

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

API 47 - 009 - 00231 County BROOKE District BUFFALO
Quad TILTONSVILLE Pad Name BARRY GREATHOUSE A-BRK-PAD 1 Field/Pool Name PANHANDLE FIELD WET
Farm name BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE Well Number BARRY GREATHOUSE A BRK 8H
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 4,449,083.44 Easting 531,015.71
Landing Point of Curve Northing 4,448,597.81 Easting 531,394.54
Bottom Hole Northing 4,445,655.53 Easting 532,517.41

Elevation (ft) 1,136.1 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 4/16/2019 Date drilling commenced 05/22/2019 Date drilling ceased 06/03/2019
Date completion activities began 07/04/2019 Date completion activities ceased 09/01/2019
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 by:

Reviewed

Jackie Stanton for Eric Blend
11/21/2020

API 47-009 - 00231 Farm name BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE Well number BARRY GREATHOUSE A BRK 8H

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	385'	NEW	J-55/54.50#	254.4', 170.3'	Y, 42 BBLS
Coal							
Intermediate 1	12.25	9.625	1,640'	NEW	J-55/36#		Y, 38 BBLS
Intermediate 2							
Intermediate 3							
Production	8.75/8.50	5.5	16,959'	NEW	HCP-110/20#		Y
Tubing		2.875	6,485'	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	3,172	15.60	1.19	3,774.68	SURFACE	24
Tubing							

Drillers TD (ft) 16,959' Loggers TD (ft) 16,959'
 Deepest formation penetrated Marcellus Shale Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5,582' MD

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 - 00231

Farm name BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE

Well number BARRY GREATHOUSE A BRK 8H

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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Scale 1 inch = 2000

Location: Brooke County, WV
Field: Brooke
Facility: Barry Greathouse A BRK Pad
Slot: Slot #8H
Well: Barry Greathouse A BRK 8H
Wellbore: Barry Greathouse A BRK 8H PWB

Pit reference wellpath is Barry Greathouse A BRK 8H PWP Rev-A 0	Grid System: NAD83 (UTM Zone 17 North, US feet)
True vertical depths are referenced to SDC 40 (RKB)	North Reference: Grid north
Measured depths are referenced to SDC 40 (RKB)	Scale: True distance
SDC 40 (RKB) to Mean Sea Level: 1183.2 feet	Created by: edsway on 2019-06-14
Mean Sea Level to Ground level (At Slot Slot #8H) - 1137.2 feet	Database: WVA_MPL-EASTERNUS_Datn
Coordinates are in feet referenced to Slot	

