

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

API 47 - 009 - 00232 County BROOKE District BUFFALO
Quad TILTONSVILLE Pad Name BARRY GREATHOUSE A-BRK-PAD1 Field/Pool Name PANHANDLE WET
Farm name BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE Well Number BARRY GREATHOUSE A BRK 206H
Operator (as registered with the OOG) SWN PRODUCTION COMPANY, LLC
Address PO BOX 12359 City SPRING State TX Zip 77391-2359

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,449,075.14 Easting 531,013.75
Landing Point of Curve Northing 4,448,869.68 Easting 530,810.73
Bottom Hole Northing 4,445,692.04 Easting 532,010.16

Elevation (ft) 1136' 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)
SOBM

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Date permit issued 01/02/2019 Date drilling commenced 04/30/2019 Date drilling ceased 05/11/2019
Date completion activities began 07/04/2019 Date completion activities ceased 09/05/2019
Verbal plugging (Y/N) N 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 275' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 384' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 292' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed
- [Signature] 12-17-19

Reviewed by:
SB 12-17-19

API 47-009 - 00232 Farm name BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE Well number BARRY GREATHOUSE A BRK 206H

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	126'	NEW	J-55/94#		Y
Surface	17.5	13.375	386'	NEW	J-55/54.50#	215.1	Y, 21 BBLs
Coal							
Intermediate 1	12.25	9.625	1,623'	NEW	J-55/36#		Y, 41 BBLs
Intermediate 2							
Intermediate 3							
Production	8.75/8.50	5.5	17,372'	NEW	HCP-110/20#		Y
Tubing		2.875	6,489'	NEW	P-110/6.50#		N
Packer type and depth set							

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	GROUT TO SURFACE				SURFACE	24
Surface	CLASS A	466	15.60	1.20	559.2	SURFACE	8
Coal	SEE SURFACE						
Intermediate 1	CLASS A	656	15.60	1.20	787.2	SURFACE	8
Intermediate 2							
Intermediate 3							
Production	CLASS A	3,268	15.60	1.19	3,888.92	SURFACE	24
Tubing							

Drillers TD (ft) 17,372' Loggers TD (ft) 17,372'
 Deepest formation penetrated _____ Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5,138'

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 _____

SURFACE: 7 CENTRALIZERS - EVERY THIRD JOINT OF CASING
 INTERMEDIATE: 24 CENTRALIZERS - EVERY THIRD JOINT OF CASING
 PRODUCTION: 181 CENTRALIZERS - EVERY THIRD JOINT FROM SURFACE TO TOP OF CURVE, THEN EVERY JOINT UNTIL TD

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

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API 47- 009 - 00232

Farm name BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE

Well number BARRY GREATHOUSE A BRK 206H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	SEE	ATTACHMENT	1		

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
		SEE	ATTACHMENT	2				

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Please insert additional pages as applicable.

