

APPROVED
NAME: Michael Jeff
DATE: 1/27/16

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

APR 47 - 085 - 10191 County Ritchie District Clay
Quad Pennsboro 7.5' Pad Name Walnut West Pad Field/Pool Name ---
Farm name Walnut Investments Co. Well Number Musgrave 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 4351525m Easting 500174m
Landing Point of Curve Northing 4351340.09m Easting 500023.62m
Bottom Hole Northing 4348199m Easting 501293m

Elevation (ft) 1121' 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 1/14/2015 Date drilling commenced 2/6/2015 Date drilling ceased 6/5/2015
Date completion activities began 7/4/2015 Date completion activities ceased 10/1/2015
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 130', 310' Open mine(s) (Y/N) depths N
Salt water depth(s) ft None Void(s) encountered (Y/N) depths N
Coal depth(s) ft 1571' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Received
Office of Oil & Gas
JAN 13 2016

Reviewed by:
WS 02/01/16 ASD
02/05/2016

API 47-085 - 10191 Farm name Walnut Investments Co. Well number Musgrave 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	30"	20"	53'	New	94#/J-55	N/A	Y
Surface	17-1/2"	13-3/8"	556'	New	48#/H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2520'	New	36#/J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	17,847'	New	23#/P-110	N/A	Y
Tubing		2-3/8"	6539		4.7#/N-80		
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	193 sx	15.6	1.18	51 Cu. Ft.	0'	8 Hrs.
Surface	Class A	662 sx	15.6	1.18	386 Cu. Ft.	0'	8 Hrs.
Coal							
Intermediate 1	Class A	972 sx	15.6	1.18	789 Cu. Ft.	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	894 sx (Lead), 1860 sx (Tail)	14.18 (Lead), 14.74 (Tail)	1.24 (Lead), 1.81 (Tail)	3626 Cu. Ft.	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 17,847' MD, 6416' TVD Loggers TD (ft) 17,799' MD
 Deepest formation penetrated Marcellus Shale Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5472'

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

** This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Schmidle Unit 1H API# 47-085-10042). Please reference the wireline logs submitted with Form WR-35 for the Schmidle Unit 1H. A Cement Bond Log has been included with this submittal.

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
Office of Oil & Gas

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

JAN 13 2016

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED N/A

API 47- 085 - 10191 Farm name Walnut Investments Co. Well number Musgrave Unit 2H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6280' (Top)</u> TVD	<u>6632' (Top)</u> MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

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 12,082 mcfpd Oil 194 bpd NGL ---- bpd Water 2 bpd GAS MEASURED BY Estimated Orifice Pilot

<u>LITHOLOGY/ FORMATION</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H₂S, ETC)</u>
	<u>DEPTH IN FT NAME TVD</u>	<u>DEPTH IN FT TVD</u>	<u>DEPTH IN FT MD</u>	<u>DEPTH IN FT MD</u>	
	<u>0</u>		<u>0</u>		
			SEE ATTACHED EXHIBIT 3		

Please insert additional pages as applicable.

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

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 Drive City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

Completed by Natalie Komp Telephone 303-357-6820
Signature  Title Permitting Agent Date 1/11/2015

Received
Office of Oil & Gas
JAN 13 2016

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

02/05/2016

API 47-085-10191 Farm Name Walnut Investments Co. Well Number Musgrave Unit 2H

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	4-Jul-15	17,578	17,745	60	Marcellus
2	1-Aug-15	17,380	17,547	60	Marcellus
3	1-Aug-15	17,181	17,349	60	Marcellus
4	3-Aug-15	16,983	17,150	60	Marcellus
5	3-Aug-15	16,785	16,952	60	Marcellus
6	3-Aug-15	16,587	16,754	60	Marcellus
7	3-Aug-15	16,389	16,556	60	Marcellus
8	3-Aug-15	16,190	16,358	60	Marcellus
9	4-Aug-15	15,992	16,159	60	Marcellus
10	4-Aug-15	15,794	15,961	60	Marcellus
11	4-Aug-15	15,596	15,763	60	Marcellus
12	5-Aug-15	15,398	15,565	60	Marcellus
13	5-Aug-15	15,199	15,367	60	Marcellus
14	5-Aug-15	15,001	15,168	60	Marcellus
15	5-Aug-15	14,803	14,970	60	Marcellus
16	6-Aug-15	14,605	14,772	60	Marcellus
17	6-Aug-15	14,407	14,574	60	Marcellus
18	6-Aug-15	14,208	14,376	60	Marcellus
19	6-Aug-15	14,010	14,177	60	Marcellus
20	7-Aug-15	13,812	13,979	60	Marcellus
21	7-Aug-15	13,614	13,781	60	Marcellus
22	7-Aug-15	13,416	13,583	60	Marcellus
23	7-Aug-15	13,217	13,385	60	Marcellus
24	8-Aug-15	13,019	13,186	60	Marcellus
25	8-Aug-15	12,821	12,988	60	Marcellus
26	8-Aug-15	12,623	12,790	60	Marcellus
27	8-Aug-15	12,425	12,592	60	Marcellus
28	9-Aug-15	12,226	12,393	60	Marcellus
29	9-Aug-15	12,028	12,195	60	Marcellus
30	10-Aug-15	11,830	11,997	60	Marcellus
31	10-Aug-15	11,632	11,799	60	Marcellus
32A	11-Aug-15	11,434	11,601	60	Marcellus
32B	11-Aug-15	11,359	11,517	60	Marcellus
33	12-Aug-15	11,184	11,332	60	Marcellus
34	12-Aug-15	11,010	11,157	60	Marcellus
35	13-Aug-15	10,836	10,983	60	Marcellus
36	13-Aug-15	10,641	10,808	60	Marcellus
37	13-Aug-15	10,443	10,610	60	Marcellus
38	13-Aug-15	10,244	10,412	60	Marcellus
39	13-Aug-15	10,046	10,213	60	Marcellus
40	14-Aug-15	9,848	10,015	60	Marcellus
41	14-Aug-15	9,650	9,817	60	Marcellus
42	14-Aug-15	9,452	9,619	60	Marcellus
43	14-Aug-15	9,253	9,421	60	Marcellus
44	14-Aug-15	9,055	9,222	60	Marcellus
45	14-Aug-15	8,857	9,024	60	Marcellus
46	15-Aug-15	8,659	8,826	60	Marcellus
47	15-Aug-15	8,461	8,628	60	Marcellus
48	15-Aug-15	8,262	8,430	60	Marcellus
49	15-Aug-15	8,064	8,231	60	Marcellus
50	15-Aug-15	7,866	8,033	60	Marcellus
51	16-Aug-15	7,668	7,835	60	Marcellus
52	16-Aug-15	7,470	7,637	60	Marcellus
53	16-Aug-15	7,271	7,439	60	Marcellus
54	16-Aug-15	7,073	7,240	60	Marcellus
55	16-Aug-15	6,875	7,042	60	Marcellus
56	16-Aug-15	6,677	6,844	60	Marcellus

