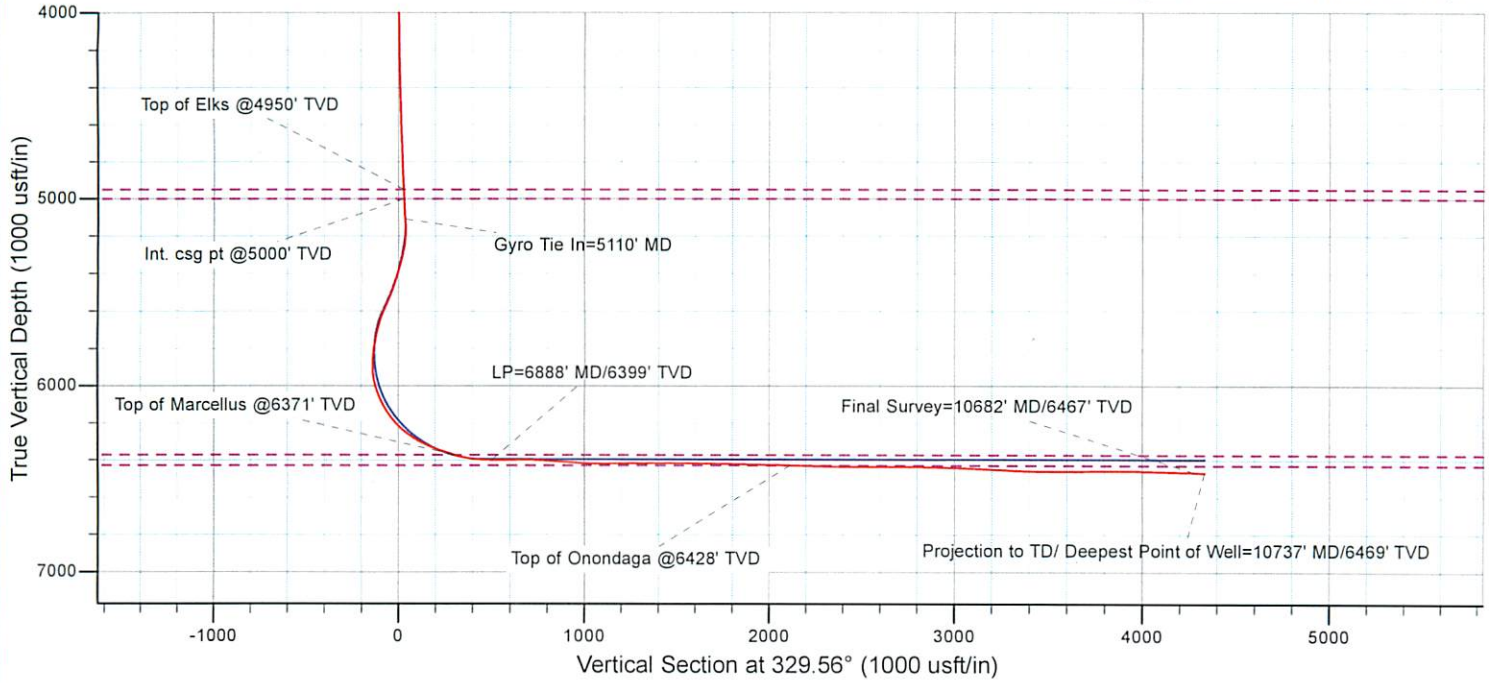
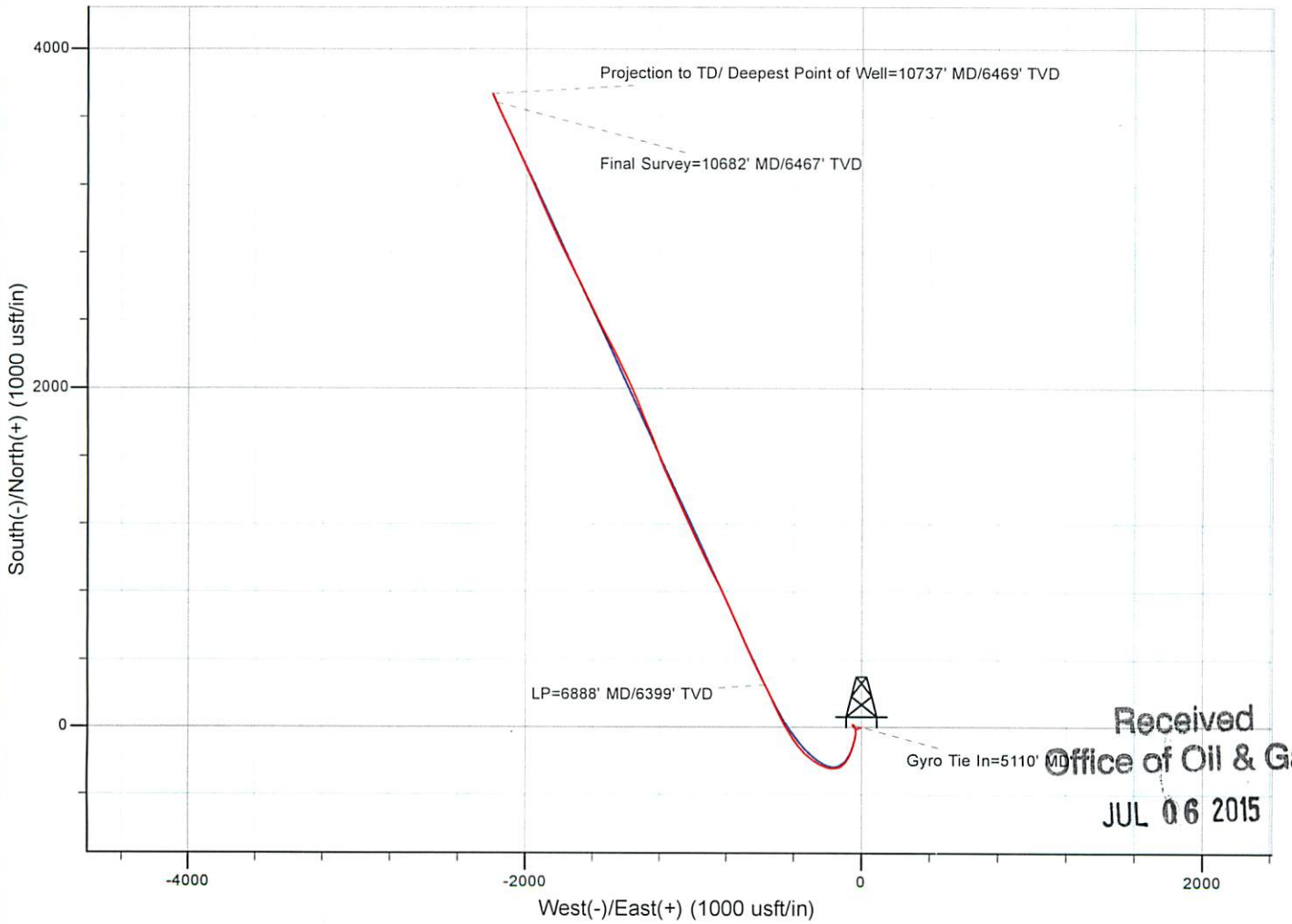
Office of Oil & Gas
JUL 06 2015

EQT Production - Marcellus

Project: Doddridge County, WV Grid
Site: Doddridge County 513144
Well: Well #513144
Wellbore: Main Wellbore
Design: 513144 As Drilled Surveys





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JUL 06 2015

513144 - 47-017-06358-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	3/27/2015	10,723.00	10,725.00	10	MARCELLUS
1	4/13/2015	10,458.00	10,640.00	32	MARCELLUS
2	4/14/2015	10,234.00	10,416.00	40	MARCELLUS
3	4/14/2015	10,009.00	10,191.00	40	MARCELLUS
4	4/15/2015	9,784.00	9,966.00	40	MARCELLUS
5	4/15/2015	9,561.00	9,741.00	40	MARCELLUS
6	4/16/2015	9,336.00	9,516.00	40	MARCELLUS
7	4/16/2015	9,109.00	9,291.00	40	MARCELLUS
8	4/16/2015	8,884.00	9,066.00	40	MARCELLUS
9	4/16/2015	8,661.00	8,841.00	40	MARCELLUS
10	4/16/2015	8,436.00	8,616.00	40	MARCELLUS
11	4/17/2015	8,209.00	8,387.00	40	MARCELLUS
12	4/17/2015	7,984.00	8,166.00	40	MARCELLUS
13	4/17/2015	7,759.00	7,941.00	40	MARCELLUS
14	4/17/2015	7,532.00	7,718.00	40	MARCELLUS
15	4/17/2015	7,309.00	7,491.00	40	MARCELLUS
16	4/18/2015	7,084.00	7,266.00	40	MARCELLUS
17	4/18/2015	6,859.00	7,041.00	40	MARCELLUS

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513144 - 47-017-06358-0000 - Stimulated Stages

Stage Number	Stimulation Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
Initiation Sleeve	4/13/2015	14.7	7,813.00	9,310.00	5,135.00	0	1814	0
1	4/13/2015	92.9	8,307.00	8,570.00	5,060.00	483,360	14429	0
2	4/14/2015	101.3	7,449.00	7,710.00	5,201.00	361,980	9311	0
3	4/14/2015	94.1	8,311.00	9,224.00	4,908.00	361,760	13960	0
4	4/15/2015	98.6	7,172.00	7,489.00	5,174.00	375,740	13935	0
5	4/16/2015	99.6	7,414.00	9,403.00	5,349.00	369,240	9911	0
6	4/16/2015	101.2	7,482.00	7,809.00	5,071.00	363,400	8962	0
7	4/16/2015	100.6	7,439.00	7,649.00	4,854.00	361,360	8824	0
8	4/16/2015	100.1	7,407.00	7,592.00	5,066.00	362,840	8954	0
9	4/16/2015	100.2	7,313.00	7,605.00	5,092.00	364,220	8547	0
10	4/17/2015	98.1	7,189.00	7,823.00	4,981.00	372,020	11121	0
11	4/17/2015	100.2	7,319.00	7,606.00	4,801.00	370,240	8714	0
12	4/17/2015	100.8	7,374.00	7,839.00	5,007.00	367,940	8630	0
13	4/17/2015	99.7	7,384.00	7,659.00	4,934.00	365,880	8607	0
14	4/17/2015	98.5	7,501.00	8,537.00	5,197.00	370,240	8550	0
15	4/18/2015	99.4	7,193.00	8,013.00	5,146.00	371,200	8557	0
16	4/18/2015	99.4	7,242.00	8,545.00	4,394.00	366,860	9317	0
17	4/18/2015	100.90	6,726.00	7,336.00	4,442	360,280	8,434	0

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/13/2015
Job End Date:	4/18/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06458-00-00
Operator Name:	EQT Production
Well Name and Number:	513144
Longitude:	-80.76635300
Latitude:	39.23609200
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,361
Total Base Water Volume (gal):	7,164,234
Total Base Non Water Volume:	0

FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

INTERSTATE Oil & Gas COMPACT COMMISSION

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Keane Group	Carrier/Base Fluid					
			Water	7732-18-5	100.00000	90.08098	None
Sand (Proppant)	Keane Group	Proppant					
			Silica Substrate	14808-60-7	100.00000	9.56560	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution					
			Calcium nitrate	10124-37-5	60.00000	0.06122	None
FFR 760	Keane Group	Friction reducer					
			Hydrotreated Light Distillate	64742-47-8	30.00000	0.01610	None
			Alkyl Alcohol	Proprietary	10.00000	0.00537	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00268	None
Hydrochloric Acid (15%)	Keane Group	Acidizing					
			Hydrochloric Acid	7647-01-0	15.00000	0.02246	None
EC6330A	Keane Group	Scale Inhibitor					
			Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00121	None
FFR 730	Keane Group	Friction reducer					
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00117	None
AI 600	Keane Group	Corrosion Inhibitor					
			Ethylene Glycol	107-21-1	40.00000	0.00015	None

			N, N-Dimethyiformamide	68-12-2	20.00000	0.00007	None
			Cinnamiaidehyde	104-55-2	15.00000	0.00006	None
			Tar bases, quinoline derivs, benzyl chloride-quatemized	72480-70-7	15.00000	0.00006	None
			2-Butoxyenthanol	111-76-2	15.00000	0.00006	None
			Poly (oxy-1,2-ethanediyl), .alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	127087-87-0	5.00000	0.00002	None
			1-Decanol	112-30-1	5.00000	0.00002	None
			Isopropyl alcohol	67-63-0	2.50000	0.00001	None
			1-Octanol	111-87-5	2.50000	0.00001	None
			Triethyl Phosphate	78-40-0	2.50000	0.00001	None
LEB-10X	Keane Group	Gel Breaker					
			Ethylene Glycol	107-21-1	30.00000	0.00001	None

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

* Total Water Volume sources may include fresh water, produced water, and/or recycled water
** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

Well Operator's Report of Well Work

EQT

Where energy meets innovation.

Well Number: 513144

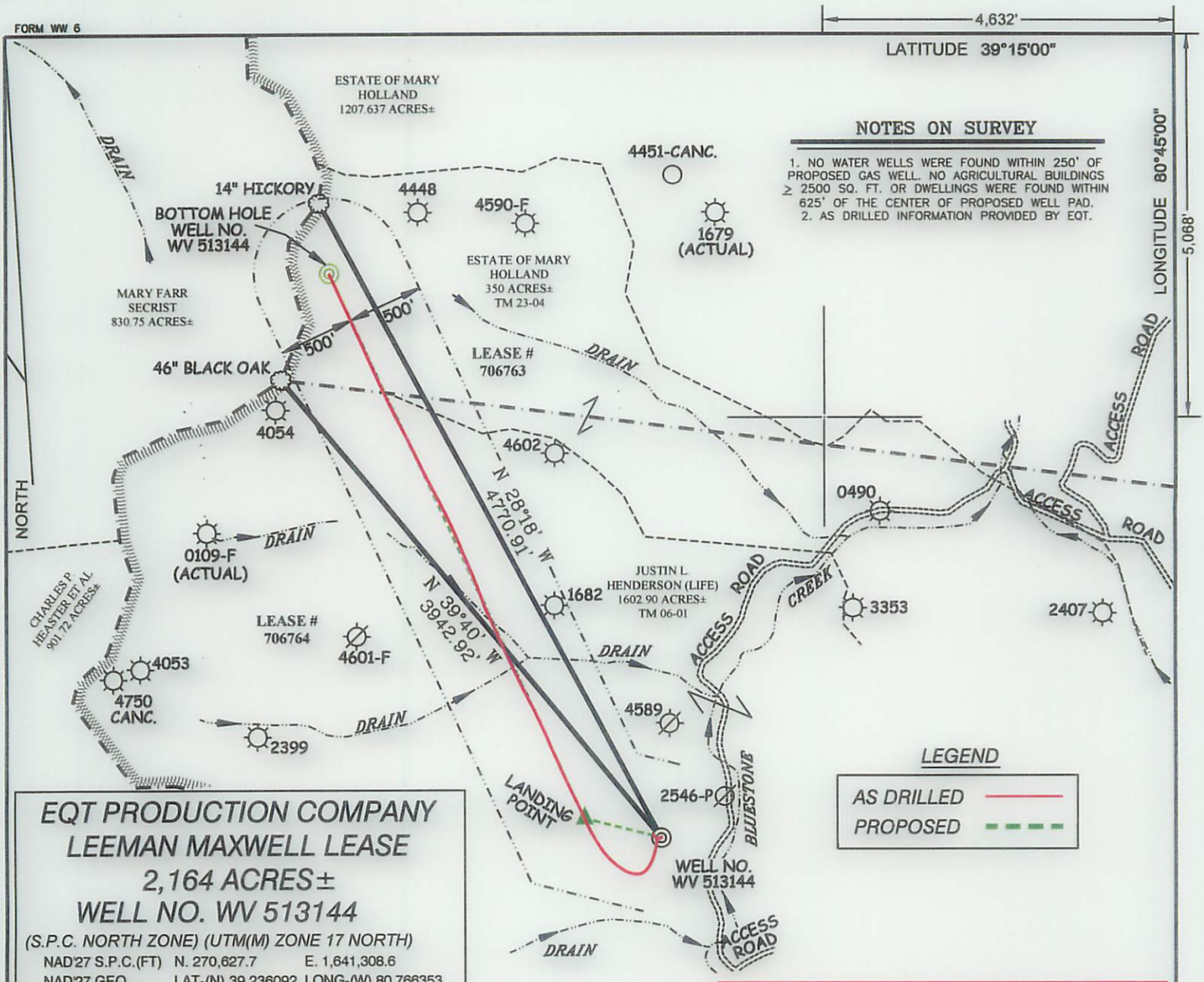
API: 47 - 017 - 6458

Submission: ☑ Initial ☐ Amended

Notes: waiting on Flowback

Received
Office of Oil & Gas
JUL 06 2015

FORM WW 6



NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
2. AS DRILLED INFORMATION PROVIDED BY EQT.

LEGEND

AS DRILLED
PROPOSED

EQT PRODUCTION COMPANY
LEEMAN MAXWELL LEASE
2,164 ACRES±
WELL NO. WV 513144

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 270,627.7	E. 1,641,308.6
NAD'27 GEO.	LAT-(N) 39.236092	LONG-(W) 80.766353
NAD'83 UTM (M)	N. 4,343,011.9	E. 520,179.4
LANDING POINT		
NAD'27 S.P.C.(FT)	N. 270,755.7	E. 1,640,796.0
NAD'27 GEO.	LAT-(N) 39.236424	LONG-(W) 80.768169
NAD'83 UTM (M)	N. 4,343,048.3	E. 520,022.6
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 274,362.8	E. 1,639,114.0
NAD'27 GEO.	LAT-(N) 39.246261	LONG-(W) 80.774287
NAD'83 UTM (M)	N. 4,344,138.6	E. 519,491.9

AS DRILLED COORDINATES FOR WELL NO. WV 513144 (47-017-06458)

(S.P.C. NORTHZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 270,627.7	E. 1,641,308.6
NAD'27 GEO.	LAT-(N) 39.236092	LONG-(W) 80.766353
NAD'83 UTM (M)	N. 4,343,011.9	E. 520,179.4
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 274,361.6	E. 1,639,112.8
NAD'27 GEO.	LAT-(N) 39.246257	LONG-(W) 80.774291
NAD'83 UTM (M)	N. 4,344,138.3	E. 519,491.5

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS SURVEYORS ENGINEERS ENVIRONMENTAL PROJECT MGMT.
(304) 462-5634 WWW.SLSSURVEYS.COM

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 677 Gregory A. Smith

GREGORY A. SMITH LICENSED No. 677 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

DATE APRIL 16, 20 13
REVISED 03/06/14 & 12/18/14
OPERATORS WELL NO. WV 513144
API WELL NO. 47 — 017 — 06458
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7889ASDRILLED513144
SCALE 1" = 1000'
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

STATE OF WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS

WELL TYPE: OIL ____ GAS X LIQUID INJECTION ____ WASTE DISPOSAL ____ IF "GAS" PRODUCTION X STORAGE ____ DEEP ____ SHALLOW X

LOCATION:
ELEVATION 970'(GROUND) 968'(PROPOSED) WATERSHED BLUESTONE CREEK
DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE OXFORD 7.5'
SURFACE OWNER JUSTIN L. HENDERSON (LIFE) ACREAGE 1,602.90±
ROYALTY OWNER LEEMAN MAXWELL HRS ACREAGE (2,164±) (1,000±)
PROPOSED WORK: LEASE NO. 706764 / 706763
DRILL X CONVERT ____ DRILL DEEPER ____ REDRILL ____ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ____ PERFORATE NEW FORMATION ____ PLUG AND ABANDON ____ CLEAN OUT AND REPLUG ____ OTHER ____
PHYSICAL CHANGE IN WELL (SPECIFY) ____ TARGET FORMATION MARCELLUS
ESTIMATED DEPTH 6399'

COUNTY NAME
PERMIT

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY
ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280
BRIDGEPORT, WV 26330 BRIDGEPORT, WV 26330

WR-35
Rev. 8/23/13

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 590 - 2253 County MINGO District MAGNOLIA
Quad MATEWAN Pad Name _____ Field/Pool Name _____
Farm name LOGAN COAL & TIMBER CORP Well Number 2362
Operator (as registered with the OOG) QUALITY NATURAL GAS, LLC
Address P.O. BOX 480 City ALLEN State KY Zip 41601

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing _____ Easting _____
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing _____ Easting _____

Elevation (ft) 797.0' GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal □ Horizontal 6A ■ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework □ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine ■Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole ■ Air □ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
N/A

Date permit issued 9/30/2014 Date drilling commenced 5/26/2015 Date drilling ceased 6/02/2015
Date completion activities began 6/09/2015 Date completion activities ceased 6/10/2015
Verbal plugging (Y/N) N Date permission granted _____ Granted by _____

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft N Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1790' Void(s) encountered (Y/N) depths N
Coal depth(s) ft N Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Received
Office of Oil & Gas
JUL 23 2015
Reviewed by:
JK ✓

API 47- 590 - 2253 Farm name LOGAN COAL & TIMBER CORP Well number 2362

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	17 1/2"	13 3/8"	42'	New	LS		
Surface	12 1/4"	9 5/8"	365'	New	LS	323', 84'	YES, 3bbls
Coal							
Intermediate 1	8 7/8"	7"	2121'	New	LS	NONE	YES, 6 bbls
Intermediate 2							
Intermediate 3							
Production	6 3/8"	4 1/2"	4256'	New	L-65	NONE	500' up in 7"
Tubing							
Packer type and depth set							

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	Class A						
Surface	Class A	130	15.5	1.18	153	Surface	8
Coal							
Intermediate 1	Class A	130, 120	15.6, 12.3	1.18, 1.84	153, 221	Surface	8
Intermediate 2							
Intermediate 3							
Production	Class A	165	13.6	1.90	313.5	500' up in 7"	8
Tubing							

Drillers TD (ft) 4260 Loggers TD (ft) 4266

Deepest formation penetrated HARRELL SHALE Plug back to (ft)

Plug back procedure

Kick off depth (ft)

Check all wireline logs run ■ caliper ■ density □ deviated/directional ■ induction ■ neutron ■ resistivity ■ gamma ray ■ temperature ■ sonic

Well cored □ Yes ■ No □ Conventional □ Sidewall Were cuttings collected □ Yes □ No
For drilling purposes only.

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING 4109', 3942', 3775', 3608', 3441', 3274', 3107', 2940', 2773' and 2606'

WAS WELL COMPLETED AS SHOT HOLE □ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? □ Yes ■ No DETAILS

WERE TRACERS USED □ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 590 - 2253 Farm name LOGAN COAL & TIMBER CORP Well number 2362

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	6/9/2015	3875	4171	46	SHALE

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	6/10/15	84	3008	3103	1348	NONE	NONE	1.55 mmscf N2/12 bbl Acid

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Please insert additional pages as applicable.

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API 47- 590 - 2253 Farm name LOGAN COAL & TIMBER CORP Well number 2362

PRODUCING FORMATION(S)	DEPTHS	
DEVONIAN SHALE (BROWN)	3875-4171' TVD	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ■ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface 750 psi Bottom Hole psi DURATION OF TEST 192 hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	531 mcfpd	bpd	bpd	bpd	☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
SEE ATTACHED					

Please insert additional pages as applicable.

