

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

API 47-069-00275 County OHIO District LIBERTY  
Quad BETHANY & VALLEY GROVE, WV Pad Name MICHAEL RATCLIFFE-OHI-PAD1 Field/Pool Name PANHANDLE FIELD WET  
Farm name MICHAEL T. RATCLIFFE Well Number MICHAEL RATCLIFFE OHI 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 4,444,328.61 Easting 536,880.45  
Landing Point of Curve Northing 4,444,268.55 Easting 537,285.42  
Bottom Hole Northing 4,439,407.33 Easting 539,448.38

Elevation (ft) 1281.2' 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

Date permit issued 05/09/2018 Date drilling commenced 02/15/2019 Date drilling ceased 03/06/2019  
Date completion activities began 04/18/2019 Date completion activities ceased 07/10/2019  
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 402' Open mine(s) (Y/N) depths RECEIVED  
Salt water depth(s) ft 755' Void(s) encountered (Y/N) depths Office of Oil and Gas  
Coal depth(s) ft 611' Cavern(s) encountered (Y/N) depths SEP 13 2019  
Is coal being mined in area (Y/N) N

Reviewed

*C. Bl* 10-16-19

RECEIVED  
Office of Oil and Gas  
SEP 13 2019  
WV Department of  
Environmental Protection  
Reviewed by:  
8/16/19

API 47-069 - 00275 Farm name MICHAEL T. RATCLIFFE Well number MICHAEL RATCLIFFE OHI 8H

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	126'	NEW	J-55/94#		Y
Surface	17.5	13.375	686'	NEW	J-55/54.50#	504.8' / 464.5'	Y; 1 BBLS
Coal	SURFACE						
Intermediate 1	12.25	9.625	2,065'	NEW	J-55/36#		Y; 49 BBLS
Intermediate 2							
Intermediate 3							
Production	8.75/8.50	5.5	24,451'	NEW	P-110 CYHP/20#		Y
Tubing		2.875	6,869	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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	GROUT TO SURFACE				SURFACE	24
Surface	CLASS A	128	15.60	1.20	153.60	SURFACE	8
Coal	SURFACE						
Intermediate 1	CLASS A	799	15.60	1.18	942.82	SURFACE	8
Intermediate 2							
Intermediate 3							
Production	CLASS A	4,628	15.60	1.19	5,507.32	SURFACE	24
Tubing							

Drillers TD (ft) 24,451' Loggers TD (ft) 24,451'  
 Deepest formation penetrated MARCELLUS Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5,965'

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 \_\_\_\_\_

RECEIVED  
Office of Oil and Gas  
SEP 13 2019  
WV Department of  
Environmental Protection



API 47- 069 - 00275 Farm name MICHAEL T. RATCLIFFE Well number MICHAEL RATCLIFFE OHI 8H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>MARCELLUS</u>	<u>6,347'</u> TVD	<u>6,679'</u> MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 1290 psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs

OPEN FLOW Gas \_\_\_\_\_ mcfpd Oil \_\_\_\_\_ bpd NGL \_\_\_\_\_ bpd Water \_\_\_\_\_ bpd GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		
	SEE	ATTACHMENT	3		

Please insert additional pages as applicable.

Drilling Contractor SWN DRILLING COMPANY  
Address PO BOX 12359 City SPRING State TX Zip 77391-2359

Logging Company BAKER HUGHES  
Address 9110 GROGANS MILL RD City THE WOODLANDS State TX Zip 77380

Cementing Company SCHLUMBERGER WELL SERVICES  
Address 110 SCHLUMBERGER DRIVE City SUGAR LAND State TX Zip 77478

Stimulating Company HALLIBURTON ENERGY SERVICE  
Address 14851 MILNER ROAD, GATE 5A City HOUSTON State TX Zip 77032

Please insert additional pages as applicable.

Completed by DENISE GRANTHAM Telephone 832-796-6139 WV Department of  
Signature *Denise Grantham* Title REGULATORY TECHNICIAN Date 9/11/2019 Environmental Protection

RECEIVED  
Office of Oil and Gas  
SEP 13 2019

# SOUTHWESTERN ENERGY

Location: Ohio County, WV  
 Field: Ohio  
 Facility: Michael Ratcliffe OHI Pad Wellbore - Michael Ratcliffe OHI 8H PWB  
 Slot: Slot 8H  
 Well: Michael Ratcliffe OHI 8H  
 Grid System: NAD83 / UTM Zone 17 North, US feet  
 North Reference: Grid north  
 Scale: True distance  
 Measured depths are referenced to SDC 41 (RKB)  
 SDC 41 (RKB) to Mean Sea Level: 1306.3 feet  
 Mean Sea Level to Ground level (At Slot: Slot 8H): -1280.3 feet  
 Coordinates are in feet referenced to Slot



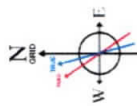
## Location Information

Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Michael Ratcliffe OHI Pad	1761519.275	14581031.088	40°08'53.876"N	80°33'59.872"W
Slot	Local N (ft)	Local E (ft)	Grid North (US ft)	Longitude
Slot 8H	70.37	-104.04	14581101.431	80°34'01.207"W
SDC 41 (RKB) to Ground level (At Slot: Slot 8H)			26ft	
Mean Sea Level to Ground level (At Slot: Slot 8H)			-1280.3ft	
SDC 41 (RKB) to Mean Sea Level			1306.3ft	