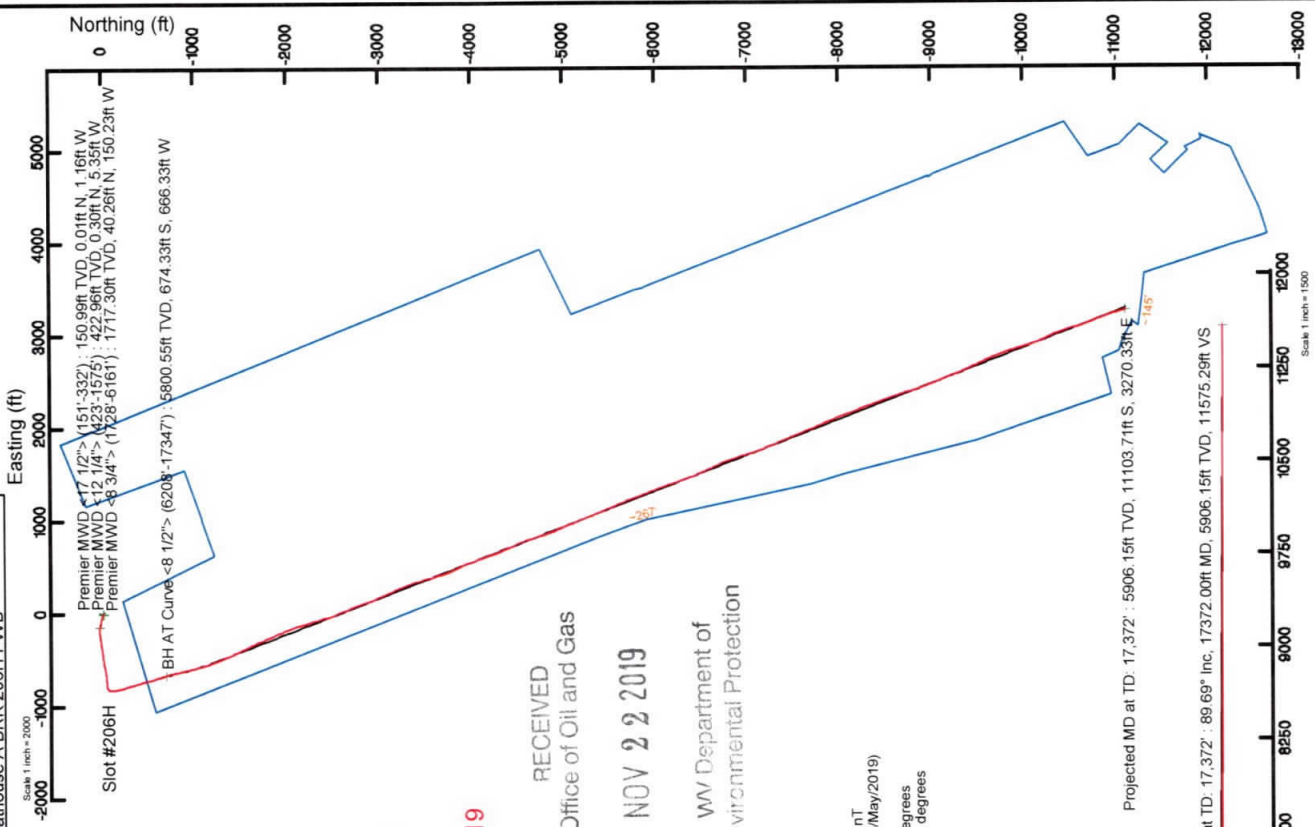
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Location: Brooke County, WV
 Field: Brooke
 Facility: Barry Greathouse A BRK Pad
 Slot: Slot #206H
 Well: Barry Greathouse A BRK 206H
 Wellbore: Barry Greathouse A BRK 206H PWB

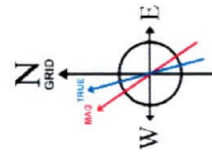
Location Information			
Facility Name	Grid East (US Ft)	Grid North (US Ft)	Longitude
Barry Greathouse A BRK Pad	1742183.879	14598655.636	80°30'08.133"W
Slot	Local N (ft)	Local E (ft)	Longitude
Slot #206H	18.19	-18.26	80°30'08.342"W
SDC 40 (RNB) to Ground level (At Slot Slot #206H)	26ft		
Mean Sea Level to Ground level (At Slot Slot #206H)	-1137.3ft		
SDC 40 (RNB) to Mean Sea Level	1163.3ft		

Grid System	
Grid System	NAD83 (UTM Zone 17 North, US feet)
True vertical depths are referenced to	SDC 40 (RNB)
Horizontal depths are referenced to	SDC 40 (RNB)
Scale	True distance
SDC 40 (RNB) to Mean Sea Level	1163.3 feet
Mean Sea Level to Ground level (At Slot Slot #206H)	1137.3 feet
Coordinates are in feet referenced to Slot	

API: 47-009-00232-0000
 BH Job #: 109780830
 Rig: SDC 40
 Duration: 4/29/2019 - 5/11/19



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User specified (HDGM) Dip: 67.48° Field: 52491 nT
 Magnetic North is 8.10 degrees West of True North (at 06/May/2019)
 Grid North is 0.24 degrees East of True North
 To correct azimuth from True to Grid subtract 0.24 degrees
 To correct azimuth from Magnetic to Grid subtract 6.34 degrees

Well Profile Data					
Design Comment	MD (ft)	Inc (ft)	Az (°)	TVD (ft)	VS (ft)
Top On	6161.00	77.760	162.830	5790.79	-630.30
Bit Projection	6233.00	79.450	163.460	5805.01	-497.94
Landing Pt	6397.25	89.543	169.000	5820.76	-456.46
On Azimuth	6723.19	89.548	158.981	5823.41	-1177.05
End of Target	17262.19	89.548	158.981	5807.30	-1109.40
					3084.77
					0.00
					11575.29

