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JUN 15 2015

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 47-017-06316 County Doddridge District West Union  
Quad Smithburg 7.5' Pad Name Nash Pad Field/Pool Name \_\_\_\_\_  
Farm name Haug, Robert M. et al Well Number Joseph 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 4,351,834m Easting 524,803m  
Landing Point of Curve Northing 4,352,053.25m Easting 525,011.69m  
Bottom Hole Northing 4,354,275m Easting 524,265m

Elevation (ft) 1,381' 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 09/25/2013 Date drilling commenced 04/01/2014 Date drilling ceased 04/26/2014  
Date completion activities began 05/03/2014 Date completion activities ceased 08/14/2014  
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 206', 222' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 1561', 1854' 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

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

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API 47-017 - 06316 Farm name Haug, Robert M. et al Well number Joseph 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"	442'	New	48#; H-40	N/A	Yes
Coal							
Intermediate 1	12 1/4"	9 5/8"	2,599'	New	36#; J-55	N/A	Yes
Intermediate 2							
Intermediate 3							
Production	8 3/4" & 8 1/2"	5 1/2"	15,442'	New	20#; P-110	N/A	Yes
Tubing		2 3/8"	7,366'		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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	196 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	520 sx	15.6	5.20	307	0'	8 Hrs.
Coal							
Intermediate 1	Class A	1,006 sx	15.6	1.18	813	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	1,002 sx (Lead); 1,316 sx (Tail)	13.5 (Lead); 15.2 (Tail)	1.44 (Lead); 1.8 (Tail)	3,058	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15,442' MD, 7,229' TVD (BHL & Deepest Point Drilled) Loggers TD (ft) 15,394'  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 6,818'

\*\*This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Olivia Unit 1H, API #47-017-06332). Please reference the wireline logs submitted with Form WR-35 for the Olivia 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 47-017-06316 Farm Name Haug, Robert M. et al Well Number Joseph Unit 2H

**EXHIBIT 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	3-May-14	15,184	15,351	60	Marcellus
2	24-Jun-14	14,985	15,153	60	Marcellus
3	24-Jun-14	14,787	14,954	60	Marcellus
4	25-Jun-14	14,588	14,755	60	Marcellus
5	25-Jun-14	14,389	14,557	60	Marcellus
6	25-Jun-14	14,191	14,358	60	Marcellus
7	26-Jun-14	13,992	14,160	60	Marcellus
8	26-Jun-14	13,793	13,961	60	Marcellus
9	26-Jun-14	13,595	13,762	60	Marcellus
10	26-Jun-14	13,396	13,564	60	Marcellus
11	27-Jun-14	13,197	13,365	60	Marcellus
12	27-Jun-14	12,999	13,166	60	Marcellus
13	28-Jun-14	12,800	12,968	60	Marcellus
14	28-Jun-14	12,602	12,769	60	Marcellus
15	28-Jun-14	12,403	12,570	60	Marcellus
16	28-Jun-14	12,204	12,372	60	Marcellus
17	28-Jun-14	12,006	12,173	60	Marcellus
18	29-Jun-14	11,807	11,975	60	Marcellus
19	29-Jun-14	11,608	11,776	60	Marcellus
20	29-Jun-14	11,410	11,577	60	Marcellus
21	29-Jun-14	11,211	11,379	60	Marcellus
22	30-Jun-14	11,013	11,180	60	Marcellus
23	30-Jun-14	10,814	10,981	60	Marcellus
24	30-Jun-14	10,615	10,783	60	Marcellus
25	30-Jun-14	10,417	10,584	60	Marcellus
26	1-Jul-14	10,218	10,386	60	Marcellus
27	1-Jul-14	10,019	10,187	60	Marcellus
28	1-Jul-14	9,821	9,988	60	Marcellus
29	1-Jul-14	9,622	9,790	60	Marcellus
30	2-Jul-14	9,424	9,591	60	Marcellus
31	2-Jul-14	9,225	9,392	60	Marcellus
32	3-Jul-14	9,026	9,194	60	Marcellus
33	3-Jul-14	8,828	8,995	60	Marcellus
34	3-Jul-14	8,629	8,797	60	Marcellus
35	3-Jul-14	8,430	8,598	60	Marcellus
36	3-Jul-14	8,232	8,399	60	Marcellus
37	3-Jul-14	8,033	8,201	60	Marcellus
38	4-Jul-14	7,834	8,002	60	Marcellus
39	4-Jul-14	7,636	7,803	60	Marcellus
40	4-Jul-14	7,437	7,605	60	Marcellus



