

APPROVED

NAME: [Signature]

DATE: 8/16/17

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

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API 47 - 085 - 10199 County Ritchie District Clay
Quad Pullman 7.5' Pad Name Mackay Pad Field/Pool Name -----
Farm name Jack D. Mackay et al Well Number McNabb Unit 4H
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 4343240m Easting 508899m
Landing Point of Curve Northing 4343006.042m Easting 509716.765m
Bottom Hole Northing 4339977m Easting 511011m

Elevation (ft) 1100' 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 02/26/2015 Date drilling commenced 06/21/2015 Date drilling ceased 08/19/2015
Date completion activities began 02/06/2016 Date completion activities ceased 09/27/2016
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 434' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1966' Void(s) encountered (Y/N) depths No
Coal depth(s) ft 301' Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

Reviewed by:

09/15/2017

API 47-085 - 10199 Farm name Jack D. Mackay et al Well number McNabb Unit 4H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	40'	New	94#, J-55	N/A	Y
Surface	17-1/2"	13-3/8"	521'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2481'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	18425'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	7013'		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	32 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	619 sx	15.6	1.18	730	0'	8 Hrs.
Coal							
Intermediate 1	Class A	959 sx	15.6	1.18	1132	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	961 sx (Lead) 1958 sx (Tail)	14.2 (Lead), 14.8 (Tail)	1.44 (Lead), 1.81 (Tail)	4928	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 19344' MD, 6579' TVD (BHL), 6604' TVD (Deepest Point Drilled) Loggers TD (ft) 19286' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 6582'

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 _____ RECEIVED Office of Oil and Gas

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

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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 N/A