Location Information

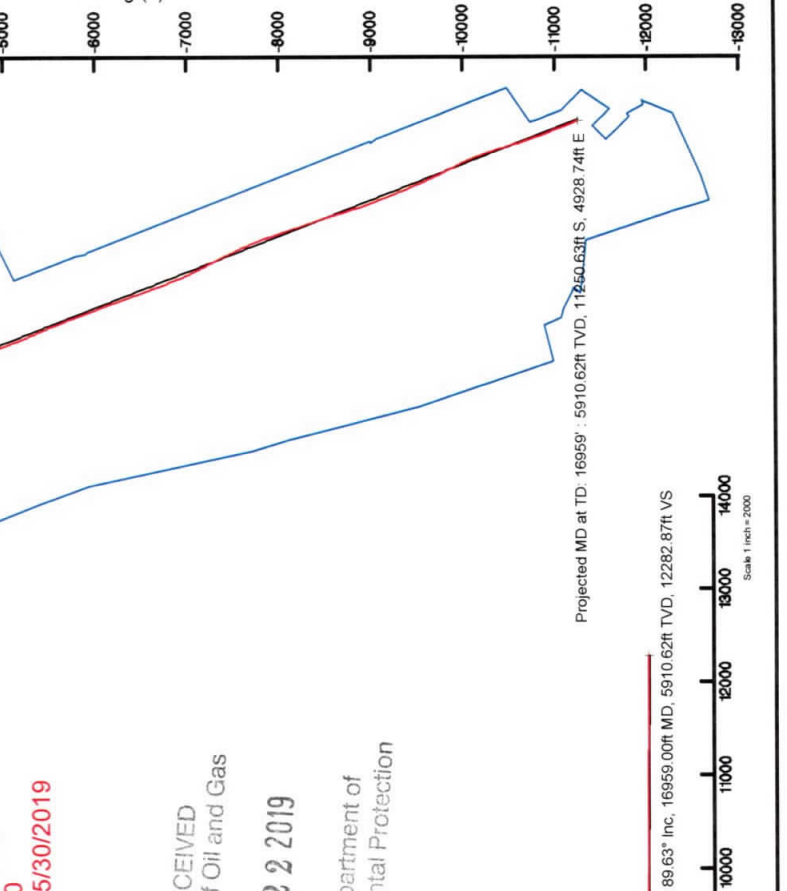
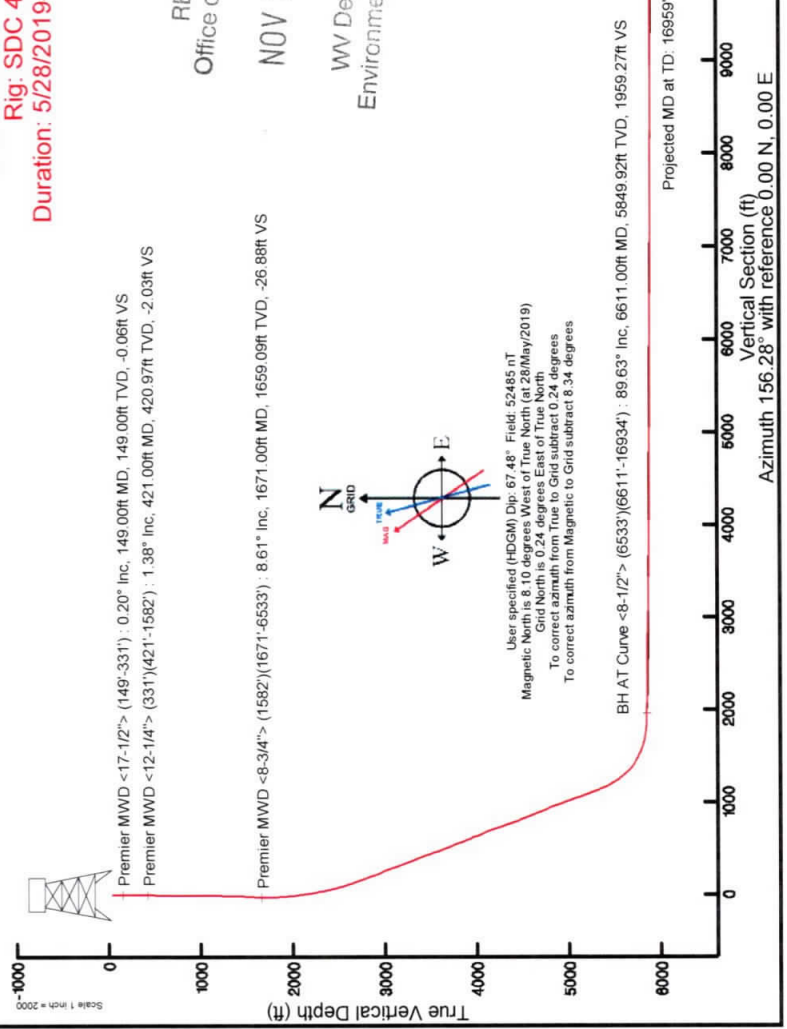
Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Barry Greathouse A BRK Pad	1742183.879	4071129.1977N	40°11'29.645"N	80°38'08.133"W
Slot	Local E (ft)	Local N (ft)	Local E (ft)	Local N (ft)
Slot #8H	45.27	-9.82	1742174.058	14596701.093

Well Profile Data

Design Comment	MD (ft)	Az (°)	Inc (°)	TVD (ft)	Local E (ft)	Local N (ft)	DLS (°/100ft)	VS (ft)
The On	6533.00	89.030	159.660	5849.01	-1520.41	1216.78	5.90	1881.44
PTB	6594.00	89.640	159.660	5849.72	-1577.61	1237.98	1.00	1942.33
Turn	6771.71	86.293	160.870	5855.02	-1744.75	1297.95	2.00	2119.48
Hold	6964.16	89.661	158.996	5962.81	-1925.36	1363.93	2.00	2311.38
BHL	16949.16	89.661	158.996	5921.89	-11246.75	4842.82	0.00	12284.99

