

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

API 47 - 085 - 10045 County Ritchie District Union  
Quad Pullman 7.5' Pad Name Ness Pad Field/Pool Name ---  
Farm name Ness, Ashley E., Jr. Well Number Langford Unit 2H  
Operator (as registered with the OOG) Antero Resources  
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 4338467m Easting 508532m  
Landing Point of Curve Northing 4338487.69m Easting 508225.13m  
Bottom Hole Northing 4341278m Easting 506987m

Elevation (ft) 1076' 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 7/23/2013 Date drilling commenced 4/23/2014 Date drilling ceased 9/1/2014  
Date completion activities began 9/16/2014 Date completion activities ceased 12/27/2014  
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 62' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 1620', 1838' Void(s) encountered (Y/N) depths No  
Coal depth(s) ft 456' Cavern(s) encountered (Y/N) depths No  
Is coal being mined in area (Y/N) No

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Reviewed by:  
AL 5/27/15 ✓  
W.S. 06/05/2015

API 47- 085 - 10045 Farm name Ness, Ashley E., Jr. Well number Langford 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	51# H-40	N/A	Yes
Surface	17- 1/2"	13- 3/8"	403'	New	48# H-40	N/A	Yes
Coal							
Intermediate 1	12-1/4"	9-5/8"	2513'	New	36# J-55	N/A	Yes
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5-1/2"	17476'	New	23# P-110	N/A	Yes
Tubing		2-3/8"	6358'		4.7# N-80	N/A	Yes
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	71 sx	15.6	1.18	38	0	8 Hrs.
Surface	Class A	475 sx	15.6	1.18	280	0	8 Hrs.
Coal							
Intermediate 1	Class A	938 sx	15.6	1.18	787	0	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	839 sx (Lead) 1763 sx (Tail)	13.5 Lead 15.2 Tail	1.44 Lead 1.8 Tail	3543	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 17436' MD, 6456' TVD (BHL), 6497' TVD (Deepest Point Drilled) Loggers TD (ft) 17428'  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5795'

\*\* This is a subsequent well. Antero only runs wireline logs on the first well on a multi-well pad (Rufus Unit 1H API#47-085-10046). Please reference the wireline logs submitted with Form WR-35 for the Rufus Unit 1H.

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 \_\_\_\_\_ **RECEIVED**  
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WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_ **MAY 26 2015**

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_ **WV Department of Environmental Protection**



API 47- 085 - 10045 Farm name Ness, Ashley E., Jr. Well number Langford Unit 2H

PRODUCING FORMATION(S)	DEPTHS	
	6432' (TOP) TVD	7018' (TOP) MD
Marcellus		

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 3000 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 1188 mcfpd Oil 2 bpd NGL --- bpd Water 57 bpd GAS MEASURED BY  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	
	0		0		

**\* PLEASE SEE EXHIBIT 3**

Please insert additional pages as applicable.

Drilling Contractor Patterson - UTI Drilling Company LLC  
Address 207 Carlton Dr. City Eighty Four State PA Zip 15330

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

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

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

Please insert additional pages as applicable.

Completed by Kara Quackenbush Telephone 303-357-7233  
Signature [Signature] Title Permitting Agent Date 3/25/2015 **RECEIVED**  
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API 47-085-10045 Farm Name Ness, Ashley E., Jr Well Number Langford Unit 2H

