

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

API 47-009-00186 County BROOKE District BUFFALO
Quad BETHANY Pad Name THURMAN SPEECE Field/Pool Name PANHANDLE FIELD WET
Farm name THURMAN SPEECE, JR. & GOLDIE N. STANLEY Well Number THURMAN SPEECE BRK 205H
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 4,448,885.599 Easting 534,895.273
Landing Point of Curve Northing 4,449,535.361 Easting 535,234.561
Bottom Hole Northing 4,452,164.205 Easting 534,126.623

Elevation (ft) 1139.5 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 2/22/2017 Date drilling commenced 7/26/2017 Date drilling ceased 10/23/2017
Date completion activities began 2/10/2018 Date completion activities ceased 4/14/2018
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 264 Open mine(s) (Y/N) depths _____
Salt water depth(s) ft 475 Void(s) encountered (Y/N) depths N
Coal depth(s) ft 320 Cavern(s) encountered (Y/N) depths N

Is coal being mined in area (Y/N) N

Reviewed

Reviewed by:
C. Phil 4-3-19

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API 47-009 - 00186 Farm name THURMAN SPEECE, JR. & GOLDIE N. STANLEY Well number THURMAN SPEECE BRK 205H

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	411	NEW	J-55/54.50#		Y, 25 bbls
Coal	SEE SURFACE						
Intermediate 1	12.25	9.625	1715	NEW	J-55/36#		Y, 34 bbls
Intermediate 2							
Intermediate 3							
Production	8.75/8.50	5.5	16460	NEW	HCP-110/20#		Y
Tubing		2.375	6785	NEW	P-110/4.7#		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	374	15.60	1.20	448.8	SURFACE	8
Coal	SEE SURFACE						
Intermediate 1	CLASS A	660	15.60	1.18	778.8	SURFACE	8
Intermediate 2							
Intermediate 3							
Production	CLASS A	3074	15.60	1.19	3658.06	SURFACE	24
Tubing							

Drillers TD (ft) 16460 Loggers TD (ft) 16460

Deepest formation penetrated MARCELLUS Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 5502

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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PRODUCING FORMATION(S)	DEPTHS		
MARCELLUS	5,944	TVD	6,739 MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1348 psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW Gas 1424 mcfpd Oil 659 bpd NGL _____ bpd Water 766 bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	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 WEATHERFORD
Address 2000 St. James Place City Houston State TX Zip 77056

Cementing Company SCHLUMBERGER WELL SERVICES
Address 1080 US Hwy 33 East City Weston State WV Zip 26452

Stimulating Company US WELL SERVICES
Address 533 Industrial Park Dr. City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

Completed by BOBBY WILLIS Telephone 832-796-2884
Signature  Title REGULATORY ANALYST Date 5/22/2018

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

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**THURMAN SPEECE 205H
ATTACHMENT 1
PERF REPORT**

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
1	1/22/2018	16,343	16,271	33
2	2/11/2018	16,238	16,166	33
3	2/11/2018	16,133	16,061	33
4	2/13/2018	16,030	15,956	33
5	2/13/2018	15,923	15,851	33
6	2/14/2018	15,818	15,746	33
7	2/14/2018	15,713	15,641	33
8	2/14/2018	15,604	15,536	33
9	2/16/2018	15,503	15,431	33
10	2/16/2018	15,398	15,326	33
11	2/16/2018	15,293	15,221	33
12	2/16/2018	15,188	15,116	33
13	2/17/2018	15,083	14,999	66
14	2/19/2018	14,971	14,906	33
15	2/20/2018	14,873	14,801	33
16	2/20/2018	14,765	14,693	33
17	2/21/2018	14,663	14,591	33
18	2/21/2018	14,558	14,481	33
19	2/21/2018	14,454	14,381	33
20	2/22/2018	14,348	14,276	33
21	2/22/2018	14,246	14,171	33
22	2/23/2018	14,138	14,066	33
23	2/24/2018	14,038	13,961	33
24	2/24/2018	13,928	13,856	33
25	2/25/2018	13,820	13,751	33
26	2/25/2018	13,718	13,646	33
27	2/25/2018	13,613	13,545	33
28	2/26/2018	13,508	13,436	33
29	2/27/2018	13,403	13,331	33
30	3/1/2018	13,298	13,226	33
31	3/1/2018	13,193	13,121	33
32	3/20/2018	13,088	13,016	33
33	3/20/2018	12,982	12,911	33
34	3/20/2018	12,878	12,806	33
35	3/20/2018	12,773	12,703	33
36	3/21/2018	12,668	12,596	33
37	3/21/2018	12,563	12,491	33
38	3/21/2018	12,458	12,386	33
39	3/21/2018	12,353	12,281	33
40	3/22/2018	12,248	12,176	33
41	3/22/2018	12,143	12,071	33
42	3/22/2018	12,038	11,966	33
43	3/22/2018	11,933	11,861	33