Well Profile Data (continued)

Design Comment	MD (ft)	Az (°)	Inc (°)	TVD (ft)	Local E (ft)	Local N (ft)	DLS (°/100ft)	VS (ft)
Premier MWD <17-1/2"> (149-331)	0.20°	149.00ft MD, 149.00ft MD	0.20°	149.00ft MD, 149.00ft MD	-0.66ft VS			
Premier MWD <12-1/4"> (331)(421-1582)	1.38°	1.38° Inc, 421.00ft MD, 420.97ft TVD						
Premier MWD <8-3/4"> (1582)(1671-6533)	8.61°	8.61° Inc, 1671.00ft MD, 1659.09ft TVD						



Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	7/4/2019
Job End Date:	7/29/2019
State:	West Virginia
County:	Brooke
API Number:	47-009-00231-00-00
Operator Name:	Southwestern Energy
Well Name and Number:	Barry Greathouse A BRK 8H
Latitude:	40.19156800
Longitude:	-80.63562700
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	5,888
Total Base Water Volume (gal):	16,082,175
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	68.59196	Density = 8.34
Produced Water	Halliburton	Base Fluid					
			Water	7732-18-5	100.00000	18.74205	Density = 8.34

Ingredients	Listed Above	Listed Above	Listed Above							
				Water		7732-18-5	100.00000	0.03779		
BE-9	Halliburton	Biocide				Listed Below				
FSTI-IC-001	FSTI	Iron Control Agent		RECEIVED Office of Oil and Gas		Listed Below				
				NOV 22 2019		Listed Below				
Sand-Premium White-40/70	Halliburton	Proppant		WV Department of Environmental Protection		Listed Below				
MC LD-2850	MultiChem	Friction Reducer				Listed Below				
FSTI HCl	FSTI	Acid				Listed Below				
FSTI-CI-01	FSTI	Acid Corrosion Inhibitor				Listed Below				
LEGEND(TM) LD-7750W	MultiChem	Scale Control				Listed Below				
Sand-Common White-100 Mesh, SSA-2	Halliburton	Proppant				Listed Below				

LEGEND(TM) LD-7750	MultiChem	Scale Inhibitor			Listed Below				
					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	11.94721		
				Hydrochloric acid	7647-01-0	15.00000	0.09294		
	RECEIVED Office of Oil and Gas			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01959		
	NOV 22 2019			Ethaniminium, N,N,N-trimethyl-2-[(1-oxo-2-propen-1-yl)oxy]-, chloride (1:1), polymer with 2-propenamide	69418-26-4	30.00000	0.01959		
	WV Department of Environmental Protection			Sodium chloride	7647-14-5	10.00000	0.00699		
				Ammonium chloride	12125-02-9	10.00000	0.00653		
				Castor oil, ethoxylated	61791-12-6	10.00000	0.00653		
				Alcohols, C12-16, ethoxylated	68551-12-2	5.00000	0.00326		
				9-Octadecenamide, n,n-bis-2(hydroxy-ethyl)-,(Z)	93-83-4	5.00000	0.00326		
				Sorbitan monooleate polyoxyethylene derivative	9005-65-6	5.00000	0.00326		
				Methanol	67-56-1	80.00000	0.00284		
				Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00220		
				Acetic acid	64-19-7	60.00000	0.00185		
				Citric acid	77-92-9	40.00000	0.00123		
				Phosphoric Acid Salt	Proprietary	5.00000	0.00046		
				Fatty acids	Trade Secret	10.00000	0.00009		
				Formaldehyde	50-00-0	0.10000	0.00007		
				1,4-Dioxane	123-91-1	0.10000	0.00007		
				Diethanolamine	111-42-2	0.10000	0.00007		

			Sodium glycollate	2836-32-0	0.10000	0.00007
			Hydroquinone monomethyl ether	150-76-5	0.10000	0.00007
			Ethylenediaminetetraacetic acid, tetrasodium salt	64-02-8	0.10000	0.00007
			Nitrotriacetic acid, trisodium salt monohydrate	5064-31-3	0.10000	0.00007