**EXHIBIT 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	16-Sep-14	17,263	17,390	60	Marcellus
2	25-Oct-14	17,113	17,240	60	Marcellus
3	25-Oct-14	16,963	17,090	60	Marcellus
4	26-Oct-14	16,813	16,940	60	Marcellus
5	26-Oct-14	16,663	16,790	60	Marcellus
6	26-Oct-14	16,513	16,640	60	Marcellus
7	27-Oct-14	16,363	16,490	60	Marcellus
8	27-Oct-14	16,213	16,340	60	Marcellus
9	27-Oct-14	16,062	16,190	60	Marcellus
10	28-Oct-14	15,912	16,039	60	Marcellus
11	28-Oct-14	15,762	15,889	60	Marcellus
12	28-Oct-14	15,612	15,739	60	Marcellus
13	29-Oct-14	15,462	15,589	60	Marcellus
14	29-Oct-14	15,312	15,439	60	Marcellus
15	29-Oct-14	15,162	15,289	60	Marcellus
16	29-Oct-14	15,012	15,139	60	Marcellus
17	29-Oct-14	14,862	14,989	60	Marcellus
18	30-Oct-14	14,712	14,839	60	Marcellus
19	30-Oct-14	14,562	14,689	60	Marcellus
20	31-Oct-14	14,412	14,539	60	Marcellus
21	31-Oct-14	14,262	14,389	60	Marcellus
22	31-Oct-14	14,112	14,239	60	Marcellus
23	1-Nov-14	13,962	14,089	60	Marcellus
24	1-Nov-14	13,812	13,939	60	Marcellus
25	1-Nov-14	13,662	13,789	60	Marcellus
26	2-Nov-14	13,512	13,639	60	Marcellus
27	2-Nov-14	13,362	13,489	60	Marcellus
28	2-Nov-14	13,212	13,339	60	Marcellus
29	2-Nov-14	13,062	13,189	60	Marcellus
30	2-Nov-14	12,911	13,039	60	Marcellus
31	3-Nov-14	12,761	12,888	60	Marcellus
32	3-Nov-14	12,611	12,738	60	Marcellus
33	3-Nov-14	12,461	12,588	60	Marcellus
34	4-Nov-15	12,311	12,438	60	Marcellus
35	4-Nov-15	12,161	12,288	60	Marcellus
36	27-Nov-14	12,011	12,138	60	Marcellus
37	27-Nov-14	11,861	11,988	60	Marcellus
38	27-Nov-14	11,711	11,838	60	Marcellus
39	28-Nov-14	11,561	11,688	60	Marcellus
40	28-Nov-14	11,411	11,538	60	Marcellus
41	28-Nov-14	11,261	11,388	60	Marcellus
42	28-Nov-14	11,111	11,238	60	Marcellus
43	29-Nov-14	10,961	11,088	60	Marcellus
44	29-Nov-14	10,811	10,938	60	Marcellus
45	29-Nov-14	10,661	10,788	60	Marcellus
46	29-Nov-14	10,511	10,638	60	Marcellus
47	29-Nov-14	10,361	10,488	60	Marcellus
48	30-Nov-14	10,211	10,338	60	Marcellus
49	30-Nov-14	10,061	10,188	60	Marcellus
50	30-Nov-14	9,911	10,038	60	Marcellus
51	1-Dec-14	9,760	9,887	60	Marcellus
52	1-Dec-14	9,610	9,737	60	Marcellus
53	1-Dec-14	9,460	9,587	60	Marcellus
54	1-Dec-14	9,310	9,437	60	Marcellus
55	2-Dec-14	9,160	9,287	60	Marcellus
56	2-Dec-14	9,010	9,137	60	Marcellus
57	2-Dec-14	8,860	8,987	60	Marcellus
58	2-Dec-14	8,710	8,837	60	Marcellus
59	2-Dec-14	8,560	8,687	60	Marcellus
60	3-Dec-14	8,410	8,537	60	Marcellus
61	3-Dec-14	8,260	8,387	60	Marcellus
62	3-Dec-14	8,110	8,237	60	Marcellus
63	4-Dec-14	7,960	8,087	60	Marcellus
64	4-Dec-14	7,810	7,937	60	Marcellus
65	4-Dec-14	7,660	7,787	60	Marcellus
66	4-Dec-14	7,510	7,637	60	Marcellus
67	4-Dec-14	7,360	7,487	60	Marcellus
68	4-Dec-14	7,210	7,337	60	Marcellus
69	5-Dec-14	7,060	7,187	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	25-Oct-14	53.4	7,384	5,675	4,674	95,400	7,397	N/A
2	25-Oct-14	62.0	7,533	6,203	4,888	155,500	7,016	N/A
3	26-Oct-14	63.3	7,071	5,666	4,526	211,300	6,346	N/A
4	26-Oct-14	64.2	7,171	5,647	4,566	213,100	6,315	N/A
5	26-Oct-14	64.2	7,157	5,544	4,828	181,800	6,889	N/A
6	26-Oct-14	63.5	7,040	5,814	4,945	163,900	6,877	N/A
7	27-Oct-14	66.9	7,320	6,098	5,379	212,400	6,308	N/A
8	27-Oct-14	55.5	7,809	5,721	4,910	47,600	6,829	N/A
9	27-Oct-14	63.0	7,214	5,668	4,592	38,900	6,209	N/A
10	28-Oct-14	63.9	7,439	5,897	4,487	210,100	6,232	N/A
11	28-Oct-14	66.7	7,488	5,924	4,790	180,400	6,377	N/A
12	29-Oct-14	68.2	7,202	5,679	5,110	210,100	5,955	N/A
13	29-Oct-14	79.4	6,988	5,692	4,987	210,000	5,903	N/A
14	29-Oct-14	66.2	6,568	5,369	4,913	213,000	5,920	N/A
15	29-Oct-14	68.6	7,066	5,429	5,173	209,000	5,845	N/A
16	30-Oct-14	67.7	6,971	5,446	5,084	211,700	5,857	N/A
17	30-Oct-14	64.9	6,677	5,288	4,961	212,000	5,833	N/A
18	30-Oct-14	65.6	6,840	5,450	5,057	210,900	5,796	N/A
19	30-Oct-14	68.0	6,906	5,514	5,123	209,600	5,855	N/A
20	31-Oct-14	65.9	6,941	5,383	5,133	210,700	5,837	N/A
21	31-Oct-14	61.1	7,212	5,374	4,832	148,700	6,246	N/A
22	1-Nov-14	65.8	7,207	5,703	4,660	154,000	6,283	N/A
23	1-Nov-14	65.1	6,929	5,393	5,137	209,700	5,768	N/A
24	1-Nov-14	64.5	6,833	5,447	5,267	177,700	6,192	N/A
25	1-Nov-14	68.5	6,942	5,466	5,208	211,100	5,724	N/A
26	2-Nov-14	65.5	7,056	5,466	5,265	210,100	5,837	N/A
27	2-Nov-14	62.8	7,090	5,776	5,228	209,800	5,751	N/A
28	2-Nov-14	67.2	7,061	5,539	5,521	210,400	5,678	N/A
29	3-Nov-14	68.1	7,114	5,484	5,437	211,700	5,669	N/A
30	3-Nov-14	64.7	7,123	5,630	5,471	210,000	5,654	N/A
31	3-Nov-14	65.0	7,084	5,735	5,477	192,200	5,623	N/A
32	3-Nov-14	68.2	6,996	5,478	5,349	213,800	5,758	N/A
33	4-Nov-14	66.2	7,026	5,338	4,586	154,100	6,127	N/A
34	4-Nov-14	64.5	7,236	5,563	5,590	207,800	5,607	N/A
35	4-Nov-14	65.8	7,327	5,867	5,618	169,100	6,155	N/A
36	27-Nov-14	61.9	7,479	5,753	5,065	167,600	6,133	N/A
37	27-Nov-14	65.9	6,978	5,793	4,630	212,400	5,616	N/A
38	27-Nov-14	66.1	6,772	5,590	4,833	210,000	5,613	N/A
39	28-Nov-14	64.5	6,777	5,774	5,094	204,100	5,470	N/A
40	28-Nov-14	65.4	6,664	5,448	4,932	210,100	5,527	N/A
41	28-Nov-14	67.2	7,083	5,561	5,202	211,300	5,558	N/A
42	28-Nov-14	66.3	7,475	6,107	4,805	210,000	5,817	N/A
43	29-Nov-14	65.9	7,183	5,662	4,959	214,600	5,710	N/A
44	29-Nov-14	64.3	6,627	5,265	5,191	212,800	5,548	N/A
45	29-Nov-14	65.0	6,681	5,183	5,608	210,400	5,404	N/A
46	29-Nov-14	67.9	7,130	5,332	5,295	203,300	5,876	N/A
47	30-Nov-14	65.1	7,257	5,239	4,675	131,500	5,599	N/A
48	30-Nov-14	65.3	6,516	6,118	5,436	216,500	5,579	N/A
49	30-Nov-14	65.9	6,678	5,627	5,003	211,800	5,443	N/A
50	30-Nov-14	69.2	6,924	5,793	4,937	210,600	5,402	N/A
51	1-Dec-14	61.9	6,417	5,493	5,746	137,700	7,241	N/A
52	1-Dec-14	67.5	6,235	5,474	5,747	211,900	5,408	N/A
53	1-Dec-14	65.1	6,453	5,498	5,424	194,800	4,714	N/A
54	1-Dec-14	64.6	6,500	5,369	4,815	210,800	5,460	N/A
55	2-Dec-14	67.3	6,541	5,571	4,889	133,800	4,783	N/A
56	2-Dec-14	65.8	6,096	5,215	5,493	211,700	5,341	N/A
57	2-Dec-14	66.7	6,493	5,449	5,719	211,500	5,316	N/A
58	2-Dec-14	66.7	6,931	5,553	5,811	209,800	5,327	N/A
59	3-Dec-14	66.8	6,497	5,479	5,073	212,800	5,319	N/A
60	3-Dec-14	66.1	6,235	5,566	5,511	210,400	5,282	N/A
61	3-Dec-14	63.5	6,124	5,405	4,947	211,500	5,283	N/A
62	3-Dec-14	66.8	6,325	5,808	3,988	211,400	5,251	N/A
63	4-Dec-14	67.0	6,266	5,369	5,275	212,100	5,251	N/A
64	4-Dec-14	66.2	5,902	5,218	4,853	209,600	5,190	N/A
65	4-Dec-14	66.4	6,269	5,530	5,397	209,300	5,170	N/A
66	4-Dec-14	67.6	6,381	5,588	5,545	209,900	5,263	N/A
67	4-Dec-14	68.1	6,364	5,552	5,414	210,500	5,187	N/A
68	5-Dec-14	68.2	6,360	5,442	5,338	210,600	5,198	N/A
69	5-Dec-14	65.7	6,104	5,515	5,452	220,400	5,310	N/A
	AVG=	65.6	6,865	5,573	5,114	13,385,100	399,257	TOTAL

