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WR-35

Rev. 8/23/13 WV GEOLOGICAL SURVEY  
MORGANTOWN, WV

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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 47-017-06192 County Doddridge District Central  
Quad Oxford 7.5' Pad Name Primm Pad Field/Pool Name ----  
Farm name Primm, Olin E. & Mary Well Number Callie Unit 1H  
Operator (as registered with the OOG) Antero Resources Corportion  
Address 1615 Wynkoop St. 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 4343582m Easting 512719m  
Landing Point of Curve Northing 4343632.73m Easting 512438.82m  
Bottom Hole Northing 4345235m Easting 511651m

Elevation (ft) 1008' 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 3/27/2013 Date drilling commenced 8/22/2013 Date drilling ceased 5/30/2014  
Date completion activities began 6/8/2014 Date completion activities ceased 8/12/2014  
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 225' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 743', 2147' Void(s) encountered (Y/N) depths No  
Coal depth(s) ft 437' Cavern(s) encountered (Y/N) depths No  
Is coal being mined in area (Y/N) No

Reviewed by: \_\_\_\_\_

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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	30"	20"	40'	New	94# H-40	N/A	Y
Surface	17- 1/2"	13- 3/8"	337'	New	48# J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2527'	New	36# J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5-1/2"	12960'	New	20# P-110	N/A	Y
Tubing		2-3/8"	6806'		5.95# 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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	200 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	419 sx	15.6	1.18	234	0'	8 Hrs.
Coal							
Intermediate 1	Class A	933 sx	15.6	1.18	791	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	829 sx (Lead) 1083 sx (Tail)	13.5 Lead 15.2 Tail	1.44 Lead 1.8 Tail	2505	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 12965' MD, 6540' TVD (BHL); 6564' TVD (Deepest point drilled) Loggers TD (ft) 12916'  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 6217'

\*\* This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Callie Unit 2H API #47-017-06193). Please reference the wireline logs submitted with Form WR-35 for Callie Unit 2H. 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 - 06192 Farm name Primm, Olin E. & Mary Well number Callie 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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PRODUCING FORMATION(S)	DEPTHS	
<u>Marcellus</u>	<u>6518' (TOP)</u> TVD	<u>6873' (TOP)</u> MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST     Build up     Drawdown     Open Flow                      OIL TEST     Flow     Pump

SHUT-IN PRESSURE    Surface 3600 psi    Bottom Hole --- psi    DURATION OF TEST --- hrs

OPEN FLOW    Gas                      Oil                      NGL                      Water                      GAS MEASURED BY

7700 mcfpd    33 bpd    --- bpd    459 bpd     Estimated     Orifice     Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	<u>0</u>		<u>0</u>		

**\*PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

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

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

Cementing Company Allied Oil & Gas Services, LLC  
Address 1036 East Main Street City Bridgeport State WV Zip 26330

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

Please insert additional pages as applicable.

Completed by Kara Quackenbush Telephone 303-357-7233  
Signature [Signature] Title Permit Representative Date 7/29/2015

**EXHIBIT 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	8-Jun-14	12,705	12,873	60	Marcellus
2	28-Jul-14	12,505	12,674	60	Marcellus
3	28-Jul-14	12,305	12,474	60	Marcellus
4	28-Jul-14	12,106	12,274	60	Marcellus
5	28-Jul-14	11,906	12,074	60	Marcellus
6	28-Jul-14	11,706	11,874	60	Marcellus
7	29-Jul-14	11,506	11,675	60	Marcellus
8	29-Jul-14	11,306	11,475	60	Marcellus
9	29-Jul-14	11,107	11,275	60	Marcellus
10	29-Jul-14	10,907	11,075	60	Marcellus
11	30-Jul-14	10,707	10,875	60	Marcellus
12	30-Jul-14	10,507	10,676	60	Marcellus
13	30-Jul-14	10,307	10,476	60	Marcellus
14	30-Jul-14	10,108	10,276	60	Marcellus
15	30-Jul-14	9,908	10,076	60	Marcellus
16	31-Jul-14	9,708	9,876	60	Marcellus
17	31-Jul-14	9,508	9,677	60	Marcellus
18	31-Jul-14	9,308	9,477	60	Marcellus
19	31-Jul-14	9,109	9,277	60	Marcellus
20	31-Jul-14	8,909	9,077	60	Marcellus
21	1-Aug-14	8,709	8,877	60	Marcellus
22	1-Aug-14	8,509	8,678	60	Marcellus
23	1-Aug-14	8,309	8,478	60	Marcellus
24	1-Aug-14	8,110	8,278	60	Marcellus
25	1-Aug-14	7,910	8,078	60	Marcellus
26	1-Aug-14	7,710	7,878	60	Marcellus
27	2-Aug-14	7,510	7,679	60	Marcellus
28	2-Aug-14	7,310	7,479	60	Marcellus
29	2-Aug-14	7,111	7,279	60	Marcellus
30	2-Aug-14	6,911	7,079	60	Marcellus