* 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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**BARRY GREATHOUSE A BRK 8H
ATTACHMENT 1
PERF REPORT**

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
1	6/26/2019	16,875	16,777	36
2	7/5/2019	16,742	16,635	42
3	7/6/2019	16,602	16,495	42
4	7/6/2019	16,462	16,355	42
5	7/7/2019	16,322	16,215	42
6	7/7/2019	16,182	16,075	42
7	7/7/2019	16,042	15,935	42
8	7/8/2019	15,902	15,795	42
9	7/8/2019	15,762	15,655	42
10	7/8/2019	15,622	15,515	42
11	7/9/2019	15,482	15,375	42
12	7/9/2019	15,342	15,235	42
13	7/9/2019	15,202	15,095	42
14	7/10/2019	15,062	14,955	42
15	7/10/2019	14,922	14,815	42
16	7/10/2019	14,782	14,675	42
17	7/11/2019	14,642	14,535	42
18	7/11/2019	14,502	14,395	42
19	7/12/2019	14,362	14,255	42
20	7/12/2019	14,222	14,115	42
21	7/12/2019	14,082	13,975	42
22	7/13/2019	13,944	13,835	42
23	7/13/2019	13,802	13,695	42
24	7/13/2019	13,662	13,553	42
25	7/13/2019	13,522	13,415	42
26	7/14/2019	13,382	13,275	42
27	7/14/2019	13,242	13,135	42
28	7/14/2019	13,102	12,995	42
29	7/15/2019	12,962	12,855	42
30	7/15/2019	12,822	12,715	42
31	7/15/2019	12,682	12,575	42
32	7/15/2019	12,542	12,435	42
33	7/16/2019	12,402	12,295	42
34	7/16/2019	12,262	12,155	42
35	7/16/2019	12,122	12,015	42
36	7/16/2019	11,979	11,875	42
37	7/17/2019	11,842	11,735	42
38	7/18/2019	11,702	11,595	42
39	7/18/2019	11,562	11,455	42
40	7/19/2019	11,422	11,315	42
41	7/19/2019	11,282	11,175	42
42	7/19/2019	11,142	11,035	42

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**BARRY GREATHOUSE A BRK 8H
ATTACHMENT 1
PERF REPORT**

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
43	7/20/2019	11,002	10,895	42
44	7/20/2019	10,862	10,755	42
45	7/20/2019	10,722	10,615	42
46	7/20/2019	10,582	10,475	42
47	7/21/2019	10,442	10,335	42
48	7/21/2019	10,302	10,195	42
49	7/21/2019	10,162	10,055	42
50	7/22/2019	10,022	9,915	42
51	7/22/2019	9,882	9,775	42
52	7/22/2019	9,742	9,635	42
53	6/27/2019	9,602	9,495	42
54	7/25/2019	9,462	9,355	42
55	7/25/2019	9,322	9,215	42
56	6/27/2019	9,182	9,075	42
57	6/27/2019	9,042	8,935	42
58	6/27/2019	8,904	8,795	42
59	7/26/2019	8,762	8,655	42
60	7/26/2019	8,622	8,515	42
61	7/26/2019	8,482	8,375	42
62	7/26/2019	8,342	8,235	42
63	7/26/2019	8,202	8,095	42
64	7/27/2019	8,060	7,955	42
65	7/27/2019	7,922	7,815	42
66	7/27/2019	7,782	7,675	42
67	7/27/2019	7,642	7,535	42
68	6/27/2019	7,502	7,393	42
69	7/28/2019	7,362	7,255	42
70	7/28/2019	7,222	7,115	42
71	7/28/2019	7,082	6,975	42
72	7/28/2019	6,942	6,835	42
73	7/28/2019	6,802	6,695	42
74	7/28/2019	6,662	6,552	42
75	7/28/2019	6,522	6,415	42