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## 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	62	N/A	62	N/A
Siltstone	0	456	0	456
Coal	est. 456	486	est. 456	486
Sand	est. 486	516	est. 486	516
Shale	est. 516	1266	est. 516	1266
Sandstone	est. 1266	1296	est. 1266	1296
Shale	est. 1296	1356	est. 1296	1356
Sandstone	est. 1356	1386	est. 1356	1386
Shale	est. 1386	1506	est. 1386	1506
Sandstone	est. 1506	1906	est. 1506	1906
Limestone	est. 1906	2010	est. 1906	2004
Big Lime	est. 2010	2068	est. 2010	2068
Big Injun	est. 2068	2317	est. 2068	2317
Gantz Sand	est. 2317	2488	est. 2317	2488
Fifty Foot Sandstone	est. 2488	2696	est. 2488	2696
Gordon	est. 2696	2488	est. 2696	2488
Fifth Sandstone	est. 2488	3075	est. 2488	3075
Bayard	est. 3075	3444	est. 3075	3444
Warren	est. 3444	3827	est. 3444	3827
Speechley	est. 3827	4034	est. 3827	4034
Baltown	est. 4034	4537	est. 4034	4537
Bradford	est. 4537	4913	est. 4537	4914
Benson	est. 4913	5150	est. 4914	5150
Alexander	est. 5150	5369	est. 5150	5370
Elk	est. 5369	5753	est. 5370	5755
Rhinestreet	5753	6117	5755	6150
Sycamore	6117	6276	6150	6485
Middlesex	6276	6381	6485	6812
Burkett	6381	6413	6812	6933
Tully	6413	6432	6933	7018
Marcellus	6432	NA	7018	17411