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4	28-Jul-14	12,106	12,274	60	Marcellus
5	28-Jul-14	11,906	12,074	60	Marcellus
6	28-Jul-14	11,706	11,874	60	Marcellus
7	29-Jul-14	11,506	11,675	60	Marcellus
8	29-Jul-14	11,306	11,475	60	Marcellus
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10	29-Jul-14	10,907	11,075	60	Marcellus
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14	30-Jul-14	10,108	10,276	60	Marcellus
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28	2-Aug-14	7,310	7,479	60	Marcellus
29	2-Aug-14	7,111	7,279	60	Marcellus
30	2-Aug-14	6,911	7,079	60	Marcellus

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**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	27-Jul-14	72.0	7,093	N/A	4,902	249,300	7,072	N/A
2	28-Jul-14	72.0	6,535	5,329	4,578	255,800	7,008	N/A
3	28-Jul-14	77.0	6,784	6,155	3,791	254,850	6,459	N/A
4	28-Jul-14	77.0	6,733	5,976	3,458	256,800	6,454	N/A
5	28-Jul-14	77.0	6,627	5,214	5,679	248,750	6,329	N/A
6	28-Jul-14	76.0	7,116	5,786	4,796	254,350	6,401	N/A
7	29-Jul-14	77.0	6,857	5,482	3,651	254,850	6,382	N/A
8	29-Jul-14	77.0	6,853	6,144	3,662	253,700	6,369	N/A
9	29-Jul-14	78.3	6,954	5,525	4,971	252,095	6,356	N/A
10	29-Jul-14	74.3	7,031	5,801	4,814	188,400	6,076	N/A
11	30-Jul-14	79.2	6,856	5,307	5,618	253,040	6,328	N/A
12	30-Jul-14	78.0	6,671	5,436	4,063	251,150	6,310	N/A
13	30-Jul-14	78.0	6,961	5,332	4,796	242,300	6,718	N/A
14	30-Jul-14	78.9	7,060	5,336	4,653	211,930	6,151	N/A
15	30-Jul-14	78.8	6,612	5,600	5,075	251,470	6,278	N/A
16	31-Jul-14	77.4	6,701	5,611	4,991	254,545	6,266	N/A
17	31-Jul-14	76.0	6,731	5,550	3,809	254,250	6,245	N/A
18	31-Jul-14	78.0	6,568	5,586	3,841	252,300	6,230	N/A
19	31-Jul-14	79.7	6,808	5,214	4,971	251,220	6,238	N/A
20	31-Jul-14	75.2	6,523	5,472	4,789	249,600	6,275	N/A
21	1-Aug-14	73.9	6,839	5,229	5,232	212,620	5,789	N/A
22	1-Aug-14	78.0	6,797	5,354	4,277	232,450	6,666	N/A
23	1-Aug-14	77.0	6,653	5,797	3,659	250,800	6,173	N/A
24	1-Aug-14	77.0	6,528	5,647	4,116	250,050	6,157	N/A
25	1-Aug-14	76.7	6,469	5,558	4,832	250,450	6,139	N/A
26	1-Aug-14	76.4	6,182	5,332	4,495	252,240	6,171	N/A
27	2-Aug-14	76.7	6,347	4,950	5,153	254,560	6,111	N/A
28	2-Aug-14	69.0	7,164	5,533	4,978	130,825	6,433	N/A
29	2-Aug-14	77.0	6,320	4,799	3,473	252,500	6,094	N/A
30	2-Aug-14	77.0	6,637	4,338	9,230	236,400	5,716	N/A
AVG=		<b>76.5</b>	<b>6,734</b>	<b>5,462</b>	<b>4,678</b>	<b>7,263,595</b>	<b>189,394</b>	TOTAL

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API 47-017-06192 Farm Name Primm, Olin E. & Mary Well Number Callie Unit 1H