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**THURMAN SPEECE 205H
ATTACHMENT 1
PERF REPORT**

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
44	3/22/2018	11,828	11,756	33
45	3/24/2018	11,723	11,651	33
46	3/25/2018	11,618	11,546	33
47	3/26/2018	11,513	11,440	33
48	3/27/2018	11,408	11,336	33
49	3/27/2018	11,303	11,231	33
50	3/27/2018	11,198	11,126	33
51	3/27/2018	11,093	11,021	33
52	3/28/2018	10,988	10,916	33
53	3/28/2018	10,883	10,811	33
54	3/29/2018	10,778	10,706	33
55	3/29/2018	10,673	10,601	33
56	3/29/2018	10,568	10,496	33
57	3/29/2018	10,463	10,391	33
58	3/29/2018	10,358	10,286	33
59	3/30/2018	10,253	10,181	33
60	3/30/2018	10,148	10,076	33
61	3/30/2018	10,043	9,971	33
62	3/30/2018	9,938	9,866	33
63	3/31/2018	9,833	9,761	33
64	3/31/2018	9,728	9,656	33
65	3/31/2018	9,623	9,551	33

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THURMAN SPEECE 205H

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/other
1	2/10/2018	83	8,421	5,386	3,892	312,380	9,509	
2	2/11/2018	83	8,308	6,028	4,096	373,700	6,259	
3	2/12/2018	84	8,174	4,003	4,333	174,780	10,363	
4	2/13/2018	88	8,102	5,420	4,015	375,450	6,823	
5	2/13/2018	85	8,071	5,325	4,539	374,200	6,049	
6	2/14/2018	81	8,179	5,360	4,169	374,020	6,186	
7	2/14/2018	78	8,161	5,468	4,220	375,650	8,713	
8	2/14/2018	85	7,811	4,901	4,655	373,940	6,175	
9	2/16/2018	86	7,816	5,045	4,486	373,860	6,305	
10	2/16/2018	83	8,246	5,912	4,318	375,200	6,496	
11	2/16/2018	68	8,147	5,756	4,197	375,120	7,959	
12	2/17/2018	82	8,020	5,081	4,275	376,860	6,231	
13	2/19/2018	84	8,045	5,912	4,741	374,950	10,655	
14	2/19/2018	88	7,748	5,421	4,602	378,200	6,374	
15	2/20/2018	88	7,792	5,539	4,578	377,130	6,092	
16	2/20/2018	88	7,394	4,943	4,569	377,440	6,102	
17	2/21/2018	89	7,864	5,380	4,376	378,160	6,072	
18	2/21/2018	89	7,145	4,379	4,364	378,100	5,982	
19	2/22/2018	88	7,670	5,671	4,480	374,760	6,224	
20	2/22/2018	89	7,498	4,130	4,345	376,820	6,091	
21	2/23/2018	82	6,928	5,337	4,462	377,120	6,080	
22	2/24/2018	86	8,072	5,672	4,385	378,180	5,989	
23	2/24/2018	84	7,923	5,299	4,482	374,890	5,955	
24	2/25/2018	87	8,005	5,424	4,521	373,700	6,039	
25	2/25/2018	88	7,950	5,581	4,741	374,370	5,976	
26	2/25/2018	86	7,976	5,416	4,261	375,380	5,975	