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BARRY GREATHOUSE A BRK 8H
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/othr
1	7/4/2019	93.1	8,228	6,374	4,253	245,611	6,326	0
2	7/5/2019	97.4	8,116	5,367	4,334	238,130	7,625	0
3	7/6/2019	99.2	7,991	5,340	4,387	244,830	6,634	0
4	7/6/2019	99.4	7,768	5,581	4,550	245,120	8,260	0
5	7/7/2019	99.3	7,690	5,397	4,653	245,200	6,767	0
6	7/7/2019	100.1	7,644	5,328	4,623	244,670	6,631	0
7	7/8/2019	99.1	7,816	5,401	4,619	245,100	6,348	0
8	7/8/2019	94.6	7,298	5,547	4,463	244,440	6,440	0
9	7/8/2019	99.6	7,635	5,328	4,547	245,310	6,274	0
10	7/8/2019	99.6	7,929	5,787	4,714	245,630	5,557	0
11	7/9/2019	99	7,667	5,644	4,393	245,940	5,529	0
12	7/9/2019	99	7,626	5,189	4,557	246,070	5,585	0
13	7/9/2019	99.4	7,775	5,466	4,435	245,019	5,563	0
14	7/10/2019	99.8	7,721	5,811	4,483	245,730	5,555	0
15	7/10/2019	100.4	7,482	5,345	4,566	246,030	5,512	0
16	7/10/2019	100.3	7,633	5,767	4,468	243,880	5,494	0
17	7/11/2019	99.7	7,373	5,755	4,486	246,250	5,456	0
18	7/12/2019	100.7	7,653	5,418	4,407	243,520	5,487	0
19	7/12/2019	100.3	7,163	5,210	4,447	246,310	5,690	0
20	7/12/2019	100.4	7,294	5,195	4,565	245,920	5,564	0
21	7/12/2019	100	7,571	5,505	4,511	245,010	5,378	0
22	7/13/2019	100.4	7,549	5,382	4,404	245,010	5,457	0
23	7/13/2019	100	7,548	5,209	4,531	245,946	5,464	0
24	7/13/2019	100	7,681	5,615	4,405	245,700	5,600	0
25	7/14/2019	100.3	7,462	5,047	4,543	246,880	5,428	0
26	7/14/2019	100.6	7,384	5,056	4,258	247,210	5,377	0
27	7/14/2019	100.7	7,783	5,068	4,517	245,830	5,529	0
28	7/14/2019	99.7	7,628	5,798	4,428	246,302	5,400	0
29	7/15/2019	100.2	7,748	5,179	4,257	246,140	5,431	0
30	7/15/2019	99.8	7,497	4,929	4,329	246,010	5,410	0
31	7/15/2019	101.2	7,468	4,952	4,408	246,720	5,372	0
32	7/15/2019	100.3	7,319	4,940	4,319	245,740	5,359	0
33	7/16/2019	99.8	7,309	5,031	4,475	246,320	5,317	0
34	7/16/2019	99.4	7,567	5,520	4,090	244,770	5,767	0
35	7/16/2019	100.7	7,183	5,080	4,504	245,660	5,363	0
36	7/17/2019	99.3	7,265	4,665	4,120	245,150	5,495	0
37	7/18/2019	100.1	7,134	6,212	4,543	244,980	5,615	0
38	7/18/2019	100	7,216	4,493	4,568	245,080	4,898	0
39	7/18/2019	90.7	7,204	5,124	4,377	244,999	8,064	0
40	7/19/2019	100.1	7,104	5,252	4,251	245,120	5,034	0
41	7/19/2019	100.1	7,236	4,954	4,508	245,090	4,947	0
42	7/19/2019	100.4	6,977	5,145	4,582	254,208	5,666	0
43	7/20/2019	100	6,721	4,798	4,313	245,020	4,978	0
44	7/20/2019	99.7	7,082	5,639	4,267	245,567	4,912	0
45	7/20/2019	100.2	7,092	5,433	4,069	244,782	4,912	0
46	7/20/2019	100	6,935	5,380	4,040	246,280	4,922	0
47	7/21/2019	100.1	6,970	5,203	4,419	245,220	4,946	0
48	7/21/2019	100.5	6,791	4,897	4,222	245,347	5,029	0
49	7/21/2019	100.4	6,510	4,867	4,171	244,296	4,984	0
50	7/22/2019	100	6,732	4,842	4,463	244,410	4,797	0
51	7/22/2019	100.6	6,676	4,835	4,385	245,020	4,805	0
52	7/24/2019	100.1	7,032	4,722	4,263	246,420	4,344	0
53	7/25/2019	99.3	6,792	5,092	4,140	244,450	4,362	0