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	2/6/2016	18206	18333	60	Marcellus
2	4/8/2016	18056	18183	60	Marcellus
3	4/9/2016	17907	18034	60	Marcellus
4	4/10/2016	17757	17884	60	Marcellus
5	4/10/2016	17607	17734	60	Marcellus
6	4/10/2016	17458	17584	60	Marcellus
7	4/10/2016	17308	17435	60	Marcellus
8	7/6/2016	17158	17285	60	Marcellus
9	7/20/2016	17008	17135	60	Marcellus
10	7/20/2016	16859	16985	60	Marcellus
11	7/20/2016	16709	16836	60	Marcellus
12	7/21/2016	16559	16686	60	Marcellus
13	8/5/2016	16409	16524	60	Marcellus
14	8/5/2016	16260	16374	60	Marcellus
15	8/6/2016	16110	16224	60	Marcellus
16	8/6/2016	15960	16075	60	Marcellus
17	8/7/2016	15811	15925	60	Marcellus
18	8/7/2016	15661	15775	60	Marcellus
19	8/8/2016	15511	15625	60	Marcellus
20	8/8/2016	15361	15476	60	Marcellus
21	8/8/2016	15212	15326	60	Marcellus
22	8/9/2016	15062	15176	60	Marcellus
23	8/9/2016	14912	15027	60	Marcellus
24	8/10/2016	14763	14877	60	Marcellus
25	8/10/2016	14613	14727	60	Marcellus
26	8/10/2016	14463	14577	60	Marcellus
27	8/10/2016	14313	14428	60	Marcellus
28	8/11/2016	14164	14278	60	Marcellus
29	8/11/2016	14014	14128	60	Marcellus
30	8/11/2016	13864	13979	60	Marcellus
31	8/12/2016	13715	13829	60	Marcellus
32	8/12/2016	13565	13679	60	Marcellus
33	8/12/2016	13415	13529	60	Marcellus
34	8/12/2016	13265	13380	60	Marcellus
35	8/13/2016	13116	13230	60	Marcellus
36	8/13/2016	12966	13080	60	Marcellus
37	8/13/2016	12816	12930	60	Marcellus
38	8/13/2016	12666	12781	60	Marcellus
39	8/14/2016	12517	12631	60	Marcellus
40	8/14/2016	12367	12481	60	Marcellus
41	8/14/2016	12217	12332	60	Marcellus
42	8/15/2016	12068	12182	60	Marcellus
43	8/15/2016	11918	12032	60	Marcellus
44	8/15/2016	11768	11882	60	Marcellus
45	8/16/2016	11618	11733	60	Marcellus
46	8/16/2016	11469	11583	60	Marcellus
47	8/16/2016	11319	11433	60	Marcellus
48	8/16/2016	11169	11284	60	Marcellus
49	8/17/2016	11020	11134	60	Marcellus
50	8/17/2016	10870	10984	60	Marcellus
51	8/17/2016	10720	10834	60	Marcellus
52	8/17/2016	10570	10685	60	Marcellus
53	8/18/2016	10421	10535	60	Marcellus
54	8/18/2016	10271	10385	60	Marcellus
55	8/18/2016	10121	10236	60	Marcellus
56	8/18/2016	9972	10086	60	Marcellus
57	8/19/2016	9822	9936	60	Marcellus
58	8/19/2016	9672	9786	60	Marcellus
59	8/19/2016	9522	9637	60	Marcellus
60	8/20/2016	9373	9487	60	Marcellus
61	8/20/2016	9223	9337	60	Marcellus
62	8/20/2016	9073	9187	60	Marcellus
63	8/20/2016	8923	9038	60	Marcellus
64	8/20/2016	8774	8888	60	Marcellus
65	8/21/2016	8624	8738	60	Marcellus
66	8/21/2016	8474	8589	60	Marcellus
67	8/21/2016	8325	8439	60	Marcellus
68	8/21/2016	8175	8289	60	Marcellus
69	8/21/2016	8025	8139	60	Marcellus
70	8/22/2016	7875	7990	60	Marcellus
71	8/22/2016	7726	7840	60	Marcellus
72	8/22/2016	7576	7690	60	Marcellus
73	8/23/2016	7426	7541	60	Marcellus
74	8/23/2016	7277	7391	60	Marcellus
75	8/23/2016	7127	7241	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	4/8/2016	59.0	8018	0	4115	160400	7202	N/A
2	4/8/2016	63.0	7389	5820	3578	231380	6956	N/A
3	4/9/2016	65.0	7389	5814	4692	230880	7029	N/A
4	4/10/2016	63.0	6927	5583	5260	206670	6828	N/A
5	4/10/2016	66.0	7468	5621	3779	232180	6702	N/A
6	4/10/2016	63.0	7100	5756	4036	223790	6483	N/A
7	4/10/2016	62.0	7050	5418	6424	225530	6440	N/A
8	7/6/2016	68.8	7991	0	4224	230260	6657	N/A
9	7/20/2016	57.0	7674	6170	3958	230400	8049	N/A
10	7/20/2016	69.0	7981	6272	3796	225420	7192	N/A
11	7/20/2016	68.8	7831	6122	4403	227790	6536	N/A
12	7/21/2016	69.8	7878	6219	4169	226730	7116	N/A
13	8/5/2016	71.0	7549	0	5351	225400	7163	N/A
14	8/5/2016	68.0	8197	6378	3875	224750	6307	N/A
15	8/6/2016	66.9	8009	6358	4634	194700	7304	N/A
16	8/6/2016	68.0	7958	5696	3898	224640	7075	N/A
17	8/7/2016	64.2	7304	5590	5606	214100	7534	N/A
18	8/7/2016	60.0	7575	5526	5056	224660	6498	N/A
19	8/8/2016	63.0	7724	5877	4476	224590	6432	N/A