\*Please note Antero determines shallow formation tops based on mud and/or wireline logs that are only run on one well on a multi-well pad (Please reference Wireline Logs submitted for the Rufus Unit 1H API# 47-085-10046). 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:	10/25/2014
Job End Date:	12/5/2014
State:	West Virginia
County:	Ritchie
API Number:	47-085-10045-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Langford Unit 2H
Longitude:	-80.90119700
Latitude:	39.19541400
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,497
Total Base Water Volume (gal):	16,768,794
Total Base Non Water Volume:	0



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## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Abstract Chemical Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	ANTERO RESOURCES	Water		7732-18-5	100.00000	90.87515	
WV Specific 40/70 mesh Sand	Nabors Completion and Production Services	Sand - Bulk - West Virginia	Crystalline Silica, quartz	14808-60-7	99.90000	5.08509	
			Aluminum Oxide	1344-28-1	1.10000	0.05599	
			Titanium Oxide	13463-67-7	0.10000	0.00509	
			Iron Oxide	1309-37-1	0.10000	0.00509	
WV Specific 20/40 mesh Sand	Nabors Completion and Production Services	Sand - Bulk - West Virginia	Crystalline Silica, quartz	14808-60-7	99.90000	2.01975	
			Aluminum Oxide	1344-28-1	1.10000	0.02224	
			Titanium Oxide	13463-67-7	0.10000	0.00202	
			Iron Oxide	1309-37-1	0.10000	0.00202	
WV Specific 30/50 mesh Sand	Nabors Completion and Production Services	Sand - Bulk - West Virginia	Crystalline Silica, quartz	14808-60-7	99.90000	0.98398	
			Aluminum Oxide	1344-28-1	1.10000	0.01084	