Drilling Contractor MOUNTAIN RIDGE
Address 72 OLD 25 E City BARBOURVILLE State KY Zip 40906

Logging Company WEATHERFORD
Address City LONDON State KY Zip 40741

Cementing Company C & J ENERGY SERVICES
Address 580 HAWTHORN DR City NORTON State VA Zip 24273

Stimulating Company C & J ENERGY SERVICES
Address 580 HAWTHORN DR City NORTON State VA Zip 24273

Please insert additional pages as applicable.

Completed by Darrell Fluharty Telephone 606-874-8041 Cell 606-548-1915
Signature Title Field Supervisor Date 7-21-2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

WELL #2362 **API#47-5902253**

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H2S, ETC)
FILL	0	3			
SAND	3	60			
SAND/SHALE	60	120			
SAND	120	180			
SAND/SHALE	180	240			
SAND	240	390			
SAND/SHALE	390	450			
SAND	450	510			
SAND/SHALE	510	660			
SHALE	660	720			
SAND/SHALE	720	750			
SAND	750	1170			
SAND/SHALE	1170	1320			
SAND	1320	1410			
SAND/SHALE	1410	1470			
SAND/SHALE/RED ROCK	1470	1605			
SAND	1605	1650			
SAND/SHALE	1650	1740			
SAND	1740	1830			
SAND/SHALE	1830	1912			
RED ROCK	1912	1950			
SAND/SHALE	1950	1995			
LITTLE LIME	1995	2098			
BIG LIME	2098	2330			
INJUN	2330	2398			
WEIR	2398	2895			
COFFEE SHALE	2895	2950			
BEREA	2950	3095			
BROWN SHALE	3095	4138			
HARRELL SHALE	4138	4266			

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Rev. 8/23/13

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47- 590 - 2254 County MINGO District MAGNOLIA
Quad MATEWAN Pad Name _____ Field/Pool Name _____
Farm name LOGAN COAL & TIMBER CORP. ET AL Well Number 2363
Operator (as registered with the OOG) QUALITY NATURAL GAS, LLC
Address P.O. BOX 480 City ALLEN State KY Zip 41601

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing _____ Easting _____
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing _____ Easting _____

Elevation (ft) 893.8' GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal □ Horizontal 6A ■ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework □ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion □ Single ■ Multiple Fluids Produced □ Brine ■Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole ■ Air □ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
N/A

Date permit issued 9/23/2014 Date drilling commenced 6/03/2015 Date drilling ceased 6/10/2015
Date completion activities began 6/16/2015 Date completion activities ceased 6/17/2015
Verbal plugging (Y/N) N Date permission granted _____ Granted by _____

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft N Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1740' Void(s) encountered (Y/N) depths N
Coal depth(s) ft N Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

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JUL 23 2015

Reviewed by:
JK - V

API 47- 590 - 2254 Farm name LOGAN COAL & TIMBER CORP. ET AL Well number 2363

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	17 1/2"	13 3/8"	42'	New	LS		
Surface	12 1/4"	9 5/8"	470'	New	LS	426', 88'	6 bbls to surface
Coal							
Intermediate 1	8 7/8"	7"	2162'	New	LS	NONE	10 bbls to surface
Intermediate 2							
Intermediate 3							
Production	6 3/8"	4 1/2"	4344'	New	L-65		500' up in 7"
Tubing							
Packer type and depth set							

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	Class A						
Surface	Class A	150	15.5	1.18	177	Surface	8
Coal							
Intermediate 1	Class A	100, 165	15.6, 12.3	1.18, 1.84	118, 304	Surface	8
Intermediate 2							
Intermediate 3							
Production	Class A	165	13.6	1.90	313.5	500' up in 7"	8
Tubing							

Drillers TD (ft) 4370 Loggers TD (ft) 4372

Deepest formation penetrated HARRELL SHALE Plug back to (ft)

Plug back procedure

Kick off depth (ft)

Check all wireline logs run ■ caliper ■ density □ deviated/directional ■ induction ■ neutron ■ resistivity ■ gamma ray ■ temperature ■ sonic

Well cored □ Yes ■ No □ Conventional □ Sidewall Were cuttings collected □ Yes □ No
For drilling purposes only.

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING 4177', 4010', 3843', 3676', 3509', 3342', 3175', 3008', 2841' and 2674

WAS WELL COMPLETED AS SHOT HOLE □ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? □ Yes ■ No DETAILS

WERE TRACERS USED □ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 590 - 2254 Farm name LOGAN COAL & TIMBER CORP. ET AL Well number 2363

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	6/16/2015	4018'	4242'	52	SHALE
2	6/17/2015	3073'	3083'	26	BEREA
3	6/17/2015	2329'	2362'	11	LIME

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	6/17/15	82	2493	2588	1289	NONE	NONE	797scf N2/12bbl 15% HCL
2	6/17/15	81	2692	2910	1362	NONE	NONE	799scf N2/12bbl 15% HCL
3	6/17/15	31	2619	3408	1221	NONE	NONE	500 scf N2/143 bbl 20%HCL

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Please insert additional pages as applicable.

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API 47- 590 - 2254 Farm name LOGAN COAL & TIMBER CORP. ET AL Well number 2363

PRODUCING FORMATION(S)	DEPTHS	
BIG LIME	2329-2362' TVD	MD
BEREA	3073-3083'	
DEVONIAN SHALE (BROWN)	4018-4242'	

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ■ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface 540 psi Bottom Hole _____ psi DURATION OF TEST 120 hrs

OPEN FLOW Gas 283 mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd GAS MEASURED BY ☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
SEE ATTACHED					

Please insert additional pages as applicable.

Drilling Contractor MOUNTAIN RIDGE
Address 72 OLD 25 E City BARBOURVILLE State KY Zip 40906

Logging Company WEATHERFORD
Address _____ City LONDON State KY Zip 40741

Cementing Company C & J ENERGY SERVICES
Address 580 HAWTHORN DR City NORTON State VA Zip 24273

Stimulating Company C & J ENERGY SERVICES
Address 580 HAWTHORN DR City NORTON State VA Zip 24273

Please insert additional pages as applicable.

Completed by Darrell Fluharty Telephone 606-874-8041 Cell 606-548-1915
Signature _____ Title Field Supervisor Date 7-21-2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

WELL #2363 **API#47-5902254**

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H2S, ETC)
FILL	0	25			
SAND	25	150			
SAND/SHALE	150	270			
SAND	270	330			
SAND/SHALE	330	390			
SAND	390	570			
SAND/SHALE	570	630			
SAND	630	690			
SAND/SHALE	690	1170			
SAND	1170	1290			
SAND/SHALE	1290	1410			
SAND	1410	1500			
SAND/SHALE	1500	1590			
SAND/SHALE/RED ROCK	1590	1650			
SAND/RED ROCK	1650	1710			
SAND/SHALE/RED ROCK	1710	1800			
SAND/SHALE	1800	1875			
SAND	1875	1920			
SAND/SHALE	1920	1980			
SAND/SLATE/RED ROCK	1980	2085			
LITTLE LIME	2085	2145			
BIG LIME	2145	2390			
INJUN	2390	2480			
WEIR	2480	2997			
COFFEE SHALE	2997	3054			
BEREA	3054	3215			
BROWN SHALE	3215	4254			
HARRELL SHALE	4254	4370			

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JUL 23 2015

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Page ___ of ___

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 095 - 02157 County Tyler District McElroy
Quad Center Point 7.5' Pad Name Forest Pad Field/Pool Name ----------
Farm name Moore, Forest & Brenda Well Number Silas Unit 1H
Operator (as registered with the OOG) Antero Resources Corporation
Address 1615 Wynkoop Street City Denver State CO Zip 80202

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey

Top hole	Northing	4,360,750m	Easting	522,384m
Landing Point of Curve	Northing	4,360,847.76m	Easting	522,120.02m
Bottom Hole	Northing	4,363,109m	Easting	521,385m

Elevation (ft) 745' GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas ■ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine ■Gas □ NGL ■ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air ■ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Air- Foam & 4% KCL
Mud- Polymer

Date permit issued 03/11/2014 Date drilling commenced 04/19/2014 Date drilling ceased 09/20/2014
Date completion activities began 10/17/2014 Date completion activities ceased 03/09/2015
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 89', 329' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 535'; 2,052' Void(s) encountered (Y/N) depths None
Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths None
Is coal being mined in area (Y/N) No

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JUL 06 2015
WV Department of
Environmental Protection

Reviewed by:
JK 7/24/15
✓

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API 47- 095 - 02157 Farm name Moore, Forest & Brenda Well number Silas Unit 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	26"	20"	40'	New	133#; J-55	N/A	Yes
Surface	17 1/2"	13 3/8"	407'	New	48#; H-40	N/A	Yes
Coal							
Intermediate 1	12 1/4"	9 5/8"	2,525'	New	36#; J-55	N/A	Yes
Intermediate 2							
Intermediate 3							
Production	8 3/4" & 8 1/2"	5 1/2"	14,846'	New	23#; P-110	N/A	Yes
Tubing		2 3/8"	10,678'		4.7#; N-80	N/A	
Packer type and depth set		N/A					

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	50 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	491 sx	15.6	1.18	283	0'	8 Hrs.
Coal							
Intermediate 1	Class A	930 sx	15.6	1.18	791	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	1,015 sx (Lead); 1,252 sx (Tail)	14.5 (Lead); 15.2 (Tail)	1.3 (Lead); 1.86 (Tail)	2,937	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 14,846' MD; 6,594' TVD (BHL); 6,602' TVD (Deepest Point Drilled) Loggers TD (ft) 14,800'

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6,196'

**This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Ed Arnold Unit 1H, API #47-095-02038). Please reference the wireline logs submitted with Form WR-35 for the Ed Arnold Unit 1H. A Cement Bond Log has been included with this submittal.

Check all wireline logs run** ☐ caliper ☐ density ☐ deviated/directional ☐ induction ☐ neutron ☐ resistivity ☐ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ■ No Conventional Sidewall Were cuttings collected ☐ Yes ■ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

Conductor- 0

Surface- 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface

Intermediate- 1 above float joint, 1 above float collar, 1 every 4th joint to surface

Production- 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

WERE TRACERS USED ☐ Yes ■ No TYPE OF TRACER(S) USED

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JUL 06 2015
WV Department of
Environmental Protection

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API 47- 095 - 02157 Farm name Moore, Forest & Brenda Well number Silas Unit 1H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)

*** PLEASE SEE ATTACHED EXHIBIT 1**

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)

*** PLEASE SEE ATTACHED EXHIBIT 2**

Please insert additional pages as applicable.

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Page ___ of ___

API 47- 095 - 02157 Farm name Moore, Forest & Brenda Well number Silas Unit 1H

PRODUCING FORMATION(S)	DEPTHS			
Marcellus	6,532' (top)	TVD	6,779' (top)	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ■ Open Flow OIL TEST ■ Flow ☐ Pump

SHUT-IN PRESSURE Surface 3,550 psi Bottom Hole ---------- psi DURATION OF TEST ---------- hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	10,182 mcfpd	10 bpd	---------- bpd	1 bpd	☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		

*** PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

Drilling Contractor Frontier Drilling LLC
Address 562 Spring Run Road City Pennsboro State WV Zip 26415

Logging Company STRC
Address 1560 Good Hope Pike City Clarksburg State WV Zip 26301

Cementing Company Nabors Completion & Production Services, Co.
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

Stimulating Company US Well Services
Address 533 Industrial Park Drive City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

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Completed by Megan Darling Telephone 303-357-7230
Signature Megan C. Darling Title Permitting Agent Date 07/02/2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

API 47-095-02157 Farm Name Moore, Forest & Brenda Well Number Silas Unit 1H					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	17-Oct-14	14,583	14,751	60	Marcellus
2	3-Jan-15	14,384	14,552	60	Marcellus
3	4-Jan-15	14,185	14,353	60	Marcellus
4	4-Jan-15	13,987	14,154	60	Marcellus
5	4-Jan-15	13,788	13,955	60	Marcellus
6	12-Jan-15	13,589	13,756	60	Marcellus
7	12-Jan-15	13,390	13,557	60	Marcellus
8	13-Jan-15	13,191	13,358	60	Marcellus
9	13-Jan-15	12,992	13,160	60	Marcellus
10	13-Jan-15	12,793	12,961	60	Marcellus
11	13-Jan-15	12,594	12,762	60	Marcellus
12	14-Jan-15	12,395	12,563	60	Marcellus
13	14-Jan-15	12,196	12,364	60	Marcellus
14	14-Jan-15	11,997	12,165	60	Marcellus
15	15-Jan-15	11,798	11,966	60	Marcellus
16	15-Jan-15	11,599	11,767	60	Marcellus
17	15-Jan-15	11,400	11,568	60	Marcellus
18	16-Jan-15	11,201	11,369	60	Marcellus
19	16-Jan-15	11,002	11,170	60	Marcellus
20	17-Jan-15	10,803	10,971	60	Marcellus
21	17-Jan-15	10,604	10,772	60	Marcellus
22	17-Jan-15	10,405	10,573	60	Marcellus
23	19-Jan-15	10,206	10,374	60	Marcellus
24	19-Jan-15	10,007	10,175	60	Marcellus
25	20-Jan-15	9,808	9,976	60	Marcellus
26	20-Jan-15	9,609	9,777	60	Marcellus
27	20-Jan-15	9,410	9,578	60	Marcellus
28	21-Jan-15	9,211	9,379	60	Marcellus
29	21-Jan-15	9,013	9,180	60	Marcellus
30	21-Jan-15	8,814	8,981	60	Marcellus
31	22-Jan-15	8,615	8,782	60	Marcellus
32	22-Jan-15	8,416	8,583	60	Marcellus
33	22-Jan-15	8,217	8,384	60	Marcellus
34	22-Jan-15	8,018	8,186	60	Marcellus
35	22-Jan-15	7,819	7,987	60	Marcellus
36	23-Jan-15	7,620	7,788	60	Marcellus
37	23-Jan-15	7,421	7,589	60	Marcellus
38	23-Jan-15	7,222	7,390	60	Marcellus
39	23-Jan-15	7,023	7,191	60	Marcellus
40	24-Jan-15	6,824	6,992	60	Marcellus

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API 47-095-02157 Farm Name Moore, Forest & Brenda Well Number Silas Unit 1H

EXHIBIT 2

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	3-Jan-15	70.9	7,250	N/A	5,353	246,080	6,633	N/A
2	3-Jan-15	72.1	7,310	5,788	5,606	247,000	6,642	N/A
3	4-Jan-15	69.3	7,436	6,032	5,516	245,480	6,834	N/A
4	4-Jan-15	72.2	7,449	5,482	5,565	245,440	7,124	N/A
5	4-Jan-15	70.1	7,177	5,547	5,396	246,010	6,581	N/A
6	12-Jan-15	64.0	7,221	5,642	5,549	114,400	6,480	N/A
7	12-Jan-15	69.1	7,206	5,882	5,817	248,000	6,644	N/A
8	13-Jan-15	69.8	7,377	5,712	5,560	247,800	6,584	N/A
9	13-Jan-15	69.9	7,399	5,657	5,530	245,900	6,482	N/A
10	13-Jan-15	70.4	7,232	5,603	5,607	247,400	6,442	N/A
11	13-Jan-15	70.4	7,166	5,807	5,516	247,700	6,470	N/A
12	14-Jan-15	70.0	7,206	5,274	5,437	248,720	6,412	N/A
13	14-Jan-15	70.1	7,254	5,745	5,355	247,300	6,399	N/A
14	14-Jan-15	69.0	7,246	6,013	5,467	247,700	6,880	N/A
15	15-Jan-15	70.1	7,395	5,638	5,208	249,900	6,392	N/A
16	15-Jan-15	70.3	7,292	5,398	5,609	250,790	6,386	N/A
17	15-Jan-15	70.6	7,240	5,734	5,454	248,400	6,344	N/A
18	16-Jan-15	70.4	7,298	5,369	5,113	247,670	6,293	N/A
19	16-Jan-15	70.3	7,379	5,538	5,527	248,600	6,272	N/A
20	17-Jan-15	70.8	7,267	5,984	5,308	247,600	6,234	N/A
21	17-Jan-15	69.9	7,411	5,903	5,204	248,500	7,000	N/A
22	17-Jan-15	69.5	7,135	5,775	5,613	247,400	6,237	N/A
23	19-Jan-15	69.3	7,259	5,524	5,233	173,200	9,195	N/A
24	19-Jan-15	64.7	7,049	5,457	5,549	170,270	6,680	N/A
25	20-Jan-15	70.0	7,101	5,914	5,449	250,260	6,250	N/A
26	20-Jan-15	69.4	6,987	5,478	5,519	220,900	6,745	N/A
27	20-Jan-15	70.7	6,941	5,706	5,434	249,100	6,153	N/A
28	21-Jan-15	70.5	6,854	5,623	5,376	246,820	6,105	N/A
29	21-Jan-15	68.6	7,081	5,615	5,434	226,650	6,812	N/A
30	21-Jan-15	70.1	6,910	5,667	5,459	249,100	6,154	N/A
31	22-Jan-15	69.0	7,027	5,443	5,590	247,880	6,111	N/A
32	22-Jan-15	71.5	7,136	5,631	5,534	247,480	6,057	N/A
33	22-Jan-15	70.8	7,073	5,529	5,369	246,990	6,046	N/A
34	22-Jan-15	70.0	7,073	5,660	5,520	247,420	6,394	N/A
35	22-Jan-15	70.6	6,920	5,324	5,439	247,260	6,023	N/A
36	23-Jan-15	70.5	7,047	5,785	5,304	247,150	5,992	N/A
37	23-Jan-15	70.4	6,879	5,337	5,199	246,880	5,969	N/A
38	23-Jan-15	71.1	6,958	5,606	5,423	246,640	5,940	N/A
39	23-Jan-15	70.8	6,708	5,683	5,411	243,580	5,943	N/A
40	24-Jan-15	70.4	6,702	5,669	4,176	250,485	6,102	N/A
	AVG=	**69.9**	**7,151**	**5,645**	**5,418**	**9,571,855**	**258,436**	TOTAL

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API 47-095-02157 Farm Name Moore, Forest & Brenda Well Number Silas Unit 1H				
EXHIBIT 3				
LITHOLOGY/ FORMATION	**TOP DEPTH (TVD) From Surface**	**BOTTOM DEPTH (TVD) From Surface**	**TOP DEPTH (MD) From Surface**	**BOTTOM DEPTH (MD) From Surface**
Fresh Water	89'	N/A	89'	N/A
Fresh Water	329'	N/A	329'	N/A
Shale/ Sandstone	0	149	0	149
Sandstone/ Trace Coal	est. 149	209	est. 149	209
Sandstone/ Shale	est. 209	429	est. 209	429
Limestone	est. 429	449	est. 429	449
Sandstone	est. 449	569	est. 449	569
Sandstone/ Limestone	est. 569	689	est. 569	689
Sandstone	est. 689	789	est. 689	789
Sandstone/ Trace Coal	est. 789	829	est. 789	829
Shale/ Sandstone	est. 829	929	est. 829	929
Sandstone/ Trace Coal	est. 929	1,029	est. 929	1,029
Sandstone	est. 1029	1,069	est. 1029	1,069
Coal/ Sandstone	est. 1069	1,429	est. 1069	1,429
Sandstone	est. 1429	1,741	est. 1429	1,741
Big Lime	1,741	1,865	1,741	1,865
Big Injun	1,865	2,308	1,865	2,308
Gantz Sand	2,308	2,461	2,308	2,461
Fifty Foot Sandstone	2,461	2,536	2,461	2,536
Gordon	2,536	2,827	2,536	2,827
Fifth Sandstone	2,827	2,877	2,827	2,877
Bayard	2,877	3,265	2,877	3,265
Warren	3,265	3,634	3,265	3,634
Speechley	3,634	3,943	3,634	3,944
Baltown	3,943	4,398	3,944	4,401
Bradford	4,398	4,896	4,401	4,902
Benson	4,896	5,154	4,902	5,161
Alexander	5,154	5,364	5,161	5,375
Elk	5,364	5,867	5,375	5,908
Rhinestreet	5,867	6,142	5,908	6,211
Sycamore	6,142	6,315	6,211	6,412
Middlesex	6,315	6,449	6,412	6,604
Burkett	6,449	6,477	6,604	6,655
Tully	6,477	6,532	6,655	6,779
Marcellus	6,532	NA	6,779	NA

*Please note Antero determines shallow formation tops based on mud logs that are only run on one well on a multi-well pad. The measured depth (MD) data on subsequent wells may be slightly different due to the well's unique departure.