20	8/8/2016	63.1	7197	5414	4420	225920	6492	N/A
21	8/8/2016	64.0	7981	6041	3946	224900	6419	N/A
22	8/9/2016	63.0	7641	5662	4896	225210	6255	N/A
23	8/9/2016	65.0	7595	5739	4183	225210	6239	N/A
24	8/10/2016	68.0	7385	5898	4551	225450	6242	N/A
25	8/10/2016	62.2	7083	5473	5284	225120	7438	N/A
26	8/10/2016	62.7	7357	6408	4546	225950	6381	N/A
27	8/10/2016	65.0	7615	6049	4045	224920	6238	N/A
28	8/11/2016	63.6	7215	5835	4996	225830	6228	N/A
29	8/11/2016	64.5	6800	5709	5215	225490	6219	N/A
30	8/11/2016	64.0	7002	5164	5229	225740	6216	N/A
31	8/12/2016	65.0	7059	5304	5275	225220	6193	N/A
32	8/12/2016	64.9	6936	6233	4521	225200	6192	N/A
33	8/12/2016	63.6	7006	5597	4069	225640	6186	N/A
34	8/12/2016	64.0	7235	5730	3886	225240	6175	N/A
35	8/13/2016	68.0	7192	5518	5036	225220	6165	N/A
36	8/13/2016	65.7	6952	5540	4972	225280	6169	N/A
37	8/13/2016	64.1	7178	5402	4964	222710	7158	N/A
38	8/13/2016	68.0	7358	5666	4529	225360	6148	N/A
39	8/14/2016	67.0	7139	6123	4066	225510	6156	N/A
40	8/14/2016	63.9	6957	6322	4339	225290	6206	N/A
41	8/14/2016	66.0	6989	5721	4696	225420	6133	N/A
42	8/15/2016	68.0	7100	5786	4117	225270	6121	N/A
43	8/15/2016	64.9	6767	6235	4539	226350	6212	N/A
44	8/15/2016	66.0	7229	6047	4714	225600	6285	N/A
45	8/16/2016	67.0	7308	5794	5489	225850	6113	N/A
46	8/16/2016	65.7	6952	5721	5414	226150	6111	N/A
47	8/16/2016	64.5	7048	5774	5229	225250	6095	N/A
48	8/16/2016	65.0	7336	6144	4650	225350	6078	N/A
49	8/17/2016	65.0	7223	6234	5305	224700	6842	N/A
50	8/17/2016	61.3	6762	5621	5070	225430	6073	N/A
51	8/17/2016	62.9	6836	5661	4831	225740	6091	N/A
52	8/17/2016	67.0	6655	5371	5156	225750	6062	N/A
53	8/18/2016	65.0	6542	5528	5085	226450	6073	N/A
54	8/18/2016	65.1	6673	5145	5183	225400	6075	N/A
55	8/18/2016	62.9	6453	5216	5090	225690	6051	N/A
56	8/18/2016	66.0	6416	5369	5010	226500	6044	N/A
57	8/19/2016	67.0	6530	5705	5007	226150	6039	N/A
58	8/19/2016	67.0	6481	5999	4579	222400	6656	N/A
59	8/19/2016	63.0	6310	5507	3639	225500	6033	N/A
60	8/20/2016	67.0	6521	5377	4377	225900	6025	N/A
61	8/20/2016	66.0	6634	5360	4442	222300	5953	N/A
62	8/20/2016	64.4	6914	5451	4434	207740	6097	N/A
63	8/20/2016	67.2	6930	5494	4039	225980	5996	N/A
64	8/20/2016	64.0	6627	5430	5314	224950	6016	N/A
65	8/21/2016	66.0	6694	5800	5308	224450	5982	N/A
66	8/21/2016	65.8	6496	5297	4339	225780	5982	N/A
67	8/21/2016	65.2	6884	5784	4485	225520	5935	N/A
68	8/21/2016	67.1	6862	5534	5002	226130	5968	N/A
69	8/21/2016	69.0	6908	5289	5201	226300	5983	N/A
70	8/22/2016	69.0	6762	5767	4526	226350	5945	N/A
71	8/22/2016	69.0	6879	6206	4108	225600	5942	N/A
72	8/22/2016	65.4	6636	5961	4293	225750	7108	N/A
73	8/23/2016	66.3	6601	6271	4353	220300	6353	N/A
74	8/23/2016	67.4	6622	5996	4498	226940	5920	N/A
75	8/23/2016	65.0	6166	5212	3886	226900	5970	N/A
AVG=			7,115	5,518	4,636	16,786,520	6,386	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	434'	N/A	434'	N/A
Shale	0	201	0	201
Sandstone	est. 201	281	est. 201	281
Siltstone	est. 281	301	est. 281	301
Coal "Washington Coal"	est. 301	361	est. 301	361
Sandstone	est. 361	581	est. 361	581
Shale	est. 581	1241	est. 581	1241
Sandstone	est. 1241	1321	est. 1241	1321
Siltstone/ sandstone	est. 1321	1401	est. 1321	1401
Sandstone	est. 1401	1721	est. 1401	1721
Shale	est. 1721	1821	est. 1721	1821
Siltstone	est. 1821	1981	est. 1821	1981
Limestone	est. 1981	2066	est. 1981	2088
Big Lime	2066	2769	2088	2807
Fifty Foot Sandstone	2769	2856	2807	2897
Gordon	2856	2990	2897	3036
Fifth Sandstone	2990	3110	3036	3160
Bayard	3110	3927	3160	4044
Speechley	3927	4233	4044	4375
Baltown	4233	4640	4375	4839
Bradford	4640	5043	4839	5288
Benson	5043	5288	5288	5564
Alexander	5288	6217	5564	6601
Sycamore	6217	6380	6601	6800
Middlesex	6380	6490	6800	6962
Burkett	6490	6524	6962	7030
Tully	6524	6550	7030	7106
Marcellus	6550	N/A	7106	N/A