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API 47-017-06316 Farm Name Haug, Robert M. et al Well Number Joseph 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	24-Jun-14	79.0	7,399	N/A	5,131	245,690	7,100	N/A
2	24-Jun-14	76.1	7,273	5,450	4,911	248,880	7,145	N/A
3	24-Jun-14	78.4	7,357	5,580	4,749	254,180	6,474	N/A
4	25-Jun-14	76.0	7,534	5,550	4,771	252,100	6,676	N/A
5	25-Jun-14	77.0	7,586	5,592	4,782	251,180	6,525	N/A
6	25-Jun-14	79.0	7,429	5,364	4,918	256,570	6,429	N/A
7	26-Jun-14	79.3	7,290	5,365	4,653	257,620	6,416	N/A
8	26-Jun-14	79.0	7,446	5,212	5,178	250,440	6,535	N/A
9	26-Jun-14	79.4	7,478	5,280	4,962	247,000	6,410	N/A
10	26-Jun-14	78.5	7,481	5,340	4,772	245,680	6,444	N/A
11	27-Jun-14	77.0	7,387	5,423	5,025	251,020	6,390	N/A
12	27-Jun-14	79.3	7,525	5,669	4,648	258,530	6,407	N/A
13	28-Jun-14	78.6	7,532	5,368	5,170	250,110	6,353	N/A
14	28-Jun-14	78.0	7,552	5,304	5,478	251,890	6,437	N/A
15	28-Jun-14	78.0	7,237	5,208	4,751	251,820	6,388	N/A
16	28-Jun-14	79.7	7,508	5,361	4,431	253,560	6,344	N/A
17	28-Jun-14	79.7	7,544	5,345	4,761	256,110	6,349	N/A
18	29-Jun-14	77.0	7,616	5,400	4,410	253,800	6,353	N/A
19	29-Jun-14	76.0	7,300	5,705	4,877	251,300	6,388	N/A
20	29-Jun-14	79.6	7,456	5,754	4,823	254,500	6,325	N/A
21	29-Jun-14	79.4	7,433	5,668	5,333	256,990	6,271	N/A
22	30-Jun-14	76.0	7,256	5,380	4,652	253,940	6,332	N/A
23	30-Jun-14	78.0	7,079	5,185	6,142	251,840	6,325	N/A
24	30-Jun-14	78.0	6,924	5,152	5,890	251,880	6,323	N/A
25	30-Jun-14	77.0	7,033	5,409	5,448	251,500	6,212	N/A
26	1-Jul-14	78.0	7,054	5,403	5,785	253,300	6,173	N/A
27	1-Jul-14	79.0	6,788	5,164	5,148	249,000	6,259	N/A
28	1-Jul-14	79.0	7,079	5,233	5,158	250,060	6,230	N/A
29	1-Jul-14	77.0	7,280	5,368	5,082	250,800	6,131	N/A
30	2-Jul-14	79.0	6,967	5,228	4,893	246,300	6,221	N/A
31	2-Jul-14	77.0	6,949	5,233	5,055	252,500	6,152	N/A
32	3-Jul-14	77.0	7,174	5,675	4,242	247,500	6,082	N/A
33	3-Jul-14	80.0	6,687	4,753	4,854	247,000	6,057	N/A
34	3-Jul-14	79.0	6,952	5,268	5,168	250,500	6,060	N/A
35	3-Jul-14	79.0	6,780	5,488	5,576	252,560	6,038	N/A
36	3-Jul-14	78.0	6,592	5,333	5,131	244,120	6,072	N/A
37	3-Jul-14	77.0	6,829	5,359	5,108	253,700	6,044	N/A
38	4-Jul-14	55.0	6,390	151	5,451	245,500	6,027	N/A
39	4-Jul-14	78.0	6,537	5,818	4,684	247,200	5,991	N/A
40	4-Jul-14	77.0	6,924	5,699	3,731	254,320	5,981	N/A
AVG=		77.5	7,191	5,262	4,993	10,052,490	252,869	TOTAL

## EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD) From
	From Surface	From Surface	From Surface	Surface
Fresh Water	206'	N/A	206'	N/A
Fresh Water	222'	N/A	222'	N/A
Shale	0	37	0	37
Siltstone	Est. 37	317	Est. 37	317
Sandstone	Est. 317	332	Est. 317	332
Siltstone/ Trace Coal	Est. 332	397	Est. 332	397
Sandstone	Est. 397	557	Est. 397	557
Silty Limestone	Est. 557	677	Est. 557	677
Sandstone	Est. 677	717	Est. 677	717
Siltstone	Est. 717	797	Est. 717	797
Limestone/Shale	Est. 797	837	Est. 797	837
Siltstone/ Sandstone	Est. 837	897	Est. 837	897
Limestone	Est. 897	917	Est. 897	917
Sandstone/ Siltstone	Est. 917	977	Est. 917	977
Limestone	Est. 977	997	Est. 977	997
Siltstone/ Limestone	Est. 997	1,357	Est. 997	1,357
Shale	Est. 1357	1,397	Est. 1357	1,397
Sandstone	Est. 1397	1,437	Est. 1397	1,437
Shale/ Sandstone	Est. 1437	1,617	Est. 1437	1,617
Sandstone	Est. 1617	1,677	Est. 1617	1,677
Sandstone/ Trace Coal	Est. 1677	1,717	Est. 1677	1,717
Sandstone / Siltstone	Est. 1717	2,123	Est. 1717	2,123
Big Lime	2,123	2,281	2,123	2,281
Big Injun	2,281	2,709	2,281	2,709
Gantz Sand	2,709	2,840	2,709	2,840
Fifty Foot Sandstone	2,840	2,919	2,840	2,919
Gordon	2,919	3,217	2,919	3,217
Fifth Sandstone	3,217	3,378	3,217	3,378
Bayard	3,378	3,621	3,378	3,622
Warren	3,621	4,060	3,622	4,063
Speechley	4,060	4,332	4,063	4,337
Baltown	4,332	4,788	4,337	4,795
Bradford	4,788	5,264	4,795	5,278
Benson	5,264	5,543	5,278	5,567
Alexander	5,543	5,727	5,567	5,763
Elk	5,727	6,418	5,763	6,486
Rhinestreet	6,418	6,647	6,486	6,733
Sycamore	6,647	6,875	6,733	6,991
Middlesex	6,875	7,024	6,991	7,186
Burkett	7,024	7,052	7,186	7,229
Tully	7,052	7,128	7,229	7,394
Marcellus	7,128	NA	7,394	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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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	6/24/2014
Job End Date:	7/4/2014
State:	West Virginia
County:	Doddridge
API Number:	47-017-06316-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Joseph Unit 2H
Longitude:	-80.71228300
Latitude:	39.31555000
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	7,229
Total Base Water Volume (gal):	10,620,498
Total Base Non Water Volume:	496,698



## 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	89.55959	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	10.16424	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.08661	
			Hydrogen Chloride	7641-01-1	18.00000	0.02069	
WFRA-405	U.S. Well Services, LLC	Friction Reducer					
			Anionic Polyacrylamide	Proprietary		0.02480	
			Water	7732-18-5	40.00000	0.02480	
			Petroleum Distillates	84742-47-8	22.00000	0.01996	
			Crystalline Salt	12125-02-9	5.00000	0.00310	
			Ethoxylated alcohol blend	Proprietary	5.00000	0.00310	
LGC-15	U.S. Well Services, LLC	Gelling Agents					
			Guar Gum	9000-30-0	50.00000	0.03336	
			Petroleum Distillates	84742-47-8	60.00000	0.03160	
			Suspending agent (solid)	14808-60-7	3.00000	0.00510	