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Antero Resources

Antero Resources
Silas Unit 1H
Tyler County WV
Northing: 14306177.04
Easting: 1713806.69
As Drilled

WELL DETAILS: Silas Unit 1H
Ground Level: 749.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	14306177.04	1713806.69	39° 23' 45.129 N	80° 44' 24.800 W	

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Silas Unit 1H, Grid North
Vertical (TVD) Reference: Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Calculation Method: Minimum Curvature

PROJECT DETAILS: Tyler County WV

Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level

Scientific Drilling

Genie Lightfoot
14:22, September 24 2014

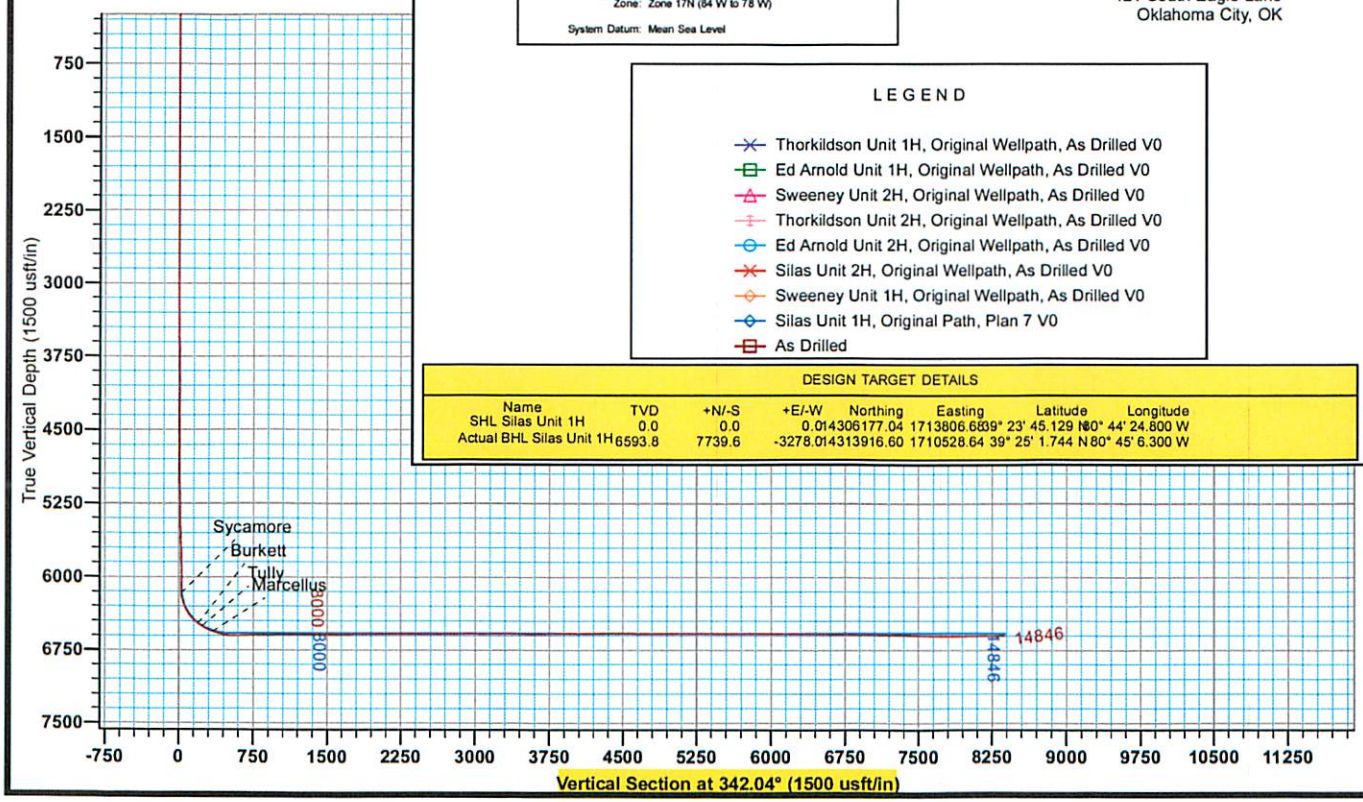
Scientific Drilling
421 South Eagle Lane
Oklahoma City, OK

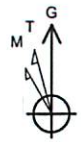
LEGEND

- Thorkildson Unit 1H, Original Wellpath, As Drilled V0
- Ed Arnold Unit 1H, Original Wellpath, As Drilled V0
- Sweeney Unit 2H, Original Wellpath, As Drilled V0
- Thorkildson Unit 2H, Original Wellpath, As Drilled V0
- Ed Arnold Unit 2H, Original Wellpath, As Drilled V0
- Silas Unit 2H, Original Wellpath, As Drilled V0
- Sweeney Unit 1H, Original Wellpath, As Drilled V0
- Silas Unit 1H, Original Path, Plan 7 V0
- As Drilled

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL Silas Unit 1H	0.0	0.0	0.0	14306177.04	1713806.69	39° 23' 45.129 N	80° 44' 24.800 W
Actual BHL Silas Unit 1H	6593.8	7739.6	-3278.0	14313916.60	1710528.64	39° 25' 1.744 N	80° 45' 6.300 W

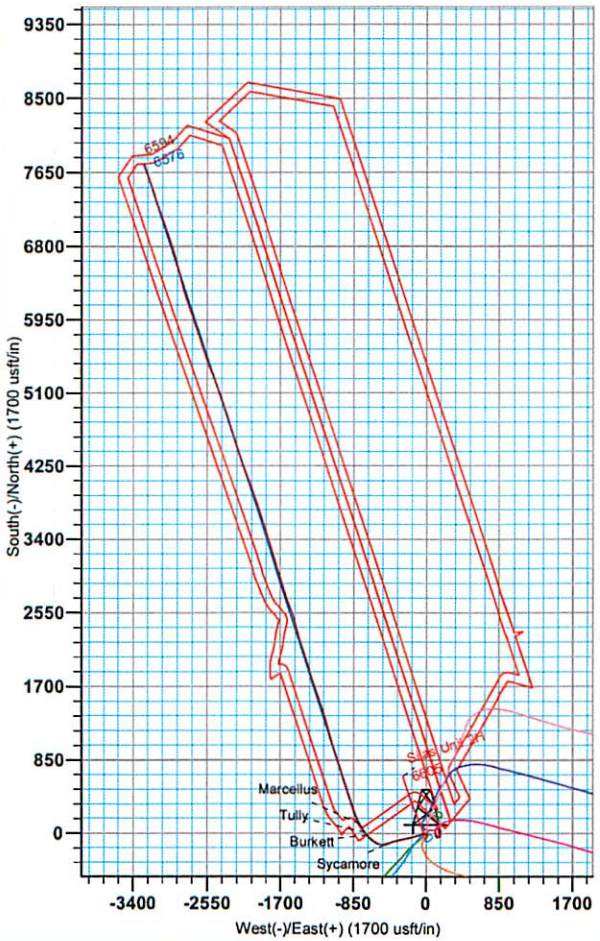




To convert Magnetic North to Grid: Subtract 8.73°
To convert True North to Grid: Subtract 0.16°

Azimuths to Grid North
True North: -0.17°
Magnetic North: -8.73°

Magnetic Field
Strength: 52322.7snT
Dip Angle: 66.93°
Date: 4/17/2014
Model: BGGM2013



Antero Resources

Tyler County WV
Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pad
Silas Unit 1H
Original Path

Design: As Drilled

EOW Completion Report

24 September, 2014

Scientific Drilling

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Antero Resources

EOW Completion Report

Scientific Drilling

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Silas Unit 1H
Project:	Tyler County WV	**TVD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Well:	Silas Unit 1H	**North Reference:**	Grid
Wellbore:	Original Path	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Project Tyler County WV, Tyler Co West Virginia

Map System:	Universal Transverse Mercator (US Survey Fee	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Zone 17N (84 W to 78 W)		

Site Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pad

Site Position:		**Northing:**	14,306,188.32 usft	**Latitude:**	39° 23' 45.240 N
From:	Map	**Easting:**	1,713,823.50 usft	**Longitude:**	80° 44' 24.585 W
Position Uncertainty:	2.0 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	0.16 °

Well Silas Unit 1H, Marcellus

Well Position	**+N/-S**	0.0 usft	**Northing:**	14,306,177.04 usft	**Latitude:**	39° 23' 45.129 N
	+E/-W	0.0 usft	**Easting:**	1,713,806.69 usft	**Longitude:**	80° 44' 24.800 W
Position Uncertainty		2.0 usft	**Wellhead Elevation:**	774.0 usft	**Ground Level:**	749.0 usft

Wellbore Original Path

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	BGGM2013	4/17/2014	-8.57	66.93	52,323

Design As Drilled

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.0	0.0	0.0	342.04

Survey Program **Date** 9/24/2014

From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
114.0	5,995.0	Survey #9 Final Gyro (Original Path)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper
6,130.0	14,846.0	Survey #10 MWD (Original Path)	MWD SDI	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
114.0	0.35	185.01	114.0	-0.3	0.0	-0.3	0.31
214.0	0.34	197.10	214.0	-0.9	-0.1	-0.8	0.07
314.0	0.31	197.26	314.0	-1.5	-0.3	-1.3	0.03
414.0	0.27	192.42	414.0	-2.0	-0.4	-1.7	0.05
514.0	0.20	210.63	514.0	-2.3	-0.6	-2.1	0.10
614.0	0.20	207.28	614.0	-2.7	-0.8	-2.3	0.01
714.0	0.22	205.17	714.0	-3.0	-0.9	-2.6	0.02
814.0	0.20	229.66	814.0	-3.3	-1.1	-2.8	0.09
914.0	0.19	241.38	914.0	-3.5	-1.4	-2.9	0.04
1,014.0	0.13	272.56	1,014.0	-3.5	-1.7	-2.9	0.10

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Silas Unit 1H
Project:	Tyler County WV	**TVD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Well:	Silas Unit 1H	**North Reference:**	Grid
Wellbore:	Original Path	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,114.0	0.09	268.67	1,114.0	-3.5	-1.9	-2.8	0.04
1,214.0	0.12	271.45	1,214.0	-3.5	-2.0	-2.7	0.03
1,314.0	0.14	256.84	1,314.0	-3.6	-2.3	-2.7	0.04
1,414.0	0.18	272.80	1,414.0	-3.6	-2.5	-2.6	0.06
1,514.0	0.25	276.37	1,514.0	-3.5	-2.9	-2.5	0.07
1,614.0	0.15	263.76	1,614.0	-3.5	-3.3	-2.4	0.11
1,714.0	0.29	281.86	1,714.0	-3.5	-3.6	-2.2	0.15
1,814.0	0.31	292.09	1,814.0	-3.3	-4.1	-1.9	0.06
1,914.0	0.17	285.46	1,914.0	-3.2	-4.5	-1.6	0.14
2,014.0	0.23	293.81	2,014.0	-3.1	-4.9	-1.4	0.07
2,114.0	0.24	291.10	2,114.0	-2.9	-5.2	-1.2	0.01
2,214.0	0.25	292.84	2,214.0	-2.8	-5.6	-0.9	0.01
2,314.0	0.18	282.10	2,314.0	-2.6	-6.0	-0.7	0.08
2,414.0	0.23	274.21	2,414.0	-2.6	-6.3	-0.5	0.06
2,514.0	0.30	279.36	2,514.0	-2.5	-6.8	-0.3	0.07
2,614.0	0.25	254.01	2,614.0	-2.6	-7.3	-0.2	0.13
2,714.0	0.36	271.84	2,714.0	-2.6	-7.8	-0.1	0.14
2,814.0	0.53	268.89	2,814.0	-2.6	-8.6	0.2	0.17
2,914.0	0.61	266.72	2,914.0	-2.6	-9.6	0.4	0.08
3,014.0	0.55	266.06	3,014.0	-2.7	-10.6	0.7	0.06
3,114.0	0.58	274.21	3,114.0	-2.7	-11.6	1.0	0.09
3,214.0	0.58	280.85	3,214.0	-2.6	-12.6	1.4	0.07
3,314.0	0.70	280.18	3,313.9	-2.4	-13.7	2.0	0.12
3,414.0	0.71	283.04	3,413.9	-2.1	-14.9	2.6	0.04
3,514.0	0.63	274.02	3,513.9	-1.9	-16.0	3.1	0.13
3,614.0	1.79	270.05	3,613.9	-1.9	-18.1	3.8	1.16
3,714.0	4.78	267.42	3,713.7	-2.1	-23.8	5.4	2.99
3,814.0	5.97	265.23	3,813.3	-2.7	-33.2	7.7	1.21
3,914.0	5.71	260.64	3,912.8	-4.0	-43.3	9.6	0.53
4,014.0	5.53	247.90	4,012.3	-6.6	-52.7	10.0	1.26
4,114.0	4.92	240.15	4,111.9	-10.5	-60.8	8.8	0.93
4,214.0	5.08	244.32	4,211.5	-14.6	-68.5	7.3	0.40
4,314.0	5.74	250.10	4,311.1	-18.2	-77.2	6.5	0.86
4,414.0	5.91	253.56	4,410.5	-21.4	-86.9	6.5	0.39
4,514.0	6.14	252.89	4,510.0	-24.4	-96.9	6.7	0.24
4,614.0	5.58	249.51	4,609.5	-27.7	-106.6	6.6	0.66
4,714.0	4.97	251.59	4,709.0	-30.7	-115.3	6.3	0.64
4,814.0	4.87	250.34	4,808.7	-33.5	-123.4	6.1	0.15
4,914.0	5.32	259.00	4,908.3	-35.8	-131.9	6.6	0.89
5,014.0	5.49	264.11	5,007.8	-37.2	-141.2	8.1	0.51
5,114.0	5.62	262.37	5,107.4	-38.4	-150.8	10.0	0.21
5,214.0	9.07	253.50	5,206.5	-41.2	-163.3	11.1	3.62
5,314.0	12.33	255.53	5,304.8	-46.2	-181.2	12.0	3.28
5,414.0	14.32	258.03	5,402.1	-51.4	-203.6	13.9	2.07

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Silas Unit 1H
Project:	Tyler County WV	**TVD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Well:	Silas Unit 1H	**North Reference:**	Grid
Wellbore:	Original Path	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
5,514.0	16.57	257.91	5,498.5	-56.9	-229.6	16.6	2.25
5,614.0	19.21	257.03	5,593.6	-63.6	-259.6	19.5	2.65
5,714.0	20.55	258.12	5,687.7	-70.9	-292.8	22.8	1.39
5,814.0	22.29	256.37	5,780.8	-79.0	-328.4	26.1	1.85
5,914.0	24.71	255.49	5,872.5	-88.7	-367.1	28.8	2.45
5,995.0	24.69	251.96	5,946.1	-98.2	-399.6	29.8	1.82
6,130.0	23.27	244.02	6,069.4	-118.6	-450.4	26.0	2.61
6,164.0	22.65	242.67	6,100.7	-124.6	-462.2	24.0	2.39
6,196.0	22.66	251.84	6,130.3	-129.3	-473.6	23.0	11.03
6,228.0	24.49	261.68	6,159.6	-132.2	-486.0	24.1	13.54
6,236.0	24.85	263.82	6,166.9	-132.6	-489.3	24.7	12.07
Sycamore							
6,260.0	26.12	269.88	6,188.5	-133.2	-499.6	27.4	12.07
6,293.0	27.44	276.65	6,218.0	-132.3	-514.4	32.8	10.07
6,325.0	29.08	283.16	6,246.2	-129.7	-529.3	39.9	10.90
6,357.0	31.13	288.96	6,273.9	-125.2	-544.7	48.8	11.12
6,389.0	33.27	294.05	6,301.0	-119.0	-560.6	59.7	10.79
6,421.0	35.53	298.64	6,327.4	-110.9	-576.8	72.3	10.75
6,453.0	37.42	302.31	6,353.1	-101.3	-593.1	86.6	9.02
6,485.0	40.52	305.93	6,378.0	-90.0	-609.8	102.4	12.02
6,517.0	44.40	308.77	6,401.6	-76.8	-626.9	120.2	13.52
6,549.0	47.90	310.79	6,423.8	-62.1	-644.6	139.7	11.85
6,582.0	51.12	313.11	6,445.2	-45.3	-663.3	161.4	11.13
6,614.0	53.36	317.13	6,464.8	-27.4	-681.1	184.0	12.15
6,629.0	54.26	319.13	6,473.7	-18.3	-689.2	195.1	12.32
Burkett							
6,646.0	55.32	321.34	6,483.5	-7.7	-698.1	208.0	12.32
6,678.0	57.65	324.66	6,501.1	13.6	-714.1	233.2	11.31
6,680.0	57.84	324.80	6,502.2	15.0	-715.1	234.8	11.07
Tully							
6,710.0	60.67	326.82	6,517.5	36.3	-729.6	259.5	11.07
6,742.0	63.79	328.50	6,532.4	60.3	-744.7	287.0	10.80
6,774.0	66.96	329.58	6,545.8	85.2	-759.7	315.3	10.37
6,804.0	69.67	331.03	6,556.9	109.4	-773.5	342.6	10.09
Marcellus							
6,806.0	69.85	331.13	6,557.5	111.1	-774.4	344.4	10.09
6,838.0	71.92	332.46	6,568.0	137.7	-788.7	374.2	7.57
6,871.0	73.68	334.14	6,577.8	165.9	-802.9	405.4	7.22
6,903.0	76.06	335.71	6,586.1	193.8	-815.9	436.0	8.82
6,935.0	80.41	337.14	6,592.7	222.6	-828.5	467.2	14.28
6,987.0	85.59	339.19	6,599.0	270.4	-847.7	518.6	10.70
7,042.0	92.08	343.49	6,600.1	322.5	-865.2	573.6	14.15
7,093.0	92.72	343.28	6,598.0	371.3	-879.8	624.5	1.32
7,189.0	89.87	339.89	6,595.8	462.4	-910.1	720.9	4.61
7,286.0	90.67	341.05	6,595.4	553.8	-942.5	817.4	1.51

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Silas Unit 1H
Project:	Tyler County WV	**TVD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Well:	Silas Unit 1H	**North Reference:**	Grid
Wellbore:	Original Path	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
7,382.0	90.47	343.53	6,594.4	645.2	-971.7	913.4	2.59
7,478.0	90.91	343.07	6,593.2	737.2	-999.3	1,009.4	0.66
7,575.0	90.94	341.77	6,591.7	829.6	-1,028.6	1,106.4	1.34
7,671.0	90.07	342.43	6,590.8	921.0	-1,058.1	1,202.4	1.14
7,768.0	89.56	342.97	6,591.1	1,013.6	-1,087.0	1,299.4	0.77
7,864.0	90.22	343.80	6,591.3	1,105.6	-1,114.4	1,395.3	1.10
7,961.0	90.24	345.07	6,590.9	1,199.0	-1,140.4	1,492.2	1.31
8,057.0	92.46	345.30	6,588.7	1,291.8	-1,165.0	1,588.1	2.32
8,154.0	90.13	341.59	6,586.5	1,384.7	-1,192.6	1,685.0	4.52
8,250.0	90.13	341.46	6,586.3	1,475.8	-1,223.0	1,781.0	0.14
8,346.0	90.03	340.50	6,586.1	1,566.5	-1,254.3	1,877.0	1.01
8,442.0	90.77	340.68	6,585.5	1,657.1	-1,286.2	1,972.9	0.79
8,539.0	90.97	341.81	6,584.0	1,748.9	-1,317.4	2,069.9	1.18
8,635.0	90.34	343.05	6,582.9	1,840.4	-1,346.4	2,165.9	1.45
8,731.0	91.11	343.38	6,581.7	1,932.3	-1,374.1	2,261.9	0.87
8,822.0	88.86	341.11	6,581.7	2,019.0	-1,401.8	2,352.9	3.51
8,913.0	89.19	341.75	6,583.2	2,105.2	-1,430.8	2,443.8	0.79
9,003.0	89.23	340.98	6,584.5	2,190.5	-1,459.6	2,533.8	0.86
9,094.0	91.18	344.33	6,584.2	2,277.3	-1,486.7	2,624.8	4.26
9,185.0	90.57	345.25	6,582.8	2,365.1	-1,510.6	2,715.7	1.21
9,275.0	90.97	345.34	6,581.6	2,452.2	-1,533.4	2,805.5	0.46
9,366.0	89.97	340.60	6,580.8	2,539.2	-1,560.1	2,896.5	5.32
9,457.0	89.33	338.16	6,581.4	2,624.3	-1,592.1	2,987.4	2.77
9,547.0	89.87	341.71	6,582.0	2,708.9	-1,623.0	3,077.3	3.99
9,638.0	90.77	342.81	6,581.5	2,795.5	-1,650.7	3,168.3	1.56
9,729.0	90.87	343.14	6,580.2	2,882.5	-1,677.3	3,259.3	0.38
9,820.0	89.30	339.58	6,580.1	2,968.7	-1,706.4	3,350.3	4.28
9,916.0	88.46	343.53	6,581.9	3,059.8	-1,736.8	3,446.2	4.21
10,013.0	89.29	342.12	6,583.8	3,152.4	-1,765.4	3,543.2	1.69
10,109.0	91.38	342.80	6,583.3	3,244.0	-1,794.3	3,639.2	2.29
10,205.0	90.91	342.80	6,581.4	3,335.6	-1,822.7	3,735.1	0.49
10,302.0	91.44	342.63	6,579.4	3,428.2	-1,851.5	3,832.1	0.57
10,398.0	91.58	341.75	6,576.8	3,519.6	-1,880.9	3,928.1	0.93
10,495.0	90.44	341.68	6,575.1	3,611.7	-1,911.3	4,025.1	1.18
10,591.0	90.40	340.91	6,574.4	3,702.6	-1,942.1	4,121.1	0.80
10,688.0	90.03	340.61	6,574.1	3,794.2	-1,974.1	4,218.0	0.49
10,784.0	90.34	341.12	6,573.7	3,884.9	-2,005.5	4,314.0	0.62
10,880.0	90.13	339.84	6,573.4	3,975.4	-2,037.6	4,410.0	1.35
10,976.0	90.24	340.81	6,573.0	4,065.8	-2,069.9	4,505.9	1.02
11,072.0	89.29	337.56	6,573.4	4,155.5	-2,104.0	4,601.8	3.53
11,168.0	89.36	340.46	6,574.6	4,245.1	-2,138.4	4,697.0	3.02
11,265.0	89.56	342.32	6,575.5	4,337.0	-2,169.4	4,794.6	1.93
11,361.0	90.07	342.97	6,575.8	4,428.7	-2,198.0	4,890.6	0.86
11,458.0	88.99	343.48	6,576.6	4,521.5	-2,226.0	4,987.6	1.23

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Project:	Tyler County WV	**TVD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Well:	Silas Unit 1H	**North Reference:**	Grid
Wellbore:	Original Path	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
11,554.0	89.36	343.80	6,578.0	4,613.6	-2,253.1	5,083.5	0.51
11,650.0	90.67	342.37	6,577.9	4,705.5	-2,281.0	5,179.5	2.02
11,746.0	90.00	340.88	6,577.4	4,796.6	-2,311.2	5,275.5	1.70
11,842.0	90.74	343.06	6,576.8	4,887.8	-2,341.0	5,371.5	2.40
11,939.0	90.07	343.20	6,576.1	4,980.7	-2,369.1	5,468.5	0.71
12,035.0	89.39	340.44	6,576.5	5,071.9	-2,399.0	5,564.5	2.96
12,131.0	89.80	339.65	6,577.2	5,162.1	-2,431.8	5,660.4	0.93
12,228.0	90.10	340.12	6,577.3	5,253.2	-2,465.2	5,757.3	0.57
12,324.0	89.93	340.19	6,577.3	5,343.5	-2,497.8	5,853.3	0.19
12,420.0	90.03	338.98	6,577.3	5,433.4	-2,531.2	5,949.2	1.26
12,516.0	90.07	340.31	6,577.2	5,523.5	-2,564.6	6,045.1	1.39
12,612.0	90.07	343.46	6,577.1	5,614.7	-2,594.5	6,141.1	3.28
12,709.0	90.03	343.60	6,577.0	5,707.7	-2,622.0	6,238.1	0.15
12,805.0	88.69	340.92	6,578.1	5,799.1	-2,651.2	6,334.1	3.12
12,901.0	88.79	340.90	6,580.2	5,889.8	-2,682.6	6,430.0	0.11
12,998.0	89.36	342.57	6,581.8	5,981.9	-2,713.0	6,527.0	1.82
13,094.0	89.29	339.62	6,582.9	6,072.7	-2,744.1	6,623.0	3.07
13,190.0	89.97	342.31	6,583.5	6,163.5	-2,775.4	6,718.9	2.89
13,287.0	88.76	342.34	6,584.6	6,255.9	-2,804.9	6,815.9	1.25
13,383.0	89.53	346.20	6,586.0	6,348.3	-2,830.9	6,911.8	4.10
13,479.0	88.96	345.75	6,587.3	6,441.4	-2,854.1	7,007.6	0.76
13,576.0	89.19	345.32	6,588.9	6,535.3	-2,878.4	7,104.4	0.50
13,671.0	89.56	345.42	6,589.9	6,627.2	-2,902.4	7,199.2	0.40
13,767.0	89.39	346.05	6,590.8	6,720.2	-2,926.0	7,295.0	0.68
13,864.0	87.11	341.71	6,593.7	6,813.4	-2,952.9	7,391.9	5.05
13,960.0	88.08	340.90	6,597.8	6,904.2	-2,983.7	7,487.8	1.32
14,056.0	88.96	340.01	6,600.2	6,994.6	-3,015.8	7,583.7	1.30
14,153.0	89.09	340.46	6,601.9	7,085.9	-3,048.6	7,680.7	0.48
14,249.0	90.40	340.35	6,602.3	7,176.4	-3,080.8	7,776.6	1.37
14,345.0	90.61	342.13	6,601.5	7,267.2	-3,111.6	7,872.6	1.87
14,442.0	90.81	342.74	6,600.3	7,359.7	-3,140.9	7,969.6	0.66
14,538.0	90.74	341.41	6,599.0	7,451.0	-3,170.5	8,065.6	1.39
14,634.0	90.48	339.49	6,598.0	7,541.5	-3,202.6	8,161.5	2.02
14,731.0	90.66	338.78	6,597.0	7,632.1	-3,237.1	8,258.4	0.76
14,788.0	91.88	339.27	6,595.7	7,685.3	-3,257.5	8,315.3	2.31
14,846.0	91.88	339.27	6,593.8	7,739.6	-3,278.0	8,373.2	0.00