Received
Office of Oil & Gas
JAN 13 2016

02/05/2016

API 47-085-10163 Farm Name Walnut Investments Co. Well Number Musgrave 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	1-Aug-15	60.1	6,724	N/A	4,348	167,930	6,797	N/A
2	1-Aug-15	59.7	6,796	5,521	3,941	174,060	7,203	N/A
3	1-Aug-15	57.6	6,942	5,809	4,498	109,000	7,091	N/A
4	3-Aug-15	59.6	6,906	6,485	3,827	69,400	6,741	N/A
5	3-Aug-15	60.2	6,913	5,761	4,263	94,105	7,176	N/A
6	3-Aug-15	57.8	7,023	5,669	3,975	119,730	6,377	N/A
7	3-Aug-15	58.8	6,977	6,148	4,699	84,150	6,264	N/A
8	3-Aug-15	52.2	6,696	5,199	4,531	137,640	7,109	N/A
9	4-Aug-15	59.9	7,205	5,436	4,381	198,290	6,802	N/A
10	4-Aug-15	60.5	7,496	5,583	3,569	213,875	6,416	N/A
11	4-Aug-15	56.4	7,087	5,643	4,275	111,640	6,908	N/A
12	5-Aug-15	67.9	6,748	6,040	3,680	224,790	6,305	N/A
13	5-Aug-15	62.5	6,977	5,624	3,952	226,795	6,407	N/A
14	5-Aug-15	61.5	7,293	6,520	4,285	204,325	7,347	N/A
15	5-Aug-15	59.8	7,299	5,838	4,973	206,500	6,987	N/A
16	6-Aug-15	64.0	6,766	6,195	4,374	234,100	6,100	N/A
17	6-Aug-15	53.9	7,688	6,748	3,998	80,620	6,953	N/A
18	6-Aug-15	64.3	7,276	6,023	4,138	211,000	7,085	N/A
19	6-Aug-15	34.8	7,367	6,416	4,774	1,856	6,556	N/A
20	7-Aug-15	58.8	6,846	6,679	5,465	217,880	6,809	N/A
21	7-Aug-15	66.8	7,231	6,267	3,681	210,910	6,952	N/A
22	7-Aug-15	62.7	7,059	5,561	4,281	231,640	6,497	N/A
23	7-Aug-15	41.3	8,005	6,509	4,975	7,270	6,436	N/A
24	8-Aug-15	40.6	7,982	6,552	4,148	2,640	6,242	N/A
25	8-Aug-15	69.9	6,784	5,932	4,606	232,130	6,478	N/A
26	8-Aug-15	64.4	6,744	5,568	4,975	234,290	6,637	N/A
27	8-Aug-15	63.4	7,236	5,718	4,821	216,760	6,410	N/A
28	9-Aug-15	12.7	7,983	5,672	4,435	1,050	6,363	N/A
29	9-Aug-15	22.3	8,073	6,731	4,038	3,289	6,766	N/A
30	10-Aug-15	33.9	8,743	7,260	4,642	13,800	6,188	N/A
31	10-Aug-15	25.8	7,988	7,145	5,057	5,100	3,463	N/A
32A	11-Aug-15	23.8	7,576	7,773	5,278	2,800	3,195	N/A
32B	11-Aug-15	58.4	7,438	N/A	3,845	110,100	6,134	N/A
33	12-Aug-15	65.2	6,397	6,477	3,837	223,600	6,232	N/A
34	12-Aug-15	64.5	7,008	6,595	4,470	232,700	6,288	N/A
35	13-Aug-15	54.9	7,188	6,609	3,865	214,300	6,645	N/A
36	13-Aug-15	63.3	6,521	6,608	4,340	196,200	5,952	N/A
37	13-Aug-15	64.3	6,213	6,326	4,323	227,010	6,057	N/A
38	13-Aug-15	63.5	6,495	6,700	4,448	202,600	6,074	N/A
39	13-Aug-15	60.7	6,498	5,744	4,666	90,700	6,674	N/A
40	14-Aug-15	61.9	6,462	5,723	4,821	119,000	6,533	N/A
41	14-Aug-15	63.8	6,636	5,844	4,603	219,050	6,041	N/A
42	14-Aug-15	64.7	6,399	6,727	4,370	233,200	6,030	N/A
43	14-Aug-15	65.2	6,125	6,183	4,499	234,800	6,026	N/A
44	14-Aug-15	63.1	6,256	5,787	4,674	152,800	6,336	N/A
45	14-Aug-15	65.0	6,303	5,672	5,257	236,100	5,968	N/A
46	15-Aug-15	60.4	6,703	5,976	3,734	215,200	6,587	N/A
47	15-Aug-15	64.4	6,419	5,761	4,667	218,700	5,962	N/A
48	15-Aug-15	64.8	6,704	5,740	4,442	227,450	6,067	N/A
49	15-Aug-15	67.4	6,336	5,411	4,435	236,900	6,364	N/A
50	15-Aug-15	66.4	5,987	5,381	5,715	234,400	6,020	N/A
51	16-Aug-15	68.3	6,112	5,515	4,901	234,300	6,013	N/A
52	16-Aug-15	65.6	6,095	6,055	4,520	223,500	5,808	N/A
53	16-Aug-15	65.4	5,959	5,851	4,245	234,510	5,897	N/A
54	16-Aug-15	66.0	5,874	6,788	4,771	235,170	5,882	N/A
55	16-Aug-15	66.2	5,804	6,505	5,132	234,300	5,907	N/A
56	16-Aug-15	67.1	5,722	5,872	4,503	233,400	5,857	N/A
	AVG=	67.9	6,878	6,107	4,456	9,469,355	360,414	TOTAL