BH AT Curve <8 1/2'> (6208'-17347') : 78.25° Inc, 6208.00ft MD, 5800.55ft TVD, 457.60ft VS
 Projected MD at TD: 17,372' : 89.69° Inc, 17372.00ft MD, 5906.15ft TVD, 11575.29ft VS

Vertical Section (ft)
 Azimuth 163.52° with reference 0.00 N, 0.00 E

Scale 1 inch = 1500

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	7/11/2019
Job End Date:	8/4/2019
State:	West Virginia
County:	Brooke
API Number:	47-009-00232-00-00
Operator Name:	Southwestern Energy
Well Name and Number:	Barry Greathouse A BRK 206 H 206H
Latitude:	40.19149400
Longitude:	-80.63565000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	5,875
Total Base Water Volume (gal):	16,608,240
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
Fresh Water	Halliburton	Base Fluid					
			Water	7732-18-5	100.00000	63.70629	Density = 8.34
Produced Water	Halliburton	Base Fluid					
			Water	7732-18-5	100.00000	23.14072	Density = 8.34

Ingredients	Listed Above	Listed Above	Listed Above							
				Water			7732-18-5	100.00000	0.03528	
Sand-Premium White-40/70	Halliburton	Proppant					Listed Below			
MC LD-2850	MultiChem	Friction Reducer					Listed Below			
LEGEND(TM) LD-7750	MultiChem	Scale Inhibitor					Listed Below			
FSTI-CI-01	FSTI	Acid Corrosion Inhibitor					Listed Below			
BE-9	Halliburton	Biocide					Listed Below			
FSTI-IC-001	FSTI	Iron Control Agent					Listed Below			
FSTI HCl	FSTI	Acid					Listed Below			
Sand-Common White-100 Mesh, SSA-2	Halliburton	Proppant					Listed Below			

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					Listed Below			
Items above are Trade Names with the exception of Base Water. Items below are the individual ingredients.								
					Crystalline silica, quartz	14808-60-7	100.00000	12.02464
					Hydrochloric acid	7647-01-0	7.50000	0.07783
					Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01777
					Ethanediamine, N,N,N-trimethyl-2-[(1-oxo-2-propen-1-yl)oxy]-, chloride (1:1), polymer with 2-propenamide	69418-26-4	30.00000	0.01777
					Sodium chloride	7647-14-5	10.00000	0.00635
					Ammonium chloride	12125-02-9	10.00000	0.00592
					Castor oil, ethoxylated	61791-12-6	10.00000	0.00592
					9-Octadecenamide, n,n-bis-2(hydroxy-ethyl)-,(Z)	93-83-4	5.00000	0.00296
					Alcohols, C12-16, ethoxylated	68551-12-2	5.00000	0.00296
					Sorbitan monooleate polyoxyethylene derivative	9005-65-6	5.00000	0.00296
					Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00209
					Acetic acid	64-19-7	60.00000	0.00154
					Methanol	67-56-1	80.00000	0.00147
					Citric acid	77-92-9	40.00000	0.00103
					Phosphoric Acid Salt	Proprietary	5.00000	0.00042
					Fatty acids	Trade Secret	10.00000	0.00007
					Formaldehyde	50-00-0	0.10000	0.00007
					Ethylenediaminetetraacetic acid, tetrasodium salt	64-02-8	0.10000	0.00006
					1,4-Dioxane	123-91-1	0.10000	0.00006
					Sodium glycolate	2836-32-0	0.10000	0.00006
					Diethanolamine	111-42-2	0.10000	0.00006
					Hydroquinone monomethyl ether	150-76-5	0.10000	0.00006

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				5064-31-3	
			Nitrotriacetic acid, trisodium salt monohydrate		
					0.10000
					0.00006

* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water
 ** Information is based on the maximum potential for concentration and thus the total may be over 100%
 *** If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

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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**WELL NAME
ATTACHMENT 1
PERF REPORT**