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Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Silas Unit 1H GL 749 + RKB 25 @ 774.0usft
Well:	Silas Unit 1H	**North Reference:**	Grid
Wellbore:	Original Path	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
6,236.0	6,166.9	-132.6	-489.3	Sycamore
6,629.0	6,473.7	-18.3	-689.2	Burkett
6,680.0	6,502.2	15.0	-715.1	Tully
6,804.0	6,556.9	109.4	-773.5	Marcellus

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	1/3/2015
Job End Date:	1/24/2015
State:	West Virginia
County:	Tyler
API Number:	47-095-02157-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Silas Unit 1H
Longitude:	-80.74004400
Latitude:	39.39595600
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,602
Total Base Water Volume (gal):	10,854,312
Total Base Non Water Volume:	479,862

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FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

Interstate Oil & Gas Compact Commission

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Antero Resources	Base Fluid					
			Water	7732-18-5	100.00000	90.15055	
Sand	U.S. Well Services, LLC	Proppant					
			Crystalline Silica, quartz	14808-60-7	100.00000	9.53227	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid					
			Water	7732-18-5	87.50000	0.08531	
			Hydrogen Chloride	7641-01-1	18.00000	0.02038	
LGC-15	U.S. Well Services, LLC	Gelling Agents					
			Guar Gum	9000-30-0	50.00000	0.04591	
			Petroleum Distillates	64742-47-8	60.00000	0.04348	
			Suspending agent (solid)	14808-60-7	3.00000	0.00702	
			Surfactant	68439-51-0	3.00000	0.00275	
WFRA-405	U.S. Well Services, LLC	Friction Reducer					
			Anionic Polyacrylamide	Proprietary		0.02622	
			Water	7732-18-5	40.00000	0.02622	
			Petroleum Distillates	64742-47-8	22.00000	0.02111	
			Crystalline Salt	12125-02-9	5.00000	0.00328	

			Ethoxylated alcohol blend	Proprietary	5.00000	0.00328	
SI-1100	U.S. Well Services	Scale Inhibitor					
			Di Water	7732-18-5	80.00000	0.00968	
			Ethylene Glycol	107-21-1	40.00000	0.00547	
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00163	
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00156	
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00151	
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00143	
			bis (hexamethylene) tramine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00139	
			Acrylic polymer	52255-49-9	5.00000	0.00061	
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent					
			2,2-dibromo-3-nitrilopropionamide	10222-01-2	20.00000	0.00445	
			Deionized Water	7732-18-5	28.00000	0.00254	
AP One	U.S. Well Services, LLC	Gel Breakers					
			Ammonium Persulfate	7727-54-0	100.00000	0.00164	
AI-301	U.S. Well Services, LLC	Acid Corrosion Inhibitors					
			Diethylene Glycol	111-46-6	30.00000	0.00013	
			Methenamine	100-97-0	20.00000	0.00010	
			Hydrogen Chloride	7647-01-0	10.00000	0.00005	
			Polyethylene polyamine	68603-67-8	10.00000	0.00004	
			Coco amine	61791-14-8	5.00000	0.00002	

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

* Total Water Volume sources may include fresh water, produced water, and/or recycled water
** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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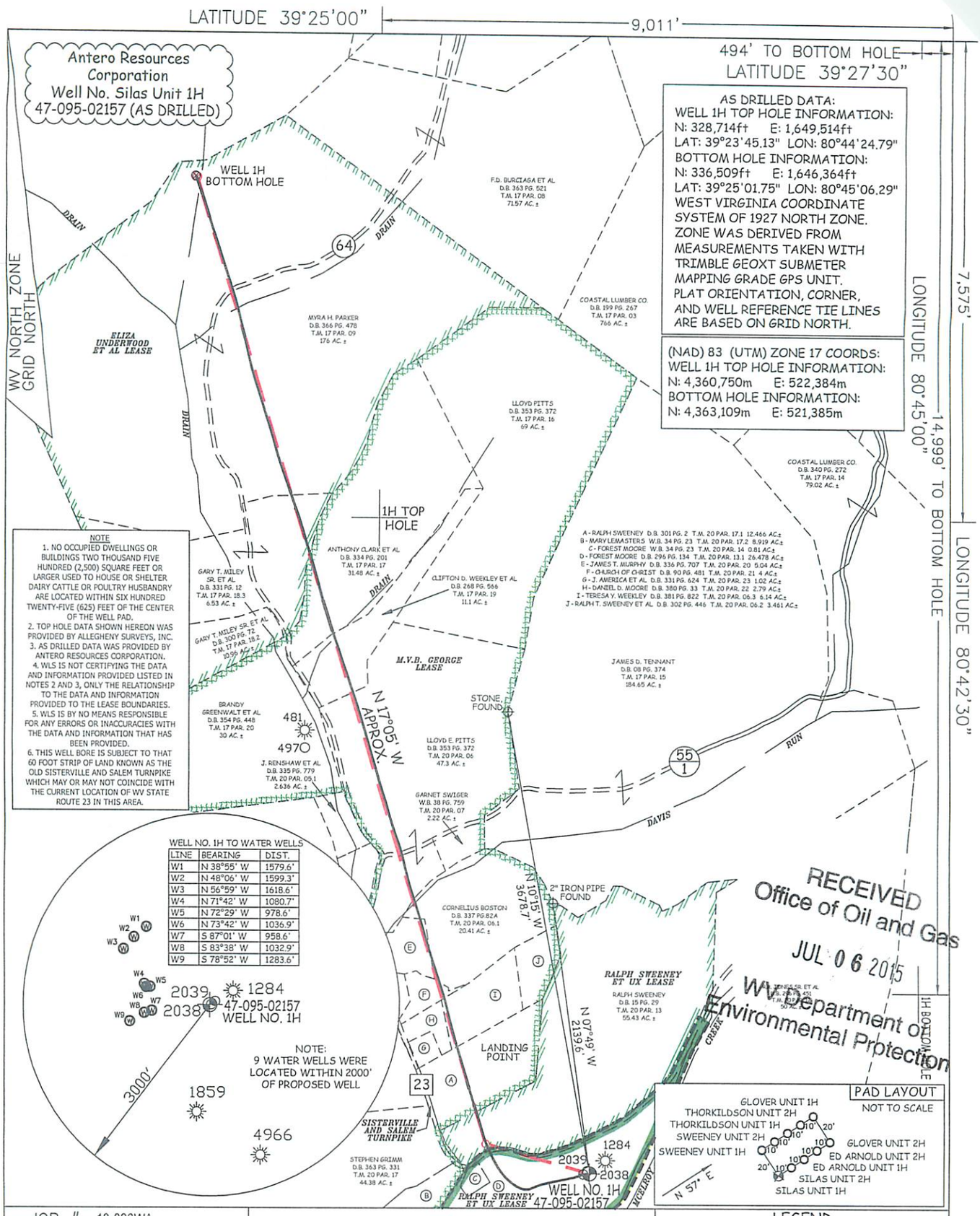

JOB # 13-096WA
DRAWING # SILAS1HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26415

LEGEND
- Surface Owner Boundary Lines +/-
- Interior Surface Tracts +/-
- Existing Fence
- Found monument, as noted
- Proposed Well Path
- As Drilled Well Path

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

DATE 06/25/15
OPERATOR'S WELL# SILAS UNIT #1H
API WELL # 47 – 095 – 02157
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 748' ORIGINAL - 745' AS DRILLED WATERSHED MCELROY CREEK
QUADRANGLE CENTER POINT 7.5' (TH) SHIRLEY 7.5' (BH) DISTRICT McELROY COUNTY TYLER
SURFACE OWNER FOREST & BRENDA MOORE ACREAGE 26.478 ACRES +/-
OIL & GAS ROYALTY OWNER RALPH SWEENEY ET UX; RALPH SWEENEY ET UX; M.V.B. GEORGE; ELIZA UNDERWOOD ET AL LEASE ACREAGE 25.668 ACRES±; 55.43 ACRES±; 300 ACRES±; 216 ACRES±
PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE ___
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE IN WELL (SPECIFY) (X) AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,594' TVD 14,846' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT

FORM WW-6

WR-35
Rev. 8/23/13

Page ___ of ___

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 095 - 02158 County Tyler District McElroy
Quad Center Point 7.5' Pad Name Forest Pad Field/Pool Name ----------
Farm name Moore, Brenda & Forest Well Number Glover Unit 1H
Operator (as registered with the OOG) Antero Resources Corporation
Address 1615 Wynkoop Street City Denver State CO Zip 80202

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey

Top hole	Northing	4,360,762m	Easting	522,390m
Landing Point of Curve	Northing	4,361,116.01m	Easting	522,466.17m
Bottom Hole	Northing	4,363,346m	Easting	521,740m

Elevation (ft) 745' GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas ■ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine ■Gas □ NGL ■ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air ■ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Air- Foam & 4% KCL
Mud- Polymer

Date permit issued 03/11/2014 Date drilling commenced 04/18/2014 Date drilling ceased 08/17/2014
Date completion activities began 10/16/2014 Date completion activities ceased 02/17/2015
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 89', 329' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 535'; 2,052' Void(s) encountered (Y/N) depths None
Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths None
Is coal being mined in area (Y/N) No

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Reviewed by:
JK - 7/24/15
✓

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API 47- 095 - 02158 Farm name Moore, Brenda & Forest Well number Glover Unit 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	40'	New	133#; J-55	N/A	Yes
Surface	17 1/2"	13 3/8"	399'	New	48#; H-40	N/A	Yes
Coal							
Intermediate 1	12 1/4"	9 5/8"	2,543'	New	36#; J-55	N/A	Yes
Intermediate 2							
Intermediate 3							
Production	8 3/4" & 8 1/2"	5 1/2"	14,810'	New	23#; P-110	N/A	Yes
Tubing		2 3/8"	6,828'		4.7#; N-80	N/A	
Packer type and depth set		N/A					

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	50 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	482 sx	15.6	1.18	277	0'	8 Hrs.
Coal							
Intermediate 1	Class A	934 sx	15.6	1.18	796	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	1,015 sx (Lead); 1,247 sx (Tail)	14.5 (Lead); 15.2 (Tail)	1.3 (Lead); 1.86 (Tail)	2,925	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 14,810' MD; 6,615' TVD (BHL); 6,626' TVD (Deepest Point Drilled) Loggers TD (ft) 14,763'

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6,463'

**This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Ed Arnold Unit 1H, API #47-095-02038). Please reference the wireline logs submitted with Form WR-35 for the Ed Arnold Unit 1H. A Cement Bond Log has been included with this submittal.

Check all wireline logs run ** ☐ caliper ☐ density ☐ deviated/directional ☐ induction ☐ neutron ☐ resistivity ☐ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ■ No Conventional Sidewall Were cuttings collected ☐ Yes ■ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

Conductor- 0

Surface- 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface

Intermediate- 1 above float joint, 1 above float collar, 1 every 4th joint to surface

Production- 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

WERE TRACERS USED ☐ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 095 - 02158 Farm name Moore, Brenda & Forest Well number Glover Unit 1H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)

* PLEASE SEE ATTACHED EXHIBIT 1

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)

* PLEASE SEE ATTACHED EXHIBIT 2

Please insert additional pages as applicable.

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API 47- 095 - 02158 Farm name Moore, Brenda & Forest Well number Glover Unit 1H

PRODUCING FORMATION(S)	DEPTHS			
Marcellus	6,554' (top)	TVD	6,823' (top)	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ■ Open Flow OIL TEST ■ Flow ☐ Pump

SHUT-IN PRESSURE Surface 3,550 psi Bottom Hole ---------- psi DURATION OF TEST ---------- hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	13,531 mcfpd	15 bpd	---------- bpd	5 bpd	☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITYAND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		

*** PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

Drilling Contractor Frontier Drilling LLC
Address 562 Spring Run Road City Pennsboro State WV Zip 26415

Logging Company STRC
Address 1560 Good Hope Pike City Clarksburg State WV Zip 26301

Cementing Company Nabors Completion & Production Services, Co.
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

Stimulating Company US Well Services
Address 533 Industrial Park Drive City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

Completed by Megan Darling Telephone 303-357-7230
Signature Megan C. Darling Title Permitting Agent Date 07/02/2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

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API 47-095-02158 Farm Name Moore, Forest & Brenda Well Number Glover Unit 1H

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	16-Oct-14	14,549	14,715	60	Marcellus
2	4-Dec-14	14,352	14,518	60	Marcellus
3	5-Dec-14	14,155	14,321	60	Marcellus
4	5-Dec-14	13,958	14,124	60	Marcellus
5	5-Dec-14	13,761	13,927	60	Marcellus
6	5-Dec-14	13,564	13,730	60	Marcellus
7	6-Dec-14	13,367	13,534	60	Marcellus
8	6-Dec-14	13,170	13,337	60	Marcellus
9	6-Dec-14	12,973	13,140	60	Marcellus
10	7-Dec-14	12,777	12,943	60	Marcellus
11	7-Dec-14	12,580	12,746	60	Marcellus
12	7-Dec-14	12,383	12,549	60	Marcellus
13	7-Dec-14	12,186	12,352	60	Marcellus
14	8-Dec-14	11,989	12,155	60	Marcellus
15	8-Dec-14	11,792	11,958	60	Marcellus
16	9-Dec-14	11,595	11,761	60	Marcellus
17	9-Dec-14	11,398	11,564	60	Marcellus
18	9-Dec-14	11,201	11,367	60	Marcellus
19	10-Dec-14	11,004	11,170	60	Marcellus
20	10-Dec-14	10,807	10,973	60	Marcellus
21	10-Dec-14	10,610	10,776	60	Marcellus
22	11-Dec-14	10,413	10,579	60	Marcellus
23	11-Dec-14	10,216	10,382	60	Marcellus
24	11-Dec-14	10,019	10,185	60	Marcellus
25	11-Dec-14	9,822	9,988	60	Marcellus
26	12-Dec-14	9,625	9,791	60	Marcellus
27	12-Dec-14	9,428	9,594	60	Marcellus
28	12-Dec-14	9,231	9,398	60	Marcellus
29	13-Dec-14	9,034	9,201	60	Marcellus
30	13-Dec-14	8,838	9,004	60	Marcellus
31	13-Dec-14	8,641	8,807	60	Marcellus
32	14-Dec-14	8,444	8,610	60	Marcellus
33	14-Dec-14	8,247	8,413	60	Marcellus
34	15-Dec-14	8,050	8,216	60	Marcellus
35	15-Dec-14	7,853	8,019	60	Marcellus
36	15-Dec-14	7,656	7,822	60	Marcellus
37	15-Dec-14	7,459	7,625	60	Marcellus
38	16-Dec-14	7,262	7,428	60	Marcellus
39	16-Dec-14	7,065	7,231	60	Marcellus
40	17-Dec-14	6,868	7,034	60	Marcellus

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API 47-095-02158 Farm Name Moore, Forest & Brenda Well Number Glover Unit 1H

EXHIBIT 2

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	4-Dec-14	67.3	7,138	N/A	5,546	243,510	6,593	N/A
2	4-Dec-14	69.3	7,361	5,901	5,904	200,500	6,003	N/A
3	5-Dec-14	71.7	7,601	5,878	5,697	243,120	6,521	N/A
4	5-Dec-14	69.7	7,382	6,048	5,823	242,920	6,557	N/A
5	5-Dec-14	70.3	7,181	5,728	5,395	243,900	6,834	N/A
6	5-Dec-14	71.4	7,307	5,848	4,621	244,300	6,459	N/A
7	6-Dec-14	70.5	7,188	5,882	5,636	244,060	6,459	N/A
8	6-Dec-14	68.5	7,288	6,049	5,372	200,040	6,431	N/A
9	6-Dec-14	68.8	7,598	5,985	5,704	215,100	6,830	N/A
10	7-Dec-14	71.7	7,318	5,948	5,651	244,020	6,390	N/A
11	7-Dec-14	71.2	7,234	5,842	5,329	243,550	6,393	N/A
12	7-Dec-14	72.3	7,293	5,827	5,901	244,500	6,350	N/A
13	7-Dec-14	69.7	7,255	5,933	5,440	244,350	5,801	N/A
14	8-Dec-14	70.2	7,167	5,857	5,619	244,330	6,385	N/A
15	8-Dec-14	68.7	7,197	5,819	5,600	245,130	6,285	N/A
16	9-Dec-14	70.0	7,069	5,784	5,761	233,860	6,179	N/A
17	9-Dec-14	70.8	6,984	5,776	5,571	243,970	6,295	N/A
18	9-Dec-14	70.7	6,973	5,741	5,521	245,050	6,234	N/A
19	10-Dec-14	70.5	6,949	5,724	5,850	243,820	6,317	N/A
20	10-Dec-14	70.5	6,918	5,796	5,485	243,670	6,197	N/A
21	10-Dec-14	70.1	6,893	5,513	5,650	243,570	6,186	N/A
22	11-Dec-14	71.1	7,338	5,750	5,709	243,970	6,174	N/A
23	11-Dec-14	69.9	7,166	5,794	5,703	244,050	6,142	N/A
24	11-Dec-14	57.2	6,597	5,755	5,535	190,070	6,754	N/A
25	11-Dec-14	70.1	7,055	5,466	5,590	241,705	6,138	N/A
26	12-Dec-14	70.2	6,995	5,778	5,563	244,610	6,126	N/A
27	12-Dec-14	70.4	7,085	5,536	5,822	243,260	6,113	N/A
28	12-Dec-14	69.8	6,738	5,766	5,767	241,450	6,081	N/A
29	13-Dec-14	70.2	7,000	5,466	5,564	242,620	6,079	N/A
30	13-Dec-14	70.4	6,912	5,637	5,405	244,860	6,060	N/A
31	13-Dec-14	70.0	7,114	5,712	5,781	243,520	6,046	N/A
32	14-Dec-14	69.9	6,791	5,459	5,579	243,520	6,047	N/A
33	14-Dec-14	70.0	7,012	6,026	5,645	243,210	6,031	N/A
34	15-Dec-14	70.2	7,298	5,726	5,772	242,400	6,086	N/A
35	15-Dec-14	70.7	6,916	6,133	5,902	244,900	5,988	N/A
36	15-Dec-14	70.9	6,572	6,034	5,662	244,400	5,988	N/A
37	15-Dec-14	70.0	6,976	5,744	5,273	244,360	5,954	N/A
38	16-Dec-14	70.5	6,853	5,744	5,912	244,120	5,955	N/A
39	16-Dec-14	71.1	6,784	6,954	6,190	244,400	5,934	N/A
40	17-Dec-14	70.2	6,497	6,100	5,500	243,580	5,948	N/A
	AVG=	**69.9**	**7,075**	**5,832**	**5,624**	**9,572,275**	**249,343**	TOTAL

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API 47-095-02158 Farm Name Moore, Forest & Brenda Well Number Glover Unit 1H				
EXHIBIT 3				
LITHOLOGY/ FORMATION	**TOP DEPTH (TVD) From Surface**	**BOTTOM DEPTH (TVD) From Surface**	**TOP DEPTH (MD) From Surface**	**BOTTOM DEPTH (MD) From Surface**
Fresh Water	89'	N/A	89'	N/A
Fresh Water	329'	N/A	329'	N/A
Shale/ Sandstone	0	149	0	149
Sandstone/ Trace Coal	est. 149	209	est. 149	209
Sandstone/ Shale	est. 209	429	est. 209	429
Limestone	est. 429	449	est. 429	449
Sandstone	est. 449	569	est. 449	569
Sandstone/ Limestone	est. 569	689	est. 569	689
Sandstone	est. 689	789	est. 689	789
Sandstone/ Trace Coal	est. 789	829	est. 789	829
Shale/ Sandstone	est. 829	929	est. 829	929
Sandstone/ Trace Coal	est. 929	1,029	est. 929	1,029
Sandstone	est. 1029	1,069	est. 1029	1,069
Coal/ Sandstone	est. 1069	1,429	est. 1069	1,429
Sandstone	est. 1429	1,721	est. 1429	1,722
Big Lime	1,721	1,872	1,722	1,873
Big Injun	1,872	2,309	1,873	2,310
Gantz Sand	2,309	2,458	2,310	2,459
Fifty Foot Sandstone	2,458	2,538	2,459	2,539
Gordon	2,538	2,819	2,539	2,820
Fifth Sandstone	2,819	2,863	2,820	2,864
Bayard	2,863	3,266	2,864	3,267
Warren	3,266	3,624	3,267	3,625
Speechley	3,624	3,928	3,625	3,929
Baltown	3,928	4,389	3,929	4,390
Bradford	4,389	4,872	4,390	4,877
Benson	4,872	5,125	4,877	5,142
Alexander	5,125	5,340	5,142	5,370
Elk	5,340	5,859	5,370	5,935
Rhinestreet	5,859	6,167	5,935	6,286
Sycamore	6,167	6,327	6,286	6,466
Middlesex	6,327	6,467	6,466	6,654
Burkett	6,467	6,495	6,654	6,701
Tully	6,495	6,554	6,701	6,823
Marcellus	6,554	NA	6,823	NA

*Please note Antero determines shallow formation tops based on mud logs that are only run on one well on a multi-well pad. The measured depth (MD) data on subsequent wells may be slightly different due to the well's unique departure.