27	2/26/2018	88	7,403	5,095	4,195	377,000	6,112	
28	2/27/2018	86	7,969	5,287	4,438	375,330	6,112	
29	2/28/2018	79	8,059	5,323	4,432	374,325	5,996	
30	3/1/2018	84.8	8,117	5,630	4,400	374,010	5,970	
31	3/2/2018	82.7	7,806	5,658	4,284	375,025	5,883	
32	3/20/2018	88	7,779	5,346	4,522	376,140	5,641	
33	3/20/2018	88.5	7,619	5,552	5,143	374,690	5,362	
34	3/20/2018	86	7,675	5,795	4,544	375,115	5,634	
35	3/20/2018	87.5	7,721	5,334	4,731	375,190	5,653	
36	3/21/2018	88.7	7,571	5,831	4,545	374,850	5,655	
37	3/21/2018	85.5	8,380	6,013	4,560	375,175	5,599	
38	3/21/2018	88.5	7,694	5,807	4,434	375,275	5,816	
39	3/21/2018	89.1	7,366	5,368	4,556	375,210	5,945	
40	3/22/2018	86.8	7,674	5,006	4,471	375,120	6,019	
41	3/22/2018	88.6	7,289	5,133	4,388	375,175	5,490	
42	3/22/2018	86.6	7,317	5,445	4,396	375,050	5,647	
43	3/22/2018	87	7,236	5,386	4,426	374,730	5,804	
44	3/24/2018	86.8	7,513	5,378	4,509	374,935	5,804	
45	3/25/2018	86.8	7,366	5,055	4,730	375,780	5,757	
46	3/26/2018	87.2	7,377	5,277	4,812	374,750	5,409	
47	3/26/2018	87.5	7,412	5,630	4,693	375,260	5,326	
48	3/27/2018	87.1	7,344	5,281	4,617	376,820	5,536	
49	3/27/2018	87.8	7,333	5,556	4,490	374,850	5,375	
50	3/27/2018	87.7	7,265	5,477	4,352	375,195	5,343	
51	3/27/2018	88.2	7,514	4,580	4,417	374,820	5,370	
52	3/28/2018	87.3	7,361	5,498	4,565	373,560	5,375	
53	3/28/2018	88.2	7,438	5,328	4,515	374,800	6,064	

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THURMAN SPEECE 205H
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/other
54	3/29/2018	88.6	7,242	5,097	4,755	377,100	5,346	
55	3/29/2018	87.5	7,127	5,012	4,482	374,978	5,260	
56	3/29/2018	88	7,178	5,109	4,496	374,825	5,287	
57	3/29/2018	87.2	7,097	5,774	4,469	375,150	5,293	
58	3/29/2018	86	7,813	5,917	4,732	374,380	6,163	
59	3/30/2018	82.5	7,661	5,829	4,544	375,860	6,122	
60	3/30/2018	87.1	7,014	5,698	4,565	374,825	5,397	
61	3/30/2018	89.2	6,908	5,254	4,619	377,940	5,313	
62	3/30/2018	88.5	7,030	5,709	4,548	376,720	5,256	
63	3/31/2018	89.7	7,075	5,288	4,713	374,780	5,288	
64	3/31/2018	88.1	6,841	5,739	4,574	374,825	5,223	
65	3/31/2018	88.9	6,960	5,672	4,611	375,100	5,192	

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Well Name: Thurman Speece BRK 205H 47009001860000