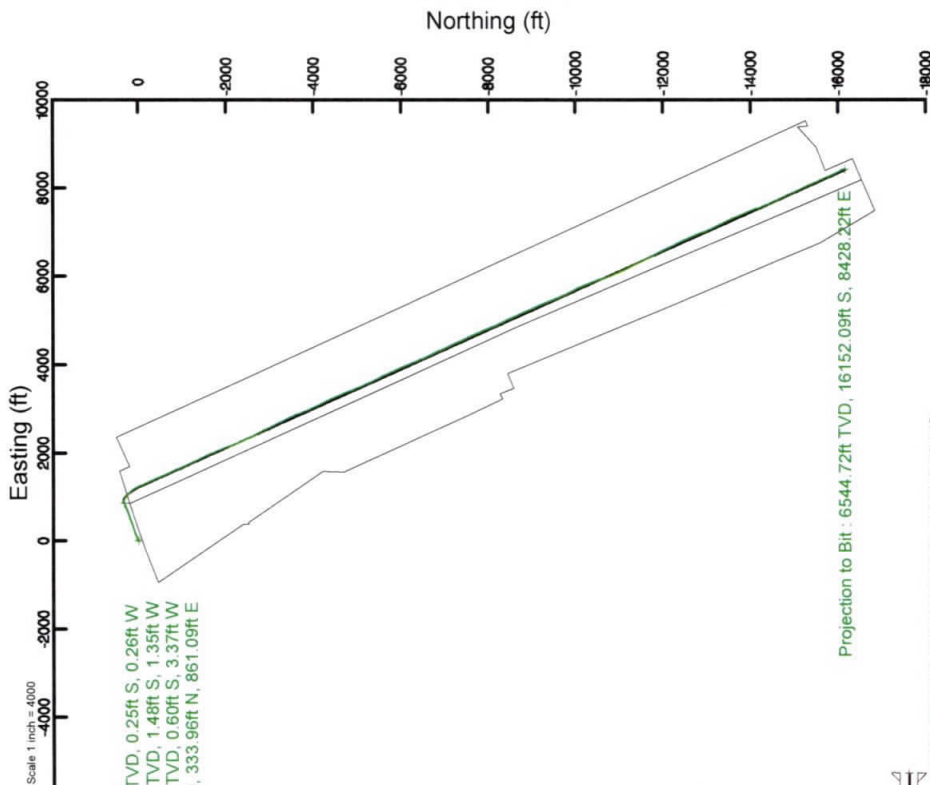
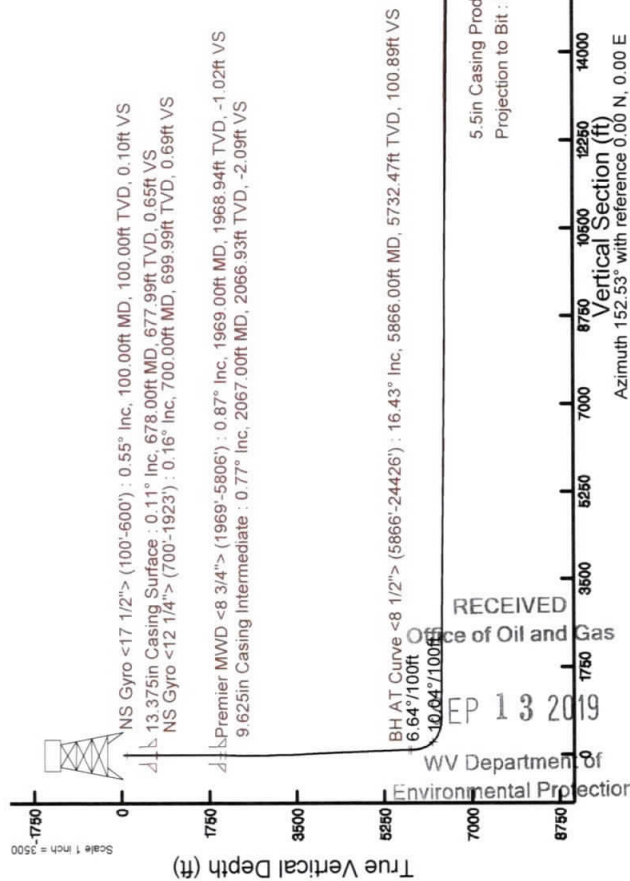
## Comments

API: 47-069-00275-0000  
 BH Job #: 109644964  
 Rig: SDC 41  
 Duration: 02/22/2019 - 03/03/2019

NS Gyro <17 1/2"> (100'-600') : 100.00ft TVD, 0.25ft S, 0.26ft W  
 NS Gyro <12 1/4"> (700'-1923') : 699.99ft TVD, 1.48ft S, 1.35ft W  
 Premier MWD <8 3/4"> (1969'-5806') : 1968.94ft TVD, 0.60ft S, 3.37ft W  
 BH AT Curve <8 1/2"> (5866'-24426') : 5732.47ft TVD, 333.96ft N, 861.09ft E



User specified Dip: 67.47°, Field: 52636 nT  
 Magnetic North is 8.28 degrees West of True North (at 16/Feb/2019)  
 To correct azimuth from True to Grid subtract 0.28 degrees  
 To correct azimuth from Magnetic to Grid subtract 8.56 degrees



RECEIVED  
 Office of Oil and Gas  
 SEP 13 2019  
 WV Department of  
 Environmental Protection

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/18/2019
Job End Date:	6/9/2019
State:	West Virginia
County:	Ohio
API Number:	47-069-02750-00-00
Operator Name:	Southwestern Energy
Well Name and Number:	Michael Ratcliffe OHI 8H
Latitude:	40.14840000
Longitude:	-80.56700000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,459
Total Base Water Volume (gal):	30,396,387
Total Base Non Water Volume:	0



## 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					
Produced Water	Halliburton	Base Fluid	Water	7732-18-5	100.00000	74.57839	Density = 8.34
			Water	7732-18-5	100.00000	12.13715	Density = 8.34

RECEIVED  
Office of Oil and Gas  
SEP 13 2019  
West Virginia Department of Environmental Protection