*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:	4/8/2016
Job End Date:	8/23/2016
State:	West Virginia
County:	Ritchie
API Number:	47-085-10199-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	McNabb 4H
Latitude:	39.14180100
Longitude:	-80.53494100
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,604
Total Base Water Volume (gal):	21,819,306
Total Base Non Water Volume:	0



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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	91.03042	
Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	8.39731	
HCL Acid (12.6%-18.0%)	J.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.27351	
			Hydrogen Chloride	7647-01-0	18.00000	0.06533	
LGC-15	J.S. Well Services	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.05443	
			Petroleum Distillates	64742-47-8	60.00000	0.05155	
			Suspending agent (solid)	14808-60-7	3.00000	0.00833	
			Surfactant	68439-51-0	3.00000	0.00327	
WFRA-405	J.S. Well Services	Friction Reducer	Water	7732-18-5	60.00000	0.04583	
			2-Propenoic acid, polymer with 2 propenamide	9003-06-9	30.00000	0.02292	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01845	

			Ethoxylated alcohol blend	68002-97-1	4.00000	0.00306
SI-1100s	U.S. Well Services	Scale Inhibitor				
			Water	7732-18-5	80.00000	0.00990
			Copolymer of Maleic and Acrylic acid	52255-49-9	10.00000	0.00146
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	7.50000	0.00125
			Phosphino carboxylic acid polymer	71050-62-9	5.00000	0.00080
			Hexamethylene triamine penta (methylene phosphonic acid)	34690-00-1	5.00000	0.00080
			Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5	2.00000	0.00032
BIOCLEAR 2000	U.S. Well Services	Anti-Bacterial Agent				
			2,2-dibromo-3-nitrilopropionamide	10222-01-2	30.00000	0.00611
			Deionized Water	7732-18-5	28.00000	0.00233
AP One	U.S. Well Services	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00191
AI-302	U.S. Well Services	Acid Corrosion Inhibitors				
			Water	7732-18-5	95.00000	0.00059
			2-Propyn-1-olcompound with methyloxirane	38172-91-7	15.00000	0.00009

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%

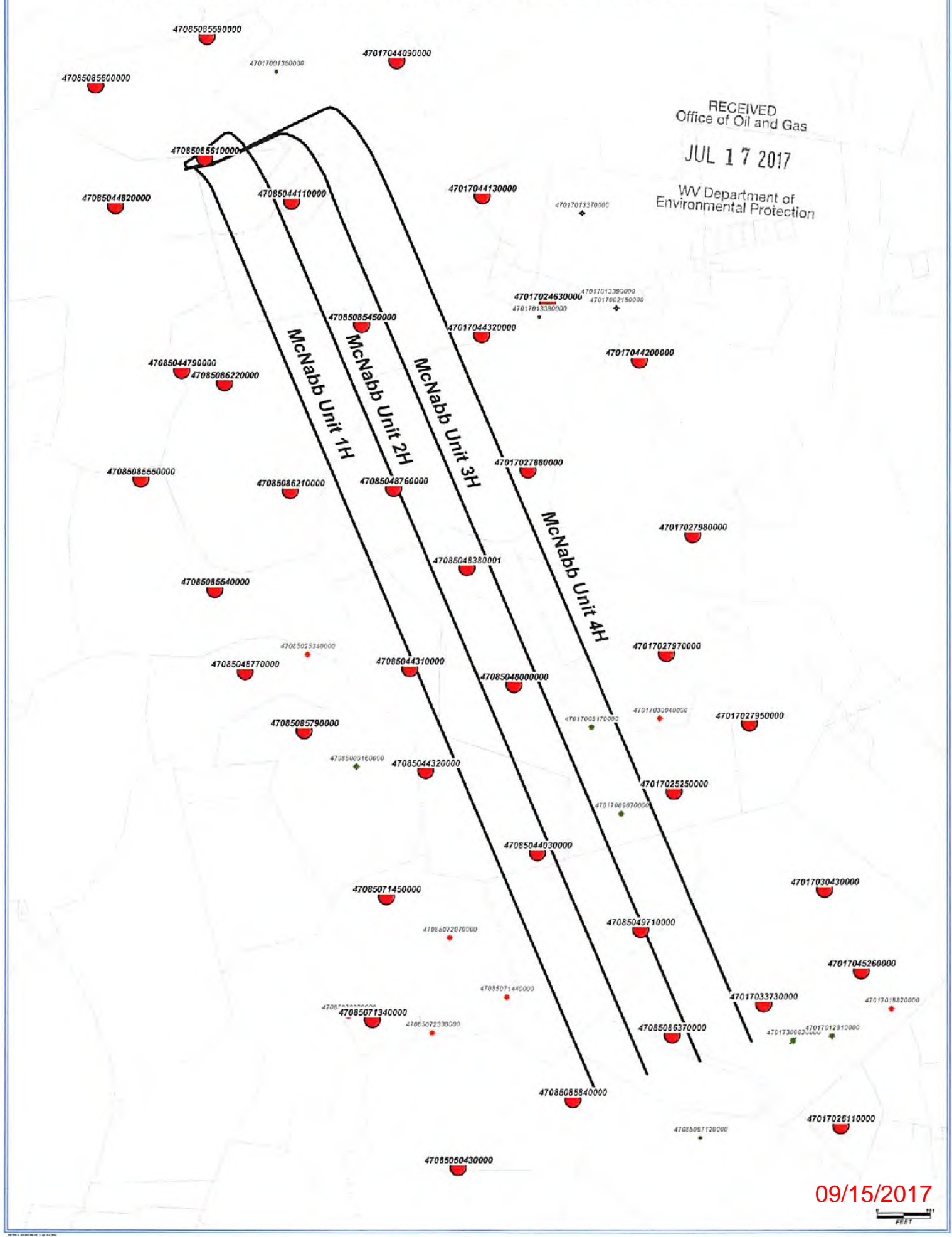
Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