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				Iron Oxide	1309-37-1	0.10000	0.00099	
				Titanium Oxide	13463-67-7	0.10000	0.00099	
WV Local 100 mesh Sand	Nabors Completion and Production Services	Sand - Bulk - West Virginia						
				Crystalline Silica, quartz	14808-60-7	99.90000	0.60072	
				Aluminum Oxide	1344-28-1	1.10000	0.00662	
				Titanium Oxide	13463-67-7	0.10000	0.00060	
				Iron Oxide	1309-37-1	0.10000	0.00060	
HCl Acid (12.5-18.0%) 22 Baume	Nabors Completion and Production Services	Bulk Acid						
				Water	7732-18-5	87.50000	0.18920	
WFR-6W	Nabors Completion and Production Services	Friction Reducer		Hydrochloric Acid	7647-01-0	18.00000	0.03892	
LSG-100L	Nabors Completion and Production Services	Gelling Agents		Anionic Water-Soluble Polymer Emulsion	Proprietary	100.00000	0.07834	
Super TSC-LT	Nabors Completion and Production Services	Paraffin & Scale Additives		Petroleum Distillates	64742-47-8	70.00000	0.06801	
AQUICAR DB 20	Nabors Completion and Production Services	Biocides		100% Non-Hazardous Mixture	Proprietary	100.00000	0.01700	
				Polyethylene glycol	25322-68-3	54.50000	0.00791	
				2,2-Dibromo-3-nitrilopropionamide (DBNPA)	10222-01-2	20.00000	0.00290	
				Sodium bromide	7647-15-6	4.00000	0.00058	
				Dibromoacetone	3252-43-5	3.00000	0.00044	
Super GREEN SOLV-M	Nabors Completion and Production Services	Paraffin & Scale Additives		Aliphatic Hydrocarbons	Proprietary	95.00000	0.00136	
				Dodecane	Proprietary	14.00000	0.00020	
				Tetradecane	Proprietary	11.00000	0.00016	
				Tridecane	Proprietary	9.00000	0.00013	
				Undecane	Proprietary	8.00000	0.00012	
OB-2 LT	Nabors Completion and Production Services	Gel Breakers		Ammonium Persulfate	7727-54-0	85.00000	0.00091	
				Crystalline Silica (in the form of quartz)	14808-60-7	10.00000	0.00011	
Acid Inhibitor 2 (AI-2)	Nabors Completion and Production Services	Acid Corrosion Inhibitors						

			Glycol Ethers	111-46-6	40.00000	0.00016
			Isopropyl Alcohol	67-63-0	40.00000	0.00016
			Propargyl Alcohol	107-19-7	40.00000	0.00016
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	10.00000	0.00004
EB-4L	Nabors Completion and Production Services	Gel Breakers				
			Ethylene Glycol	107-21-1	40.00000	0.00018
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.						
Other Ingredients	Nabors Completion and Production Services	Other Ingredients				
			Copolymer	Proprietary	100.00000	0.07834
			guar gum	9000-30-0	50.00000	0.04858
			Water	7732-18-5	40.00000	0.03134
			Isoparaffinic Solvent	64742-47-8	26.00000	0.02037
			Water	7732-18-5	60.00000	0.01020
			Proprietary	Proprietary	50.00000	0.00850
			Water	7732-18-5	32.00000	0.00464
			Ethylene Glycol	107-21-1	4.00000	0.00313
			Ethoxylated alcohols	Proprietary	4.00000	0.00313
			Proprietary	Proprietary	15.00000	0.00255
			Proprietary	Proprietary	15.00000	0.00255
			Proprietary	Proprietary	15.00000	0.00255
			Surfactant Blend	Proprietary	3.00000	0.00235
			Crystalline Silica (in the form of quartz)	14808-60-7	2.00000	0.00194
			Surfactant	68439-51-0	2.00000	0.00194
			Sugar	57-50-1	100.00000	0.00046
			Proprietary	Proprietary	100.00000	0.00046
			Water	7732-18-5	100.00000	0.00023
			Water	7732-18-5	48.00000	0.00020
			Alkali Chloride salt	Proprietary	15.00000	0.00016
			2,2-Dibromomalonamide	73003-80-2	1.00000	0.00015
			Monobromo-3-nitropropionamide	1113-55-9	1.00000	0.00015
			2-Propenamide as residual	79-06-1	0.10000	0.00008
			2-Butoxyethanol	111-76-2	13.00000	0.00005
			Proprietary	Proprietary	10.00000	0.00004
			Proprietary	Proprietary	1.00000	0.00001
			Proprietary	Proprietary	1.00000	0.00001
			Proprietary	Proprietary	1.00000	0.00001
			Proprietary	Proprietary	1.00000	0.00001
			Proprietary	Proprietary	0.99000	0.00000
			Organophylic Clay	68953-58-2		
			Proprietary	Proprietary	0.02000	