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
1	6/26/2019	17,286	17,189	36
2	7/11/2019	17,154	17,047	42
3	7/12/2019	17,014	16,907	42
4	7/12/2019	16,874	16,767	42
5	7/12/2019	16,734	16,627	42
6	7/13/2019	16,594	16,487	42
7	7/13/2019	16,454	16,347	42
8	7/13/2019	16,314	16,207	42
9	7/14/2019	16,174	16,067	42
10	7/14/2019	16,034	15,927	42
11	7/14/2019	15,892	15,787	42
12	7/14/2019	15,754	15,651	42
13	7/15/2019	15,614	15,507	42
14	7/15/2019	15,474	15,367	42
15	7/15/2019	15,334	15,227	42
16	7/15/2019	15,194	15,087	42
17	7/16/2019	15,054	14,947	42
18	7/16/2019	14,914	14,807	42
19	7/16/2019	14,774	14,667	42
20	7/17/2019	14,634	14,527	42
21	7/18/2019	14,494	14,387	42
22	7/18/2019	14,354	14,247	42
23	7/19/2019	14,214	14,107	42
24	7/19/2019	14,074	13,967	42
25	7/19/2019	13,934	13,827	42
26	7/20/2019	13,794	13,687	42
27	7/20/2019	13,654	13,547	42
28	7/20/2019	13,514	13,407	42
29	7/20/2019	13,374	13,267	42
30	7/20/2019	13,234	13,127	42
31	7/21/2019	13,094	12,987	42
32	7/21/2019	12,954	12,847	42
33	7/22/2019	12,814	12,707	42
34	7/22/2019	12,674	12,567	42
35	7/25/2019	12,536	12,427	42
36	7/25/2019	12,394	12,287	42
37	7/26/2019	12,254	12,147	42
38	7/26/2019	12,114	12,007	42
39	6/27/2019	11,974	11,867	42
40	7/27/2019	11,834	11,727	30
41	7/27/2019	11,694	11,587	42
42	7/27/2019	11,554	11,447	42

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**WELL NAME
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PERF REPORT**

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
43	7/27/2019	11,414	11,307	42
44	7/28/2019	11,274	11,167	42
45	7/28/2019	11,134	11,027	42
46	7/28/2019	10,994	10,887	42
47	7/28/2019	10,854	10,747	42
48	7/29/2019	10,714	10,607	42
49	7/29/2019	10,574	10,469	42
50	7/29/2019	10,434	10,327	42
51	7/29/2019	10,294	10,187	42
52	7/29/2019	10,154	10,050	42
53	7/30/2019	10,014	9,907	42
54	7/30/2019	9,874	9,767	42
55	7/30/2019	9,734	9,627	42
56	7/31/2019	9,592	9,487	42
57	7/31/2019	9,454	9,350	42
58	7/31/2019	9,314	9,207	42
59	7/31/2019	9,174	9,067	42
60	7/31/2019	9,034	8,927	42
61	7/31/2019	8,894	8,787	69
62	8/1/2019	8,754	8,647	42
63	8/1/2019	8,614	8,507	42
64	8/1/2019	8,474	8,367	42
65	8/1/2019	8,334	8,227	42
66	8/1/2019	8,194	8,087	42
67	8/1/2019	8,054	7,947	42
68	8/2/2019	7,914	7,807	42
69	8/2/2019	7,774	7,667	42
70	8/2/2019	7,634	7,527	42
71	8/3/2019	7,494	7,387	42
72	8/3/2019	7,354	7,247	42
73	8/3/2019	7,214	7,107	42
74	8/3/2019	7,074	6,967	42
75	8/3/2019	6,934	6,827	42
76	8/3/2019	6,794	6,687	42
77	8/4/2019	6,654	6,547	42
78	8/4/2019	6,514	6,407	42

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**WELL NAME
ATTACHMENT 2
STIM REPORT**