Ingredients	Listed Above	Listed Above	Listed Above							
				Water		7732-18-5	100.00000	0.03515		
Sand-Common White-100 Mesh, SSA-2	Halliburton	Proppant				Listed Below				
MC LD-2850	MultiChem	Friction Reducer				Listed Below				
Nalco SCAL 16486A	Nalco	Scale Inhibitor				Listed Below				
BE-9W	Halliburton	Biocide				Listed Below				
FSTI HCl	FSTI	Acid				Listed Below				
FSTI-CI-01	FSTI	Acid Corrosion Inhibitor				Listed Below				
Sand-Premium White-40/70	Halliburton	Proppant				Listed Below				
BE-9	Halliburton	Biocide				Listed Below				





			Ethoxylated fatty acid	Proprietary	5.00000	0.00111
			Fatty acid ester	Proprietary	5.00000	0.00111
			Citric acid	77-92-9	40.00000	0.00100
			Methanol	67-56-1	80.00000	0.00060
			Fatty acids	Trade Secret	10.00000	0.00007
			1,4-Dioxane	123-91-1	0.10000	0.00005
			Formaldehyde	50-00-0	0.10000	0.00005
			Diethanolamine	111-42-2	0.10000	0.00005
			Sodium glycollate	2836-32-0	0.10000	0.00005
			Nitrotriacetic acid, trisodium salt monohydrate	5064-31-3	0.10000	0.00005
			Ethylenediaminetetraacetic acid, tetrasodium salt	64-02-8	0.10000	0.00005
			Hydroquinone monomethyl ether	150-76-5	0.10000	0.00005

\* 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)

**MICHAEL RATCLIFFE OHI 8H  
ATTACHMENT 1  
PERF REPORT**

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
1	4/12/2019	24,408	24,309	36
2	4/18/2019	24,196	24,128	42
3	4/20/2019	24,094	24,027	42
4	4/20/2019	23,994	23,887	42
5	4/20/2019	23,854	23,747	42
6	4/21/2019	23,714	23,607	42
7	4/21/2019	23,574	23,467	42
8	4/21/2019	23,434	23,327	42
9	4/22/2019	23,294	23,187	42
10	4/22/2019	23,154	23,047	42
11	4/22/2019	23,014	22,907	42
12	4/23/2019	22,874	22,767	42
13	4/23/2019	22,734	22,627	42
14	4/23/2019	22,594	22,487	42
15	4/24/2019	22,454	22,347	42
16	4/25/2019	22,314	22,207	42
17	4/29/2019	22,174	22,067	42
18	4/30/2019	22,034	21,927	42
19	5/1/2019	21,894	21,787	42
20	5/1/2019	21,754	21,647	42
21	5/2/2019	21,614	21,507	42
22	5/3/2019	21,474	21,367	42
23	5/4/2019	21,334	21,227	42
24	5/5/2019	21,194	21,087	42
25	5/5/2019	21,054	20,947	42
26	5/5/2019	20,914	20,807	42
27	5/6/2019	20,774	20,667	42
28	5/9/2019	20,634	20,527	42
29	5/10/2019	20,494	20,387	42
30	5/11/2019	20,354	20,247	42
31	5/11/2019	20,210	20,107	42
32	5/12/2019	20,074	19,967	42
33	5/12/2019	19,934	19,827	42
34	5/13/2019	19,794	19,687	42
35	5/13/2019	19,654	19,547	42
36	5/13/2019	19,514	19,407	42
37	5/14/2019	19,374	19,267	42
38	5/14/2019	19,234	19,129	42
39	5/15/2019	19,094	18,987	42
40	5/15/2019	18,954	18,847	42
41	5/16/2019	18,814	18,707	42
42	5/16/2019	18,674	18,567	42
43	5/17/2019	18,534	18,427	42
44	5/17/2019	18,394	18,287	42
45	5/17/2019	18,254	18,147	42

RECEIVED  
Office of Oil and Gas  
SEP 1 2019  
WV Department of  
Environmental Protection

46	5/18/2019	18,114	18,007	42
47	5/18/2019	17,974	17,867	42
48	5/18/2019	17,834	17,727	42
49	5/19/2019	17,694	17,587	42
50	5/19/2019	17,554	17,447	42
51	5/19/2019	17,414	17,307	42
52	5/20/2019	17,274	17,167	42
53	5/20/2019	17,134	17,027	42
54	5/21/2019	16,994	16,887	42
55	5/21/2019	16,854	16,747	42
56	5/21/2019	16,714	16,607	42
57	5/22/2019	16,574	16,467	42
58	5/22/2019	16,434	16,327	42
59	5/22/2019	16,294	16,187	42
60	5/22/2019	16,154	16,047	42
61	5/22/2019	16,014	15,907	42
62	5/22/2019	15,874	15,767	42
63	5/23/2019	15,734	15,627	42
64	5/23/2019	15,594	15,487	42
65	5/23/2019	15,454	15,347	42
66	5/23/2019	15,314	15,207	42
67	5/23/2019	15,174	15,067	42
68	5/24/2019	15,034	14,927	42
69	5/24/2019	14,894	14,787	42
70	5/24/2019	14,754	14,647	42
71	5/24/2019	14,614	14,507	42
72	5/24/2019	14,474	14,367	42
73	5/25/2019	14,334	14,227	42
74	5/25/2019	14,194	14,087	42
75	5/25/2019	14,054	13,947	42
76	5/25/2019	13,914	13,807	42
77	5/26/2019	13,774	13,667	42
78	5/26/2019	13,634	13,527	42
79	5/26/2019	13,494	13,387	42
80	5/26/2019	13,354	13,247	42
81	5/26/2019	13,214	13,107	42
82	5/27/2019	13,074	12,967	42
83	5/27/2019	12,934	12,827	42
84	5/27/2019	12,794	12,687	42
85	5/28/2019	12,654	12,547	42
86	5/28/2019	12,514	12,407	42
87	5/29/2019	12,374	12,267	42
88	5/29/2019	12,234	12,127	42
89	5/29/2019	12,094	11,987	42
90	5/30/2019	11,954	11,847	42
91	5/30/2019	11,814	11,707	42
92	5/30/2019	11,674	11,567	42
93	5/31/2019	11,534	11,427	42
94	5/31/2019	11,394	11,287	42