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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MCNABB UNIT 4H (MACKAY PAD) - DATA COLLECTED ON OFFSET WELLS PER ADDENDUM PG 1

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MCNABB UNIT 4H (MACKAY PAD) - DATA COLLECTED ON OFFSET WELLS PER ADDENDUM PG 2

UWI (APINum)	Well Name	Well Number	Operator	Hist Oper	TD	ELEV_GR	TD (SSTVD)	Perfs (shallowest, deepest)
47085044110000	ANDERSON&VAN CAMPEN	H-879	LIPPIZAN PETRO INCOR	HAUGHT G L & SONS	5970	848	-5122	5033'-5037' (Angola), 5656'-5890' (Rhinstreet)
47085044820000	ANDERSON	H-924	LIPPIZAN PETRO INCOR	HAUGHT G L & SONS	5980	1109	-4871	5385'-5955' (Angola-Rhinstreet)
47085044790000	CAMPEN A & V	H/519	LIPPIZAN PETRO INCOR	HAUGHT G L & SONS	5935	1085	-4850	4337'-5858' (L Huron-Rhinstreet)
47017044130000	BURGESS HAROLD R ET AL	2	KEY OIL COMPANY	KEY OIL INCORPORATED	5721	1061	-4660	3458'-3472' (Warren), 5292'-5305' (Alexander)
47017027950000	ROSS S BYRL ET AL	1	ABARTA O&G CO INC	CHASE PETROLEUM CO	5700	1070	-4630	3440'-3460' (Speechley), 5274'-5304' (Alexander)
47085048000000	GOODWIN PAUL K ET AL	1	ABARTA O&G CO INC	CHASE PETROLEUM CO	5694	1080	-4614	4574'-4592' (Riley), 5155'-5279' (Alexander)
47085044320000	HUDKINS ROY	3	ABARTA O&G CO INC	CHASE PETROLEUM CO	5800	1196	-4604	4497'-4671' (L Huron), 5409'-5438' (Alexander)
47017024630000	LEGGETT GUSSLE ET AL	1	CLOWSER PROD CO	CHASE PETROLEUM CO	5430	835	-4595	3253' (Warren)
47017025250000	PRINZ TRACT	1	ABARTA O&G CO INC	CHASE PETROLEUM CO	5620	1044	-4576	5006'-5010' (Benson), 5294'-5311' (Alexander)
47085044310000	HUDKINS ROY	2	ABARTA O&G CO INC	CHASE PETROLEUM CO	5795	1240	-4555	4728'-4774' (Riley), 5402'-5437' (Alexander)
47017027980000	ROSS S BYRL ET AL	4	ABARTA O&G CO INC	CHASE PETROLEUM CO	5469	950	-4519	3342'-3352' (Speechley), 5146'-5172' (Alexander)
47085048760000	BRITTON-LEGGETT	3	ABARTA O&G CO INC	CHASE PETROLEUM CO	5478	965	-4513	3380'-3400' (Speechley), 5208'-5232' (Alexander)
47017026110000	LEGGETT ROY	1	ENERVEST OPERATING	CHASE PETROLEUM CO	5467	956	-4511	2190'-2224' (Weir), 5067'-5106' (Alexander)
47085048380001	ROSS S BYRL	1	ABARTA O&G CO INC	MERIDIAN EXPLORATION	5710	1210	-4500	3996'-4114' (Balltown), 5400'-5410' (Alexander)
47017027970000	ROSS S BYRL ET AL	3	ABARTA O&G CO INC	CHASE PETROLEUM CO	5530	1035	-4495	3438'-3464' (Speechley), 5239'-5270' (Alexander)
47085085790000	MOATS	1	KEY OIL COMPANY	KEY OIL INCORPORATED	5665	1190	-4475	3607'-3634' (Warren), 5407'-5447' (Alexander)
47017027880000	GASTON C S ET AL	2	ABARTA O&G CO INC	CHASE PETROLEUM CO	5476	1015	-4461	3850'-3930' (Balltown), 5202'-5248' (Alexander)
47085050430000	MIRACLE	1	CHASE PETROLEUM CO	CHASE PETROLEUM CO	5591	1140	-4451	4478'-4660' (Bradford-Riley), 5217'-5311' (Alexander)
47017044320000	BURGESS	3	KEY OIL COMPANY	KEY OIL INCORPORATED	5452	1018	-4434	3258'-3289' (Warren), 5205'-5236' (Alexander)
47085085450000	BURGESS	4	KEY OIL COMPANY	KEY OIL INCORPORATED	5573	1142	-4431	3500'-3548' (Warren), 5361'-5372' (Alexander)
47085044030000	HUDKINS ROY	1	ABARTA O&G CO INC	CHASE PETROLEUM CO	5550	1123	-4427	5034'-5036' (Benson), 5300'-5328' (Alexander)
47085085600000	FLANAGAN	2	KEY OIL COMPANY	KEY OIL INCORPORATED	5545	1124	-4421	3258'-3289' (Warren), 5279'-5310' (Alexander)
47017044090000	BRITTON ALTA MARIE	1	KEY OIL COMPANY	KEY OIL INCORPORATED	5250	832	-4418	3632'-3833' (Balltown), 4996'-5045' (Alexander)
47085048770000	BALL C W HEIRS ET AL	1-A	PETROLEUM RESOURCES	CHASE PETROLEUM CO	5616	1200	-4416	4640'-4732' (Bradford-Riley), 53874'-5434' (Alexander)
47017044200000	DAVIS H B & NELLIE JTOS H & W ET AL	2	KEY OIL COMPANY	KEY OIL INCORPORATED	5316	906	-4410	3451'-3825' (Balltown), 5120'-5137' (Alexander)
47085086220000	EASTERN AMERICAN ENERGY CORPORATION	2	KEY OIL COMPANY	KEY OIL INCORPORATED	5516	1109	-4407	3503'-3521' (Warren), 5304'-5348' (Alexander)
47085085590000	FLANAGAN	1	KEY OIL COMPANY	KEY OIL INCORPORATED	5200	795	-4405	3133'-3178' (Warren), 4953'-4990' (Alexander)
47085086210000	EASTERN AMERICAN ENERGY CORPORATION	1	KEY OIL COMPANY	KEY OIL INCORPORATED	5548	1144	-4404	3526'-3557' (Warren), 5335'-5361' (Alexander)
47085085550000	CROOKS	2	KEY OIL COMPANY	KEY OIL INCORPORATED	5560	1158	-4402	3537'-3582' (Warren), 5342'-5379' (Alexander)
47017030430000	GRAY THOMAS C HEIRS	2	ABARTA O&G CO INC	CHASE PETROLEUM CO	5331	930	-4401	3688'-3760' (Balltown), 4185'-4400' (Bradford-Riley)
47085085610000	FLANAGAN	3	KEY OIL COMPANY	KEY OIL INCORPORATED	5513	1122	-4391	3503'-3520' (Warren), 5286'-5340' (Alexander)
47085085840000	MIRACLE	1	KEY OIL COMPANY	KEY OIL INCORPORATED	5420	1037	-4383	3396'-3422' (Warren), 5197'-5232' (Alexander)
47085049710000	BYHAM BRICE ET VIR	1	ABARTA O&G CO INC	CHASE PETROLEUM CO	5481	1105	-4376	3456'-3476' (Speechley), 5249'-5295' (Alexander)
47017045260000	GRAY HEIRS	1	KEY OIL COMPANY	KEY OIL INCORPORATED	5309	941	-4368	3305'-3333' (Warren), 5128'-5152' (Alexander)
47085071450000	MILLER JOSEPH ET AL	3	COOK RON E	STALNAKER GENE INC	5558	1191	-4367	3459'-3900' (L Huron), 4540'-5467' (L Huron-Angola)
47085086370000	GRAY HEIRS	2	KEY OIL COMPANY	KEY OIL INCORPORATED	5333	987	-4346	3304'-3381' (Warren), 5142'-5206' (Alexander)
47085085540000	CROOKS	1	KEY OIL COMPANY	KEY OIL INCORPORATED	5453	1120	-4333	3516'-3552' (Warren), 5300'-5360' (Alexander)
47085071340000	MILLER JOSEPH ET AL	1	COOK RON E	STALNAKER GENE INC	5353	1098	-4255	3432'-3998' (L Huron), 4680'-5290' (L Huron-Angola)
47017033730000	GRAY HEIRS ET AL	1	ABARTA O&G CO INC	CHASE PETROLEUM CO	5000	912	-4088	3691'-3740' (Balltown), 4736'-4802' (Benson)
47085067120000	BROADWATER HEIRS	1	ABARTA O&G CO INC	CHASE PETROLEUM CO	4600	900	-3700	
47085072330000	MILLER JOSEPH ET AL	5	COOK RON E	STALNAKER GENE INC	2999	972	-2027	
47085072970000	MILLER JOSEPH ET AL	7	COOK RON E	STALNAKER GENE INC	2999	1132	-1867	
47017030040000	PRIMM N H HEIRS	1	CUNNINGHAM NAOMI	CHASE PETROLEUM CO	2477	915	-1562	
47085072320000	MILLER JOSEPH ET AL	4	STALNAKER ENERGY	STALNAKER GENE INC	2400	1079	-1321	
47017018820000	E M NUTTER ET AL	1	UNITED OPERATING CO	UNITED OPERATING CO	2243	960	-1283	
47017013390000	RALPH LEGGETT	4	TARGA DEV INC	MANN DRILLING	2085	875	-1210	
47017013380000	RALPH LEGGETT	1	MANN DRILLING	MANN DRILLING	2012	820	-1192	
47017005170000	NATHAN H PRIM	1	JESAM ENERGY	STRICKLIN C A	2106	917	-1189	
47017009070000	ORLA ADAMS	1	AGGIE OIL & GAS	AGGIE OIL & GAS	2099	927	-1172	
47017013370000	RALPH LEGGETT	3	MANN DRILLING	MANN DRILLING	2275	1105	-1170	
47017002150000	RALPH LEGGETT	2	PIGOTT L G	PIGOTT L G	1971	834	-1137	
47017309920000	HANNAH WALDO	1 E-551	CARNEGIE NAT GAS CRP	CARNEGIE NAT GAS CRP	2039	912	-1127	
47017012810000	L R C GRAY HEIRS	1	DEEM J FRANK	DEEM J FRANK	2059	947	-1112	
47085025340000	W C BALL HRS	1	INTERSTATE PROD COMP	ROBERTS D D	2293	1204	-1089	
47085071440000	MILLER JOSEPH ET AL	2	COOK RON E	STALNAKER GENE INC	2090	1014	-1076	
47085000160000	F E PRITCHARD	1467	EQT PRODUCTION CO	CARNEGIE NAT GAS CRP	2203	1148	-1055	
47017001360000	H O DOTSON	1	VIKING INTL RES	MCBURNAY GLEN F	1756	845	-911	