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\* 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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LATITUDE 39°12'30"

7,474'

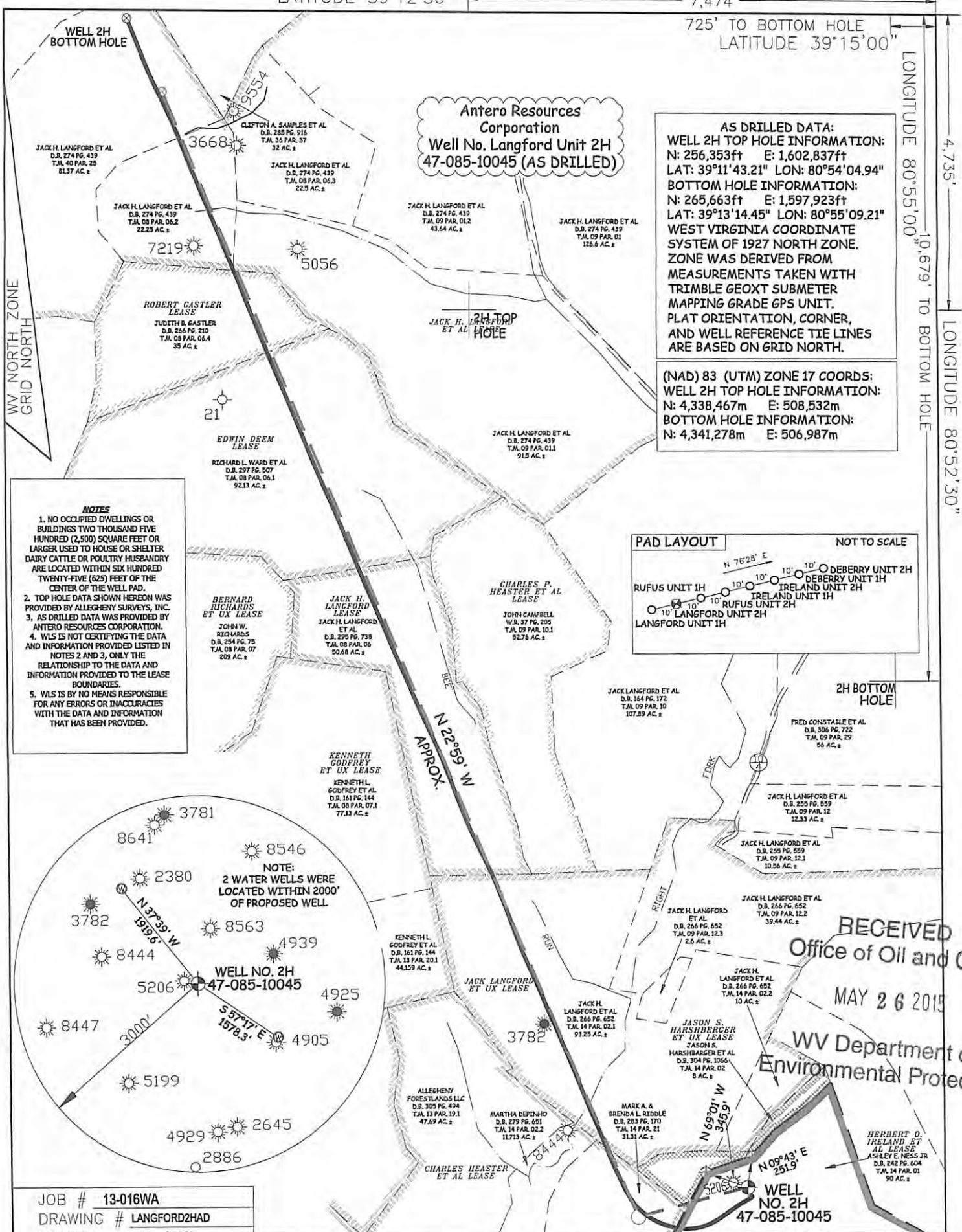
725' TO BOTTOM HOLE  
LATITUDE 39°15'00"