RECEIVED  
Office of Oil and Gas

SEP 13 2019

WV Department of  
Environmental Protection

95	5/31/2019	11,254	11,147	42
96	5/31/2019	11,114	11,007	42
97	6/1/2019	10,974	10,867	42
98	6/2/2019	10,834	10,727	42
99	6/2/2019	10,694	10,587	42
100	6/2/2019	10,554	10,447	42
101	6/3/2019	10,414	10,307	42
102	6/3/2019	10,274	10,167	42
103	6/3/2019	10,134	10,027	42
104	6/3/2019	9,994	9,887	42
105	6/3/2019	9,854	9,747	42
106	6/4/2019	9,714	9,607	42
107	6/4/2019	9,574	9,467	42
108	6/4/2019	9,434	9,327	42
109	6/4/2019	9,294	9,187	42
110	6/5/2019	9,154	9,047	42
111	6/5/2019	9,017	8,907	42
112	6/5/2019	8,874	8,767	42
113	6/5/2019	8,734	8,627	42
114	6/6/2019	8,594	8,487	42
115	6/6/2019	8,454	8,347	42
116	6/6/2019	8,314	8,207	42
117	6/6/2019	8,174	8,067	42
118	6/7/2019	8,034	7,927	42
119	6/7/2019	7,894	7,787	42
120	6/7/2019	7,754	7,647	42
121	6/7/2019	7,614	7,507	42
122	6/8/2019	7,474	7,367	42
123	6/8/2019	7,334	7,227	42
124	6/8/2019	7,194	7,087	42
125	6/8/2019	7,054	6,947	42
126	6/8/2019	6,914	6,807	42
127	6/9/2019	6,774	6,667	42

RECEIVED  
Office of Oil and Gas

SEP 13 2019  
WV Department of  
Environmental Protection

## MICHAEL RATCLIFFE OHI 8H

## ATTACHMENT 2

## STIM REPORT

STAGE NUM	Stim 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
1	4/18/2019	69.2	8,090	8,182	3,748	280,163	8,852	0
2	4/19/2019	77.6	8,121	5,078	4,098	281,126	9,902	0
3	4/20/2019	78.8	8,183	5,698	3,962	278,200	9,686	0
4	4/20/2019	83.5	8,192	5,888	4,353	278,690	10,093	0
5	4/21/2019	86.7	8,402	5,577	4,565	278,778	8,955	0
6	4/21/2019	84.2	8,042	5,615	4,606	281,580	9,091	0
7	4/21/2019	83	8,143	5,490	4,595	279,750	9,088	0
8	4/21/2019	85.1	8,229	5,242	4,881	280,037	8,881	0
9	4/21/2019	71.3	8,284	5,474	4,654	278,670	8,867	0
10	4/22/2019	78.2	8,031	6,248	4,714	281,190	8,819	0
11	4/23/2019	77.9	8,143	8,450	4,873	279,429	8,808	0
12	4/23/2019	72	8,108	5,445	4,774	279,490	9,001	0
13	4/23/2019	83.8	8,299	6,126	4,742	279,980	8,898	0
14	4/23/2019	81.4	8,288	6,098	4,972	280,327	8,875	0
15	4/25/2019	88.5	8,509	6,189	4,931	280,011	8,847	0
16	4/25/2019	78.2	8,311	7,178	4,504	280,330	9,113	0
17	4/29/2019	96.5	8,357	5,605	4,711	279,810	8,969	0
18	4/30/2019	95.5	8,450	6,202	4,853	280,050	9,134	0
19	5/1/2019	92.2	8,361	6,855	4,648	280,280	9,247	0
20	5/1/2019	91.9	9,511	6,529	3,764	280,100	9,289	0
21	5/2/2019	96.8	8,679	5,969	4,912	280,060	8,625	0
22	5/4/2019	93	8,599	6,581	5,521	281,380	8,814	0
23	5/4/2019	96.9	8,456	5,748	5,444	280,650	8,859	0
24	5/5/2019	83.4	8,201	6,292	4,598	280,380	8,495	0
25	5/5/2019	91.2	8,307	5,838	4,999	280,051	9,075	0
26	5/5/2019	85.3	8,668	6,117	4,799	280,340	8,412	0
27	5/9/2019	91.3	8,591	6,294	4,357	280,484	8,466	0
28	5/10/2019	84.6	8,212	6,138	4,539	281,108	9,572	0
29	5/11/2019	89.7	8,525	5,761	4,913	279,910	8,661	0
30	5/11/2019	87.4	8,145	6,053	4,746	281,319	8,534	0
31	5/10/2019	92.1	8,472	6,187	4,626	280,940	6,434	0
32	5/12/2019	84	8,174	5,946	4,698	280,741	6,171	0
33	5/12/2019	90.4	9,498	5,902	4,565	279,370	6,200	0
34	5/13/2019	77.6	8,256	6,167	4,500	280,070	6,210	0
35	5/13/2019	90.8	8,484	6,327	4,933	279,500	6,166	0
36	5/14/2019	85.5	8,350	6,045	4,864	281,450	6,173	0
37	5/14/2019	83.8	8,389	6,238	4,372	280,051	6,201	0
38	5/15/2019	94.8	8,624	4,411	4,873	280,090	6,354	0
39	5/15/2019	82.3	8,150	6,266	4,875	279,711	6,130	0
40	5/16/2019	86	8,411	5,919	4,773	278,420	6,578	0
41	5/16/2019	84.2	8,171	5,739	4,795	280,850	6,093	0
42	5/16/2019	89.7	8,388	5,746	4,418	280,630	6,137	0
43	5/17/2019	91.6	7,904	5,578	4,837	279,395	6,031	0
44	5/17/2019	98.9	8,371	6,435	4,337	280,854	5,908	0
45	5/18/2019	99.1	8,463	5,724	4,430	280,030	6,093	0
46	5/18/2019	85	8,153	5,876	4,552	279,030	5,987	0
47	5/18/2019	90.6	8,230	5,686	4,712	280,802	5,825	0
48	5/18/2019	97.1	8,493	5,839	4,640	279,980	5,931	0
49	5/19/2019	98.8	8,411	6,289	4,438	279,660	6,037	0
50	5/19/2019	89.4	8,361	5,792	4,625	279,991	5,749	0
51	5/19/2019	99.7	8,393	5,754	4,277	280,690	5,889	0
52	5/20/2019	100.2	8,293	7,460	4,328	281,240	5,878	0
53	5/20/2019	82.4	8,284	5,603	4,409	278,748	5,719	0
54	5/21/2019	95.8	8,241	5,350	4,398	279,863	5,666	0
55	5/21/2019	98.8	8,316	5,383	4,206	279,305	6,306	0
56	5/21/2019	95.5	8,384	5,574	4,413	279,690	5,285	0
57	5/22/2019	98.5	8,229	5,617	4,529	280,020	5,243	0
58	5/22/2019	99.6	8,162	5,584	4,468	278,940	5,424	0
59	5/22/2019	98.6	8,262	5,987	4,432	280,350	5,462	0