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Antero Resources

Antero Resources
Glover Unit 1H
Tyler County WV
Northing: 14306216.40
Easting: 1713829.03
As Drilled

WELL DETAILS: Glover Unit 1H
Ground Level: 749.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	14306216.40	1713829.03	39° 23' 45.518 N	80° 44' 24.514 W	

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Glover Unit 1H, Grid North
Vertical (TVD) Reference: Frontier 22: GL 749' + 25' RKB @ 774.0usft
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: Frontier 22: GL 749' + 25' RKB @ 774.0usft
Calculation Method: Minimum Curvature

PROJECT DETAILS: Tyler County WV

Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level

Scientific Drilling

Genie Lightfoot
10:53, August 22 2014

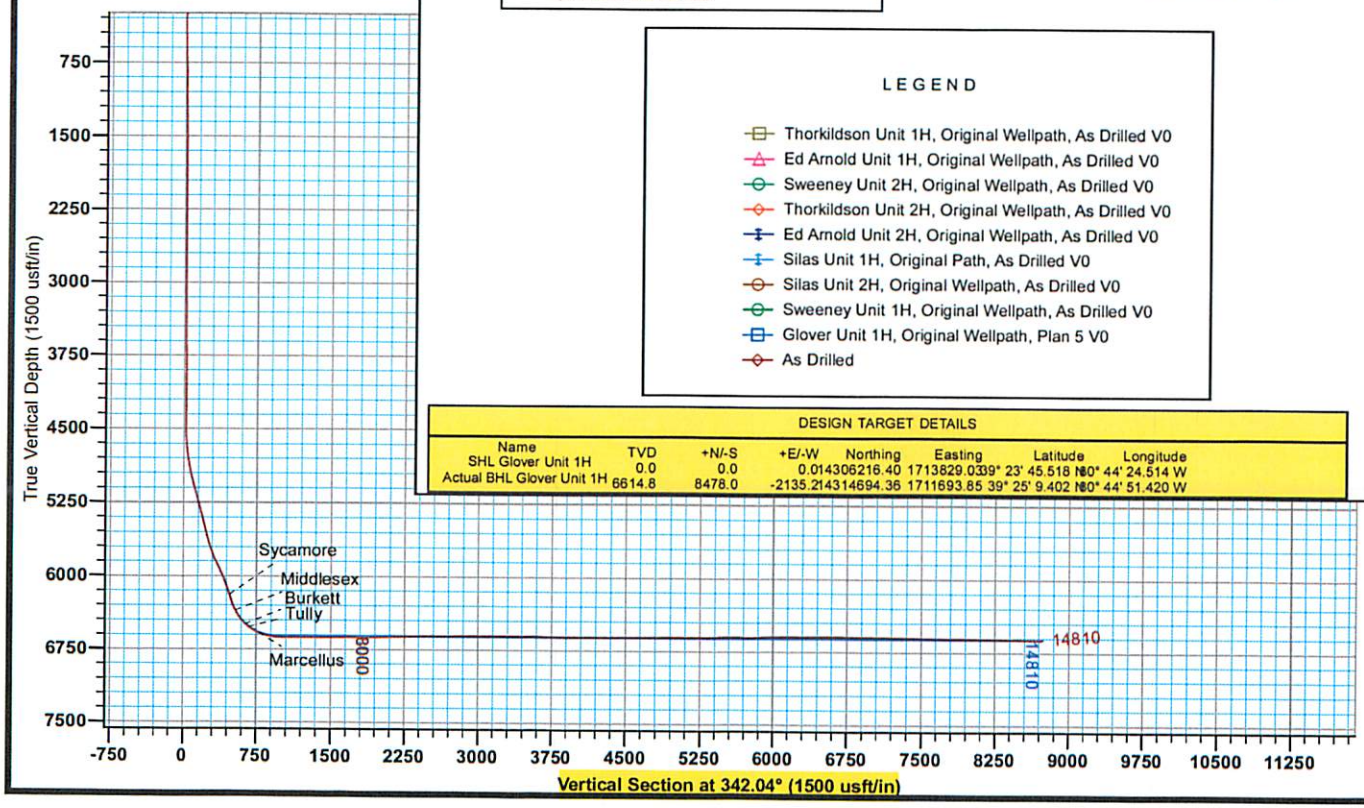
Scientific Drilling
421 South Eagle Lane
Oklahoma City, OK

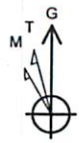
LEGEND

- Thorkildson Unit 1H, Original Wellpath, As Drilled V0
- Ed Arnold Unit 1H, Original Wellpath, As Drilled V0
- Sweeney Unit 2H, Original Wellpath, As Drilled V0
- Thorkildson Unit 2H, Original Wellpath, As Drilled V0
- Ed Arnold Unit 2H, Original Wellpath, As Drilled V0
- Silas Unit 1H, Original Path, As Drilled V0
- Silas Unit 2H, Original Wellpath, As Drilled V0
- Sweeney Unit 1H, Original Wellpath, As Drilled V0
- Glover Unit 1H, Original Wellpath, Plan 5 V0
- As Drilled

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL Glover Unit 1H	0.0	0.0	0.0	14306216.40	1713829.03	39° 23' 45.518 N	80° 44' 24.514 W
Actual BHL Glover Unit 1H	6614.8	8478.0	-2135.21	14314694.36	1711693.85	39° 25' 9.402 N	80° 44' 51.420 W

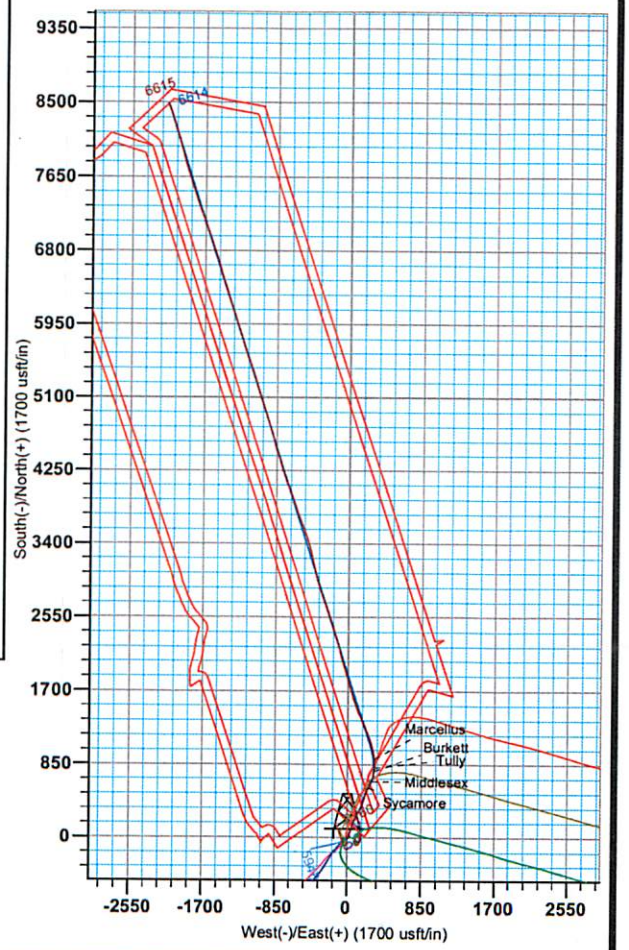




To convert Magnetic North to Grid: Subtract 8.73°
To convert True North to Grid: Subtract 0.16°

Azimuths to Grid North
True North: -0.17°
Magnetic North: -8.73°

Magnetic Field
Strength: 52321.3snT
Dip Angle: 66.93°
Date: 4/21/2014
Model: BGGM2013



Antero Resources

Tyler County WV
Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pad
Glover Unit 1H
Original Wellpath

Design: As Drilled

EOW Completion Report

22 August, 2014

Scientific Drilling

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Antero Resources

EOW Completion Report

Scientific Drilling

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 1H
Project:	Tyler County WV	**TVD Reference:**	Frontier 22: GL 749' + 25' RKB @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 25' RKB @ 774.0usft
Well:	Glover Unit 1H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Project Tyler County WV, Tyler Co West Virginia

Map System:	Universal Transverse Mercator (US Survey Fee	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Zone 17N (84 W to 78 W)		

Site Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pad

Site Position:		**Northing:**	14,306,188.32 usft	**Latitude:**	39° 23' 45.240 N
From:	Map	**Easting:**	1,713,823.50 usft	**Longitude:**	80° 44' 24.585 W
Position Uncertainty:	2.0 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	0.16 °

Well Glover Unit 1H, Marcellus

Well Position	**+N/-S**	0.0 usft	**Northing:**	14,306,216.40 usfl	**Latitude:**	39° 23' 45.518 N
	+E/-W	0.0 usft	**Easting:**	1,713,829.03 usfl	**Longitude:**	80° 44' 24.514 W
Position Uncertainty		2.0 usft	**Wellhead Elevation:**	774.0 usfl	**Ground Level:**	749.0 usft

Wellbore Original Wellpath

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	BGGM2013	4/21/2014	-8.57	66.93	52,321

Design As Drilled

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.0	0.0	0.0	342.04

Survey Program **Date** 8/22/2014

From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
114.0	6,275.7	Survey #8 Final Gyro (Original Wellpath)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper
6,275.7	14,810.0	Survey #9 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
114.0	0.35	224.26	114.0	-0.2	-0.2	-0.2	0.31
214.0	0.35	231.54	214.0	-0.7	-0.7	-0.4	0.04
314.0	0.14	154.96	314.0	-1.0	-0.9	-0.6	0.35
414.0	0.43	81.06	414.0	-1.0	-0.5	-0.8	0.41
514.0	4.23	58.80	513.9	1.0	3.1	0.0	3.84
614.0	5.27	53.76	613.6	5.6	9.9	2.3	1.12
714.0	6.30	53.49	713.0	11.6	18.0	5.4	1.03
814.0	2.71	47.92	812.7	16.4	24.2	8.1	3.61
914.0	1.93	49.13	912.6	19.1	27.2	9.8	0.78
1,014.0	1.24	46.41	1,012.6	20.9	29.3	10.9	0.69

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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,114.0	0.92	51.49	1,112.6	22.2	30.7	11.6	0.33
1,214.0	0.46	43.90	1,212.6	23.0	31.6	12.1	0.47
1,314.0	0.19	20.52	1,312.6	23.4	31.9	12.4	0.30
1,414.0	0.23	357.78	1,412.6	23.8	32.0	12.8	0.09
1,514.0	0.28	338.62	1,512.6	24.2	31.9	13.2	0.10
1,614.0	0.32	340.08	1,612.6	24.7	31.7	13.7	0.04
1,714.0	0.12	325.19	1,712.6	25.1	31.6	14.1	0.21
1,814.0	0.17	308.39	1,812.6	25.2	31.4	14.3	0.07
1,914.0	0.17	292.98	1,912.6	25.4	31.1	14.5	0.05
2,014.0	0.14	263.65	2,012.6	25.4	30.9	14.7	0.08
2,114.0	0.21	276.20	2,112.6	25.4	30.6	14.8	0.08
2,214.0	0.12	246.59	2,212.6	25.4	30.3	14.8	0.12
2,314.0	0.10	257.68	2,312.6	25.3	30.1	14.8	0.03
2,414.0	0.23	286.32	2,412.6	25.4	29.8	14.9	0.15
2,514.0	0.27	289.65	2,512.6	25.5	29.4	15.2	0.04
2,614.0	0.30	265.38	2,612.6	25.6	28.9	15.4	0.12
2,714.0	0.40	280.68	2,712.6	25.6	28.3	15.6	0.14
2,814.0	0.50	280.84	2,812.6	25.8	27.6	16.0	0.10
2,914.0	0.44	288.18	2,912.5	26.0	26.8	16.5	0.08
3,014.0	0.56	268.32	3,012.5	26.1	25.9	16.8	0.21
3,114.0	0.59	272.38	3,112.5	26.1	24.9	17.1	0.05
3,214.0	0.56	285.10	3,212.5	26.2	23.9	17.6	0.13
3,314.0	0.49	279.65	3,312.5	26.4	23.0	18.0	0.09
3,414.0	0.55	277.15	3,412.5	26.6	22.1	18.4	0.06
3,514.0	0.54	270.96	3,512.5	26.6	21.2	18.8	0.06
3,614.0	0.59	274.07	3,612.5	26.7	20.2	19.1	0.06
3,714.0	0.50	287.78	3,712.5	26.8	19.3	19.6	0.16
3,814.0	0.34	316.24	3,812.5	27.2	18.7	20.1	0.26
3,914.0	0.35	302.83	3,912.5	27.6	18.2	20.6	0.08
4,014.0	0.37	308.38	4,012.5	27.9	17.7	21.1	0.04
4,114.0	0.32	326.96	4,112.5	28.4	17.3	21.7	0.12
4,214.0	0.08	342.99	4,212.5	28.7	17.1	22.0	0.24
4,314.0	0.09	38.98	4,312.5	28.8	17.1	22.1	0.08
4,414.0	0.03	350.71	4,412.5	28.9	17.2	22.2	0.07
4,514.0	0.51	5.02	4,512.5	29.4	17.2	22.6	0.48
4,614.0	4.29	30.17	4,612.4	33.0	19.1	25.5	3.83
4,714.0	8.45	17.57	4,711.8	43.3	23.2	34.0	4.36
4,814.0	11.84	18.70	4,810.2	60.0	28.7	48.2	3.40
4,914.0	13.56	17.30	4,907.7	80.9	35.5	66.0	1.75
5,014.0	17.46	18.30	5,004.1	106.4	43.7	87.7	3.91
5,114.0	19.11	19.10	5,099.0	136.1	53.8	112.9	1.67
5,214.0	19.74	19.33	5,193.3	167.5	64.7	138.4	0.63
5,314.0	19.45	21.62	5,287.5	198.9	76.5	165.6	0.82
5,414.0	19.68	26.16	5,381.8	229.5	90.0	190.6	1.54

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Survey

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5,514.0	18.96	26.16	5,476.1	259.2	104.6	214.3	0.72
5,614.0	20.84	27.86	5,570.2	289.5	120.1	238.4	1.97
5,714.0	23.97	29.67	5,662.6	322.9	138.4	264.5	3.20
5,814.0	27.01	25.59	5,752.9	361.0	158.3	294.6	3.51
5,914.0	29.83	16.56	5,840.8	405.4	175.2	331.6	5.13
6,014.0	30.23	15.56	5,927.4	453.5	189.1	373.1	0.64
6,114.0	27.76	17.49	6,014.9	499.9	202.8	413.0	2.64
6,214.0	25.57	25.92	6,104.3	541.6	219.3	447.6	4.37
6,275.7	25.74	28.78	6,159.9	565.3	231.5	466.3	2.03
6,311.0	25.60	27.55	6,191.7	578.8	238.7	477.0	1.56
Sycamore							
6,399.0	25.29	24.44	6,271.2	612.7	255.3	504.2	1.56
6,431.0	26.20	22.97	6,300.0	625.5	260.9	514.5	3.47
6,463.0	29.46	21.15	6,328.3	639.3	266.5	526.0	10.53
6,491.0	32.90	20.33	6,352.3	652.9	271.6	537.3	12.37
Middlesex							
6,495.0	33.39	20.22	6,355.6	654.9	272.4	539.0	12.37
6,528.0	37.61	20.21	6,382.5	672.9	279.0	554.1	12.79
6,560.0	39.55	19.95	6,407.5	691.6	285.9	569.8	6.08
6,592.0	41.51	17.92	6,431.8	711.3	292.6	586.4	7.38
6,624.0	44.96	14.64	6,455.1	732.3	298.7	604.6	12.86
6,656.0	48.36	11.88	6,477.1	755.0	304.0	624.5	12.34
6,679.0	50.69	9.51	6,492.0	772.2	307.3	639.8	12.79
Burkett							
6,688.0	51.61	8.63	6,497.7	779.1	308.4	646.1	12.79
6,720.0	54.85	5.56	6,516.8	804.5	311.5	669.3	12.71
6,726.0	55.35	4.94	6,520.2	809.4	312.0	673.8	11.88
Tully							
6,753.0	57.65	2.26	6,535.1	831.9	313.4	694.7	11.88
6,785.0	60.75	359.05	6,551.5	859.4	313.7	720.8	12.96
6,817.0	64.24	356.02	6,566.3	887.7	312.5	748.1	13.76
6,848.0	66.86	353.69	6,579.1	915.8	309.9	775.6	10.85
Marcellus							
6,849.0	66.94	353.62	6,579.5	916.7	309.8	776.5	10.85
6,881.0	70.04	351.27	6,591.3	946.2	305.9	805.8	11.85
6,913.0	72.98	349.78	6,601.4	976.2	300.9	835.8	10.19
6,945.0	76.34	347.66	6,609.9	1,006.4	294.9	866.5	12.29
6,977.0	79.19	345.21	6,616.7	1,036.8	287.5	897.6	11.63
7,027.0	84.94	343.01	6,623.6	1,084.4	274.0	947.1	12.30
7,110.0	91.31	340.54	6,626.3	1,163.2	248.0	1,030.0	8.23
7,206.0	89.76	336.61	6,625.4	1,252.5	213.0	1,125.8	4.10
7,302.0	89.56	335.90	6,625.9	1,340.4	174.3	1,221.3	0.77
7,399.0	91.51	337.34	6,625.0	1,429.4	135.8	1,317.9	2.50
7,495.0	89.16	338.41	6,624.5	1,518.3	99.7	1,413.6	2.69
7,591.0	90.17	341.11	6,625.0	1,608.4	66.5	1,509.5	3.00

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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
7,687.0	90.30	345.45	6,624.6	1,700.3	38.9	1,605.5	4.52
7,782.0	91.54	345.34	6,623.1	1,792.2	14.9	1,700.3	1.31
7,878.0	90.10	340.41	6,621.7	1,883.9	-13.3	1,796.3	5.35
7,974.0	90.50	342.75	6,621.2	1,975.0	-43.7	1,892.2	2.47
8,070.0	89.93	345.74	6,620.9	2,067.4	-69.7	1,988.2	3.17
8,165.0	92.19	345.78	6,619.1	2,159.5	-93.1	2,082.9	2.38
8,260.0	92.18	342.86	6,615.5	2,250.8	-118.8	2,177.8	3.07
8,356.0	92.92	343.57	6,611.2	2,342.7	-146.4	2,273.7	1.07
8,452.0	91.68	342.45	6,607.4	2,434.4	-174.5	2,369.6	1.74
8,548.0	90.97	341.17	6,605.2	2,525.6	-204.4	2,465.5	1.52
8,644.0	89.60	340.63	6,604.7	2,616.3	-235.8	2,561.5	1.53
8,739.0	90.00	340.63	6,605.0	2,705.9	-267.4	2,656.5	0.42
8,835.0	91.04	341.00	6,604.1	2,796.6	-298.9	2,752.5	1.15
8,931.0	89.90	340.86	6,603.4	2,887.3	-330.3	2,848.4	1.20
9,026.0	90.47	343.69	6,603.1	2,977.8	-359.2	2,943.4	3.04
9,123.0	90.00	345.63	6,602.7	3,071.3	-384.8	3,040.3	2.06
9,219.0	90.10	348.09	6,602.6	3,164.8	-406.7	3,136.0	2.56
9,310.0	90.94	348.31	6,601.7	3,253.9	-425.3	3,226.4	0.95
9,400.0	89.50	344.46	6,601.4	3,341.3	-446.5	3,316.2	4.57
9,491.0	91.04	342.32	6,601.0	3,428.5	-472.5	3,407.1	2.90
9,582.0	89.46	339.10	6,600.6	3,514.4	-502.5	3,498.1	3.94
9,672.0	88.46	339.18	6,602.2	3,598.5	-534.6	3,588.0	1.11
9,763.0	88.32	338.06	6,604.8	3,683.2	-567.7	3,678.8	1.24
9,854.0	89.03	340.08	6,606.9	3,768.1	-600.2	3,769.6	2.35
9,944.0	88.86	342.05	6,608.5	3,853.3	-629.4	3,859.6	2.20
10,035.0	89.93	340.81	6,609.5	3,939.5	-658.4	3,950.6	1.80
10,126.0	90.87	339.65	6,608.8	4,025.1	-689.2	4,041.5	1.64
10,216.0	89.66	338.14	6,608.4	4,109.1	-721.6	4,131.4	2.15
10,307.0	89.90	340.82	6,608.8	4,194.3	-753.5	4,222.3	2.96
10,404.0	90.23	343.31	6,608.7	4,286.6	-783.3	4,319.3	2.59
10,500.0	90.94	342.03	6,607.7	4,378.2	-811.9	4,415.2	1.52
10,596.0	89.73	339.36	6,607.1	4,468.8	-843.7	4,511.2	3.05
10,693.0	90.00	345.61	6,607.4	4,561.3	-872.8	4,608.2	6.45
10,789.0	92.12	344.05	6,605.6	4,653.9	-898.0	4,704.0	2.74
10,886.0	90.60	342.19	6,603.3	4,746.7	-926.1	4,801.0	2.48
10,982.0	89.90	340.57	6,602.9	4,837.7	-956.8	4,897.0	1.84
11,079.0	90.17	343.22	6,602.8	4,929.9	-986.9	4,993.9	2.75
11,175.0	90.47	341.87	6,602.3	5,021.4	-1,015.7	5,089.9	1.44
11,271.0	89.26	341.19	6,602.5	5,112.5	-1,046.1	5,185.9	1.45
11,368.0	91.48	344.20	6,601.9	5,205.1	-1,075.0	5,282.9	3.86
11,464.0	92.28	343.13	6,598.7	5,297.1	-1,102.0	5,378.8	1.39
11,560.0	91.51	342.34	6,595.5	5,388.8	-1,130.4	5,474.8	1.13
11,657.0	89.29	339.92	6,594.9	5,480.5	-1,161.8	5,571.7	3.39
11,753.0	88.96	340.99	6,596.3	5,571.0	-1,193.9	5,667.7	1.17
11,849.0	90.17	342.33	6,597.1	5,662.1	-1,224.1	5,763.7	1.88

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11,945.0	91.17	342.66	6,595.9	5,753.7	-1,253.0	5,859.7	1.10
12,041.0	92.22	343.24	6,593.1	5,845.4	-1,281.1	5,955.6	1.25
12,138.0	91.11	342.22	6,590.3	5,938.0	-1,309.9	6,052.6	1.55
12,234.0	90.13	339.81	6,589.2	6,028.8	-1,341.1	6,148.5	2.71
12,331.0	88.69	340.94	6,590.2	6,120.1	-1,373.7	6,245.5	1.89
12,427.0	90.30	343.26	6,591.1	6,211.4	-1,403.2	6,341.5	2.94
12,523.0	90.67	344.21	6,590.3	6,303.6	-1,430.1	6,437.4	1.06
12,620.0	89.56	341.36	6,590.1	6,396.2	-1,458.8	6,534.4	3.15
12,716.0	88.96	341.66	6,591.3	6,487.3	-1,489.2	6,630.4	0.70
12,812.0	91.17	344.29	6,591.2	6,579.1	-1,517.3	6,726.4	3.58
12,908.0	89.80	343.02	6,590.4	6,671.2	-1,544.4	6,822.3	1.95
13,004.0	89.80	342.02	6,590.7	6,762.7	-1,573.2	6,918.3	1.04
13,100.0	89.60	341.32	6,591.2	6,853.9	-1,603.4	7,014.3	0.76
13,197.0	89.73	341.69	6,591.8	6,945.9	-1,634.2	7,111.3	0.40
13,293.0	88.39	339.92	6,593.4	7,036.5	-1,665.7	7,207.3	2.31
13,390.0	89.40	340.40	6,595.2	7,127.7	-1,698.6	7,304.2	1.15
13,486.0	88.69	339.09	6,596.8	7,217.8	-1,731.9	7,400.1	1.55
13,582.0	89.09	338.56	6,598.7	7,307.3	-1,766.5	7,495.9	0.69
13,678.0	89.23	341.36	6,600.1	7,397.4	-1,799.4	7,591.8	2.92
13,774.0	90.10	341.97	6,600.7	7,488.6	-1,829.6	7,687.8	1.11
13,871.0	90.91	342.39	6,599.8	7,580.9	-1,859.3	7,784.8	0.94
13,967.0	88.28	340.91	6,600.5	7,672.0	-1,889.5	7,880.8	3.14
14,063.0	88.82	343.10	6,602.9	7,763.3	-1,919.2	7,976.8	2.35
14,160.0	87.85	343.35	6,605.7	7,856.1	-1,947.1	8,073.7	1.03
14,256.0	89.46	345.80	6,608.0	7,948.6	-1,972.7	8,169.6	3.05
14,353.0	90.47	345.82	6,608.1	8,042.7	-1,996.4	8,266.4	1.04
14,449.0	88.22	341.94	6,609.2	8,134.9	-2,023.1	8,362.3	4.67
14,545.0	89.19	342.53	6,611.3	8,226.3	-2,052.4	8,458.3	1.18
14,642.0	89.23	341.92	6,612.7	8,318.6	-2,082.0	8,555.2	0.63
14,756.0	89.29	341.34	6,614.1	8,426.8	-2,117.9	8,669.2	0.51
14,810.0	89.29	341.34	6,614.8	8,478.0	-2,135.2	8,723.2	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
6,311.0	6,191.7	578.8	238.7	Sycamore
6,491.0	6,352.3	652.9	271.6	Middlesex
6,679.0	6,492.0	772.2	307.3	Burkett
6,726.0	6,520.2	809.4	312.0	Tully
6,848.0	6,579.1	915.8	309.9	Marcellus