**BARRY GREATHOUSE A BRK 8H
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	7/25/2019	99.9	6,998	5,477	4,441	245,020	4,023	0
55	7/25/2019	100.2	6,891	5,082	4,445	258,970	4,578	0
56	7/25/2019	100.3	6,769	5,000	4,224	246,110	4,366	0
57	7/25/2019	100.2	6,620	5,061	4,309	245,270	4,512	0
58	7/26/2019	99.9	6,608	5,364	4,419	246,380	4,418	0
59	7/26/2019	97.9	6,742	5,282	4,390	245,520	4,004	0
60	7/26/2019	99.7	6,771	4,928	4,423	245,610	4,164	0
61	7/26/2019	98.7	6,813	5,246	4,250	245,270	3,969	0
62	7/26/2019	99.4	6,402	5,368	4,058	244,320	3,936	0
63	7/27/2019	100.3	6,414	5,259	4,200	244,260	3,915	0
64	7/27/2019	100.1	6,550	4,987	4,150	244,170	3,863	0
65	7/27/2019	100	6,478	4,784	4,359	244,470	4,050	0
66	7/27/2019	99.8	6,691	5,184	4,422	244,800	4,010	0
67	7/27/2019	99.7	6,770	5,024	4,214	242,630	3,832	0
68	7/28/2019	100.2	6,772	5,397	4,555	244,610	3,909	0
69	7/28/2019	100.4	6,962	5,205	4,146	244,650	3,880	0
70	7/28/2019	97.1	7,158	5,407	4,650	207,540	4,359	0
71	7/28/2019	99.9	6,523	5,283	4,503	244,140	3,903	0
72	7/28/2019	100.2	6,398	5,444	4,474	220,740	3,754	0
73	7/28/2019	99.9	6,064	4,896	4,026	245,420	3,860	0
74	7/28/2019	99.9	6,215	5,141	4,035	244,100	3,793	0
75	7/29/2019	100.7	6,263	5,034	4,397	244,920	3,850	0

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WV Department of
Environmental Protection



ATTACHMENT 3

Well Name: Barry Greathouse A BRK 8H **47009002310000**

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)	1884.00	1870.00	5517.00	5291.00	
Rhinestreet (shale)	5517.00	5291.00	5782.00	5528.00	
Cashaqua (shale)	5782.00	5528.00	5844.00	5577.00	
Middlesex (shale)	5844.00	5577.00	5929.00	5641.00	
Burket (shale)	5929.00	5641.00	5949.00	5655.00	
Tully (ls)	5949.00	5655.00	6033.00	5709.00	
Mahantango (shale)	6033.00	5709.00	6237.00	5798.00	
Marcellus (shale)	6237.00	5798.00	NA	NA	GAS

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WV Department of
Environmental Protection

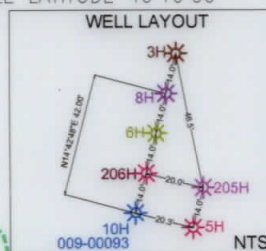
(2000' SCALE) SURFACE HOLE LATITUDE 40°12'30" 2969'

(2000' SCALE) BOTTOM HOLE LATITUDE 40°10'00" 9734'



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.

GRID NORTH
UTM, NAD83 DATUM, ZONE 17, US FT

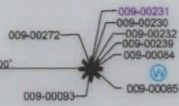
2224'

(2000' SCALE) BOTTOM HOLE LONGITUDE: -80°35'00"

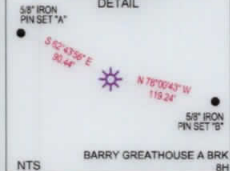
6117'

(2000' SCALE) SURFACE HOLE LONGITUDE: -80°37'30"

EXISTING WELLS WITHIN 3000' SCALE: 1"=3000'