RECEIVED  
Office of Oil and Gas

SEP 13 2019

WV Department of  
Environmental Protection

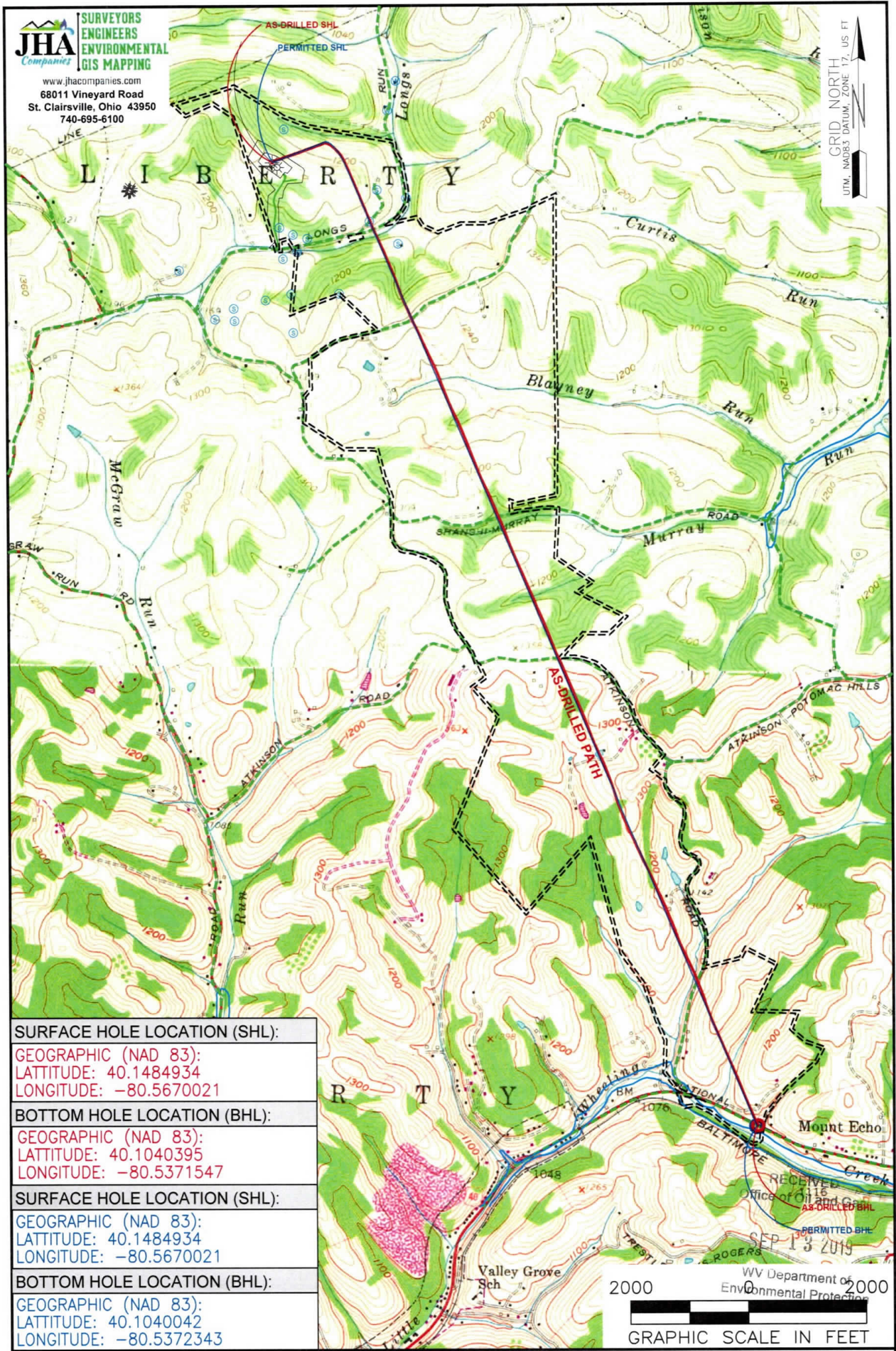
60	5/22/2019	89.1	8,143	5,758	4,402	280,450	5,310	0
61	5/22/2019	99.2	8,196	5,422	4,719	280,540	4,517	0
62	5/22/2019	97.1	8,266	5,673	4,499	280,070	4,387	0
63	5/23/2019	97	8,296	5,605	4,655	280,050	4,335	0
64	5/23/2019	98.3	8,256	5,652	4,581	280,761	4,381	0
65	5/23/2019	96.4	8,262	5,744	4,363	282,014	4,445	0
66	5/23/2019	99	8,350	5,627	4,309	279,980	4,302	0
67	5/24/2019	95.4	8,265	5,840	4,661	282,314	4,425	0
68	5/24/2019	95.5	8,315	5,675	4,338	280,846	4,543	0
69	5/24/2019	93.7	8,137	5,518	4,468	283,657	4,534	0
70	5/24/2019	97.3	8,275	5,754	4,969	280,030	4,291	0
71	5/24/2019	97.1	8,299	5,812	4,364	280,450	4,267	0
72	5/25/2019	98.9	8,226	5,323	4,425	280,690	4,242	0
73	5/25/2019	99.3	8,215	5,760	4,312	280,570	4,262	0
74	5/25/2019	88.6	7,887	5,909	4,199	282,556	4,379	0
75	5/25/2019	98.8	8,182	5,898	3,969	284,602	5,049	0
76	5/25/2019	99.6	8,094	6,077	4,633	280,250	4,627	0
77	5/26/2019	100.2	8,125	5,978	4,555	279,230	4,222	0
78	5/26/2019	100.2	8,181	6,018	4,533	280,320	4,259	0
79	5/26/2019	99.1	7,968	5,896	4,725	280,965	4,275	0
80	5/26/2019	99.1	8,056	6,245	4,669	283,966	4,331	0
81	5/26/2019	100.2	7,903	5,866	4,454	280,710	4,195	0
82	5/27/2019	99.5	8,196	6,180	4,891	280,587	4,284	0
83	5/27/2019	99.3	7,518	5,663	4,734	282,965	4,287	0
84	5/27/2019	99.8	7,907	6,086	4,664	280,140	4,216	0
85	5/28/2019	99.8	8,169	6,220	4,543	280,687	4,269	0
86	5/28/2019	94.6	7,767	5,564	4,565	280,000	4,274	0
87	5/29/2019	95.1	7,889	5,923	4,545	279,466	4,280	0
88	5/29/2019	100	7,985	5,943	4,578	281,270	4,271	0
89	5/29/2019	94.7	7,900	5,616	4,823	280,627	4,140	0
90	5/30/2019	94.6	7,955	6,215	4,939	280,010	4,237	0
91	5/30/2019	98.7	7,815	5,732	4,553	274,340	4,248	0
92	5/31/2019	93.4	8,029	5,826	4,462	284,874	4,272	0
93	5/31/2019	100.3	7,686	5,756	4,746	279,208	4,176	0
94	5/31/2019	99.6	7,835	5,862	4,835	280,680	4,139	0
95	5/31/2019	100.5	7,717	5,792	4,788	282,775	4,098	0
96	6/1/2019	99	7,947	5,917	4,688	280,947	4,227	0
97	6/2/2019	100.4	7,741	6,164	4,484	281,146	4,166	0
98	6/2/2019	100.4	7,534	6,105	4,747	280,020	4,102	0
99	6/2/2019	99.7	7,387	6,003	4,712	280,645	4,258	0
100	6/3/2019	94.8	8,082	6,116	3,948	280,015	4,287	0