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	264.00	264.00	
Top of Salt Water	475.00	475.00	NA	NA	
Pittsburgh Coal	320.00	320.00	401.00	401.00	
Pottsville (ss)	463.00	463.00	559.00	559.00	
Mauch Chunk (shale)	629.00	629.00	1220.00	1220.00	
Raven Cliff (ss)	838.00	838.00	1012.00	1012.00	
Maxton (ss)	1120.00	1120.00	1220.00	1220.00	
Greenbriar (ls)	1286.00	1286.00	1560.00	1557.00	
Big Injun (ss)	1560.00	1557.00	1636.00	1633.00	
Berea (siltstone)	NA	NA	NA	NA	
Rhinstreet (shale)	NA	NA	NA	NA	
Cashaqua (shale)	NA	NA	NA	NA	
Middlesex (shale)	6065.00	5724.00	6147.00	5765.00	
Burket (shale)	6147.00	5765.00	6176.00	5779.00	
Tully (ls)	6176.00	5779.00	6307.00	5833.00	
Mahantango (shale)	6307.00	5833.00	6739.00	5944.00	
Marcellus (shale)	6739.00	5944.00	NA	NA	GAS

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	2/10/2018
Job End Date:	4/6/2018
State:	West Virginia
County:	Brooke
API Number:	47-009-00186-00-00
Operator Name:	Southwestern Energy
Well Name and Number:	Thurman Speece BRK 205H
Latitude:	40.18963400
Longitude:	-80.59006200
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	5,969
Total Base Water Volume (gal):	21,817,709
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
Water	Southwestern Energy	Carrier/Base Fluid	Water	7732-18-5	100.00000	83.49112	
Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	15.55814	
HCL Acid (12.6%-17.5%)	J.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.40000	0.71336	
WFRA-2000	J.S. Well Services, LLC	Friction Reducer	Hydrogen Chloride	7647-01-0	17.50000	0.16585	
			Water	7732-18-5	60.00000	0.02473	
			2-Propanoic acid, polymer with 2-propanamide	90003-06-9	30.00000	0.01236	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01014	
BIOC11219A	WV Department of Environmental Protection	Anti-Bacterial Agent	Methanol	64-17-5	60.00000	0.00907	
			Benzyl-(C12-C16 Alkyl)-Dimethyl-Ammonium Chloride	68424-85-1	30.00000	0.00577	
			Glutaraldehyde	111-30-8	10.00000	0.00192	

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SCAL16486A	Nalco Champion	Scale Inhibitor	Ethylene Glycol	107-21-1	30.00000	0.00166
			Amine Triphosphate	Proprietary	30.00000	0.00149
LT FLUSH SYSTEM I	J.S. Well Services, LLC	Other	Mineral oil, petroleum distillates, hydro-treated light naphthenic	64742-53-6	100.00000	0.00239
CALCIUM CHLORIDE	J.S. Well Services, LLC	Other	Calcium chloride	10043-52-4	90.00000	0.00134
AI-303	J.S. Well Services, LLC	Acid Corrosion Inhibitors	Ethylene glycol	107-21-1	40.00000	0.00029
			Cinnamaldehyde	104-55-2	20.00000	0.00010
			Formic acid	64-18-6	20.00000	0.00010
			Butyl cellosolve	111-76-2	20.00000	0.00009
			Polyether	60828-78-6	10.00000	0.00005
			Acetophenone thiourea, formaldehyde polymer	68527-49-1	5.00000	0.00003

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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5D Survey Report

SOUTHWESTERN ENERGY

Field Name: *SOUTHWESTERN_BROOKE CO, WV UTM NAD 83 (17N)*
Site Name: *Thurman Speece BRK Pad*
Well Name: *Thurman Speece BRK 205H*
Survey: *Definitive survey*

19 November 2017



Weatherford[®]