Received
Office of Oil & Gas
JAN 13 2016

02/05/2016

API 47-085-10191 Farm Name Walnut Investments Co., Well Number Musgrave 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	1-Aug-15	60.1	6,724	N/A	4,348	167,930	6,797	N/A
2	1-Aug-15	59.7	6,796	5,521	3,941	174,060	7,203	N/A
3	1-Aug-15	57.6	6,942	5,809	4,498	109,000	7,091	N/A
4	3-Aug-15	59.6	6,906	6,485	3,827	69,400	6,741	N/A
5	3-Aug-15	60.2	6,913	5,761	4,263	94,105	7,176	N/A
6	3-Aug-15	57.8	7,023	5,669	3,975	119,730	6,377	N/A
7	3-Aug-15	58.8	6,977	6,148	4,699	84,150	6,264	N/A
8	3-Aug-15	52.2	6,686	5,199	4,531	137,640	7,109	N/A
9	4-Aug-15	59.9	7,205	5,436	4,381	198,290	6,802	N/A
10	4-Aug-15	60.5	7,496	5,583	3,569	213,875	6,416	N/A
11	4-Aug-15	56.4	7,087	5,643	4,275	111,640	6,908	N/A
12	5-Aug-15	67.9	6,748	6,040	3,680	224,790	6,305	N/A
13	5-Aug-15	62.5	6,977	5,624	3,952	226,795	6,407	N/A
14	5-Aug-15	61.5	7,293	6,520	4,285	204,325	7,347	N/A
15	5-Aug-15	59.8	7,299	5,838	4,973	206,500	6,987	N/A
16	6-Aug-15	64.0	6,766	6,195	4,374	234,100	6,100	N/A
17	6-Aug-15	53.9	7,688	6,748	3,998	80,620	6,953	N/A
18	6-Aug-15	64.3	7,276	6,023	4,138	211,000	7,085	N/A
19	6-Aug-15	34.8	7,367	6,416	4,774	1,856	6,556	N/A
20	7-Aug-15	58.8	6,846	6,679	5,465	217,880	6,809	N/A
21	7-Aug-15	66.8	7,231	6,267	3,681	210,910	6,952	N/A
22	7-Aug-15	62.7	7,059	5,561	4,281	231,640	6,497	N/A
23	7-Aug-15	41.3	8,005	6,509	4,975	7,270	6,436	N/A
24	8-Aug-15	40.6	7,982	6,552	4,148	2,640	6,242	N/A
25	8-Aug-15	69.9	6,784	5,932	4,606	232,130	6,478	N/A
26	8-Aug-15	64.4	6,744	5,568	4,975	234,290	6,637	N/A
27	8-Aug-15	63.4	7,236	5,718	4,821	216,760	6,410	N/A
28	9-Aug-15	12.7	7,983	5,672	4,435	1,050	6,363	N/A
29	9-Aug-15	22.3	8,073	6,731	4,038	3,289	6,766	N/A
30	10-Aug-15	33.9	8,743	7,260	4,642	13,800	6,188	N/A
31	10-Aug-15	25.8	7,988	7,145	5,057	5,100	3,463	N/A
32A	11-Aug-15	23.8	7,576	7,773	5,278	2,800	3,195	N/A
32B	11-Aug-15	58.4	7,438	N/A	3,845	110,100	6,134	N/A
33	12-Aug-15	65.2	6,397	6,477	3,837	223,600	6,232	N/A
34	12-Aug-15	64.5	7,008	6,595	4,470	232,700	6,288	N/A
35	13-Aug-15	54.9	7,188	6,609	3,865	214,300	6,645	N/A
36	13-Aug-15	63.3	6,521	6,608	4,340	196,200	5,952	N/A
37	13-Aug-15	64.3	6,213	6,326	4,323	227,010	6,057	N/A
38	13-Aug-15	63.5	6,495	6,700	4,448	202,600	6,074	N/A
39	13-Aug-15	60.7	6,498	5,744	4,666	90,700	6,674	N/A
40	14-Aug-15	61.9	6,462	5,723	4,821	119,000	6,533	N/A
41	14-Aug-15	63.8	6,836	5,844	4,603	219,050	6,041	N/A
42	14-Aug-15	64.7	6,399	6,727	4,370	233,200	6,030	N/A
43	14-Aug-15	65.2	6,125	6,183	4,499	234,800	6,026	N/A
44	14-Aug-15	63.1	6,256	5,787	4,674	152,800	6,336	N/A
45	14-Aug-15	65.0	6,303	5,672	5,257	236,100	5,968	N/A
46	15-Aug-15	60.4	6,703	5,976	3,734	215,200	6,587	N/A
47	15-Aug-15	64.4	6,419	5,761	4,667	218,700	5,962	N/A
48	15-Aug-15	64.8	6,704	5,740	4,442	227,450	6,067	N/A
49	15-Aug-15	67.4	6,336	5,411	4,435	236,900	6,364	N/A
50	15-Aug-15	66.4	5,987	5,381	5,715	234,400	6,020	N/A
51	16-Aug-15	68.3	6,112	5,515	4,901	234,300	6,013	N/A
52	16-Aug-15	65.6	6,095	6,055	4,520	223,500	5,808	N/A
53	16-Aug-15	65.4	5,959	5,851	4,245	234,510	5,897	N/A
54	16-Aug-15	68.0	5,874	6,788	4,771	235,170	5,882	N/A
55	16-Aug-15	66.2	5,804	6,505	5,132	234,300	5,907	N/A
56	16-Aug-15	67.1	5,722	5,872	4,503	233,400	5,857	N/A
	AVG=	57.9	6,878	6,107	4,456	9,469,355	360,414	TOTAL