RECEIVED
 Office of Oil and Gas
 JUL 17 2017
 MN Department of
 Environmental Protection

11,136' TO BOTTOM HOLE

LATITUDE 39°15'00"

LONGITUDE 80°50'00"

LONGITUDE 80°52'30"

LONGITUDE 80°55'00"

LONGITUDE 80°57'30"

LONGITUDE 80°59'00"

LONGITUDE 80°59'30"

LONGITUDE 80°59'30"

Antero Resources Corporation
Well No. McNabb Unit 4H
API #47-085-10199

A - ROBERT L. BRITTON ET AL. D.B. 144 AC 347 T.M. 12 PAR. 033 1 AC
B - JOSEPH E. HAUGHT ET AL. D.B. 230 AC 570 T.M. 12 PAR. 012 1 AC
C - KEVIN E. BRITTON D.B. 210 AC 570 T.M. 12 PAR. 014 225 AC
D - W.L. BRITTON ET AL. D.B. 148 AC 33 T.M. 12 PAR. 01 27.7 AC

AS DRILLED DATA:
WELL 4H TOP HOLE INFORMATION:
N: 271,994ft E: 1,604,302ft
LAT: 39°14'18.01" LON: 80°53'49.41"
BOTTOM HOLE INFORMATION:
N: 261,171ft E: 1,611,057ft
LAT: 39°12'32.08" LON: 80°52'21.47"
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 4H TOP HOLE INFORMATION:
N: 4,343,240m E: 508,899m
BOTTOM HOLE INFORMATION:
N: 4,339,977m E: 511,011m

RECEIVED
Office of Oil and Gas

JUL 17 2017

WV Department of Environmental Protection

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

DOUGLAS R. ROWE P.S. 2202
DATE 08/08/17
OPERATOR'S WELL # MCNABB UNIT #4H

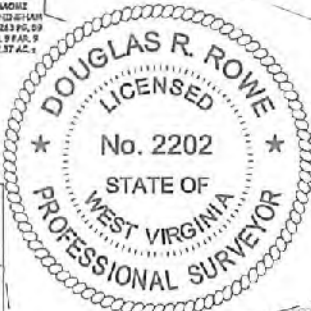
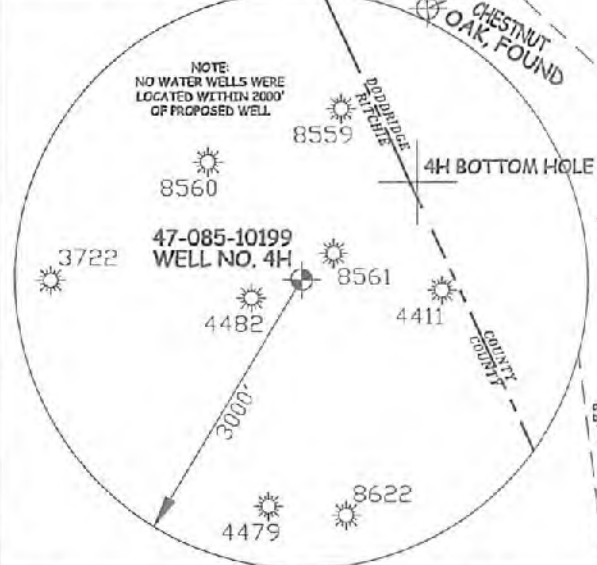
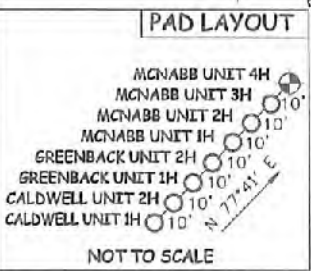
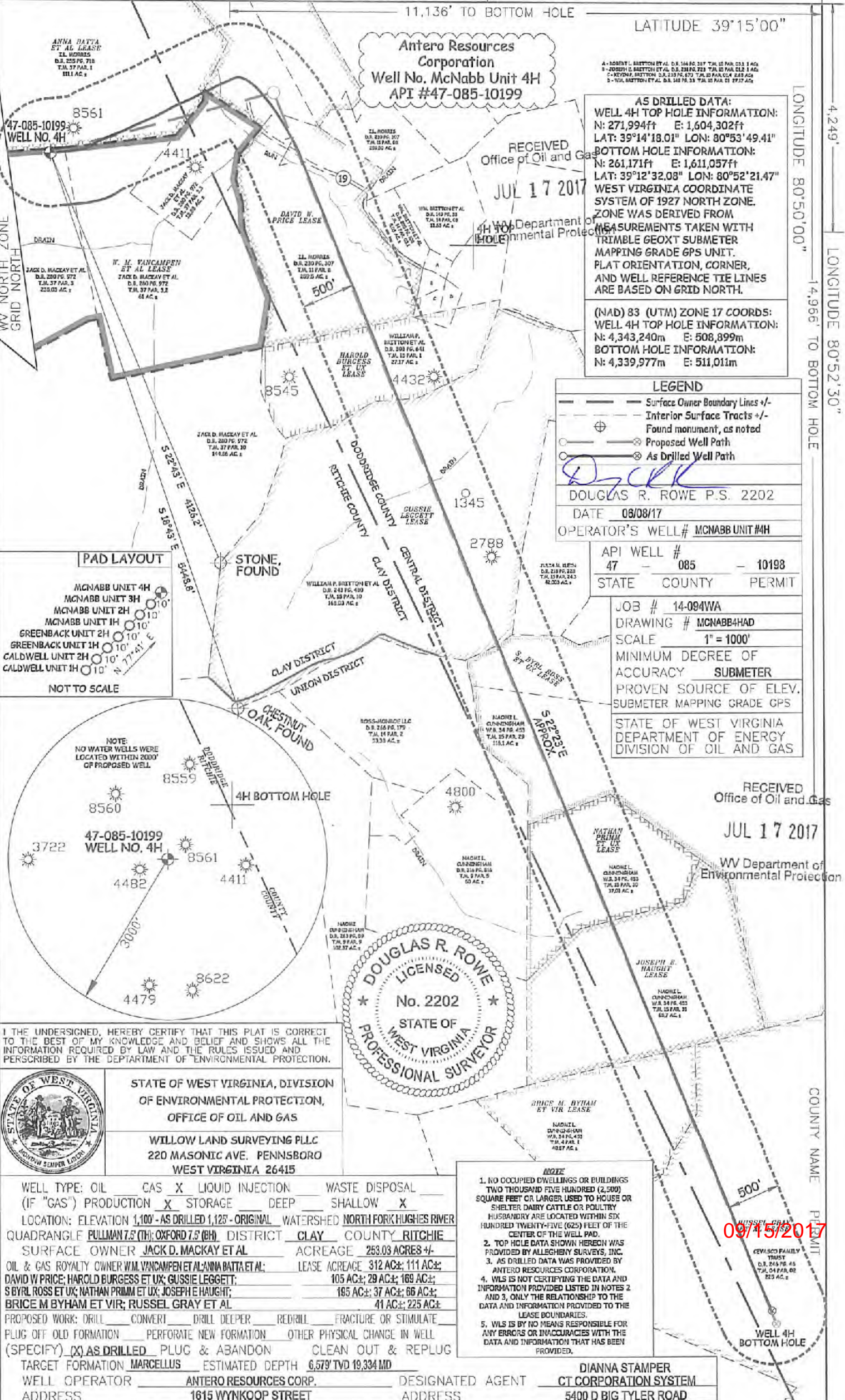
API WELL # 47 - 085 - 10198
STATE COUNTY PERMIT