SI-1000	U.S. Well Services, LLC	Scale Inhibitor	Surfactant	68439-51-0	3.00000	0.00200
			Anionic Copolymer	Proprietary		0.00427
			Ethylene Glycol	107-21-1	20.00000	0.00386
			Water	7732-18-5	30.00000	0.00322
X-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent				
			2,2-dibromo-3-nitropropionamide	10222-01-2	20.00000	0.00494
			Deionized Water	7732-18-5	28.00000	0.00282
AP One	U.S. Well Services, LLC	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00140
AI-300	U.S. Well Services, LLC	Acid Corrosion Inhibitors				
			Ethylene Glycol	107-21-1	31.00000	0.00023
			N,N-Dimethylformamide	68-12-2	15.00000	0.00007
			Cinnamaldehyde	104-55-2	5.00000	0.00006
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	13.00000	0.00006
			2-Butoxyethanol	111-76-2	7.00000	0.00005
			Water	7732-18-5	20.00000	0.00002
			Ethoxylated Nonylphenol	68412-54-4	5.00000	0.00002
			Triethyl Phosphate	78-40-0	3.00000	0.00001
			Isopropyl Alcohol	67-63-0	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.

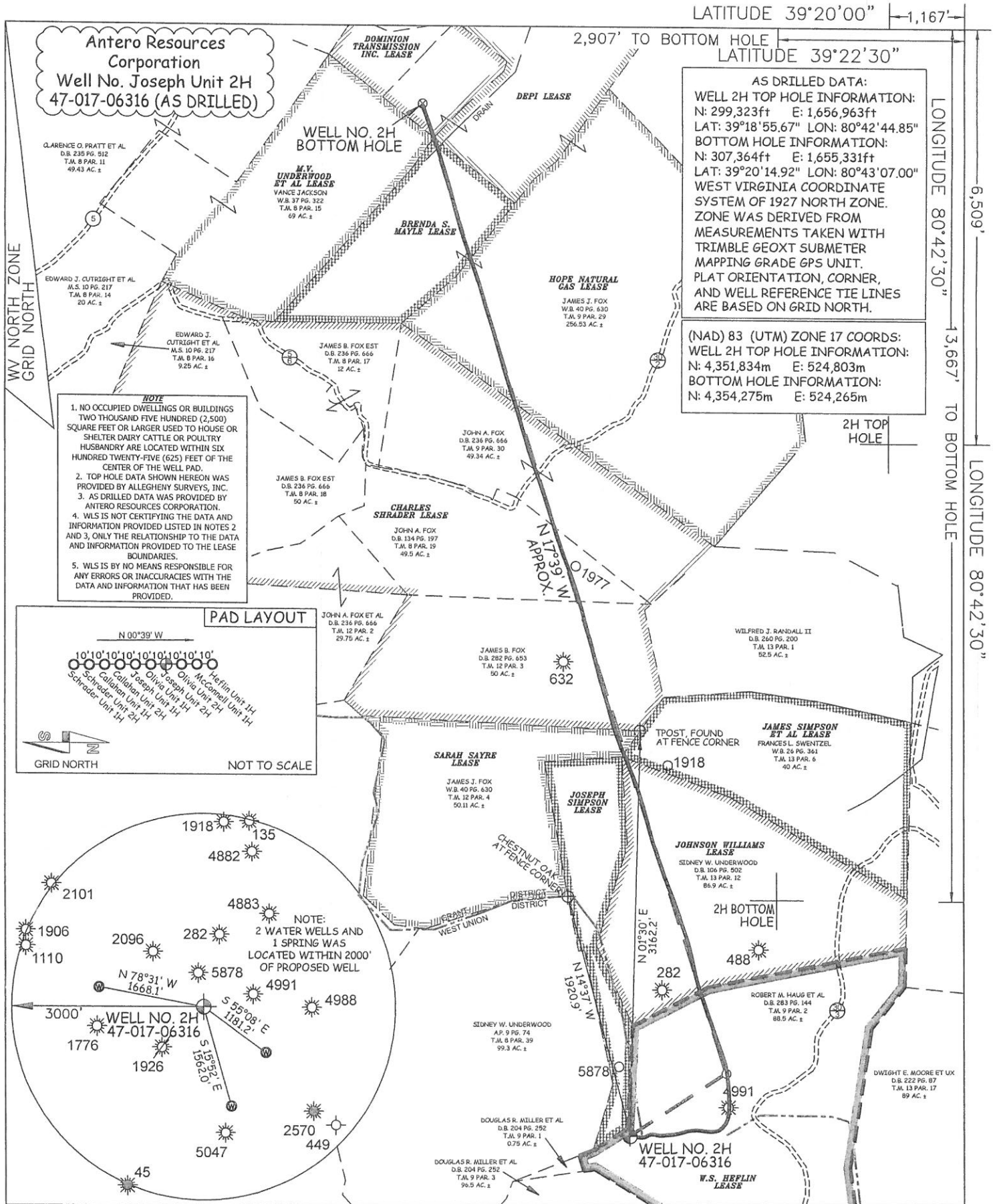
\* Total Water Volume sources may include fresh water, produced water, and/or recycled water  
 \*\* Information is based on the maximum potential for concentration and thus the total may be over 100%