Received
Office of Oil & Gas
JAN 13 2016

02/05/2016

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	130	N/A	130	N/A
Fresh Water	310	N/A	310	N/A
Sandstone	0	422	0	422
Shale	est 422	638	est 422	638
Siltstone	est 638	736	est 638	736
Shale	est 736	756	est 736	756
Limestone	est 756	780	est 756	780
Shale	est 780	798	est 780	798
Sandstone	est 798	818	est 798	818
Shale	est 818	838	est 818	838
Sandstone	est 838	858	est 838	858
Shale	est 858	1,047	est 858	1,047
Sandstone	est 1047	1,218	est 1047	1,218
Trace Coal/Sandstone	est 1218	1,238	est 1218	1,238
Shale	est 1238	1,318	est 1238	1,318
Sandstone	est 1318	1,458	est 1318	1,458
Shale/Trace Coal	est 1458	1,478	est 1458	1,478
Shale	est 1478	1,514	est 1478	1,514
Sandstone	est 1514	1,558	est 1514	1,558
Coal	est 1558	1,578	est 1558	1,578
Sandstone	est 1578	1,658	est 1578	1,658
Shale/Trace Coal	est 1658	1,678	est 1658	1,678
Silty Shale	est 1678	1,738	est 1678	1,738
Sandstone	est 1738	1,858	est 1738	1,858
Shale	est 1858	1,901	est 1858	1,901
Limestone	est 1901	1,919	est 1901	1,919
Shale	est 1919	1,976	est 1919	1,980
Big Lime	1,976	2,160	1,980	2,164
Big Injun	2,160	2,524	2,164	2,528
Gantz Sand	2,524	2,850	2,528	2,854
Fifty Foot Sandstone	2,850	2,967	2,854	2,972
Gordon	2,967	3,400	2,972	3,404
Fifth Sandstone	3,400	3,467	3,404	3,471
Bayard	3,467	3,947	3,471	3,951
Speechley	3,947	4,189	3,951	4,193
Baltown	4,189	4,627	4,193	4,632
Bradford	4,627	4,974	4,632	4,978
Benson	4,974	5,200	4,978	5,205
Alexander	5,200	5,489	5,205	5,494
Elk	5,489	5,719	5,494	5,734
Rhinestreet	5,719	6,063	5,734	6,213
Sycamore	6,063	6,158	6,213	6,353
Middlesex	6,158	6,252	6,353	6,532
Burkett	6,252	6,275	6,532	6,609
Tully	6,275	6,280	6,609	6,632
Marcellus	6,280	NA	6,632	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.

Received
Office of Oil & Gas

JAN 13 2016

02/05/2016

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	8/1/2015
Job End Date:	8/16/2015
State:	West Virginia
County:	Ritchie
API Number:	47-085-10191-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Musgrave 2H
Longitude:	-80.99815600
Latitude:	39.31303900
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,416
Total Base Water Volume (gal):	15,877,272
Total Base Non Water Volume:	526,074



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	92.83875	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	6.63908	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.19167	
			Hydrogen Chloride	7647-01-0	18.00000	0.04578	
LGC-15	U.S. Well Services	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.07573	
			Petroleum Distillates	64742-47-8	60.00000	0.07172	
			Suspending agent (solid)	14808-60-7	3.00000	0.01158	
			Surfactant	68439-51-0	3.00000	0.00454	
WFRA-405	U.S. Well Services	Friction Reducer	Water	7732-18-5	40.00000	0.03088	
			Anionic Polyacrylamide	Proprietary	40.00000	0.03088	
			Sodium Chloride	7647-14-5	20.00000	0.01544	
			Petroleum Distillates	64742-47-8	20.00000	0.01243	
			Ethoxylated alcohol blend	Proprietary	5.00000	0.00386	

SI-1100	U.S. Well Services	Scale Inhibitor				
			Water	7732-18-5	80.00000	0.01001
			Ethylene Glycol	107-21-1	25.00000	0.00353
			Copolymer of Maleic and Acrylic acid	52255-49-9	10.00000	0.00148
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	7.50000	0.00127
			Hexamethylene triamine penta (methylene phosphonic acid)	34690-00-1	5.00000	0.00081
			Phosphino carboxylic acid polymer	71050-62-9	5.00000	0.00081
			Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5	2.00000	0.00033
K-BAC 1020	U.S. Well Services	Anti-Bacterial Agent				
			2,2-dibromo-3-nitrilopropionamide	10222-01-2	20.00000	0.00437
			Deionized Water	7732-18-5	28.00000	0.00249
AP One	U.S. Well Services	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00218
AI-301	U.S. Well Services	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	0.00004
			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)

Received
Office of Oil & Gas
JAN 13 2016

LATITUDE 39°20'00"

11,267'

7,597' TO BOTTOM HOLE

LATITUDE 39°17'30"

LONGITUDE 80°57'30"

7,392'

LONGITUDE 80°57'30"

Antero Resources Corporation
Well No. Musgrave Unit 2H
47-085-10191 (AS DRILLED)

AS DRILLED DATA:
WELL 2H TOP HOLE INFORMATION:
N: 299,660ft E: 1,576,124ft
LAT: 39°18'46.94" LON: 80°59'53.36"
BOTTOM HOLE INFORMATION:
N: 288,685ft E: 1,579,617ft
LAT: 39°16'59.05" LON: 80°59'06.62"
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: 4,351,525m E: 500,174m
BOTTOM HOLE INFORMATION:
N: 4,348,199m E: 501,293m