JOB # 14-094WA
DRAWING # MCNABB4HAD
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

RECEIVED
Office of Oil and Gas

JUL 17 2017

WV Department of Environmental Protection



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 RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

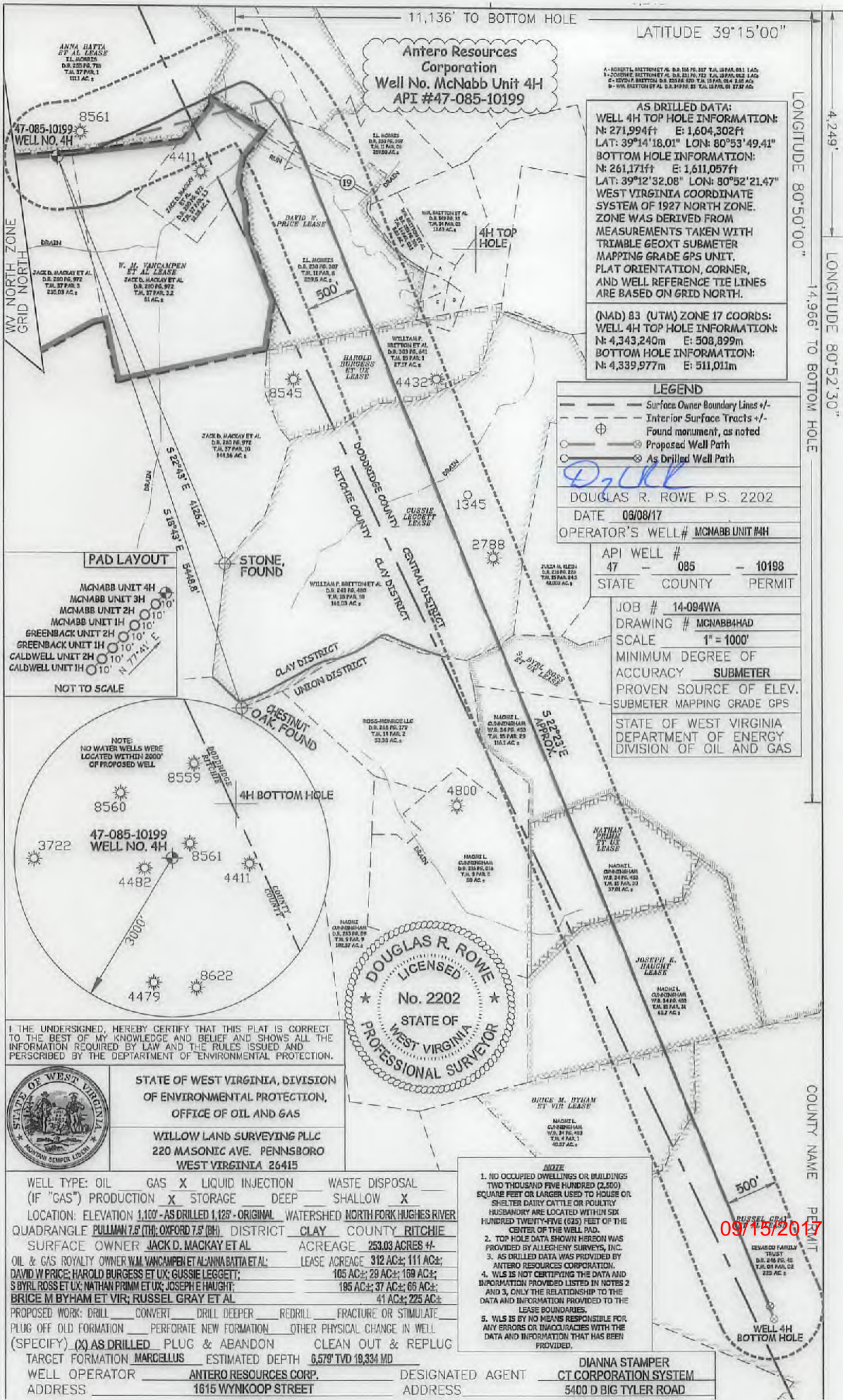
WELL TYPE: OIL CAS LIQUID INJECTION WASTE DISPOSAL
(IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
LOCATION: ELEVATION 1,100' - AS DRILLED 1,125' - ORIGINAL WATERSHED NORTH FORK HUGHES RIVER
QUADRANGLE PULLMAN 7.5 (TH); OXFORD 7.5 (PH) DISTRICT CLAY COUNTY RITCHIE
SURFACE OWNER JACK D. MACKAY ET AL ACREAGE 253.03 ACRES +/-
OIL & GAS ROYALTY OWNER W.M. VINCAMPEN ET AL; ANNA DATTA ET AL; LEASE ACREAGE 312 AC; 111 AC;
DAVID W PRICE; HAROLD BURGESS ET UX; GUSSIE LEGGETT; 105 AC; 29 AC; 169 AC;
S BYRLE ROSS ET UX; NATHAN PRIMM ET UX; JOSEPH E HAUGHT; 185 AC; 37 AC; 66 AC;
BRICE M BYHAM ET VIR; RUSSEL GRAY ET AL 41 AC; 225 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 6,579' TVD 19,334 MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD

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.

DIANNA STAMPER
CT CORPORATION SYSTEM
5400 D BIG TYLER ROAD

09/15/2017

WELL 4H BOTTOM HOLE



Antero Resources Corporation
Well No. McNabb Unit 4H
API #47-085-10199

AS DRILLED DATA:
WELL 4H TOP HOLE INFORMATION:
N: 271,994ft E: 1,604,302ft
LAT: 39°14'18.01" LON: 80°53'49.41"
BOTTOM HOLE INFORMATION:
N: 261,171ft E: 1,611,057ft
LAT: 39°12'32.08" LON: 80°52'21.47"
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(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 4H TOP HOLE INFORMATION:
N: 4,343,240m E: 508,899m
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N: 4,339,977m E: 511,011m