101	6/3/2019	100.1	7,726	5,807	4,758	279,159	4,109	0
102	6/3/2019	98.2	7,530	6,052	4,385	281,170	4,035	0
103	6/3/2019	99.5	7,543	6,214	4,768	280,770	4,175	0
104	6/3/2019	100.3	7,230	6,064	4,473	280,026	4,129	0
105	6/4/2019	94.2	7,769	6,295	4,450	279,929	4,069	0
106	6/4/2019	100.2	7,482	6,194	4,520	280,500	4,145	0
107	6/4/2019	100.5	7,701	6,016	4,607	280,110	4,190	0
108	6/4/2019	99.05	7,301	5,936	4,669	279,769	4,072	0
109	6/5/2019	94.7	7,676	6,336	4,765	280,912	4,051	0
110	6/5/2019	100.4	7,299	7,011	4,497	279,720	4,035	0
111	6/5/2019	100.4	7,334	6,077	4,603	279,440	4,070	0
112	6/5/2019	100.2	7,327	6,286	4,644	278,680	4,065	0
113	6/5/2019	100.4	7,396	5,977	4,697	280,269	4,025	0
114	6/6/2019	100.3	7,429	6,030	4,647	280,089	4,032	0
115	6/6/2019	100.4	7,149	5,959	4,275	279,330	4,072	0
116	6/6/2019	100.3	7,026	5,886	4,199	280,060	4,141	0
117	6/7/2019	100.2	6,818	5,764	4,208	280,637	4,171	0
118	6/7/2019	99.9	6,996	5,948	4,269	394,240	3,963	0
119	6/7/2019	99.9	6,703	6,054	4,242	280,780	4,392	0
120	6/7/2019	99.5	6,951	5,642	4,568	280,820	4,393	0
121	6/7/2019	98.6	6,739	5,736	4,497	279,278	4,071	0
122	6/8/2019	98.4	6,600	5,565	4,838	281,044	4,098	0
123	6/8/2019	97.8	7,003	5,260	4,378	280,300	4,184	0

Department of  
Environmental Protection

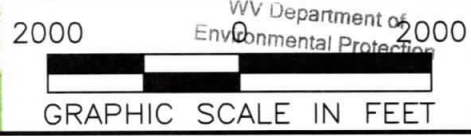
124	6/8/2019	97.4	6,999	5,647	4,454	280,930	4,186	0
125	6/8/2019	100.1	6,561	5,454	4,125	280,850	3,916	0
126	6/8/2019	98.3	6,570	5,563	4,726	280,274	3,894	0
127	6/9/2019	100.1	6,496	5,668	4,227	280,000	3,889	0

RECEIVED  
Office of Oil and Gas

SEP 13 2019  
WV Department of  
Environmental Protection



<b>SURFACE HOLE LOCATION (SHL):</b>
<b>GEOGRAPHIC (NAD 83):</b> LATITUDE: 40.1484934 LONGITUDE: -80.5670021
<b>BOTTOM HOLE LOCATION (BHL):</b>
<b>GEOGRAPHIC (NAD 83):</b> LATITUDE: 40.1040395 LONGITUDE: -80.5371547
<b>SURFACE HOLE LOCATION (SHL):</b>
<b>GEOGRAPHIC (NAD 83):</b> LATITUDE: 40.1484934 LONGITUDE: -80.5670021
<b>BOTTOM HOLE LOCATION (BHL):</b>
<b>GEOGRAPHIC (NAD 83):</b> LATITUDE: 40.1040042 LONGITUDE: -80.5372343



**NOTES ON SURVEY**  
 1. 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.  
 2. THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARCELS SHOWN HEREON.  
 3. ALL INSETS ARE GRID NORTH UNLESS OTHERWISE DEPICTED.