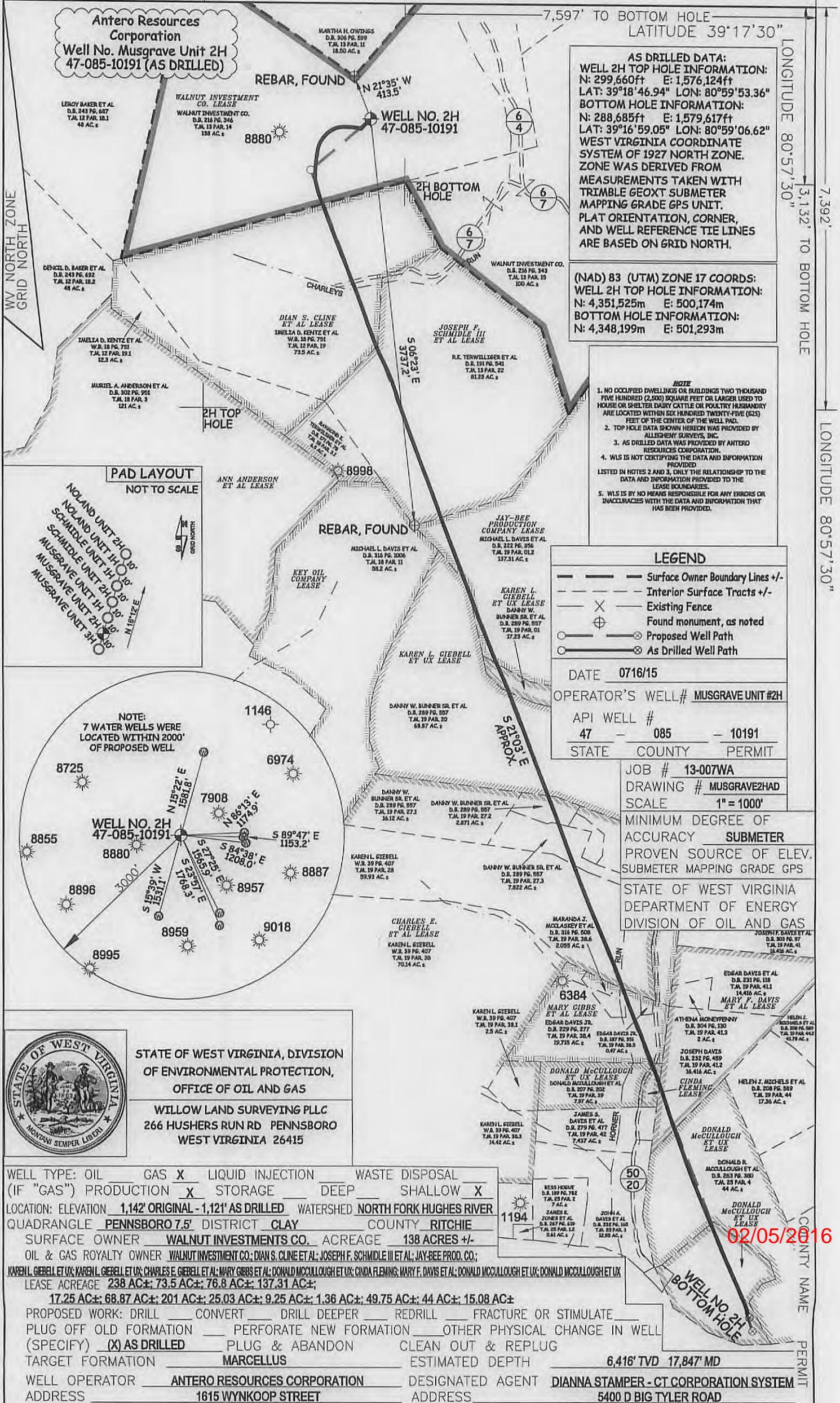
- NOTE**
- NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND TWO HUNDRED (2,000) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.
 - TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY ALLEGHENY SURVEYS, INC.
 - AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
 - 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 INCUMBESSES.
 - WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.

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

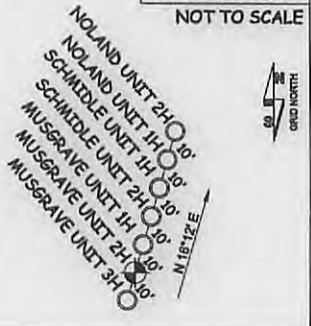
DATE 07/16/15
 OPERATOR'S WELL # MUSGRAVE UNIT #2H
 API WELL # 47 - 085 - 10191
 STATE COUNTY PERMIT

JOB # 13-007WA
 DRAWING # MUSGRAVE2HAD
 SCALE 1" = 1000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

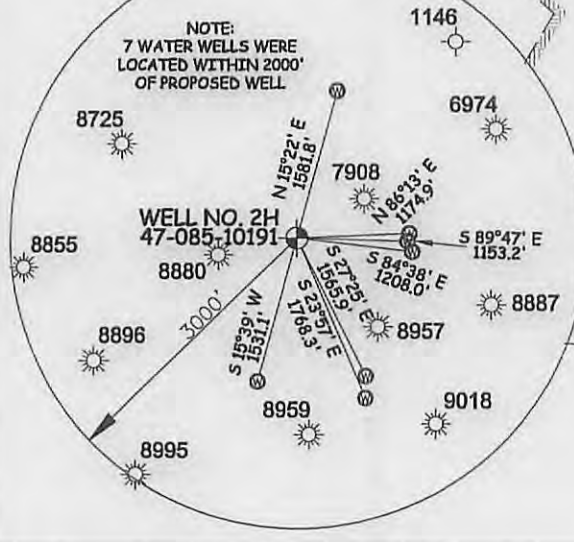
STATE OF WEST VIRGINIA
 DEPARTMENT OF ENERGY
 DIVISION OF OIL AND GAS



PAD LAYOUT
NOT TO SCALE



NOTE:
7 WATER WELLS WERE LOCATED WITHIN 2000' OF PROPOSED WELL



STATE OF WEST VIRGINIA, DIVISION
 OF ENVIRONMENTAL PROTECTION,
 OFFICE OF OIL AND GAS
 WILLOW LAND SURVEYING PLLC
 266 HUSHERS RUN RD PENNSBORO
 WEST VIRGINIA 26415