WELL REFERENCE DETAIL



SURFACE HOLE LOCATION (SHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4449083.44 EASTING: 531015.71
LANDING POINT LOCATION (LPL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4448597.81 EASTING: 531394.54
BOTTOM HOLE LOCATION (BHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4445655.53 EASTING: 532517.41
SURFACE HOLE LOCATION (SHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4449083.44 EASTING: 531015.71
LANDING POINT LOCATION (LPL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4448656.41 EASTING: 531370.15
BOTTOM HOLE LOCATION (BHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4445656.71 EASTING: 532521.70

LINE	BEARING	DISTANCE
L1	S14°50'10"W	1097.91'
L2	N34°10'17"W	1134.88'



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



(+) 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 SURVEY SOURCE OF ELEVATION: GRADE GPS (NAVD 88, US FT)

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

BARRY GREATHOUSE A BRK
OPERATOR'S WELL #: 8H
API WELL #: 47 009 00231
STATE COUNTY PERMIT

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

WATERSHED: UPPER OHIO SOUTH
DISTRICT: BUFFALO COUNTY: BROOKE
SURFACE OWNER: BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE
OIL & GAS ROYALTY OWNER: RAYLE COAL COMPANY

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: 5,911' TMD 16,959' TMD

WELL OPERATOR: SWN PRODUCTION COMPANY, LLC
ADDRESS: 1300 FORT PIERPONT DRIVE, SUITE 201
CITY: MORGANTOWN STATE: WV ZIP CODE: 26508

DESIGNATED AGENT: BRITTANY WOODY
ADDRESS: 1300 FORT PIERPONT DRIVE, SUITE 201
CITY: MORGANTOWN STATE: WV ZIP CODE: 26508

LEGEND:	REVISIONS:	DATE: 11-18-2019
● EXISTING BOTTOM HOLE		API NO: 47-009-00231
⊙ EXISTING / PRODUCING WELLHEAD		DRAWN BY: R.GRIMES
LPL* EXISTING LANDING POINT LOCATION		SCALE: 1" = 3000'
● PROPOSED SURFACE HOLE / BOTTOM HOLE		DRAWING NO: 2017-422
LPL* PROPOSED LANDING POINT LOCATION		WELL LOCATION PLAT
— ACCESS ROAD		
— PUBLIC ROAD		
— FLOOD PLAIN		
— LEASE BOUNDARY		
— ASDRILLED 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	MARY R. WOOD	03-B41-0084.0000
3	DANNY GENE BRITT & VIRGINIA MARGARET BRITT	03-B46-0027.0000
4	JAMES B. & MELISSA D. GEBHARDT	03-B46-0029.0000
5	TERRY CRUPE	03-B46-0033.0000
6	ALFRED E. SCHELL	03-B46-0037.0000
7	ALFRED E. SCHELL	03-B46-0039.0000
8	JEANETTE MARIE KERNS, MELISSA KERNS & CHRISTINA KERNS	03-B46-0040.0001
9	MY THREE SONS HOLDINGS, LP	03-B46-0024.0000
10	JEANETTE MARIE KERNS	04-R6-8.1
11	MELISSA ANN KERNS	04-R6-8
12	FLORENCE E. WHITE & JOHN M. WHITE	04-R6-10
13	MARTHA HERCULES	04-R6-7
14	WINDSOR COAL COMPANY	04-R6-12
15	WAYNE E. SHOOK	04-R6-15
16	SUZANNE D. & CHAD D. CLUTTER	04-R6-14.5
17	CHARLES B. DAVIS, III & ELIZABETH MARIE DAVIS	04-R6-14.3
18	CHARLES B. DAVIS, III & ELIZABETH MARIE DAVIS	04-R6-14.4
19	CHARLES B. DAVIS, III & ELIZABETH MARIE DAVIS	04-R6-14.2
20	RANDALL L. CRABTREE & CYNTHIA S. KOVALSKI	04-R6-27.3