LONGITUDE 80°55'00"

4,735'

10,679' TO BOTTOM HOLE

LONGITUDE 80°52'30"

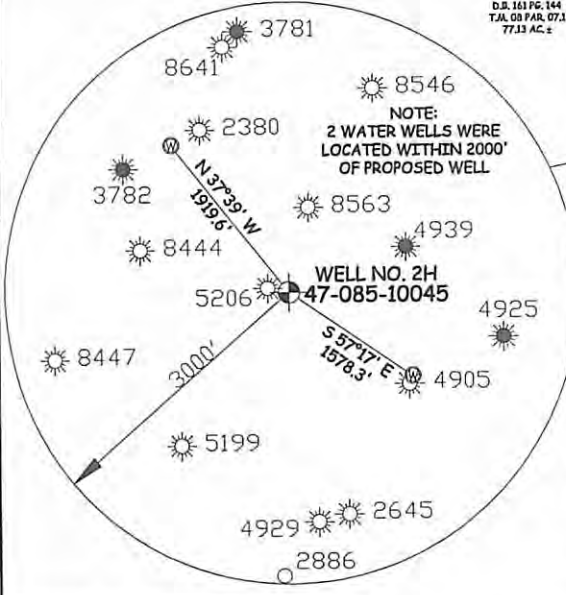
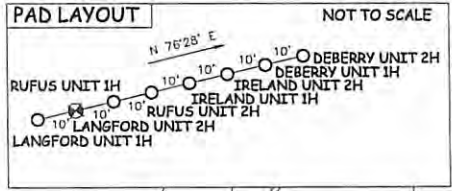


**AS DRILLED DATA:**  
**WELL 2H TOP HOLE INFORMATION:**  
 N: 256,353ft E: 1,602,837ft  
**BOTTOM HOLE INFORMATION:**  
 N: 265,663ft E: 1,597,923ft  
**WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.**

**(NAD) 83 (UTM) ZONE 17 COORDS:**  
**WELL 2H TOP HOLE INFORMATION:**  
 N: 4,338,467m E: 508,532m  
**BOTTOM HOLE INFORMATION:**  
 N: 4,341,278m E: 506,987m

**NOTES**

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.



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JOB # 13-016WA  
 DRAWING # LANGFORD2HAD  
 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  
 WELL TYPE: OIL GAS  LIQUID INJECTION WASTE DISPOSAL  
 (IF "GAS") PRODUCTION  STORAGE DEEP SHALLOW

LOCATION: ELEVATION 1,080' ORIGINAL - 1,076' AS DRILLED WATERSHED SOUTH FORK HUGHES RIVER  
 QUADRANGLE PULLMAN 7.5' DISTRICT UNION COUNTY RITCHIE

SURFACE OWNER ASHLEY E. NESS, JR. ACREAGE 90 ACRES +/-  
 OIL & GAS ROYALTY OWNER HERBERT O. IRELAND ET AL; CHARLES HEASTER ET AL; LEASE ACREAGE 90 ACRES +/-; 234.49 ACRES +/-  
 JACK LANGFORD ET UX; JACK H. LANGFORD; EDWIN DEEM; ROBERT GASTLER; JACK H. LANGFORD ET AL 145.28 ACRES +/-; 50.68 ACRES +/-; 92.13 ACRES +/-; 31.26 ACRES +/-; 448.5 ACRES +/-

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE   
 PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL  
 (SPECIFY)  AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG  
 TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,456' TVD 17,436' 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

DATE 03/30/15 OPERATOR'S WELL# LANGFORD UNIT #2H  
 API WELL # 47 - 085 - 10045  
 STATE COUNTY PERMIT 06/05/2015