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 # 13-026WA		STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS	<b>LEGEND</b> - - - Surface Owner Boundary Lines +/- - - - Interior Surface Tracts +/- X Existing Fence Found monument, as noted O Proposed Well Path O As Drilled Well Path
DRAWING # JOSEPH2HAD		WILLOW LAND SURVEYING PLLC P.O. BOX 17 PENNSBORO, WV 26415	
SCALE 1" = 1000'		DATE 05/07/15	
MINIMUM DEGREE OF ACCURACY SUBMETER	STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS	OPERATOR'S WELL# JOSEPH UNIT #2H	COUNTY NAME PERMIT
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS	WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ (IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X	API WELL # 47 - 017 - 06316	
STATE OF WEST VIRGINIA QUADRANGLE SMITHBURG 7.5'	LOCATION: ELEVATION 1,430' ORIGINAL - 1,381' AS-DRILLED WATERSHED HEADWATERS MIDDLE ISLAND CREEK	STATE COUNTY PERMIT	
SURFACE OWNER ROBERT M. HAUG ET AL	ACREAGE 88.5 ACRES +/-	DESIGNATED AGENT DIANNA STAMPER	CT CORPORATION SYSTEM 5400 D BIG TYLER ROAD CHARLESTON, WV 25313
OIL & GAS ROYALTY OWNER W.S. HEFLIN; JOHNSON WILLIAMS; JAMES SIMPSON ET AL;	LEASE ACREAGE 89 ACRES±; 52.9 ACRES±; 40 ACRES±;	ADDRESS 1615 WYNKOOP STREET	
SARAH SAYRE; CHARLES SHRADER; HOPE NATURAL GAS; BRENDA S. MAYLE; M.V. UNDERWOOD ET AL; DEPI; DOMINION TRANSMISSION INC.	50 ACRES±; 214 ACRES±; 147.5 ACRES±; 28 ACRES±; 50 ACRES±; 65.10 ACRES±; 24.28 ACRES±	ADDRESS 1615 WYNKOOP STREET	
PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE ___	ESTIMATED DEPTH 7,229' TVD 15,442' MD	ADDRESS 1615 WYNKOOP STREET	DENVER, CO 80202
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE IN WELL (SPECIFY) (X) AS DRILLED	PLUG & ABANDON ___ CLEAN OUT & REPLUG ___	ADDRESS 1615 WYNKOOP STREET	
TARGET FORMATION MARCELLUS	ESTIMATED DEPTH 7,229' TVD 15,442' MD	ADDRESS 1615 WYNKOOP STREET	DENVER, CO 80202
WELL OPERATOR ANTERO RESOURCES CORP.	DESIGNATED AGENT DIANNA STAMPER	ADDRESS 1615 WYNKOOP STREET	DENVER, CO 80202
ADDRESS 1615 WYNKOOP STREET	ADDRESS 5400 D BIG TYLER ROAD	ADDRESS 1615 WYNKOOP STREET	DENVER, CO 80202