STAGE NUM	Stim Date	Ave Pump Rate (BPM)	Ave Treatment	Max Breakdown	ISIP (PSI)	Amount of Proppant (lbs)	Amount of water bbls	Amount of nitrogen/othe
1	7/11/2019	94	7,932	7,424	4,113	244,090	6,711	0
2	7/12/2019	94.4	94	4,997	4,426	244,640	6,958	0
3	7/12/2019	100	7,537	5,587	4,459	244,700	6,892	0
4	7/12/2019	100.4	7,749	5,250	4,584	248,950	7,048	0
5	7/13/2019	100.3	7,951	5,321	4,408	244,140	6,629	0
6	7/13/2019	99.6	7,695	5,531	4,545	245,770	6,875	0
7	7/13/2019	100.1	7,872	5,103	4,410	245,347	6,521	0
8	7/13/2019	97.4	7,673	5,599	4,441	247,790	6,492	0
9	7/14/2019	100.7	7,754	4,543	4,401	245,000	7,566	0
10	7/14/2019	100.2	7,606	5,009	4,439	245,290	6,253	0
11	7/14/2019	99.4	7,933	5,601	4,355	245,563	5,626	0
12	7/14/2019	98.6	8,070	5,351	4,516	249,160	5,677	0
13	7/15/2019	100.1	7,776	5,267	4,486	245,170	5,570	0
14	7/15/2019	97.9	7,884	5,218	4,292	246,560	5,648	0
15	7/15/2019	99.9	7,823	5,073	4,371	244,700	5,398	0
16	7/15/2019	98.8	7,748	5,102	4,300	245,700	5,558	0
17	7/16/2019	97.9	7,890	5,059	4,334	244,910	5,628	0
18	7/16/2019	99.2	7,821	5,187	4,245	244,750	5,773	0
19	7/16/2019	77.6	7,853	5,155	4,564	180,260	8,178	0
20	7/17/2019	97.2	7,933	4,819	6,214	226,995	9,527	0
21	7/18/2019	76.3	7,451	4,822	4,250	244,330	6,840	0
22	7/18/2019	99.9	7,498	4,752	4,311	247,267	5,018	0
23	7/19/2019	99.7	6,978	4,709	4,248	246,130	5,977	0
24	7/19/2019	99.7	7,578	4,728	4,391	245,110	5,120	0
25	7/20/2019	99	7,509	5,108	4,226	245,200	5,650	0
26	7/20/2019	99.8	7,371	4,695	4,559	245,660	5,095	0
27	7/20/2019	100.1	7,070	4,832	4,957	244,420	5,038	0
28	7/20/2019	99.9	6,955	4,802	4,222	244,700	5,150	0
29	7/20/2019	100.3	7,017	4,601	4,324	244,878	5,110	0
30	7/21/2019	100.3	6,980	4,635	4,281	246,120	4,821	0
31	7/21/2019	100.3	7,099	4,925	4,156	245,380	4,969	0
32	7/21/2019	100.2	7,051	5,015	4,271	243,930	5,148	0
33	7/22/2019	100.1	6,976	4,896	4,368	244,560	5,050	0
34	7/25/2019	100.1	7,456	4,774	4,317	244,390	5,597	0
35	7/25/2019	99.9	7,210	4,566	4,394	244,780	4,942	0
36	7/26/2019	100.2	7,399	5,246	4,314	245,080	5,525	0
37	7/26/2019	97.7	7,429	5,351	4,429	246,840	4,996	0
38	7/26/2019	99.3	7,185	5,089	4,300	245,480	4,835	0
39	7/26/2019	99.9	7,001	5,009	4,380	245,430	4,788	0
40	7/27/2019	100	7,064	4,997	4,507	244,350	5,042	0
41	7/27/2019	100.7	7,257	4,801	4,506	244,940	4,890	0
42	7/27/2019	99.3	7,352	4,914	4,524	243,085	5,081	0
43	7/27/2019	99.5	7,531	5,372	4,468	244,610	4,703	0
44	7/28/2019	98.6	7,637	5,547	4,437	245,230	5,366	0
45	7/28/2019	100.1	7,142	5,514	4,510	245,160	4,772	0
46	7/28/2019	100.2	6,977	5,600	4,296	244,720	4,774	0
47	7/29/2019	100.4	7,109	5,297	4,390	244,280	4,736	0
48	7/29/2019	100.2	7,010	4,575	4,618	244,430	4,789	0
49	7/29/2019	100	7,157	5,115	4,314	244,870	4,756	0
50	7/29/2019	100.1	6,900	5,165	4,514	244,960	4,347	0
51	7/29/2019	100	6,984	5,301	4,300	245,310	4,137	0
52	7/30/2019	99.7	7,093	5,035	4,325	244,980	4,149	0
53	7/30/2019	98.9	7,041	5,051	4,351	429,670	4,192	0