**LEGEND:**

●	EXISTING BOTTOM HOLE	—	ACCESS ROAD
☼	EXISTING / PRODUCING WELLHEAD	- - -	PUBLIC ROAD
LPL*	EXISTING LANDING POINT LOCATION	⬭	FLOOD PLAIN
●	PROPOSED SURFACE HOLE / BOTTOM HOLE	—	LEASE BOUNDARY
LPL*	PROPOSED LANDING POINT LOCATION	—	AS-DRILLED PATH
		—	PROPOSED PATH

<b>WELL OPERATOR:</b> SWN PRODUCTION COMPANY, LLC	<b>WELL (FARM) NAME:</b> MICHAEL RATCLIFFE OHI	<b>WELL #</b> 8H	<b>SERIAL #</b> XXXX
<b>ADDRESS:</b> P.O. BOX 1300 JANE LEW, WV 26378	<b>COUNTY - CODE</b> OHIO - 069	<b>DISTRICT;</b> LIBERTY	
<b>SURFACE OWNER:</b> MICHAEL T. RATCLIFFE	<b>USGS 7 1/2 QUADRANGLE MAP NAME</b> BETHANY & VALLEY GROVE, WV		



**JHA**  
SURVEYORS  
ENGINEERS  
ENVIRONMENTAL  
GIS MAPPING  
Companies

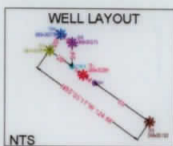
www.jhacompanies.com  
68011 Vineyard Road  
St. Clairsville, Ohio 43950  
740-695-6100

NOTES ON SURVEY

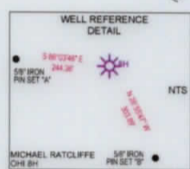
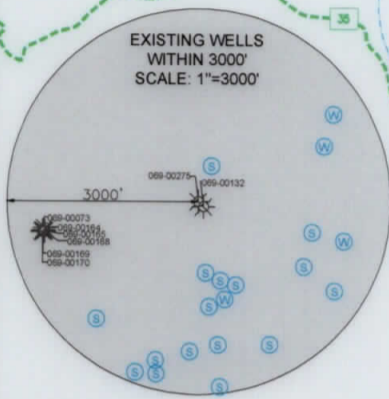
1. COORDINATE SYSTEM IS UTM NAD 83 DATUM, ZONE 17, U.S. FOOT AND WELL COORDINATES ESTABLISHED USING SURVEY GRADE GPS.
2. SURFACE AND ROYALTY OWNER INFORMATION AND THEIR BOUNDARIES SHOWN HEREON WERE PLOTTED FROM DEEDS AND/OR TAX PARCEL MAPS PROVIDED BY CLIENT AND/OR FIELD LOCATIONS.
3. THIS PLAT DOES 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

LINE	BEARING	DISTANCE
L1	N62°54'55"W	868.67'
L2	N02°52'46"W	1458.71'



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



<b>SURFACE HOLE LOCATION (SHL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4444328.61 EASTING: 536880.45
<b>LANDING POINT (LPL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4444268.55 EASTING: 537285.42
<b>BOTTOM HOLE LOCATION (BHL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4439407.33 EASTING: 539448.38
<b>SURFACE HOLE LOCATION (SHL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4444328.61 EASTING: 536880.45
<b>LANDING POINT (LPL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4444298.18 EASTING: 537267.40
<b>BOTTOM HOLE LOCATION (BHL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4439403.38 EASTING: 539441.62



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

COMPANY:  
**SWN** Production Company, LLC

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

MICHAEL RATCLIFFE  
OPERATOR'S WELL #: OHI 8H

API WELL #:

47	069	275
STATE	COUNTY	PERMIT

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

WATERSHED: OHIO UPPER SOUTH ELEVATION: 1,281.2'

DISTRICT: LIBERTY COUNTY: OHIO QUADRANGLE: BETHANY & VALLEY GROVE, WV

SURFACE OWNER: MICHAEL T. RATCLIFFE ACREAGE: ±55.835

OIL & GAS ROYALTY OWNER: MICHAEL T. RATCLIFFE ACREAGE: ±55.835

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: 6544' TVD 24,451' 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:
● EXISTING BOTTOM HOLE		09-06-2019
⊙ EXISTING SPRING		
⊙ EXISTING / PRODUCING WELLHEAD		
LPL* EXISTING LANDING POINT LOCATION		
● PROPOSED SURFACE HOLE / BOTTOM HOLE		
LPL* PROPOSED LANDING POINT LOCATION		
⊙ EXISTING WATER WELL		
⊙ EXISTING SPRING		
— SURVEYED BOUNDARY		
— LEASE BOUNDARY		
— ASDRILLED PATH		
— PROPOSED PATH		