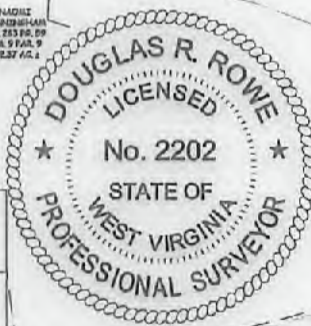
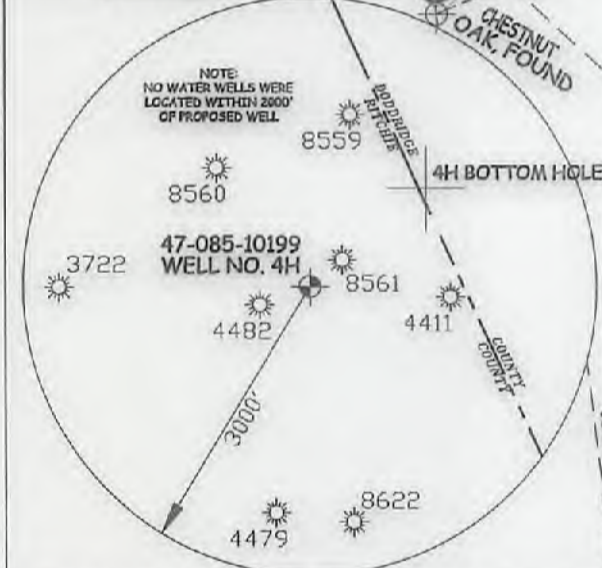
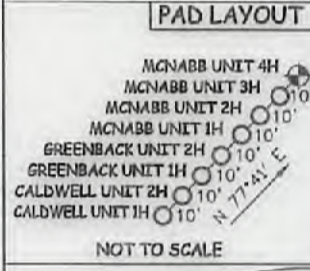
LEGEND

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

DOUGLAS R. ROWE P.S. 2202
DATE 06/08/17
OPERATOR'S WELL# MCNABB UNIT #4H

API WELL # 47 - 085 - 10199
STATE COUNTY PERMIT

JOB # 14-094WA
DRAWING # MCNABB4HAD
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



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 RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

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

LOCATION: ELEVATION 1,100' - AS DRILLED 1,125' - ORIGINAL WATERSHED NORTH FORK HUGHES RIVER
QUADRANGLE PULLMAN 7.5 (TH); OXFORD 7.5 (BH) DISTRICT CLAY COUNTY RITCHIE
SURFACE OWNER JACK D. MACKAY ET AL ACREAGE 253.03 ACRES +/-
OIL & GAS ROYALTY OWNER W.M. VANCAMPEN ET AL; ANNA BATTIA ET AL; LEASE ACREAGE 312 AC±; 111 AC±;
DAVID W PRICE; HAROLD BURGESS ET UX; GUSSIE LEGGETT; 105 AC±; 29 AC±; 169 AC±;
S BYRL ROSS ET UX; NATHAN PRIMM ET UX; JOSEPH E HAUGHT; 195 AC±; 37 AC±; 66 AC±;
BRICE M BYHAM ET VIR; RUSSEL GRAY ET AL 41 AC±; 225 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 6,579' TVD 10,334 MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM
5400 D BIG TYLER ROAD

NOTE

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09/15/2017

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Discharge Monitoring Report
Oil and Gas General Permit

Company Name: Antero Resources Corporation
API No: 47-085-10199 County: Ritchie
District: Clay Well No: McNabb Unit 4H
Farm Name: Jack D. Mackay, et al
Discharge Date/s From:(MMDDYY) 10/07/16 To: (MMDDYY) 11/06/16
Discharge Times. From: 0:00 To: 24:00
Total Volume to be Disposed from this facility (gallons): 960,304
Disposal Option(s) Utilized (write volumes in gallons):

- (1) Land Application: _____ (Include a topographical map of the Area.)
- (2) UIC: 819,315 Permit No. 3400923821, 3416729731, 4708509721, 3410523619, 3400923761, 3416729543, 3416729464, 3416729445
- (3) Offsite Disposal: _____ Site Location: _____
- (4) Reuse: 140,989 Alternate Permit Number: _____
- (5) Centralized Facility: _____ Permit No. _____
- (6) Other method: _____ (Include an explanation)

Follow Instructions below to determine your treatment category:

- Optional Pretreatment test: n/a Cl- mg/l n/a DO mg/l
1. Do you have permission to use expedited treatment from the Director or his representative?
(Y/N) n/a If yes, who? _____ and place a four (4) on line 7.
If not go to line 2
 2. Was Frac Fluid or flowback put into the pit? (Y/N) n/a If yes, go to line 5. If not, go to line 3.
 3. Do you have a chloride value pretreatment (see above)? (Y/N) n/a If yes, go to line 4
If not, go to line 5.
 4. Is the Chloride level less than 5000 mg/l? (Y/N) n/a If yes, then enter a one (1) on line 7.
 5. Do you have a pretreatment value for DO? (See above) (Y/N) n/a If yes, go to line 6
If not, enter a three (3) in line 7.
 6. Is the DO level greater than 2.5 mg/l?(Y/N) n/a If yes, enter a two (2) on line 7. If not, enter a three (3) on line 7.
 7. n/a is the category of your pit. Use the Appropriate section.
 8. Comments on Pit condition: n/a No pit on site.

Name of Principal Exec. Officer: Gretchen Kohler
Title of Officer: Environmental & Regulatory Manager
Date Completed: 11/30/17

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Gretchen Kohler
Signature of a Principal Exec. Officer or Authorized agent.

RECEIVED
Office of Oil and Gas
JUL 17 2017
09/15/2017
WV Depa
Environmental Prot

Category 1
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	5	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl	5,000	_____	5,000	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

*** Al is only reported if the pH is above 9.0

Category 2
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	10	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____

** Include a description of your aeration technique.

*** Al is only reported if the pH is above 9.0

Date: _____

Aeration Code: _____

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Category 3
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	20	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____

Date: _____

** Include a description of your aeration technique.

Aeration Code: _____

*** Al is only reported if the pH is above 9.0.

Category 4
Sampling Results
API No: _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	1	_____	N/A	N/A	Days
Fe	Monitor	_____	Monitor	_____	mg/l
D.O.	Monitor	_____	Monitor	_____	mg/l
Settleable Sol.	Monitor	_____	Monitor	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Activated Carbon (0.175)		_____	N/A	N/A	lb/Bl
Date Site Reclaimed	N/A	N/A			10 days from dis.
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____

Date: _____

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