**WELL NAME
ATTACHMENT 2
STIM REPORT**

STAGE NUM	Stim Date	Ave Pump Rate (BPM)	Ave Treatment	Max Breakdown	ISIP (PSI)	Amount of Proppant (lbs)	Amount of water bbls	Amount of nitrogen/othe
54	7/30/2019	97.7	6,812	5,212	4,266	251,950	4,170	0
55	7/30/2019	99.9	6,782	5,163	4,201	246,330	4,102	0
56	7/31/2019	100.1	6,572	4,754	4,244	245,850	4,042	0
57	7/31/2019	99.8	6,667	4,792	4,258	246,280	4,179	0
58	7/31/2019	99.8	6,650	5,152	4,253	246,450	4,119	0
59	7/31/2019	100	6,781	5,059	4,124	252,101	4,127	0
60	7/31/2019	99.7	6,996	6,730	4,312	246,274	4,105	0
61	7/31/2019	97.9	7,238	5,004	4,213	246,440	6,480	0
62	8/1/2019	99	6,660	4,943	4,481	246,020	4,176	0
63	8/1/2019	99.2	6,900	5,067	4,253	245,450	4,151	0
64	8/1/2019	100.2	6,741	5,301	4,323	246,016	3,982	0
65	8/1/2019	100.1	6,657	4,988	4,229	245,523	3,904	0
66	8/1/2019	100	6,617	5,336	4,402	246,388	4,183	0
67	8/2/2019	99.2	6,649	5,068	4,264	245,310	4,117	0
68	8/2/2019	100.1	6,461	5,094	4,216	244,970	4,136	0
69	8/2/2019	99.9	6,414	4,794	4,093	248,530	4,037	0
70	8/2/2019	100.2	6,615	5,406	4,001	246,320	3,964	0
71	8/3/2019	99.4	6,815	5,198	4,227	247,240	3,952	0
72	8/3/2019	100	6,398	3,837	4,340	246,510	4,049	0
73	8/3/2019	99.8	6,370	5,326	4,180	245,560	3,985	0
74	8/3/2019	99.9	6,360	5,725	4,062	246,055	3,879	0
75	8/3/2019	100.1	6,184	5,905	4,162	244,635	4,132	0
76	8/4/2019	99.5	6,156	5,131	4,245	244,290	4,020	0
77	8/4/2019	99.6	6,308	5,255	4,083	242,540	3,994	0
78	8/4/2019	99.5	6,135	5,048	4,220	245,350	3,895	0

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WV Department of
Environmental Protection



ATTACHMENT 3

Well Name: Barry Greathouse A BRK 206H 47009002320000

LITHOLOGY/FORMATION	TOP DEPTH, MD (FT)	TOP DEPTH, TVD (FT)	BOTTOM DEPTH, MD (FT)	BOTTOM DEPTH, TVD (FT)	QUANTITY AND TYPE OF FLUID
Base of Fresh Water	0.00	0.00	275.00	275.00	
Top of Salt Water	384.00	384.00	NA	NA	
Pittsburgh Coal	292.00	292.00	NA	NA	
Pottsville (ss)	398.00	398.00	796.00	796.00	
Raven Cliff (ss)	796.00	796.00	1047.00	1047.00	
Maxton (ss)	1047.00	1047.00	1349.00	1349.00	
Big Injun (ss)	1349.00	1349.00	1872.00	1868.00	
Berea (siltstone)	1880.00	1867.00	5358.00	5277.00	
Rhinestreet (shale)	5358.00	5277.00	5623.00	5512.00	
Cashaqua (shale)	5623.00	5512.00	5688.00	5562.00	
Middlesex (shale)	5688.00	5562.00	5778.00	5626.00	
Burket (shale)	5778.00	5626.00	5802.00	5641.00	
Tully (ls)	5802.00	5641.00	5898.00	5696.00	
Mahantango (shale)	5898.00	5696.00	6115.00	5780.00	
Marcellus (shale)	6115.00	5780.00	NA	NA	GAS

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Environmental Protection

(2000' SCALE) SURFACE HOLE LATITUDE 40°12'30" 2975'

(2000' SCALE) BOTTOM HOLE LATITUDE 40°10'00" 11398'

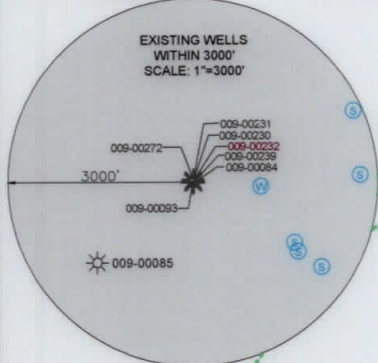
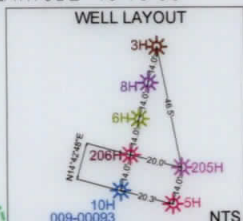


www.jhacompanies.com
68011 Vineyard Road
St. Clairsville, Ohio 43950
740-695-6100