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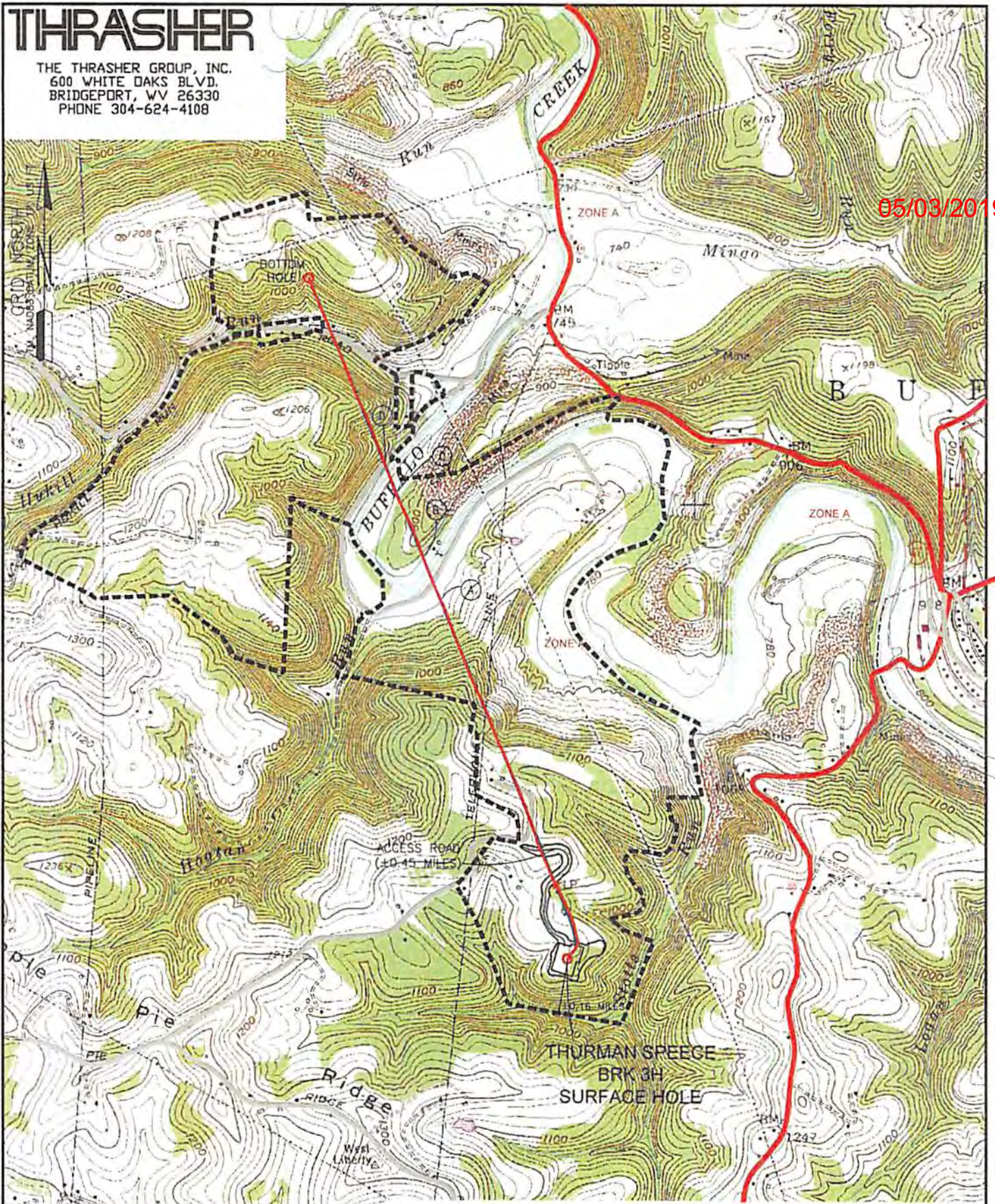
<u>Well Name</u>	<u>Well Name To Remove</u>	<u>Notes</u>
Brooke County Parks BRK 205H	Samuel Hubbard BRK 206H	Spreadsheet from Liz 5/16
Brooke County Parks BRK 5H	Samuel Hubbard BRK 406H	Spreadsheet from Liz 5/16
Kathy Mayhew BRK 6H	Benjamin Honecker OHI 205H	Spreadsheet from Liz 5/16
Linda Greathouse BRK 206H	Mike Ryniawec BRK 10H	Spreadsheet from Liz 5/16
Linda Greathouse BRK 6H	John Harwatt BRK 1H & 6H	Spreadsheet from Liz 5/16
Michael Ratcliffe OHI 10H	William Rodgers OHI 1H	conversation w/Sean Gaffney 5/16
Michael Ratcliffe OHI 6H	Carl Rotter OHI 5H	conversation w/Sean Gaffney 5/16
Michael Ratcliffe OHI 8H	Carl Rotter OHI 205H	conversation w/Sean Gaffney 5/16
Nick Ballato BRK	Samuel Hubbard BRK 606H	Spreadsheet from Liz 5/16
Russell Hervey BRK 201H	OV Royalty Trust LLC BRK 210H	Spreadsheet from Liz 5/16
Russell Hervey BRK 401H	OV Royalty Trust LLC BRK 10H	Spreadsheet from Liz 5/16
Shawn Couch OHI 3H	Mike Ryniawec BRK 6H	Spreadsheet from Liz 5/16
Worthley BRK 5H	Alan Degarmo BRK 10H	Spreadsheet from Liz 5/16
<u>Mentioned - Not Confirmed</u>		
Gary Kestner OHI 205H	Samuel Jones BRK 10H	
Gary Kestner OHI 5H	Samuel Jones BRK 8H	
Sandra Parr BRK 5H ?	James Seabright BRK 206H ??	mentioned in 5/17 Dev Schedule Meeting