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Checked By: _____ Approved By: _____ Date: _____

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	12/4/2014
Job End Date:	12/17/2014
State:	West Virginia
County:	Tyler
API Number:	47-095-02158-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Glover Unit 1H
Longitude:	-80.73996400
Latitude:	39.39606400
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,615
Total Base Water Volume (gal):	10,472,406
Total Base Non Water Volume:	485,895

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FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

INTERSTATE Oil & Gas COMPACT COMMISSION

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Antero Resources	Base Fluid					
			Water	7732-18-5	100.00000	89.78333	
Sand	U.S. Well Services, LLC	Proppant					
			Crystalline Silica, quartz	14808-60-7	100.00000	9.84007	
LGC-15	U.S. Well Services, LLC	Gelling Agents					
			Guar Gum	9000-30-0	50.00000	0.07373	
			Petroleum Distillates	64742-47-8	60.00000	0.06983	
			Suspending agent (solid)	14808-60-7	3.00000	0.01128	
			Surfactant	68439-51-0	3.00000	0.00442	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid					
			Water	7732-18-5	87.50000	0.08806	
			Hydrogen Chloride	7641-01-1	18.00000	0.02103	
WFRA-405	U.S. Well Services, LLC	Friction Reducer					
			Water	7732-18-5	40.00000	0.02432	
			Anionic Polyacrylamide	Proprietary		0.02432	
			Petroleum Distillates	64742-47-8	22.00000	0.01958	
			Ethoxylated alcohol blend	Proprietary	5.00000	0.00304	

			Crystalline Salt	12125-02-9	5.00000	0.00304	
SI-1100	U.S. Well Services	Scale Inhibitor					
			Di Water	7732-18-5	80.00000	0.01023	
			Ethylene Glycol	107-21-1	40.00000	0.00578	
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00173	
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00165	
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00160	
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00151	
			bis (hexamethylene) tramine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00147	
			Acrylic polymer	52255-49-9	5.00000	0.00064	
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent					
			2,2-dibromo-3-nitrilopropionamide	10222-01-2	20.00000	0.00451	
			Deionized Water	7732-18-5	28.00000	0.00258	
AP One	U.S. Well Services, LLC	Gel Breakers					
			Ammonium Persulfate	7727-54-0	100.00000	0.00189	
AI-301	U.S. Well Services, LLC	Acid Corrosion Inhibitors					
			Diethylene Glycol	111-46-6	30.00000	0.00014	
			Methenamine	100-97-0	20.00000	0.00011	
			Hydrogen Chloride	7647-01-0	10.00000	0.00005	
			Polyethylene polyamine	68603-67-8	10.00000	0.00004	
			Coco amine	61791-14-8	5.00000	0.00002	

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

* Total Water Volume sources may include fresh water, produced water, and/or recycled water
** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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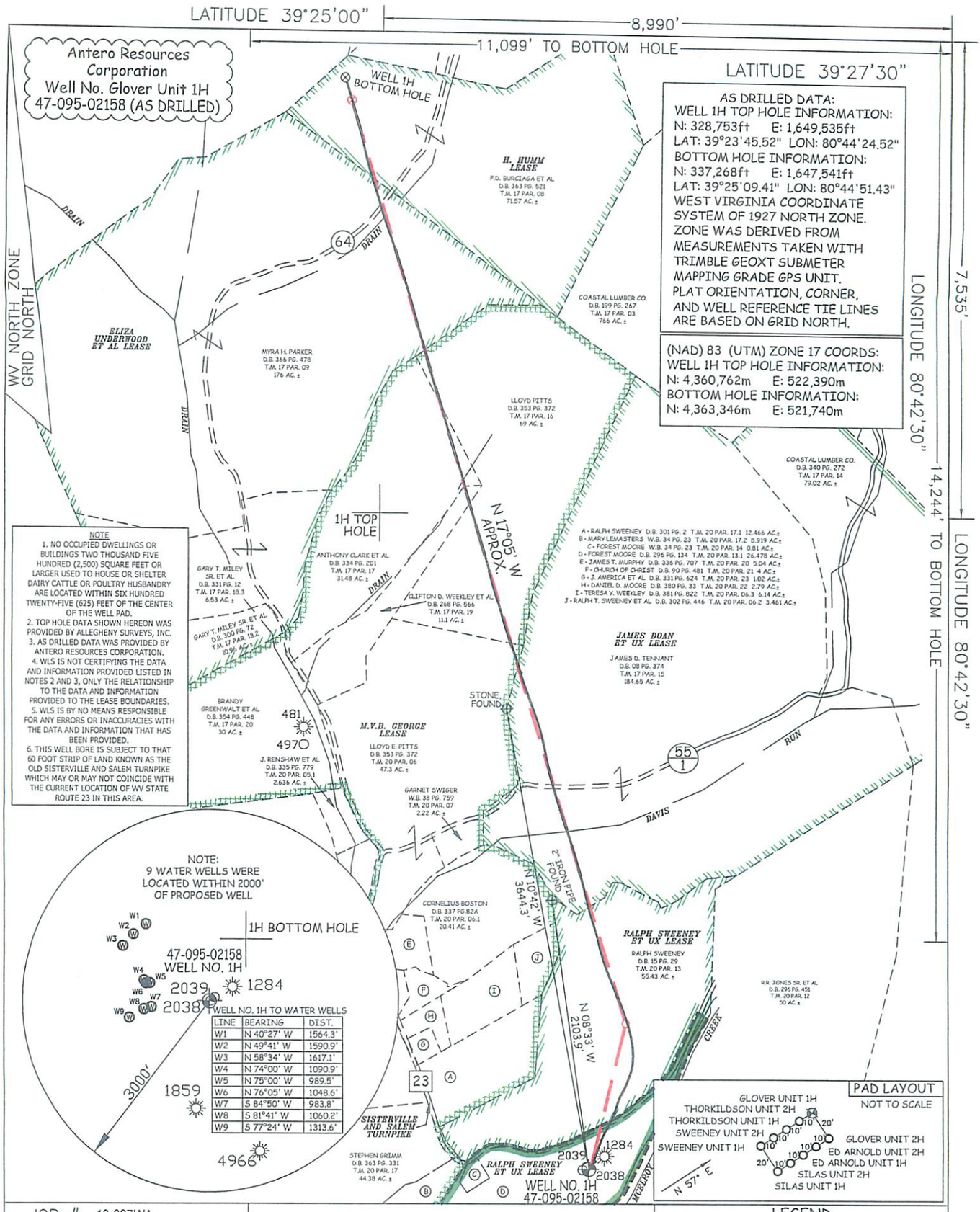

JOB # 13-097WA
DRAWING # GLOVER1HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26415

DATE 06/25/15
OPERATOR'S WELL# GLOVER UNIT #1H

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

API WELL #
47 – 095 – 02158
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 748' ORIGINAL - 745' AS DRILLED WATERSHED MCELROY CREEK
QUADRANGLE CENTER POINT 7.5' DISTRICT McELROY COUNTY TYLER
SURFACE OWNER FOREST & BRENDA MOORE ACREAGE 26.478 ACRES +/-
OIL & GAS ROYALTY OWNER RALPH SWEENEY ET UX; RALPH SWEENEY ET UX; JAMES DOAN ET UX; M.V.B. GEORGE; ELIZA UNDERWOOD ET AL; H. HUMM LEASE ACREAGE 25.668 ACRES±; 55.43 ACRES±; 263.67 ACRES±; 300 ACRES±; 216 ACRES±; 77.20 ACRES±
PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE ___
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE IN WELL (SPECIFY) (X) AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,615' TVD 14,810' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM
DENVER, CO 80202 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

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State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 095 - 02159 County Tyler District McElroy
Quad Center Point 7.5' Pad Name Forest Pad Field/Pool Name ----------
Farm name Moore, Forest & Brenda Well Number Glover Unit 2H
Operator (as registered with the OOG) Antero Resources Corporation
Address 1615 Wynkoop Street City Denver State CO Zip 80202

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey

Top hole	Northing	4,360,757m	Easting	522,394m
Landing Point of Curve	Northing	4,361,325.76m	Easting	522,606.42m
Bottom Hole	Northing	4,363,329m	Easting	521,957m

Elevation (ft) 745' GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas ■ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine ■Gas □ NGL ■ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air ■ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Air- Foam & 4% KCL
Mud- Polymer

Date permit issued 03/11/2014 Date drilling commenced 04/18/2014 Date drilling ceased 09/06/2014
Date completion activities began 10/16/2014 Date completion activities ceased 02/10/2015
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 89', 329' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 535'; 2,052' Void(s) encountered (Y/N) depths None
Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths None
Is coal being mined in area (Y/N) No

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Reviewed by:
JZC 7/24/15
✓

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API 47- 095 - 02159 Farm name Moore, Forest & Brenda Well number Glover Unit 2H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	40'	New	133#; J-55	N/A	Yes
Surface	17 1/2"	13 3/8"	402'	New	48#; H-40	N/A	Yes
Coal							
Intermediate 1	12 1/4"	9 5/8"	2,542'	New	36#; J-55	N/A	Yes
Intermediate 2							
Intermediate 3							
Production	8 3/4" & 8 1/2"	5 1/2"	14,208'	New	20#; P-110	N/A	Yes
Tubing		2 3/8"	7,061'		4.7#; N-80	N/A	
Packer type and depth set		N/A					

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	50 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	481 sx	15.6	1.18	279	0'	8 Hrs.
Coal							
Intermediate 1	Class A	937 sx	15.6	1.18	796	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	858 sx (Lead);1,271 sx (Tail)	14.5 (Lead); 15.2 (Tail)	1.3 (Lead); 1.86 (Tail)	2,787	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 14,208' TMD; 6,573' TVD (BHL); 6,605' TVD (Deepest Point Drilled) Loggers TD (ft) 7,302'

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6,716'

**This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Ed Arnold Unit 1H, API #47-095-02038). Please reference the wireline logs submitted with Form WR-35 for the Ed Arnold Unit 1H. A Cement Bond Log has been included with this submittal.

Check all wireline logs run** ☐ caliper ☐ density ☐ deviated/directional ☐ induction ☐ neutron ☐ resistivity ☐ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ■ No Conventional Sidewall Were cuttings collected ■ Yes ☐ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

Conductor- 0

Surface- 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface

Intermediate- 1 above float joint, 1 above float collar, 1 every 4th joint to surface

Production- 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

WERE TRACERS USED ☐ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 095 - 02159 Farm name Moore, Forest & Brenda Well number Glover Unit 2H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)

* PLEASE SEE ATTACHED EXHIBIT 1

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)

* PLEASE SEE ATTACHED EXHIBIT 2

Please insert additional pages as applicable.

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API 47- 095 - 02159 Farm name Moore, Forest & Brenda Well number Glover Unit 2H

PRODUCING FORMATION(S)	DEPTHS			
Marcellus	6,555' (top)	TVD	7,091' (top)	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ■ Open Flow OIL TEST ■ Flow ☐ Pump

SHUT-IN PRESSURE Surface 3,550 psi Bottom Hole ---------- psi DURATION OF TEST ---------- hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	11,523 mcfpd	16 bpd	---------- bpd	2 bpd	☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITYAND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		

*** PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

Drilling Contractor Frontier Drilling LLC
Address 562 Spring Run Road City Pennsboro State WV Zip 26415

Logging Company STRC
Address 1560 Good Hope Pike City Clarksburg State WV Zip 26301

Cementing Company Nabors Completion & Production Services, Co.
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

Stimulating Company US Well Services
Address 533 Industrial Park Drive City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

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Completed by Megan Darling Telephone 303-357-7230
Signature Megan C Darling Title Permitting Agent Date 07/02/2015

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Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

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Environmental Protectio

API 47-095-02159 Farm Name Moore, Forest & Brenda Well Number Glover Unit 2H					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	16-Oct-14	13,947	14,116	60	Marcellus
2	17-Nov-14	13,747	13,916	60	Marcellus
3	18-Nov-14	13,547	13,716	60	Marcellus
4	19-Nov-14	13,346	13,515	60	Marcellus
5	21-Nov-14	13,146	13,315	60	Marcellus
6	21-Nov-14	12,946	13,115	60	Marcellus
7	21-Nov-14	12,745	12,914	60	Marcellus
8	21-Nov-14	12,545	12,714	60	Marcellus
9	22-Nov-14	12,345	12,514	60	Marcellus
10	22-Nov-14	12,144	12,313	60	Marcellus
11	23-Nov-14	11,944	12,113	60	Marcellus
12	23-Nov-14	11,744	11,913	60	Marcellus
13	23-Nov-14	11,543	11,712	60	Marcellus
14	24-Nov-14	11,343	11,512	60	Marcellus
15	24-Nov-14	11,143	11,312	60	Marcellus
16	24-Nov-14	10,942	11,111	60	Marcellus
17	25-Nov-14	10,742	10,911	60	Marcellus
18	25-Nov-14	10,542	10,711	60	Marcellus
19	25-Nov-14	10,341	10,510	60	Marcellus
20	26-Nov-14	10,141	10,310	60	Marcellus
21	26-Nov-14	9,941	10,110	60	Marcellus
22	26-Nov-14	9,740	9,909	60	Marcellus
23	26-Nov-14	9,540	9,709	60	Marcellus
24	27-Nov-14	9,340	9,509	60	Marcellus
25	27-Nov-14	9,139	9,308	60	Marcellus
26	28-Nov-14	8,939	9,108	60	Marcellus
27	28-Nov-14	8,739	8,908	60	Marcellus
28	29-Nov-14	8,538	8,707	60	Marcellus
29	29-Nov-14	8,338	8,507	60	Marcellus
30	29-Nov-14	8,138	8,307	60	Marcellus
31	30-Nov-14	7,937	8,106	60	Marcellus
32	1-Dec-14	7,737	7,906	60	Marcellus
33	1-Dec-14	7,537	7,706	60	Marcellus
34	1-Dec-14	7,336	7,505	60	Marcellus
35	2-Dec-14	7,136	7,305	60	Marcellus

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API 47-095-02159 Farm Name Moore, Forest & Brenda Well Number Glover Unit 2H

EXHIBIT 2

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	14-Nov-14	51.8	7,577	6,311	4,776	63,420	7,267	N/A
2	17-Nov-14	56.0	7,436	6,258	5,580	140,100	5,941	N/A
3	18-Nov-14	59.8	6,995	6,190	4,861	208,120	6,112	N/A
4	19-Nov-14	61.2	7,463	6,821	4,846	137,290	7,245	N/A
5	21-Nov-14	62.9	7,301	6,191	5,205	207,350	6,391	N/A
6	21-Nov-14	63.5	7,442	5,906	3,938	244,900	7,173	N/A
7	21-Nov-14	63.3	7,258	6,172	5,193	177,220	7,144	N/A
8	21-Nov-14	63.9	7,158	5,839	5,292	245,870	6,461	N/A
9	22-Nov-14	62.3	7,925	5,971	5,156	115,540	6,453	N/A
10	22-Nov-14	64.4	7,198	5,647	5,481	185,360	7,069	N/A
11	23-Nov-14	70.9	7,439	5,939	5,172	247,040	6,993	N/A
12	23-Nov-14	61.2	7,310	5,710	5,330	165,700	6,343	N/A
13	23-Nov-14	57.9	7,335	5,621	5,242	222,400	6,948	N/A
14	24-Nov-14	64.8	7,127	5,682	4,646	238,840	6,885	N/A
15	24-Nov-14	60.9	7,059	5,689	4,839	216,080	6,377	N/A
16	24-Nov-14	63.9	7,086	5,826	5,077	191,100	6,288	N/A
17	25-Nov-14	63.9	7,444	5,980	4,836	247,800	6,386	N/A
18	25-Nov-14	62.4	7,011	5,661	4,951	223,980	6,344	N/A
19	25-Nov-14	64.4	6,992	5,962	4,701	217,800	6,720	N/A
20	26-Nov-14	67.8	7,142	5,928	4,102	249,100	6,369	N/A
21	26-Nov-14	67.2	7,043	5,789	5,287	187,760	6,403	N/A
22	26-Nov-14	63.8	7,046	5,799	5,452	198,200	5,929	N/A
23	26-Nov-14	70.2	6,969	5,810	5,018	250,200	6,238	N/A
24	27-Nov-14	70.6	6,920	5,201	5,586	249,000	6,343	N/A
25	27-Nov-14	69.2	7,154	5,898	5,647	203,700	5,668	N/A
26	28-Nov-14	70.9	7,010	5,846	5,126	249,020	6,311	N/A
27	28-Nov-14	70.9	6,360	5,328	5,858	250,600	6,164	N/A
28	29-Nov-14	67.3	7,099	5,650	4,448	104,520	6,140	N/A
29	29-Nov-14	70.3	6,866	6,144	5,306	251,200	6,227	N/A
30	29-Nov-14	70.8	6,756	5,507	5,083	239,600	6,040	N/A
31	30-Nov-14	69.9	6,997	6,142	4,257	249,600	6,089	N/A
32	1-Dec-14	70.3	7,159	5,873	5,085	211,000	6,649	N/A
33	1-Dec-14	71.0	6,526	5,988	5,058	247,150	6,457	N/A
34	1-Dec-14	69.3	6,417	5,639	5,552	251,100	6,214	N/A
35	2-Dec-14	70.1	6,412	5,813	5,410	247,460	6,302	N/A
	AVG=	**65.4**	**7,098**	**5,878**	**5,068**	**7,335,120**	**226,083**	TOTAL

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API 47-095-02159 Farm Name Moore, Forest & Brenda Well Number Glover Unit 2H

EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD) From Surface	BOTTOM DEPTH (TVD) From Surface	TOP DEPTH (MD) From Surface	BOTTOM DEPTH (MD) From Surface
Fresh Water	89'	N/A	89'	N/A
Fresh Water	329'	N/A	329'	N/A
Shale/ Sandstone	0	149	0	149
Sandstone/ Trace Coal	149	209	149	209
Sandstone/ Shale	209	429	209	429
Limestone	429	449	429	449
Sandstone	449	569	449	569
Sandstone/ Limestone	569	689	569	689
Sandstone	689	789	689	789
Sandstone/ Trace Coal	789	829	789	829
Shale/ Sandstone	829	929	829	929
Sandstone/ Trace Coal	929	1,029	929	1,029
Sandstone	1,029	1,069	1,029	1,069
Coal/ Sandstone	1,069	1,429	1,069	1,429
Sandstone	1,429	1,741	1,429	1,741
Big Lime	1,741	1,883	1,741	1,883
Big Injun	1,883	2,310	1,883	2,310
Gantz Sand	2,310	2,467	2,310	2,467
Fifty Foot Sandstone	2,467	2,533	2,467	2,533
Gordon	2,533	2,823	2,533	2,824
Fifth Sandstone	2,823	2,881	2,824	2,883
Bayard	2,881	3,262	2,883	3,270
Warren	3,262	3,623	3,270	3,641
Speechley	3,623	3,930	3,641	3,959
Baltown	3,930	4,384	3,959	4,471
Bradford	4,384	4,901	4,471	5,061
Benson	4,901	5,167	5,061	5,360
Alexander	5,167	5,357	5,360	5,572
Elk	5,357	5,913	5,572	6,215
Rhinestreet	5,913	6,170	6,215	6,519
Sycamore	6,170	6,325	6,519	6,699
Middlesex	6,325	6,467	6,699	6,900
Burkett	6,467	6,495	6,900	6,949
Tully	6,495	6,555	6,949	7,091
Marcellus	6,555	NA	7,091	NA

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Antero Resources

Antero Resources
Glover Unit 2H
Tyler County WV
Northing: 14306199.50
Easting: 1713840.31
As Drilled

WELL DETAILS: Glover Unit 2H
Ground Level: 749.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	14306199.50	1713840.31	39° 23' 45.350 N	80° 44' 24.371 W	

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Glover Unit 2H, Grid North
Vertical (TVD) Reference: Frontier 22: GL 749' + 24' RKB @ 774.0usft
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: Frontier 22: GL 749' + 24' RKB @ 774.0usft
Calculation Method: Minimum Curvature