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
 LOCATION: ELEVATION 1,142' ORIGINAL - 1,121' AS DRILLED WATERSHED NORTH FORK HUGHES RIVER
 QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE
 SURFACE OWNER WALNUT INVESTMENTS CO. ACREAGE 138 ACRES +/-
 OIL & GAS ROYALTY OWNER WALNUT INVESTMENT CO.; DIAN S. CLINE ET AL.; JOSEPH F. SCHMIDLE III ET AL.; JAY-BEE PROD. CO.;
KAREN L. GIEBEL ET UX; KAREN L. GIEBEL ET UX; CHARLES E. GIEBEL ET AL.; MARY GIBBS ET AL.; DONALD MCCULLOUGH ET UX; CINDA FLEMING; MARY F. DAVIS ET AL.; DONALD MCCULLOUGH ET UX; DONALD MCCULLOUGH ET UX
 LEASE ACREAGE 238 AC±; 73.5 AC±; 76.8 AC±; 137.31 AC±;
17.25 AC±; 68.87 AC±; 201 AC±; 25.03 AC±; 9.25 AC±; 1.36 AC±; 49.75 AC±; 44 AC±; 15.08 AC±
 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 6,416' TVD 17,847' MD
 WELL OPERATOR ANTERO RESOURCES CORPORATION DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

02/05/2016



Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

January 12, 2016

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: John Kearney
601 57th Street
Charleston, WV 25304

Mr. Kearney:

Please find enclosed the data collected as part of Antero's Ritchie County Addendums. Please include this information as a supplement to the previously submitted Final Well Operator's Report of Well Work, Form WR-35 for the following wells:

- Musgrave Unit 1H (API# 47-085-10163) – Walnut West Pad
- Musgrave Unit 2H (API# 47-085-10191) – Walnut West Pad
- Noland Unit 1H (API# 47-085-10164) – Walnut West Pad
- Schmidle Unit 1H (API# 47-085-10042) – Walnut West Pad

If you have any questions please feel free to contact me at (303) 357-6820.

Sincerely,

A handwritten signature in blue ink, appearing to read "Natalie Komp", is written over a faint, larger version of the same signature.

Natalie Komp
Permitting Agent
Antero Resources Corporation

RECEIVED
Office of Oil and Gas

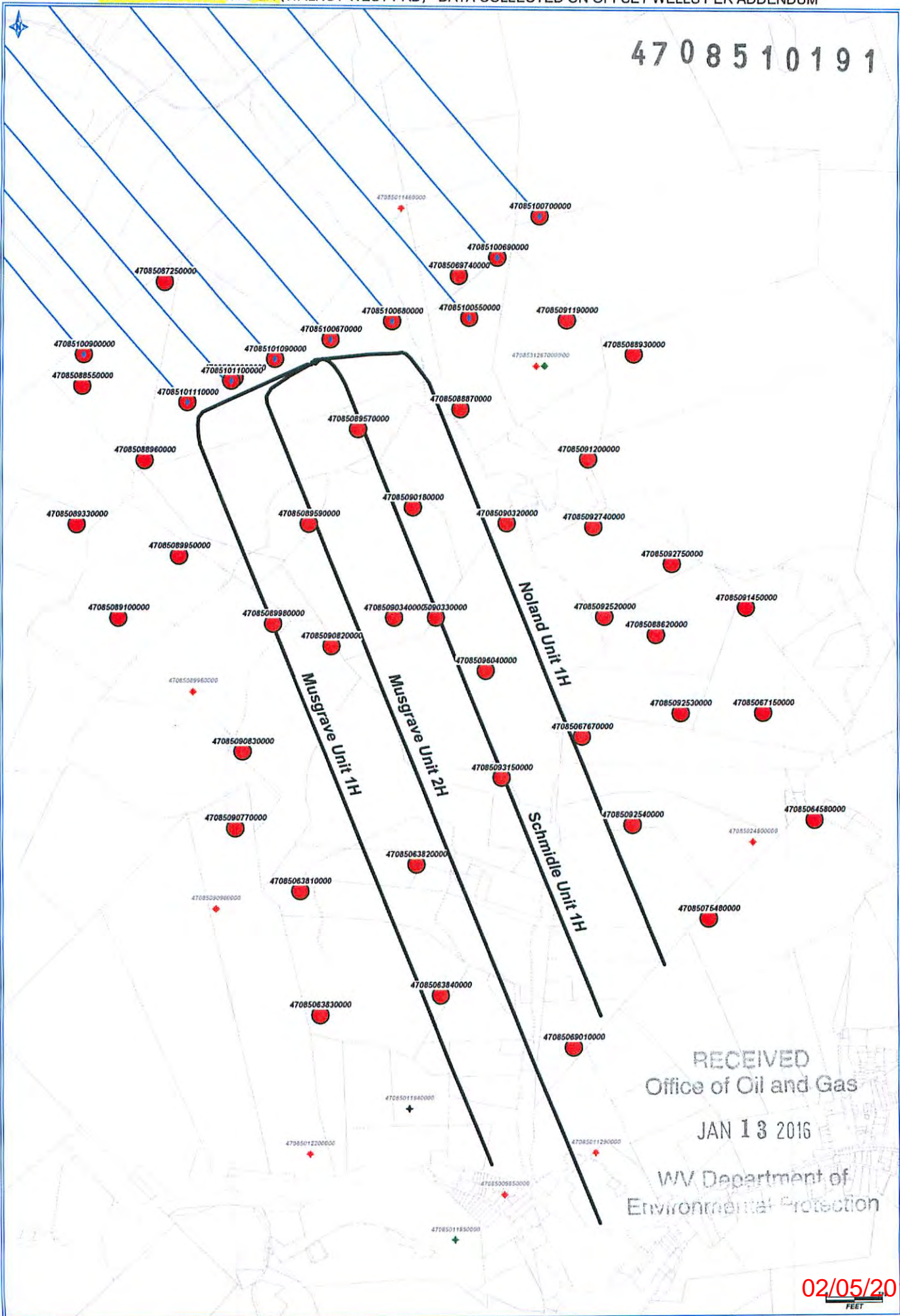
JAN 13 2016

WV Department of
Environmental Protection

Enclosures

02/05/2016

4708510191



RECEIVED
 Office of Oil and Gas
 JAN 13 2016
 WV Department of
 Environmental Protection