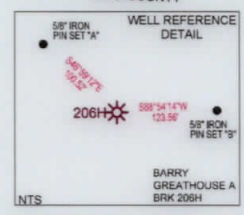


NOTES ON SURVEY

1. COORDINATE SYSTEM IS UTM NAD 83 DATUM, ZONE 17, U.S. FOOT AND WELL COORDINATES ESTABLISHED USING SURVEY GRADE GPS.
2. SURFACE AND ROYALTY OWNER INFORMATION AND THEIR BOUNDARIES SHOWN HEREON WERE PLOTTED FROM DEEDS AND/OR TAX PARCEL MAPS PROVIDED BY CLIENT AND/OR FIELD LOCATIONS.
3. THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARCELS SHOWN HEREON.
4. NO DWELLINGS OR BUILDINGS WITHIN 625 FEET OF PROPOSED CENTER OF PAD
5. NO PERENNIAL STREAMS, LAKES, PONDS, RESERVOIRS OR WETLANDS WITHIN 100 FEET OF THE LIMITS OF DISTURBANCE.
6. NO NATURALLY PRODUCING TROUT STREAM WITHIN 300 FEET OF THE LIMITS OF DISTURBANCE.
7. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF PROPOSED WELL.



SURFACE HOLE LOCATION (SHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4449075.14 EASTING: 531013.75
LANDING POINT LOCATION (LPL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4448869.68 EASTING: 530810.73
BOTTOM HOLE LOCATION (BHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4445692.04 EASTING: 532010.16
SURFACE HOLE LOCATION (SHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4449075.14 EASTING: 531013.75
LANDING POINT LOCATION (LPL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4448883.35 EASTING: 530792.49
BOTTOM HOLE LOCATION (BHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4445693.05 EASTING: 532014.41



LINE	BEARING	DISTANCE
L1	S14°49'18"W	1125.90'
L2	N35°14'47"W	1115.50'



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 REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

P.S. 2041 *[Signature]* 11/18/19

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25034

MINIMUM DEGREE OF ACCURACY:	1/200
PROVEN SOURCE OF ELEVATION:	SURVEY GRADE GPS (NAVD 88, US FT)

SWN Production Company, LLC **swn** Production Company™

BARRY GREATHOUSE A BRK

OPERATOR'S WELL #: 206H

API WELL #: 47 STATE 009 COUNTY 232 PERMIT

WELL TYPE: OIL WASTE DISPOSAL PRODUCTION DEEP GAS LIQUID INJECTION STORAGE SHALLOW

WATERSHED: UPPER OHIO SOUTH ELEVATION: 1136.0'

DISTRICT: BUFFALO COUNTY: BROOKE QUADRANGLE: TILTONSVILLE, OH & BETHANY, WV

SURFACE OWNER: BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE ACREAGE: ±229.00

OIL & GAS ROYALTY OWNER: RAYLE COAL COMPANY ACREAGE: ±229.00

DRILL DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION

CONVERT PLUG & ABANDON CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY) AS-DRILLED

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: 5,906' TVD 17,372' TMD

WELL OPERATOR: SWN PRODUCTION COMPANY, LLC DESIGNATED AGENT: BRITTANY WOODY



ADDRESS: 1300 FORT PIERPONT DRIVE, SUITE 201 ADDRESS: 1300 FORT PIERPONT DRIVE, SUITE 201

CITY: MORGANTOWN STATE: WV ZIP CODE: 26508 CITY: MORGANTOWN STATE: WV ZIP CODE: 26508

LEGEND:	REVISIONS:	DATE: 11-18-2019
● EXISTING BOTTOM HOLE		
★ EXISTING / PRODUCING WELLHEAD		
LPL★ EXISTING LANDING POINT LOCATION		
● PROPOSED SURFACE HOLE / BOTTOM HOLE		
LPL★ PROPOSED LANDING POINT LOCATION		
— ACCESS ROAD		
— PUBLIC ROAD		
— FLOOD PLAIN		
— LEASE BOUNDARY		
— AS-DRILLED PATH		
— PROPOSED PATH		