PROJECT DETAILS: Tyler County WV

Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level

Scientific Drilling

Genie Lightfoot
14:20, September 12 2014

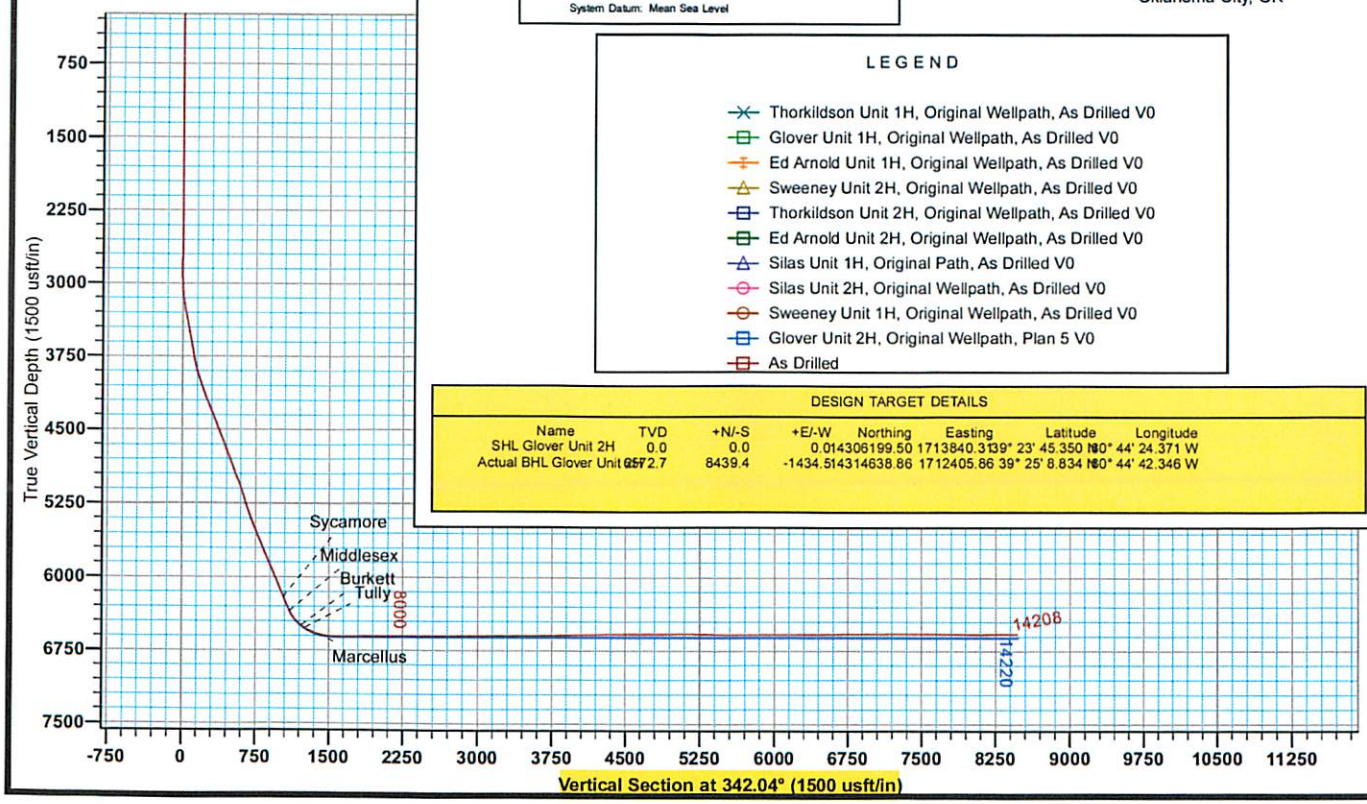
Scientific Drilling
421 South Eagle Lane
Oklahoma City, OK

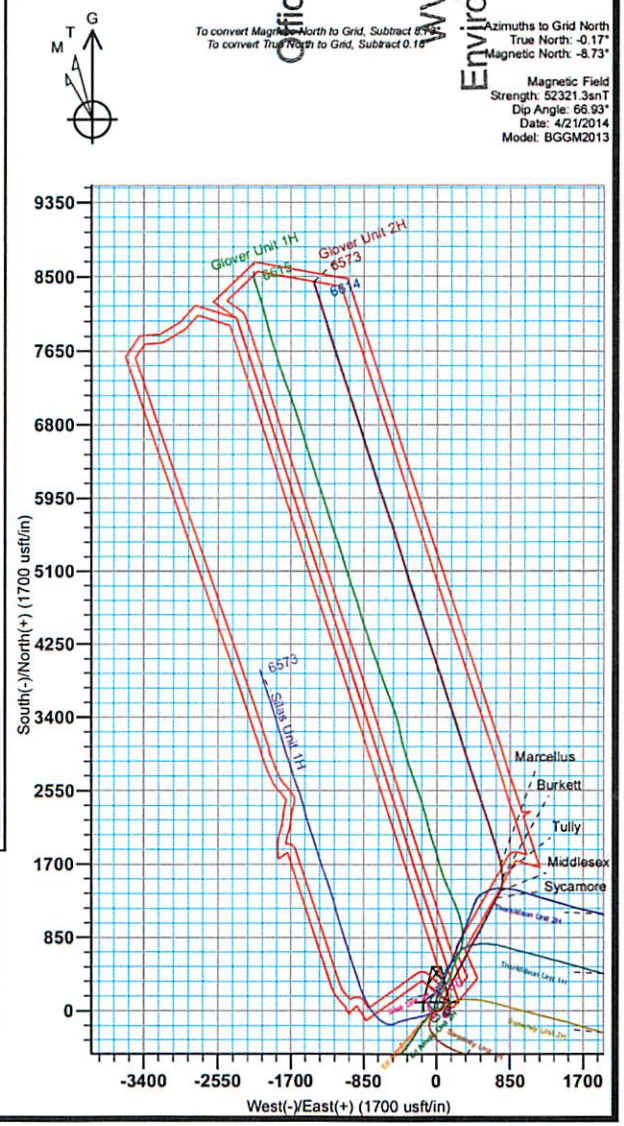
LEGEND

- Thorkildson Unit 1H, Original Wellpath, As Drilled V0
- Glover Unit 1H, Original Wellpath, As Drilled V0
- Ed Arnold Unit 1H, Original Wellpath, As Drilled V0
- Sweeney Unit 2H, Original Wellpath, As Drilled V0
- Thorkildson Unit 2H, Original Wellpath, As Drilled V0
- Ed Arnold Unit 2H, Original Wellpath, As Drilled V0
- Silas Unit 1H, Original Path, As Drilled V0
- Silas Unit 2H, Original Wellpath, As Drilled V0
- Sweeney Unit 1H, Original Wellpath, As Drilled V0
- Glover Unit 2H, Original Wellpath, Plan 5 V0
- As Drilled

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL Glover Unit 2H	0.0	0.0	0.0	14306199.50	1713840.31	39° 23' 45.350 N	80° 44' 24.371 W
Actual BHL Glover Unit 2H	6572.7	8439.4	-1434.5	14314638.86	1712405.86	39° 25' 8.834 N	80° 44' 42.346 W





Antero Resources

Tyler County WV
Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pad
Glover Unit 2H
Original Wellpath

Design: As Drilled

EOW Completion Report

12 September, 2014

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Scientific Drilling

Antero Resources

EOW Completion Report

Scientific Drilling

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 2H
Project:	Tyler County WV	**TVD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Well:	Glover Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Project Tyler County WV, Tyler Co West Virginia

Map System:	Universal Transverse Mercator (US Survey Fee	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Zone 17N (84 W to 78 W)		

Site Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pad

Site Position:		**Northing:**	14,306,188.32 usft	**Latitude:**	39° 23' 45.240 N
From:	Map	**Easting:**	1,713,823.50 usft	**Longitude:**	80° 44' 24.585 W
Position Uncertainty:	2.0 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	0.16 °

Well Glover Unit 2H, Marcellus

Well Position	**+N/-S**	0.0 usft	**Northing:**	14,306,199.50 usft	**Latitude:**	39° 23' 45.350 N
	+E/-W	0.0 usft	**Easting:**	1,713,840.31 usft	**Longitude:**	80° 44' 24.371 W
Position Uncertainty		2.0 usft	**Wellhead Elevation:**	774.0 usft	**Ground Level:**	749.0 usft

Wellbore Original Wellpath

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	BGGM2013	4/21/2014	-8.57	66.93	52,321

Design As Drilled

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.0	0.0	0.0	342.04

Survey Program **Date** 9/12/2014

From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
39.0	5,445.0	Survey #4 Final Gyro (Original Wellpath)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper
5,498.0	14,208.0	Survey #5 MWD (Original Wellpath)	MWD SDI	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
39.0	0.14	177.34	39.0	0.0	0.0	0.0	0.36
64.0	0.28	177.34	64.0	-0.1	0.0	-0.1	0.56
89.0	0.42	177.34	89.0	-0.3	0.0	-0.3	0.56
114.0	0.52	175.52	114.0	-0.5	0.0	-0.5	0.40
139.0	0.55	170.92	139.0	-0.7	0.1	-0.7	0.31
164.0	0.56	179.10	164.0	-1.0	0.1	-0.9	0.32
189.0	0.71	195.17	189.0	-1.2	0.0	-1.2	0.93
214.0	0.78	195.50	214.0	-1.6	0.0	-1.5	0.28
239.0	0.67	190.34	239.0	-1.9	-0.1	-1.7	0.51
264.0	0.67	201.19	264.0	-2.1	-0.2	-2.0	0.51

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 2H
Project:	Tyler County WV	**TVD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Well:	Glover Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
289.0	0.68	217.38	289.0	-2.4	-0.3	-2.2	0.76
314.0	0.67	229.47	314.0	-2.6	-0.5	-2.3	0.57
339.0	0.69	233.15	339.0	-2.8	-0.8	-2.4	0.19
364.0	0.64	240.31	364.0	-3.0	-1.0	-2.5	0.39
389.0	0.56	246.05	389.0	-3.1	-1.3	-2.5	0.40
414.0	0.55	246.83	414.0	-3.2	-1.5	-2.6	0.05
439.0	0.54	250.51	439.0	-3.3	-1.7	-2.6	0.15
464.0	0.47	244.53	464.0	-3.3	-1.9	-2.6	0.35
489.0	0.42	243.56	489.0	-3.4	-2.1	-2.6	0.20
514.0	0.44	250.37	514.0	-3.5	-2.2	-2.6	0.22
539.0	0.40	253.68	539.0	-3.6	-2.4	-2.6	0.19
564.0	0.37	253.70	564.0	-3.6	-2.6	-2.6	0.12
589.0	0.37	251.93	589.0	-3.6	-2.7	-2.6	0.05
614.0	0.30	258.33	614.0	-3.7	-2.9	-2.6	0.32
639.0	0.26	261.63	639.0	-3.7	-3.0	-2.6	0.17
664.0	0.27	256.41	664.0	-3.7	-3.1	-2.6	0.10
689.0	0.25	258.53	689.0	-3.8	-3.2	-2.6	0.09
714.0	0.22	260.24	714.0	-3.8	-3.3	-2.6	0.12
739.0	0.21	258.43	739.0	-3.8	-3.4	-2.6	0.05
764.0	0.23	256.50	764.0	-3.8	-3.5	-2.5	0.09
789.0	0.19	247.19	789.0	-3.8	-3.6	-2.5	0.21
814.0	0.15	238.20	814.0	-3.9	-3.7	-2.6	0.19
839.0	0.16	231.67	839.0	-3.9	-3.7	-2.6	0.08
864.0	0.18	220.76	864.0	-4.0	-3.8	-2.6	0.15
889.0	0.22	220.64	889.0	-4.0	-3.8	-2.7	0.16
914.0	0.31	238.60	914.0	-4.1	-3.9	-2.7	0.49
939.0	0.35	250.99	939.0	-4.2	-4.0	-2.7	0.33
964.0	0.26	255.16	964.0	-4.2	-4.2	-2.7	0.37
989.0	0.21	253.63	989.0	-4.2	-4.3	-2.7	0.20
1,014.0	0.22	261.94	1,014.0	-4.2	-4.4	-2.7	0.13
1,039.0	0.22	269.08	1,039.0	-4.3	-4.5	-2.7	0.11
1,064.0	0.21	255.13	1,064.0	-4.3	-4.5	-2.7	0.21
1,089.0	0.22	251.27	1,089.0	-4.3	-4.6	-2.7	0.07
1,114.0	0.19	254.18	1,114.0	-4.3	-4.7	-2.7	0.13
1,139.0	0.18	254.82	1,139.0	-4.3	-4.8	-2.7	0.04
1,164.0	0.20	249.46	1,164.0	-4.4	-4.9	-2.7	0.11
1,189.0	0.26	238.67	1,189.0	-4.4	-5.0	-2.7	0.29
1,214.0	0.30	239.18	1,214.0	-4.5	-5.1	-2.7	0.16
1,239.0	0.32	234.30	1,239.0	-4.6	-5.2	-2.7	0.13
1,264.0	0.39	236.27	1,264.0	-4.6	-5.3	-2.8	0.28
1,289.0	0.35	240.26	1,289.0	-4.7	-5.5	-2.8	0.19
1,314.0	0.32	242.43	1,314.0	-4.8	-5.6	-2.8	0.13
1,339.0	0.37	248.46	1,339.0	-4.9	-5.7	-2.9	0.25
1,364.0	0.36	254.69	1,364.0	-4.9	-5.9	-2.9	0.16

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 2H
Project:	Tyler County WV	**TVD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Well:	Glover Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,389.0	0.36	255.80	1,389.0	-4.9	-6.0	-2.8	0.03
1,414.0	0.37	259.29	1,414.0	-5.0	-6.2	-2.8	0.10
1,439.0	0.35	262.80	1,439.0	-5.0	-6.3	-2.8	0.12
1,464.0	0.34	262.07	1,464.0	-5.0	-6.5	-2.8	0.04
1,489.0	0.33	261.19	1,489.0	-5.0	-6.6	-2.8	0.04
1,514.0	0.35	261.18	1,514.0	-5.1	-6.8	-2.7	0.08
1,539.0	0.34	266.54	1,539.0	-5.1	-6.9	-2.7	0.14
1,564.0	0.28	271.91	1,564.0	-5.1	-7.1	-2.7	0.27
1,589.0	0.27	271.90	1,589.0	-5.1	-7.2	-2.6	0.04
1,614.0	0.23	286.17	1,614.0	-5.1	-7.3	-2.6	0.29
1,639.0	0.22	286.16	1,639.0	-5.0	-7.4	-2.5	0.04
1,664.0	0.19	282.54	1,664.0	-5.0	-7.5	-2.5	0.13
1,689.0	0.14	319.19	1,689.0	-5.0	-7.5	-2.4	0.46
1,714.0	0.11	336.08	1,714.0	-4.9	-7.6	-2.4	0.19
1,739.0	0.07	331.67	1,739.0	-4.9	-7.6	-2.3	0.16
1,764.0	0.07	333.65	1,764.0	-4.9	-7.6	-2.3	0.01
1,789.0	0.12	319.50	1,789.0	-4.8	-7.6	-2.3	0.22
1,814.0	0.10	303.27	1,814.0	-4.8	-7.6	-2.2	0.15
1,839.0	0.03	234.41	1,839.0	-4.8	-7.7	-2.2	0.37
1,864.0	0.02	310.09	1,864.0	-4.8	-7.7	-2.2	0.13
1,889.0	0.10	257.12	1,889.0	-4.8	-7.7	-2.2	0.36
1,914.0	0.09	236.48	1,914.0	-4.8	-7.7	-2.2	0.14
1,939.0	0.07	246.77	1,939.0	-4.8	-7.8	-2.2	0.10
1,964.0	0.07	239.67	1,964.0	-4.9	-7.8	-2.2	0.03
1,989.0	0.06	240.43	1,989.0	-4.9	-7.8	-2.2	0.04
2,014.0	0.08	238.52	2,014.0	-4.9	-7.8	-2.2	0.08
2,039.0	0.11	229.48	2,039.0	-4.9	-7.9	-2.2	0.13
2,064.0	0.24	256.39	2,064.0	-4.9	-7.9	-2.2	0.60
2,089.0	0.27	261.33	2,089.0	-5.0	-8.1	-2.2	0.15
2,114.0	0.25	254.22	2,114.0	-5.0	-8.2	-2.2	0.15
2,139.0	0.29	263.84	2,139.0	-5.0	-8.3	-2.2	0.24
2,164.0	0.24	268.75	2,164.0	-5.0	-8.4	-2.2	0.22
2,189.0	0.26	263.96	2,189.0	-5.0	-8.5	-2.2	0.12
2,214.0	0.23	260.45	2,214.0	-5.0	-8.6	-2.1	0.13
2,239.0	0.29	256.94	2,239.0	-5.1	-8.7	-2.1	0.25
2,264.0	0.30	261.38	2,264.0	-5.1	-8.9	-2.1	0.10
2,289.0	0.26	254.13	2,289.0	-5.1	-9.0	-2.1	0.21
2,314.0	0.21	255.07	2,314.0	-5.1	-9.1	-2.1	0.20
2,339.0	0.14	262.90	2,339.0	-5.1	-9.1	-2.1	0.30
2,364.0	0.17	265.09	2,364.0	-5.2	-9.2	-2.1	0.12
2,389.0	0.18	296.69	2,389.0	-5.1	-9.3	-2.0	0.38
2,414.0	0.22	288.85	2,414.0	-5.1	-9.4	-2.0	0.19
2,439.0	0.42	266.24	2,439.0	-5.1	-9.5	-1.9	0.93
2,464.0	0.49	259.97	2,464.0	-5.1	-9.7	-1.9	0.34
2,489.0	0.32	252.64	2,489.0	-5.2	-9.9	-1.9	0.71

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 2H
Project:	Tyler County WV	**TVD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Well:	Glover Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
2,514.0	0.14	238.65	2,514.0	-5.2	-10.0	-1.9	0.75
2,539.0	0.08	126.32	2,539.0	-5.2	-10.0	-1.9	0.74
2,564.0	0.32	86.21	2,564.0	-5.2	-9.9	-1.9	1.06
2,589.0	1.69	75.86	2,589.0	-5.1	-9.5	-2.0	5.51
2,614.0	3.42	74.72	2,613.9	-4.8	-8.4	-2.0	6.92
2,639.0	5.18	77.41	2,638.9	-4.4	-6.6	-2.2	7.08
2,664.0	6.58	79.86	2,663.7	-3.9	-4.1	-2.5	5.69
2,689.0	6.83	80.78	2,688.6	-3.4	-1.2	-2.9	1.09
2,714.0	6.89	80.53	2,713.4	-2.9	1.8	-3.3	0.27
2,739.0	6.93	81.26	2,738.2	-2.5	4.7	-3.8	0.39
2,764.0	6.66	83.27	2,763.0	-2.1	7.7	-4.3	1.44
2,789.0	6.73	82.96	2,787.8	-1.7	10.6	-4.9	0.32
2,814.0	6.65	83.34	2,812.7	-1.4	13.5	-5.4	0.37
2,839.0	6.52	83.00	2,837.5	-1.0	16.3	-6.0	0.54
2,864.0	6.65	79.39	2,862.3	-0.6	19.1	-6.5	1.74
2,889.0	6.93	71.65	2,887.2	0.2	22.0	-6.6	3.82
2,914.0	6.86	65.37	2,912.0	1.3	24.8	-6.4	3.03
2,939.0	6.80	63.28	2,936.8	2.5	27.5	-6.0	1.02
2,964.0	7.03	57.45	2,961.6	4.0	30.1	-5.4	2.95
2,989.0	7.71	47.92	2,986.4	6.0	32.6	-4.4	5.59
3,014.0	8.06	44.63	3,011.2	8.4	35.1	-2.9	2.28
3,039.0	9.18	37.09	3,035.9	11.2	37.5	-0.9	6.36
3,064.0	9.45	35.06	3,060.6	14.5	39.9	1.5	1.70
3,089.0	9.69	34.43	3,085.2	17.9	42.3	4.0	1.05
3,114.0	9.85	34.08	3,109.9	21.4	44.7	6.6	0.68
3,139.0	10.90	32.62	3,134.5	25.1	47.1	9.4	4.33
3,164.0	11.11	32.29	3,159.0	29.2	49.7	12.4	0.88
3,189.0	11.96	31.30	3,183.5	33.4	52.3	15.7	3.49
3,214.0	12.94	30.61	3,207.9	38.0	55.1	19.2	3.96
3,239.0	13.72	30.16	3,232.2	43.0	58.0	23.0	3.15
3,264.0	14.51	30.26	3,256.5	48.3	61.1	27.1	3.16
3,289.0	15.66	30.06	3,280.6	53.9	64.3	31.4	4.60
3,314.0	16.06	29.86	3,304.7	59.8	67.8	36.0	1.61
3,339.0	15.67	28.73	3,328.7	65.8	71.1	40.7	1.99
3,364.0	14.60	25.94	3,352.8	71.6	74.1	45.2	5.18
3,389.0	13.47	22.87	3,377.1	77.1	76.6	49.7	5.41
3,414.0	12.31	19.43	3,401.5	82.3	78.6	54.0	5.56
3,439.0	11.47	15.26	3,425.9	87.2	80.2	58.2	4.80
3,464.0	11.15	11.14	3,450.4	92.0	81.3	62.4	3.48
3,489.0	11.08	7.27	3,475.0	96.7	82.1	66.7	3.00
3,514.0	11.33	7.35	3,499.5	101.6	82.7	71.1	1.00
3,539.0	12.07	8.73	3,524.0	106.6	83.4	75.7	3.16
3,564.0	13.00	9.68	3,548.4	111.9	84.3	80.8	3.81
3,589.0	13.85	10.48	3,572.7	117.6	85.3	85.6	3.48

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 2H
Project:	Tyler County WV	**TVD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Well:	Glover Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
3,614.0	14.27	11.43	3,597.0	123.6	86.4	90.9	1.92
3,639.0	13.42	15.03	3,621.2	129.4	87.8	96.0	4.84
3,664.0	12.53	20.92	3,645.6	134.8	89.5	100.6	6.37
3,689.0	11.88	26.14	3,670.0	139.6	91.6	104.6	5.12
3,714.0	11.97	29.06	3,694.5	144.2	94.0	108.2	2.44
3,739.0	12.47	27.19	3,718.9	148.8	96.5	111.8	2.55
3,764.0	13.37	25.12	3,743.3	153.9	99.0	115.9	4.05
3,789.0	14.27	23.90	3,767.6	159.3	101.4	120.3	3.78
3,814.0	15.08	23.36	3,791.7	165.1	104.0	125.0	3.29
3,839.0	15.99	23.82	3,815.8	171.2	106.7	130.0	3.67
3,864.0	17.08	23.04	3,839.8	177.8	109.5	135.3	4.45
3,889.0	17.99	22.09	3,863.6	184.7	112.4	141.1	3.82
3,914.0	19.03	21.27	3,887.3	192.1	115.3	147.2	4.29
3,939.0	19.85	20.71	3,910.9	199.9	118.3	153.7	3.36
3,964.0	20.42	19.67	3,934.4	207.9	121.2	160.4	2.69
3,989.0	21.42	18.74	3,957.7	216.4	124.2	167.5	4.21
4,014.0	22.44	18.80	3,980.9	225.2	127.2	175.0	4.08
4,039.0	23.34	19.43	4,004.0	234.4	130.4	182.8	3.73
4,064.0	24.14	20.73	4,026.8	243.9	133.8	190.7	3.82
4,089.0	24.78	21.72	4,049.6	253.5	137.6	198.7	3.04
4,114.0	25.60	23.14	4,072.2	263.3	141.6	206.8	4.07
4,139.0	26.35	24.23	4,094.7	273.4	146.0	215.0	3.56
4,164.0	26.95	25.11	4,117.0	283.6	150.7	223.3	2.87
4,189.0	27.55	26.33	4,139.3	293.9	155.7	231.5	3.28
4,214.0	27.99	27.13	4,161.4	304.3	160.9	239.8	2.31
4,239.0	28.82	27.14	4,183.4	314.8	166.4	248.2	3.32
4,264.0	29.67	27.16	4,205.2	325.7	171.9	256.8	3.40
4,289.0	30.10	26.97	4,226.9	336.8	177.6	265.6	1.76
4,314.0	30.51	27.09	4,248.5	348.0	183.3	274.6	1.66
4,339.0	30.21	27.70	4,270.0	359.3	189.1	283.4	1.72
4,364.0	30.14	28.20	4,291.6	370.4	195.0	292.2	1.04
4,389.0	30.09	28.10	4,313.3	381.4	200.9	300.9	0.28
4,414.0	29.92	28.31	4,334.9	392.4	206.9	309.5	0.80
4,439.0	29.82	29.97	4,356.6	403.3	212.9	318.0	3.33
4,464.0	30.27	30.63	4,378.2	414.1	219.2	326.3	2.23
4,489.0	30.56	30.82	4,399.8	425.0	225.7	334.7	1.22
4,514.0	30.05	30.47	4,421.4	435.9	232.1	343.0	2.18
4,539.0	29.56	29.71	4,443.1	446.6	238.4	351.3	2.47
4,564.0	29.53	29.32	4,464.8	457.3	244.4	359.7	0.78
4,589.0	29.54	28.29	4,486.6	468.1	250.4	368.1	2.03
4,614.0	29.03	27.47	4,508.4	478.9	256.1	376.6	2.60
4,639.0	28.17	26.64	4,530.3	489.6	261.5	385.1	3.79
4,664.0	27.99	26.62	4,552.4	500.1	266.8	393.5	0.74
4,689.0	28.50	26.96	4,574.4	510.7	272.1	401.9	2.14