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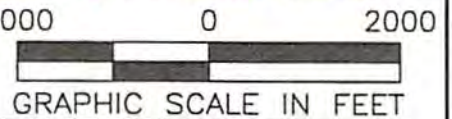
THRASHER

THE THRASHER GROUP, INC.
600 WHITE OAKS BLVD.
BRIDGEPORT, WV 26330
PHONE 304-624-4108

05/03/2019



WELL: THURMAN SPEECE BRK 5H
QUAD: BETHANY, WV



NAME AND DISTANCE TO THE NEAREST STREAM:	STREAM CROSSING COORDINATES (NAD 83):
UNNAMED TRIBUTARY TO STOTTS RUN IS LOCATED ±0.16 MILES SOUTH OF THE CENTER OF THE DRILL PAD.	A. LAT: 40.2044029° / LONG: -80.5969990° B. LAT: 40.2061941° / LONG: -80.5979576° C. LAT: 40.2086681° / LONG: -80.5993062° D. LAT: 40.2099805° / LONG: -80.5999745°

COMPANY:	SWN Production Company, LLC	SWN Production Company™
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WELL RESTRICTIONS:
WELL PAD, LOD, & E & S CONTROL FEATURES TO PERENNIAL STREAM, LAKE, POND, RESERVOIR OR WETLAND: >100 FEET
WELL PAD, LOD, & E & S CONTROL FEATURES TO NATURALLY PRODUCING TROUT STREAM: >300 FEET
WELL PAD, LOD, & E & S CONTROL FEATURES TO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY: >1000 FEET
WELL SHL TO EXISTING WATER WELL OR DEVELOPED SPRING: >250 FEET
CENTER OF PAD TO OCCUPIED DWELLING STRUCTURE: >625 FEET
CENTER OF PAD TO AGRICULTURAL BUILDINGS LARGER THAN 2500 SQ FT: >625 FEET

OPERATOR'S	THURMAN SPEECE
WELL #:	BRK 3H
LOCATION:	BUFFALO, BROOKE COUNTY, WEST VIRGINIA

FEMA FLOOD INFORMATION:
BY GRAPHIC PLOTTING ONLY FEMA FIRM INCORPORATED AREA OF BROOKE COUNTY, WEST VIRGINIA; MAP NUMBER 54009C0130D; EFFECTIVE DATE: 04/19/2010 & MAP NUMBER 54009C0140D; EFFECTIVE DATE: 04/19/2010.