02/05/2016

FEET

MUSGRAVE UNIT 1H & 2H (WALNUT WEST PAD) - DATA COLLECTED ON OFFSET WELLS PER ADDENDUM

UWI (API Num)	Well Name	Well Number	Operator	Historical Operator	TD	ELEV_GR	TD (SSTVD)	Perfs (shallowest, deepest)
47085100550000	KIESSLING TERRY & H	PEN2CHS	NOBLE ENERGY INC	NOBLE ENERGY INC	16598	1084	-15514	MRCL Horizontal well
47085100670000	KIESSLING TERRY & H	PEN2AHS	NOBLE ENERGY INC	NOBLE ENERGY INC	16397	1081	-15316	MRCL Horizontal well
47085100690000	KIESSLING TERRY & H	PEN2DHS	NOBLE ENERGY INC	NOBLE ENERGY INC	16273	1084	-15189	MRCL Horizontal well
47085100680000	KIESSLING TERRY & H	PEN2BHS	NOBLE ENERGY INC	NOBLE ENERGY INC	16010	1084	-14926	MRCL Horizontal well
47085100700000	KIESSLING TERRY & H	PEN2EHS	NOBLE ENERGY INC	NOBLE ENERGY INC	15953	1084	-14869	MRCL Horizontal well
47085101090000	COKELEY LAWRENCE &	PEN 20 BHS	NOBLE ENERGY INC	NOBLE ENERGY INC	15247	1081	-14166	MRCL Horizontal well
47085101100000	COKELEY LAWRENCE &	PEN 20 CHS	NOBLE ENERGY INC	NOBLE ENERGY INC	14921	1081	-13840	MRCL Horizontal well
47085101110000	COKELEY LAWRENCE &	PEN 20 DHS	NOBLE ENERGY INC	NOBLE ENERGY INC	14852	1081	-13771	MRCL Horizontal well
47085100900000	COKELEY LAWRENCE &	PEN 20 MHS	NOBLE ENERGY INC	NOBLE ENERGY INC	13237	1081	-12156	MRCL Horizontal well
47085067670000	WEDEKMAN MARY V	WK-303	ROSS & WHARTON	KEPCO INCORPORATED	5979	1085	-4894	4936'-4938' (Benson), 5796'-5889' (Rhinstreet)
47085069740000	HUFFORD DWIGHT	JK-967	PETROLEUM DEV CORP	J & J ENTERPRISES	5995	1118	-4877	4935'-4937' (Benson), 5784'-5874' (Rhinstreet)
47085064580000	HAZELBAKER BRENDEN	1	MAY GAS CO	RARE EARTH ENERGY	5987	1144	-4843	4995'-5284' (Java/Angola), 5352'-5810' (Rhinstreet)
47085064590000	HAZELBAKER BRENDEN	2	RARE EARTH MINERALS	RARE EARTH ENERGY	5900	1086	-4814	no perfs recorded
47085075480000	HAZELBAKER BRENDEN	2	MAY GAS CO	RARE EARTH ENERGY	5450	1086	-4364	2062'-2440' (Big Injun/Weir), 5216'-5220' (Alexander)
47085069010000	HAYHURST ELLA D	1	MAY GAS CO	RARE EARTH ENERGY	5290	964	-4326	3381'-3440' (Berea/L Huron), 4496'-4846' (Java)
47085091190000	WILSON LORI	1	KEY OIL COMPANY	KEY OIL COMPANY	5438	1154	-4284	4888'-4991' (Benson)
47085067150000	GIEBELL C E & MARY	1	LIPPIZAN PETRO INCOR	STALNAKER GENE INC	5363	1105	-4258	3507'-3686' (Berea/L Huron), 4843'-5245' (Angola)
47085087250000	BAKER	1	KEY OIL COMPANY	KEY OIL COMPANY	5332	1077	-4255	4883'-4901' (Benson)
47085090770000	RAINES	1	ZICKEFOOSE W F & R L	BOWIE INC	5276	1028	-4248	1976'-2002' (Big Injun), 4856'-4860' (Benson)
47085063830000	GIEBELL C E & MARY	3	LIPPIZAN PETRO INCOR	STALNAKER GENE INC	5211	987	-4224	3412'-3813' (Berea/L Huron), 4503'-5158' (Angola)
47085063840000	GIEBELL C E & MARY	4	LIPPIZAN PETRO INCOR	STALNAKER GENE INC	5215	1001	-4214	3393'-4207' (Berea/L Huron), 4207'-5136' (Angola)
47085090830000	GIEBELL	5	KEY OIL COMPANY	KEY OIL COMPANY	5130	1030	-4100	4861'-4875' (Benson)
47085089590000	ANDERSON M A	3	GASSEARCH CORPORATN	GASSEARCH CORPORATN	5204	1121	-4083	1776'-1825' (Maxton), 4608'-4953' (Riley/Benson)
47085089100000	ANDERSON M A	1	GASSEARCH CORPORATN	GASSEARCH CORPORATN	5108	1099	-4049	1984'-2065' (Big Injun), 4561'-4888' (Riley/Benson)
47085089890000	ANDERSON M A	2	GASSEARCH CORPORATN	GASSEARCH CORPORATN	5170	1127	-4043	2461'-2960' (Weir/Gordon), 4639'-4970' (Riley/Benson)
47085096040000	GIEBELL	7	KEY OIL COMPANY	KEY OIL	5060	1031	-4029	4874'-4877' (Benson)