WELL BORE TABLE FOR SURFACE / ROYALTY OWNERS		
TRACT	SURFACE OWNER (S) / ROYALTY OWNER (R)	TAX PARCEL
1	MICHAEL T. RATCLIFFE (S/R)	03-L5-12.4
TRACT	SURFACE OWNER	TAX PARCEL
2	TRAVIS C. RATCLIFFE	03-L5-12
3	TRAVIS CHRISTOPHER RATCLIFFE (L/E)	03-L5-12.1
4	DONALD D. PRINCE	03-L5-24
5	SUSAN LOUISE SMITH	03-L5-27
6	SUSAN NORTHWOOD SMITH & RICHARD ALAN SMITH	03-L5-23.1
7	DALE R. & JACKIE A. RITCHEA	03-L5-23.2
8	WALTER W., JR. & MONA DEE KNOLLINGER	03-L5-23.4
9	DONALD L. & DEBORAH JO WADDELL	03-L5-23.6
10	DONALD L. & DEBORAH JO WADDELL	03-L5-23
11	BERNARD T. & MARJORIE A. RAAB	03-L8-7
12	ROBERT C. JONES	03-L8-11
13	DAVID E. DAVIS, JR.	03-L8-35
14	HOWARD WINTERS	03-L8-36
15	HOWARD WINTERS	03-L11-28.1
16	MARTHA E. CREIGHTON	03-L11-29
17	MILDRED J. MAZGAJ	03-L11-62

ADJOINING OWNERS TABLE		
TRACT	SURFACE OWNER	TAX PARCEL
A	JOSEPH P. & SHIRLEY J. TAGGART	03-L5-3
B	DONALD F. & J.L. DOLENCE	03-L5-11
C	JOSEPH G. PRINCE & DONALD D. PRINCE	03-L5-11.2
D	HELEN L. & JOHN I., JR. TOMINACK	03-L5-10
E	LYNN MCELVANY	03-L5-26
F	GLENN A. DILLE	03-L8-9.7
G	NEAL P. BROWN	03-L8-9.6
H	PETER, JR. & D.J. COTTAGE, THE COTTAGE FAMILY REV TRUST)	03-L8-8
I	DONALD L. & DEBORAH JO WADDELL	03-L8-39
J	SCOTT A. & JILL L. DILLE	03-L8-9.3
K	GEORGE E., III & M.A. PORTER	03-L8-9.5
L	ROBERT F. & N.C. REASS	03-L9-1
M	JODY LEE SHILLING	03-L8-10
N	RANDY J. CREIGHTON	03-L8-11.2
O	PAUL A. MAIN	03-L8-10.1
P	RICHARD C. & K.J. WHEAT	03-L8-10.2
Q	LARRY G. BALL	03-L8-42
R	SUSAN J.H. HARDMAN	03-L8-37
S	BERNARD T. & PATRICIA ADAMS	03-L8-37.1
T	TIMMY B. & AMY LYNN MINCH	03-L9-12
U	WILLIAM I. RODGERS & DOUGLAS W. RODGERS	03-L12-1
V	CATHY J. & JERRY W. CALDWELL	03-L12-6
W	JERRY & CATHY CALDWELL	03-L11-69
X	LARRY MICHAEL PATRICK	03-L11-68
Y	MARION S. & MILDRED J. MAZGAJ	03-L11-67
Z	TUNNEL RIDGE, LLC	03-L12-32
AA	SHARON & WARREN GRIFFITH	03-L11-60.1
AB	JOHN A. NOLAN, JR.	03-L11-61
AC	JOHN A. NOLAN, JR.	03-L11-63
AD	WINTERS FAMILY FARM, LLC	03-L11-28
AE	EDWARD G. GROUX, JR. & JEFFREY L. GROUX	03-L11-27
AF	EDWARD G. & LYDIA GROUX (LIFE ESTATE), EDWARD G. GROUX, JR.	03-L11-26
AG	EDWARD G. & LYDIA GROUX (LIFE ESTATE), EDWARD G. GROUX, JR.	03-L11-26.6
AH	ROBERT C. JONES	03-L8-11.1
AI	ROBERT A. SHILLING, SR.	03-L8-33.9
AJ	JOSEPH T. KLUG	03-L8-34.1
AK	ROBERT A. SHILLING, SR.	03-L8-33
AL	THOMAS P. & TERESA HUDRLIK	03-L8-12.12
AM	BILL RAILING	03-L8-12.8
AN	VICKI L. & DANIEL P. TUSTIN	03-L8-12.6
AO	DANIEL P. TUSTIN, JR.	03-L8-12.9
AP	DANIEL PAUL TUSTIN, JR.	03-L8-12.11
AQ	RICHARD R. & L.L. BLOOMFIELD	03-L8-12.10
AR	BARNETT E. & LAURIE L. BECK	03-L8-12.5
AS	KATHY J. HUNTER	03-L8-6
AT	A.R. & Z.I. NIXON	03-L8-5
AU	JENNIFER G. BURROWS	03-L8-4.1
AV	DAVID PAUL & DAWN M. DOYLE	03-L8-4
AW	RICHARD C. LINK (LIFE ESTATE: ROBERT W., JR. & D.M. LINK)	03-L5-22.6
AX	DAVID A. WADDELL	03-L5-23.5
AY	EDWARD & ELIZABETH LINK	03-L5-23.7
AZ	JASON & RACHEL MILLER	03-L5-23.3
BA	EDWARD R. & ELIZABETH A. LINK	03-L5-22
BB	MICHAEL T. RATCLIFFE	03-L5-12.3
BC	CASEY P. & DEVAN M. YOUNG	03-L5-13
BD	MARK & ANNELIESE KAUFMAN	03-L5-1.1

REVISIONS:

COMPANY:

**SWN**  
Production Company, LLC

**SWN** <sup>R+</sup> <sup>V+</sup> <sup>0</sup>  
Production Company™

OPERATOR'S MICHAEL RATCLIFFE  
WELL #: OHI 8H

DATE: 09-06-2019

DISTRICT:  
LIBERTY

COUNTY:  
OHIO

STATE:  
WV

DRAWN BY: D. REED  
SCALE: N/A  
DRAWING NO: 2017-637  
WELL LOCATION PLAT