WELL BORE TABLE FOR SURFACE / ROYALTY OWNERS		
TRACT	SURFACE OWNER (S) / ROYALTY OWNER (R)	TAX PARCEL
1	BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE (S) RAYLE COAL COMPANY (R)	03-B41-0082.0000
TRACT	SURFACE OWNER	TAX PARCEL
2	DANNY GENE BRITT & VIRGINIA MARGARET BRITT	03-B46-0027.0000
3	TRACY GILBERT	03-B46-0022.0000
4	BUSTER T. BLAKE & BARBARA A. BLAKE	03-B46-0023.0000
5	GARY L. WILLIAMS & MARGIE WILLIAMS	03-B46-0025.0000
6	MY THREE SONS HOLDING LP.	03-B46-0024.0000
7	GARY HERCULES & MARTHA HERCULES	04-R6-4
8	GARY & MARTHA HERCULES	04-R6-4.1
9	SHORT CREEK COAL CO	04-R6-17.3
10	SHORT CREEK COAL CO	04-R6-17.4
11	WINDELL H. & G. GOFF	04-R6-27.1

ADJOINING OWNERS TABLE		
TRACT	SURFACE OWNER	TAX PARCEL
A	ROBERT J. MILLER JR. & LINDA MILLER	03-B41-0047.0000
B	JAY GLEN COLLINS	03-B41-0080.0000
C	DALE T. WOOD & MARY R. WOOD	03-B41-0084.0000
D	JAMES B. GEBHARDT & MELISSA D. GEBHARDT	03-B46-0029.0000
E	RACHAEL R. BAXTER	03-B46-0028.0000
F	GRACE FRIEND	03-B46-0030.0000
G	REBECCA FRIEND	03-B46-0026.0000
H	TERRY L. CRUPE	03-B46-0033.0000
I	ALFRED SCHELL	03-B46-0037.0000
J	MELISSA KERNS, CHRISTINA A. KERNS, TIMOTHY E. KERNS & JEANETTE M. KERNS	03-B46-0040.0001
K	TIMOTHY E. KERNS & JEANETTE M. KERNS	04-R6-8.1
L	MELISSA ANN KERNS	04-R6-8
M	ULRICH UTT	04-R6-24.1
N	ULRICH UTT	04-R6-24.2
O	GARY & MARTHA HERCULES	04-R6-6.1
P	GARY & MARTHA HERCULES	04-R6-5
Q	GARY & MARTHA HERCULES	04-R6-6
R	GARY WAYNE HERCULES	04-R6-16
S	WINDSOR COAL COMPANY C/O CNX LAND-PROPERTY TAX	04-R6-12
T	WAYNE E SHOOK	04-R6-15
U	CHARLES B. DAVIS, III & ELIZABETH MARIE DAVIS	04-R6-14.4
V	RANDALL L. CRABTREE & CYNTHIA S. KOVALSKI	04-R6-27.3
W	NICOLE L. CARENBAUER	04-R6-28.6
X	WINDELL H. GOFF, II & GLADYS GOFF	04-R6-24.3
Y	STELLA M. BRYAN & KATHLEEN J. BRYAN	04-R6-17.1
Z	WINDSOR COAL COMPANY C/O CNX LAND-PROPERTY TAX	04-R6-25
AA	RICHARD A. WOOD, JR.	04-R6-24.6
AB	SHORT CREEK COAL COMPANY C/O RAYLE COAL COMPANY	04-R6-17
AC	SHORT CREEK COAL COMPANY C/O RAYLE COAL COMPANY	04-R6-17.2
AD	OHIO COUNTY BOARD OF COMMISSIONERS	04-R5-55
AE	WINDSOR COAL COMPANY C/O CNX LAND-PROPERTY TAX	04-R6-25
AF	BRUCE D. BONAR (2) & WILLIAM BONAR (1)	03-B46-0020.0000
AG	TRACY GILBERT	03-B46-0023.0001
AH	TRACY GILBERT	03-B46-0022.0001
AI	OHIO COUNTY BOARD OF COMMISSIONERS	04-R5-10
AJ	STACY ANN GREATHOUSE & PATRICIA ANN GREATHOUSE	03-B46-0041.0000
AK	BARRY L. GREATHOUSE & PATRICIA ANN GREATHOUSE	03-B41-0083.0000
AL	BARRY L. GREATHOUSE & PATRICIA ANN GREATHOUSE	03-B41-0032.0000

REVISIONS:	COMPANY:		 	
	OPERATOR'S		BARRY GREATHOUSE A BRK	
	WELL #:		206H	
	DISTRICT:	COUNTY:	STATE:	DATE: 11-18-2019
	BUFFALO	BROOKE	WV	DRAWN BY: R.GRIMES
				SCALE: N/A
				DRAWING NO: 2017-422
				WELL LOCATION PLAT