47085092530000	NOLAND	2	KEY OIL COMPANY	KEY OIL COMPANY	5097	1076	-4021	4946'-4949' (Benson)
47085091450000	MAPLE	1	KEY OIL COMPANY	KEY OIL COMPANY	5153	1134	-4019	4991'-4994' (Benson)
47085092740000	NOLAND	6	KEY OIL COMPANY	KEY OIL COMPANY	5129	1118	-4011	1973' (Big Injun), 4972'-4975' (Benson)
47085093150000	GIEBELL	6	KEY OIL COMPANY	KEY OIL COMPANY	5003	992	-4011	4848'-4851' (Benson)
47085092750000	NOLAND	7	KEY OIL COMPANY	KEY OIL COMPANY	5132	1130	-4002	4967'-4975' (Benson)
47085063810000	GIEBELL C E & MARY	1	LIPPIZAN PETRO INCOR	STALNAKER GENE INC	5109	1108	-4001	3516'-3668' (Berea/L Huron), 4666'-4948' (Benson)
47085088800000	SMITH	2	KEY OIL COMPANY	KEY OIL COMPANY	5057	1060	-3997	4543'-4558' (Riley), 4886'-4888' (Benson)
47085089590000	MUSGRAVE	1	KEY OIL COMPANY	KEY OIL COMPANY	5059	1065	-3994	4910'-4913' (Benson)
47085088870000	SMITH	3	KEY OIL COMPANY	KEY OIL COMPANY	4899	907	-3992	4398'-4408' (Riley), 4747'-4408' (Benson)
47085088930000	PENNSBORO	1	KEY OIL COMPANY	KEY OIL COMPANY	5150	1159	-3991	5018'-5021' (Benson)
47085090180000	SCHMIDLE	1	KEY OIL COMPANY	KEY OIL COMPANY	5031	1041	-3990	4529'-4547' (Riley), 4876'-4878' (Benson)
47085092520000	NOLAND	1	KEY OIL COMPANY	KEY OIL COMPANY	5010	1021	-3989	4869'-4877' (Benson)
47085090330000	GIEBELL	2	KEY OIL COMPANY	KEY OIL COMPANY	5096	1110	-3986	5000'-5003' (Benson)
47085090320000	GIEBELL	1	KEY OIL COMPANY	KEY OIL COMPANY	5065	1081	-3984	4576'-4594' (Riley), 4926'-4929' (Benson)
47085088620000	SMITH	1	KEY OIL COMPANY	KEY OIL COMPANY	5017	1034	-3983	4847'-4850' (Benson)
47085089570000	SMITH	5	KEY OIL COMPANY	KEY OIL COMPANY	4967	988	-3979	4806'-4821' (Benson)
47085090340000	GIEBELL	3	KEY OIL COMPANY	KEY OIL COMPANY	5000	1021	-3979	4879'-4882' (Benson)
47085091200000	WILSON LORI	2	KEY OIL COMPANY	KEY OIL COMPANY	5153	1180	-3973	5016'-5019' (Benson)
47085092540000	NOLAND	3	KEY OIL COMPANY	KEY OIL COMPANY	4904	933	-3971	3306'-3363' (Warren), 4776'-4779' (Benson)
47085090820000	GIEBELL	4	KEY OIL COMPANY	KEY OIL COMPANY	5106	1138	-3968	2032' (Big Lime), 4973'-4976' (Benson)
47085089560000	SMITH	4	KEY OIL COMPANY	KEY OIL COMPANY	5062	1101	-3961	4923'-4926' (Benson)
47085089330000	BAKER	4	KEY OIL COMPANY	KEY OIL COMPANY	5066	1106	-3960	4582'-4597' (Riley), 4920'-4953' (Benson)
47085088550000	BAKER	2	KEY OIL COMPANY	KEY OIL COMPANY	5177	1219	-3958	5034'-5037' (Benson)
47085083820000	GIEBELL C E & MARY	2	LIPPIZAN PETRO INCOR	STALNAKER GENE INC	4905	1000	-3905	3248'-3437' (Berea/L Huron), 4116'-4877' (Java)
47085095350000	GIEBELL	7	KEY OIL COMPANY	KEY OIL COMPANY	4230	1031	-3199	
47085089960000	ANDERSON M A	4	GASSEARCH CORPORATN	GASSEARCH CORPORATN	3230	1133	-2097	
47085090980000	RAINES	14	ZICKEFOOSE W F & R L	BOWIE INC	3050	1064	-1986	
47085024800000	CHARLES W HORN	1	TERM ENERGY	LEMON PHILIP	2240	1108	-1132	
47085012200000	MARY LOFTIS	1	DEEM F S	DEEM F S	2128	998	-1130	
47085011290000	H C SCHULTE	3	KOHL T H	KOHL T H	2205	1085	-1120	
47085011950000	W H & CARRIESTEWAR	1	MCCALL DRILLING	MCCALL DRILLING	2007	915	-1092	
47085012670000	W BARNARD	1	RANGER PETROLEUM INC	RANGER PETROLEUM INC	1963	874	-1089	
47085312670000	GEORGE BOYCE	1	MOSES J R	MOSES J R	2125	1061	-1064	
47085011460000	S F MCDOWNELL	1	BEASON GAS COMPANY	BEASON GAS COMPANY	1975	912	-1063	
47085011940000	NOBLE ENERGY	1	UNKNOWN	UNKNOWN	1996	1002	-994	
47085008580000	HENRY SCHULTE	2	YOUNG CHARLES E	YOUNG CHARLES E	2025	1078	-947	

47085101991

son
S