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	KATHY LYNN & MICHAEL MAYHEW, ET AL	03-B42-0027.0000
D	DALE T. & MARY R. WOOD	03-B46-0046.0000
E	BETSY D. TUSTIN	03-B47-0002.0001
F	ERIC J. TUSTIN	03-B46-0029.0001
G	RICHARD A. HARRIS	03-B46-0034.0000
H	DONNA LEE KLAGES	03-B46-0036.0000
I	DONNA LEE KLAGES	03-B46-0035.0000
J	WILLARD ARDEN, JR. & CANDACE JEAN HARRIS	03-B46-0038.0000
K	WILLARD ARDEN, JR. & CANDACE JEAN HARRIS	03-B46-0040.0000
L	JEFFREY A. HORNICK	03-B47-0005.0000
M	MARK A. WADE & MARY IVA SMITH	03-B47-0004.0000
N	MARK A. WADE & MARY IVA WADE-SMITH	04-R6-11
O	DALE M. SIMPSON	03-L1-2
P	DALE M. SIMPSON	04-R6-13
Q	CHARLES B. DAVIS, JR. (L/E) & MADONA DAVIS	04-R6-14
R	SUZANNE D. & CHAD D. CLUTTER	04-R6-14.6
S	DALE M. SAMPSON	04-R6-32
T	GREGORY L. CULLEY	04-R6-33.1
U	GREGORY L. & LINDA L. CULLEY; BETTY CULLEY (L/E)	04-R6-33
V	TOWN OF WEST LIBERTY	09-WL9-1
W	DUANE RUPERT & LAURIE RUPERT	04-R6-31
X	DUANE RUPERT & LAURIE RUPERT	04-R6-30
Y	CHARLES J. ROBINSON (L/E) & RANDALL CRABTREE	04-R6-27.2
Z	RANDALL CRABTREE	04-R6-28.8
AA	NICOLE L. CARENBAUER	04-R6-28.6
AB	WINDELL H. GOFF, II & GLADYS GOFF	04-R6-27.1
AC	SHORT CREEK COAL COMPANY	04-R6-17.4
AD	SHORT CREEK COAL COMPANY	04-R6-17.3
AE	GARY WAYNE HERCULES	04-R6-16
AF	GARY & MARTHA HERCULES	04-R6-6
AG	GARY & MARTHA HERCULES	04-R6-5
AH	GARY & MARTHA HERCULES	04-R6-6.1
AI	ULRICH UTT	04-R6-24.2
AJ	ULRICH UTT	04-R6-24.1
AK	GARY & MARTHA HERCULES	04-R6-4
AL	MARC SEAMON	04-R6-2
AM	BRUCE D. BONAR & WILLIAM BONAR	03-B46-0020.0000
AN	TRACY GILBERT	03-B46-0023.0001
AO	BUSTER T. & BARBARA A. BLAKE	03-B46-0023.0000
AP	GARY L. & MARGIE WILLIAMS	03-B46-0025.0000
AQ	REBECCA FRIEND	03-B46-0026.0000
AR	GRACE FRIEND	03-B46-0030.0000
AS	CRAIG ALLEN PITNER	03-B46-0031.0000
AT	CHARLES P. GEBHARDT, FREIDA GEBHARDT & JAMES GEBHARDT	03-B46-0032.0000
AU	RACHEL R. BAXTER	03-B46-0028.0000
AV	TRACY GILBERT	03-B46-0022.0000
AW	TRACY GILBERT	03-B46-0022.0001
AX	OHIO COUNTY BOARD OF COMMISSIONERS	04-R5-10
AY	STACY ANN HAYMAN & PATRICIA ANN GREATHOUSE	03-B46-0041.0000
AZ	BARRY L. & PATRICIA A. GREATHOUSE	03-B41-0083.0000
BA	FREDERICK C., JR. & STACEY A. HAYMAN	03-B41-0083.0001
BB	BARRY L. & PATRICIA A. GREATHOUSE	03-B41-0032.0000

REVISIONS:

COMPANY:

SWN
Production Company, LLC

SWN *R-V+0*
Production Company™

OPERATOR'S BARRY GREATHOUSE A BRK

WELL #: 8H

DISTRICT:
BUFFALO

COUNTY:
BROOKE

STATE:
WV

DATE: 11-18-2019
API NO: 47-009-00231
DRAWN BY: R.GRIMES
SCALE: N/A
DRAWING NO: 2017-422
WELL LOCATION PLAT

PROPERTY NUMBER 2501166096
PAD ID 3001156331