**EXHIBIT 3**

LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Fresh Water	225'	N/A	225'	N/A
Shale	0	227	0	227
Sandstone	est. 227	437	est. 227	437
Coal	est. 437	457	est. 437	457
Sandy shale	est. 457	477	est. 457	477
Shale	est. 477	595	est. 477	595
Sandstone	est. 595	605	est. 595	605
Shale	est. 605	625	est. 605	625
Sandstone	est. 625	638	est. 625	638
Shale	est. 638	659	est. 638	659
Sandstone	est. 659	808	est. 659	808
Shale	est. 808	1175	est. 808	1175
Sandy shale	est. 1175	1235	est. 1175	1235
Trace coal	est. 1235	1257	est. 1235	1257
Shale	est. 1257	1421	est. 1257	1421
Sandstone	est. 1421	1445	est. 1421	1445
Sandy shale	est. 1445	1477	est. 1445	1477
Trace coal/shale	est. 1477	1542	est. 1477	1542
Sandstone	est. 1542	1683	est. 1542	1683
Sandy shale	est. 1683	1991	est. 1683	1991
Big Lime	1991	2035	1991	2035
Big Injun	2035	2330	2035	2330
Weir	2330	2637	2330	2637
Fifty Foot Sandstone	2637	2798	2637	2798
Gordon	2798	3078	2798	3078
Fifth Sandstone	3078	3101	3078	3101
Bayard	3101	3405	3101	3405
Speechley	3405	4090	3405	4090
Baltown	4090	4545	4090	4545
Bradford	4545	4973	4545	4975
Benson	4973	5228	4975	5236
Alexander	5228	6177	5236	6306
Sycamore	6177	6343	6306	6517
Middlesex	6343	6463	6517	6727
Burkett	6463	6489	6727	6786
Tully	6489	6518	6786	6873
Marcellus	6518	NA	6873	NA

\*Please note Antero determines 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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**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Job Start Date:	7/27/2014
Job End Date:	8/2/2014
State:	West Virginia
County:	Doddridge
API Number:	47-017-06192-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Callie Unit 1H
Longitude:	-80.85261400
Latitude:	39.24145600
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,564
Total Base Water Volume (gal):	7,954,548
Total Base Non Water Volume:	268,822

**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	92.37155	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	7.32891	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.09389	
LGC-15	U.S. Well Services, LLC	Gelling Agents	Hydrogen Chloride	7641-01-1	18.00000	0.02243	
			Guar Gum	9000-30-0	50.00000	0.04082	
			Petroleum Distillates	64742-47-8	60.00000	0.03866	
			Suspending agent (solid)	14808-60-7	3.00000	0.00624	
			Surfactant	68439-51-0	3.00000	0.00245	
WFRA-405	U.S. Well Services, LLC	Friction Reducer	Water	7732-18-5	40.00000	0.02407	
			Anionic Polyacrylamide	Proprietary		0.02407	
			Petroleum Distillates	64742-47-8	22.00000	0.01937	
			Crystalline Salt	12125-02-9	5.00000	0.00301	

SI-1000	U.S. Well Services, LLC	Scale Inhibitor	Ethoxylated alcohol blend	Proprietary	5.00000	0.00301
			Anionic Copolymer	Proprietary		0.00430
			Ethylene Glycol	107-21-1	20.00000	0.00389
			Water	7732-18-5	30.00000	0.00324
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent				
			2,2-dibromo-3-nitropropionamide	10222-01-2	20.00000	0.00495
			Deionized Water	7732-18-5	28.00000	0.00283
AP One	U.S. Well Services, LLC	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00175
AI-300	U.S. Well Services, LLC	Acid Corrosion Inhibitors				
			Ethylene Glycol	107-21-1	31.00000	0.00025
			N,N-Dimethylformamide	68-12-2	15.00000	0.00008
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	13.00000	0.00007
			Cinnamaldehyde	104-55-2	5.00000	0.00007
			2-Butoxyethanol	111-76-2	7.00000	0.00006
			Water	7732-18-5	20.00000	0.00002
			Ethoxylated Nonylphenol	68412-54-4	5.00000	0.00002
			Isopropyl Alcohol	67-63-0	3.00000	0.00001
			Triethyl Phosphate	78-40-0	3.00000	0.00001