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 2H
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Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Well:	Glover Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
4,714.0	28.82	27.62	4,596.3	521.3	277.6	410.3	1.80
4,739.0	28.65	28.59	4,618.3	531.9	283.3	418.7	1.99
4,764.0	28.49	28.63	4,640.2	542.4	289.0	426.9	0.64
4,789.0	28.28	27.76	4,662.2	552.9	294.6	435.1	1.86
4,814.0	28.74	27.42	4,684.2	563.5	300.2	443.5	1.95
4,839.0	28.63	26.97	4,706.1	574.2	305.7	451.9	0.97
4,864.0	28.20	26.01	4,728.1	584.8	311.0	460.4	2.51
4,889.0	28.07	25.61	4,750.1	595.4	316.1	468.9	0.92
4,914.0	27.70	25.02	4,772.2	606.0	321.1	477.4	1.85
4,939.0	28.09	24.75	4,794.3	616.6	326.0	486.0	1.64
4,964.0	28.67	25.20	4,816.3	627.4	331.0	494.7	2.47
4,989.0	28.96	26.15	4,838.2	638.2	336.3	503.4	2.17
5,014.0	28.64	28.62	4,860.1	648.9	341.8	511.9	4.93
5,039.0	28.45	30.39	4,882.1	659.3	347.7	520.0	3.47
5,064.0	28.48	30.72	4,904.1	669.6	353.7	527.9	0.64
5,089.0	27.66	28.77	4,926.1	679.8	359.6	535.8	4.92
5,114.0	27.74	27.01	4,948.3	690.1	365.0	543.9	3.29
5,139.0	28.11	25.75	4,970.4	700.5	370.2	552.3	2.79
5,164.0	28.16	24.11	4,992.4	711.2	375.2	560.9	3.10
5,189.0	28.29	22.73	5,014.4	722.1	379.9	569.8	2.66
5,214.0	27.94	22.54	5,036.5	733.0	384.4	578.7	1.45
5,239.0	27.16	24.95	5,058.7	743.5	389.1	587.3	5.44
5,264.0	26.67	26.82	5,081.0	753.7	394.0	595.5	3.91
5,289.0	25.97	28.78	5,103.4	763.5	399.2	603.2	4.46
5,314.0	26.20	29.95	5,125.8	773.1	404.6	610.7	2.25
5,339.0	25.31	31.18	5,148.3	782.5	410.1	617.9	4.15
5,364.0	25.85	33.44	5,170.9	791.6	415.8	624.8	4.46
5,389.0	25.94	34.75	5,193.4	800.6	422.0	631.5	2.32
5,414.0	26.56	33.81	5,215.8	809.8	428.2	638.3	2.99
5,439.0	26.97	31.51	5,238.1	819.2	434.3	645.4	4.46
5,445.0	27.06	31.01	5,243.5	821.6	435.7	647.2	4.07
5,498.0	26.97	25.87	5,290.7	842.7	447.1	663.8	4.41
5,594.0	27.29	25.59	5,376.1	882.2	466.1	695.4	0.36
5,691.0	29.10	28.29	5,461.6	923.0	486.9	727.9	2.28
5,787.0	30.77	27.89	5,544.8	965.2	509.5	761.1	1.75
5,883.0	29.33	26.80	5,627.9	1,007.9	531.6	794.9	1.60
5,978.0	31.07	27.64	5,710.0	1,050.4	553.4	828.6	1.88
6,075.0	31.29	28.12	5,793.0	1,094.8	576.9	863.6	0.34
6,171.0	30.71	27.17	5,875.3	1,138.6	599.9	898.2	0.79
6,267.0	31.84	26.29	5,957.3	1,183.1	622.3	933.6	1.27
6,363.0	30.83	29.01	6,039.3	1,227.3	645.4	968.5	1.81
6,459.0	30.28	30.29	6,122.0	1,269.8	669.6	1,001.4	0.89
6,555.0	30.86	29.06	6,204.7	1,312.2	693.7	1,034.3	0.89

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 2H
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Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Well:	Glover Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
6,618.0	30.91	27.86	6,258.7	1,340.6	709.1	1,056.6	0.98
6,651.0	30.72	26.57	6,287.1	1,355.6	716.9	1,068.5	2.08
6,684.0	30.41	25.92	6,315.5	1,370.7	724.3	1,080.6	1.37
6,716.0	32.59	23.31	6,342.8	1,385.9	731.2	1,092.9	8.03
6,724.0	33.50	22.28	6,349.5	1,389.9	732.9	1,096.2	13.36
Middlesex							
6,748.0	36.27	19.46	6,369.2	1,402.7	737.8	1,106.9	13.36
6,780.0	40.72	15.46	6,394.2	1,421.7	743.7	1,123.1	15.93
6,812.0	44.42	11.60	6,417.8	1,442.8	748.8	1,141.6	14.15
6,844.0	47.28	8.44	6,440.1	1,465.4	752.8	1,161.9	11.40
6,876.0	49.24	4.96	6,461.4	1,489.1	755.5	1,183.6	10.17
6,909.0	51.95	2.92	6,482.3	1,514.5	757.3	1,207.2	9.50
6,925.0	53.35	1.92	6,492.0	1,527.2	757.8	1,219.1	10.06
Burkett							
6,940.0	54.67	1.02	6,500.8	1,539.4	758.1	1,230.6	10.06
6,973.0	57.14	358.19	6,519.3	1,566.7	757.9	1,256.6	10.32
6,974.0	57.24	358.08	6,519.9	1,567.5	757.9	1,257.4	13.05
Tully							
7,005.0	60.23	354.90	6,536.0	1,594.0	756.3	1,283.1	13.05
7,037.0	63.68	352.21	6,551.0	1,622.0	753.1	1,310.8	13.09
7,069.0	67.29	350.47	6,564.3	1,650.8	748.7	1,339.5	12.32
7,101.0	70.96	349.54	6,575.7	1,680.2	743.5	1,369.1	11.79
7,116.0	72.85	349.12	6,580.3	1,694.2	740.9	1,383.2	12.87
Marcellus							
7,133.0	74.99	348.66	6,585.1	1,710.3	737.7	1,399.5	12.87
7,166.0	78.38	347.33	6,592.7	1,741.7	731.0	1,431.4	11.00
7,198.0	81.54	346.27	6,598.2	1,772.4	723.8	1,462.8	10.40
7,230.0	84.01	344.91	6,602.3	1,803.1	715.9	1,494.5	8.80
7,245.0	85.56	344.73	6,603.6	1,817.5	712.0	1,509.4	10.40
7,298.0	90.60	342.10	6,605.4	1,868.3	696.9	1,562.3	10.72
7,394.0	89.56	339.36	6,605.3	1,958.9	665.2	1,658.3	3.05
7,490.0	91.38	343.07	6,604.5	2,049.7	634.3	1,754.3	4.30
7,587.0	91.57	342.48	6,602.0	2,142.3	605.6	1,851.2	0.64
7,682.0	91.44	342.14	6,599.5	2,232.8	576.8	1,946.2	0.38
7,779.0	90.20	342.63	6,598.1	2,325.3	547.4	2,043.2	1.37
7,875.0	89.03	341.75	6,598.7	2,416.7	518.0	2,139.2	1.52
7,971.0	90.64	341.67	6,599.0	2,507.8	487.9	2,235.2	1.68
8,068.0	89.16	341.59	6,599.2	2,599.9	457.4	2,332.2	1.53
8,164.0	89.43	340.81	6,600.4	2,690.7	426.4	2,428.1	0.86
8,261.0	91.07	342.81	6,599.9	2,782.9	396.1	2,525.1	2.67
8,357.0	90.94	342.01	6,598.3	2,874.4	367.1	2,621.1	0.84
8,453.0	90.03	342.67	6,597.4	2,965.8	338.0	2,717.1	1.17
8,550.0	90.77	343.97	6,596.8	3,058.8	310.2	2,814.1	1.54
8,646.0	90.81	343.56	6,595.4	3,150.9	283.3	2,910.0	0.43
8,743.0	90.40	342.97	6,594.4	3,243.8	255.4	3,007.0	0.74

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MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
8,834.0	90.44	342.84	6,593.8	3,330.8	228.7	3,098.0	0.15
8,924.0	89.63	341.80	6,593.7	3,416.5	201.3	3,188.0	1.46
9,015.0	89.21	341.54	6,594.6	3,502.9	172.7	3,279.0	0.54
9,105.0	90.10	339.34	6,595.2	3,587.7	142.6	3,368.9	2.64
9,196.0	91.98	343.34	6,593.5	3,673.9	113.5	3,459.9	4.86
9,288.0	90.13	341.98	6,591.8	3,761.7	86.1	3,551.9	2.50
9,378.0	90.74	341.57	6,591.1	3,847.2	57.9	3,641.8	0.82
9,469.0	90.44	341.49	6,590.2	3,933.5	29.1	3,732.8	0.34
9,559.0	90.54	340.51	6,589.4	4,018.6	-0.2	3,822.8	1.09
9,649.0	91.55	340.46	6,587.8	4,103.4	-30.3	3,912.8	1.12
9,740.0	91.95	341.67	6,585.0	4,189.4	-59.8	4,003.7	1.40
9,831.0	90.60	341.04	6,583.0	4,275.6	-88.9	4,094.7	1.64
9,927.0	90.70	340.57	6,581.9	4,366.3	-120.4	4,190.7	0.50
10,024.0	91.81	341.35	6,579.8	4,457.9	-152.1	4,287.6	1.40
10,120.0	90.54	343.05	6,577.8	4,549.3	-181.4	4,383.6	2.21
10,216.0	90.34	342.18	6,577.1	4,640.9	-210.1	4,479.6	0.93
10,313.0	90.10	340.81	6,576.7	4,732.9	-240.9	4,576.6	1.43
10,409.0	90.23	340.78	6,576.4	4,823.6	-272.5	4,672.5	0.14
10,505.0	90.67	342.02	6,575.7	4,914.6	-303.1	4,768.5	1.37
10,601.0	90.34	343.41	6,574.8	5,006.2	-331.6	4,864.5	1.49
10,696.0	90.20	344.02	6,574.4	5,097.4	-358.2	4,959.5	0.66
10,792.0	90.40	343.75	6,573.9	5,189.6	-384.9	5,055.4	0.35
10,888.0	89.97	343.56	6,573.5	5,281.7	-411.9	5,151.4	0.49
10,984.0	89.19	343.91	6,574.3	5,373.9	-438.8	5,247.3	0.89
11,081.0	87.21	341.58	6,577.3	5,466.5	-467.5	5,344.3	3.15
11,177.0	89.30	341.63	6,580.2	5,557.5	-497.8	5,440.2	2.18
11,273.0	90.13	341.56	6,580.7	5,648.6	-528.1	5,536.2	0.87
11,368.0	90.40	340.87	6,580.3	5,738.6	-558.7	5,631.2	0.78
11,464.0	90.03	338.12	6,579.9	5,828.5	-592.3	5,727.1	2.89
11,559.0	90.47	340.34	6,579.5	5,917.3	-626.0	5,822.0	2.38
11,655.0	90.87	341.98	6,578.4	6,008.1	-657.0	5,918.0	1.76
11,752.0	90.44	342.56	6,577.3	6,100.5	-686.6	6,015.0	0.74
11,848.0	90.44	343.53	6,576.5	6,192.3	-714.6	6,110.9	1.01
11,945.0	90.20	341.98	6,576.0	6,285.0	-743.3	6,207.9	1.62
12,040.0	89.93	341.57	6,575.9	6,375.2	-773.0	6,302.9	0.52
12,137.0	89.66	341.15	6,576.2	6,467.1	-804.0	6,399.9	0.51
12,233.0	90.17	342.73	6,576.4	6,558.4	-833.8	6,495.9	1.73
12,329.0	90.64	343.00	6,575.7	6,650.1	-862.1	6,591.9	0.56
12,426.0	90.10	342.43	6,575.1	6,742.7	-890.9	6,688.9	0.81
12,521.0	91.81	342.37	6,573.5	6,833.3	-919.6	6,783.9	1.80
12,617.0	90.74	343.28	6,571.3	6,925.0	-948.0	6,879.8	1.46
12,714.0	90.10	342.54	6,570.6	7,017.7	-976.5	6,976.8	1.01
12,810.0	90.44	342.30	6,570.2	7,109.2	-1,005.5	7,072.8	0.43
12,906.0	89.80	339.97	6,570.0	7,200.0	-1,036.5	7,168.8	2.52

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Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Glover Unit 2H
Project:	Tyler County WV	**TVD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Site:	Ed Arnold/Sweeney/Thorkildosn/Glover/Silas Pac	**MD Reference:**	Frontier 22: GL 749' + 24' RKB @ 774.0usft
Well:	Glover Unit 2H	**North Reference:**	Grid
Wellbore:	Original Wellpath	**Survey Calculation Method:**	Minimum Curvature
Design:	As Drilled	**Database:**	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
13,002.0	90.10	341.66	6,570.1	7,290.7	-1,068.0	7,264.8	1.79
13,098.0	89.97	341.09	6,570.0	7,381.7	-1,098.7	7,360.8	0.61
13,194.0	89.50	342.83	6,570.4	7,472.9	-1,128.4	7,456.8	1.88
13,291.0	89.87	342.11	6,571.0	7,565.4	-1,157.6	7,553.8	0.83
13,387.0	90.37	341.31	6,570.8	7,656.6	-1,187.8	7,649.7	0.98
13,483.0	89.50	342.04	6,570.9	7,747.7	-1,218.0	7,745.7	1.18
13,579.0	88.52	341.09	6,572.5	7,838.8	-1,248.3	7,841.7	1.42
13,675.0	89.50	343.87	6,574.2	7,930.3	-1,277.2	7,937.7	3.07
13,772.0	89.93	345.33	6,574.7	8,023.8	-1,303.0	8,034.6	1.57
13,868.0	90.00	342.67	6,574.7	8,116.1	-1,329.4	8,130.5	2.77
13,965.0	91.38	343.70	6,573.6	8,208.9	-1,357.5	8,227.5	1.78
14,061.0	90.07	341.71	6,572.4	8,300.6	-1,386.0	8,323.5	2.48
14,152.0	89.66	340.48	6,572.6	8,386.7	-1,415.5	8,414.5	1.42
14,208.0	90.00	340.00	6,572.7	8,439.4	-1,434.4	8,470.4	1.05

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
6,555.0	6,204.7	1,312.2	693.7	Sycamore
6,724.0	6,349.5	1,389.9	732.9	Middlesex
6,925.0	6,492.0	1,527.2	757.8	Burkett
6,974.0	6,519.9	1,567.5	757.9	Tully
7,116.0	6,580.3	1,694.2	740.9	Marcellus

Checked By: _____ Approved By: _____ Date: _____

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Hydraulic Fracturing Fluid Product Component Information Disclosure

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Job Start Date:	11/14/2014
Job End Date:	12/2/2014
State:	West Virginia
County:	Tyler
API Number:	47-095-02159-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Glover Unit 2H
Longitude:	-80.73992800
Latitude:	39.39601100
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	7,581
Total Base Water Volume (gal):	9,495,486
Total Base Non Water Volume:	384,530

FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

Interstate Oil & Gas Compact Commission

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Antero Resources	Base Fluid					
			Water	7732-18-5	100.00000	91.12272	
Sand	U.S. Well Services, LLC	Proppant					
			Crystalline Silica, quartz	14808-60-7	100.00000	8.44016	
LGC-15	U.S. Well Services, LLC	Gelling Agents					
			Guar Gum	9000-30-0	50.00000	0.08599	
			Petroleum Distillates	64742-47-8	60.00000	0.08144	
			Suspending agent (solid)	14808-60-7	3.00000	0.01315	
			Surfactant	68439-51-0	3.00000	0.00516	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid					
			Water	7732-18-5	87.50000	0.09752	
			Hydrogen Chloride	7641-01-1	18.00000	0.02329	
WFRA-405	U.S. Well Services, LLC	Friction Reducer					
			Anionic Polyacrylamide	Proprietary		0.03140	
			Water	7732-18-5	40.00000	0.03140	
			Petroleum Distillates	64742-47-8	22.00000	0.02528	
			Crystalline Salt	12125-02-9	5.00000	0.00393	

			Ethoxylated alcohol blend	Proprietary	5.00000	0.00393	
SI-1100	U.S. Well Services	Scale Inhibitor					
			Di Water	7732-18-5	80.00000	0.01040	
			Ethylene Glycol	107-21-1	40.00000	0.00588	
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00176	
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00168	
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00163	
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00153	
			bis (hexamethylene) tramine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00150	
			Acrylic polymer	52255-49-9	5.00000	0.00065	
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent					
			2,2-dibromo-3-nitrilopropionamide	10222-01-2	20.00000	0.00432	
			Deionized Water	7732-18-5	28.00000	0.00247	
AP One	U.S. Well Services, LLC	Gel Breakers					
			Ammonium Persulfate	7727-54-0	100.00000	0.00243	
AI-301	U.S. Well Services, LLC	Acid Corrosion Inhibitors					
			Diethylene Glycol	111-46-6	30.00000	0.00015	
			Methenamine	100-97-0	20.00000	0.00012	
			Hydrogen Chloride	7647-01-0	10.00000	0.00005	
			Polyethylene polyamine	68603-67-8	10.00000	0.00005	
			Coco amine	61791-14-8	5.00000	0.00002	

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

* Total Water Volume sources may include fresh water, produced water, and/or recycled water
** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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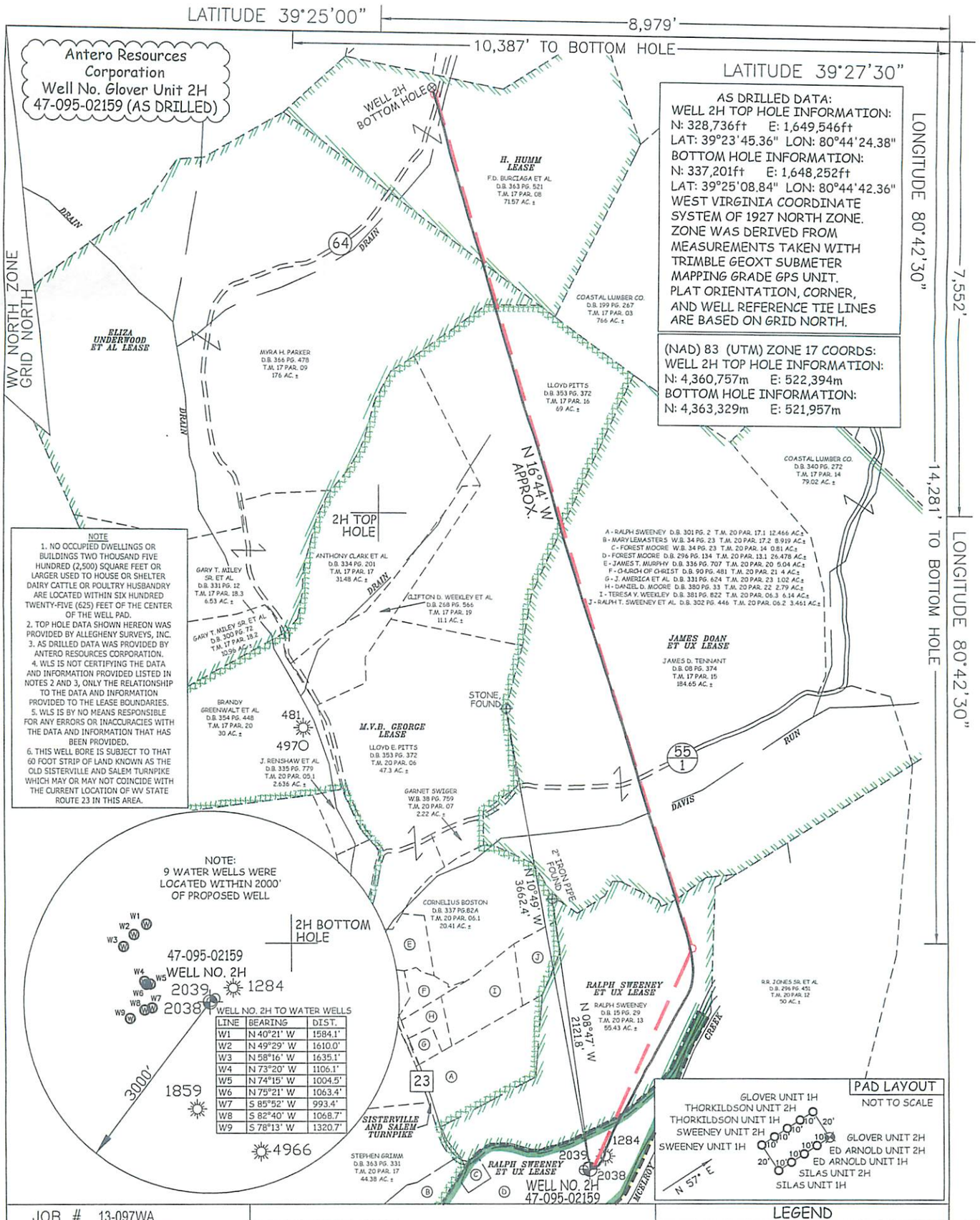

JOB # 13-097WA
DRAWING # GLOVER2HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26415

LEGEND
Surface Owner Boundary Lines
Interior Surface Tracts +/-
Existing Fence
Found monument, as noted
Proposed Well Path
As Drilled Well Path

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STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

DATE 06/25/15
OPERATOR'S WELL# GLOVER UNIT #2H
API WELL # 47 — 095 — 02159
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 748' ORIGINAL - 745' AS DRILLED WATERSHED MCELROY CREEK
QUADRANGLE CENTER POINT 7.5' DISTRICT McELROY COUNTY TYLER
SURFACE OWNER FOREST & BRENDA MOORE ACREAGE 26.478 ACRES +/-
OIL & GAS ROYALTY OWNER RALPH SWEENEY ET UX; RALPH SWEENEY ET UX; M.V.B. GEORGE; JAMES DOAN ET UX; ELIZA UNDERWOOD ET AL; H. HUMM
LEASE ACREAGE 25.668 ACRES±; 55.43 ACRES±; 300 ACRES±; 263.67 ACRES±; 216 ACRES±; 77.26 ACRES±
PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE ___
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE IN WELL
(SPECIFY) (X) AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,573' TVD 14,208' MD

COUNTY NAME
PERMIT

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

FORM WW-6