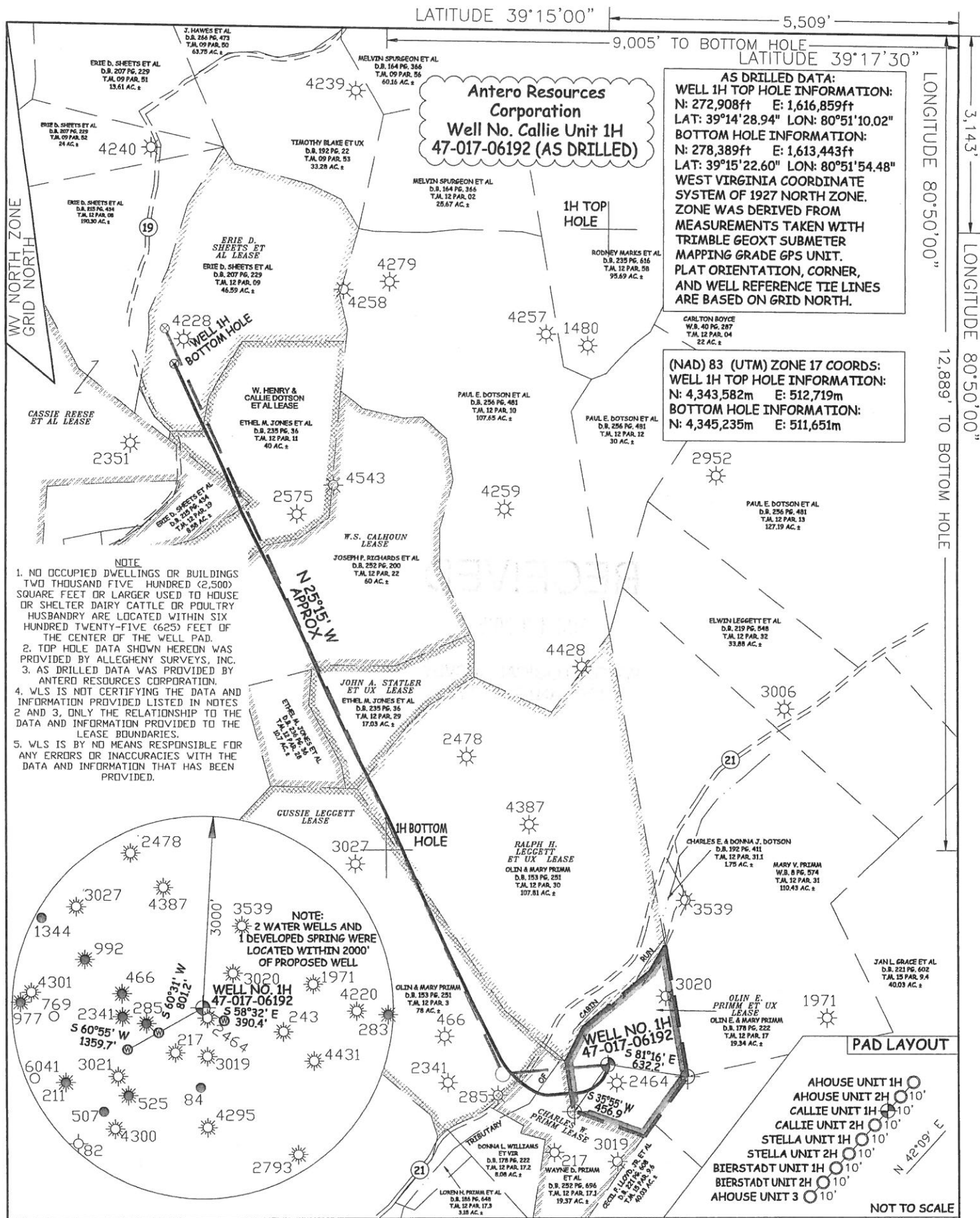
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

\* 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 # **12-157WA**  
 DRAWING # **CALLIE1HAD**  
 SCALE **1" = 1000'**  
 MINIMUM DEGREE OF ACCURACY **SUBMETER**  
 PROVEN SOURCE OF ELEV. **SUBMETER MAPPING GRADE GPS**

STATE OF WEST VIRGINIA  
 DEPARTMENT OF ENERGY  
 DIVISION OF OIL AND GAS  
 WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
 LOCATION: ELEVATION **1,030' ORIGINAL - 1,008' AS DRILLED** WATERSHED **NORTH FORK HUGHES RIVER**  
 QUADRANGLE **OXFORD 7.5'** DISTRICT **CENTRAL** COUNTY **DODDRIDGE**  
 SURFACE OWNER **OLIN E. & MARY PRIMM** ACREAGE **19.34 ACRES +/-**  
 OIL & GAS ROYALTY OWNER **OLIN E. PRIMM ET UX; CHARLES W. PRIMM; GUSSIE LEGGETT; RALPH H. LEGGETT ET UX; JOHN A. STATLER ET UX; W.S. CALHOUN; W. HENRY & CALLIE DOTSON ET AL; CASSIE REESE ET AL; ERIE D. SHEETS ET AL** LEASE ACREAGE **19.34 ACRES +/-; 19.37 ACRES +/-; 78 ACRES +/-; 108 ACRES +/-; 17 ACRES +/-; 63 ACRES +/-; 50.25 ACRES +/-; 63 ACRES +/-; 47 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 **6,540' TVD 12,965' 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**

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 **05/26/15**  
 OPERATOR'S WELL# **CALLIE UNIT #1H**  
 API WELL # **47-017-06192**  
 STATE COUNTY PERMIT

COUNTY NAME **DODDRIDGE**  
 PERMIT

**LEGEND**

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