SURFACE HOLE LOCATION:	GEOGRAPHIC (NAD83): LATITUDE: 40.1896103° LONGITUDE: -80.5901439°
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LEGEND:	
○ PROPOSED SURFACE HOLE / BOTTOM HOLE	— ACCESS ROAD
⊙ EXISTING / PRODUCING WELLHEAD	— PUBLIC ROAD
LPL* LANDING POINT LOCATION	— ACCESS ROAD TO PREV. SITE
— FLOOD PLAN	— LEASE BOUNDARY
	— PROPOSED PATH
	— AS-DRILLED PATH

BOTTOM HOLE LOCATION:	GEOGRAPHIC (NAD83): LATITUDE: 40.2177442° LONGITUDE: -80.6041300°
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REVISIONS:	DATE: 05-03-2018
	DRAWN BY: K. POTH
	SCALE: 1" = 2000'
	DRAWING NO: 030-2888
	TOPOGRAPHIC MAP

THRASHER

THE THRASHER GROUP, INC.
600 WHITE OAKS BLVD.
BRIDGEPORT, WV 26330
PHONE 304-624-4108

TRACT	SURFACE OWNER	TAX PARCEL	ACRES
1	THURMAN O. SPEECE JR, GOLDIE M. STANLEY	3-842-43	15.57
2	THURMAN O. SPEECE JR, GOLDIE M. STANLEY	3-842-45	14.20
3	WILLIAM A. SPERRINGER III & JENNA L. SPERRINGER	3-837-78	2.36
4	BENJAMIN M. MOSA & CHRISTINE L. HEISE	3-837-74	24.41
5	BENJAMIN M. MOSA & CHRISTINE L. HEISE	3-837-75	1.29

NOTES ON SURVEY

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

05/03/2019

SURFACE HOLE LOCATION (SHL):

UTM (NAD83, ZONE 17, METERS):
NORTHING: 4,448,885.599
EASTING: 534,895.273

LANDING POINT LOCATION (LPL):

UTM (NAD83, ZONE 17, METERS):
NORTHING: 4,449,535.361
EASTING: 535,234.561

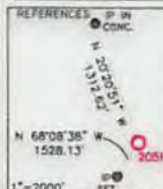
BOTTOM HOLE LOCATION (BHL):

UTM (NAD83, ZONE 17, METERS):
NORTHING: 4,452,164.205
EASTING: 534,126.623

ID	ADJOINER	TAX PARCEL
A	DAVID SEVER, DANAH MCDONALD, JENNIFER FERDINAN	3-837-71
B	WILLIAM E. JOHNSON AND HAZEL C. JOHNSON	3-837-73
C	THEODORE W. BUNNELL	3-837-68
D	LOTHIE KETH	3-837-67
E	JOHN B. DAUGHERTY	3-837-85
F	WINDSOR POWER HOUSE COAL CO	3-842-48
G	THURMAN O. SPEECE, JR. AND GOLDIE M. STANLEY	3-842-47



SURFACE HOLE 21,983'
BOTTOM HOLE 11,219'
Longitude: 80°35'00"

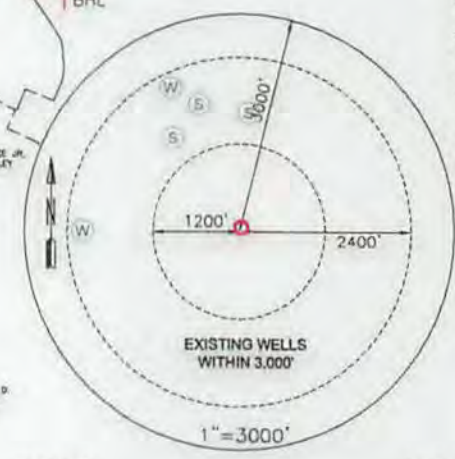


SWN PRODUCTION COMPANY, LLC SURFACE HOLES

- THURMAN SPEECE BRK 5H
- THURMAN SPEECE BRK 205H
- THURMAN SPEECE BRK 405H
- THURMAN SPEECE BRK 805H

SURFACE HOLE LOCATION (SHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4,448,885.599 EASTING: 534,895.273
LANDING POINT LOCATION (LPL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4,449,403.020 EASTING: 535,282.619
BOTTOM HOLE LOCATION (BHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4,452,164.217 EASTING: 534,121.088

THURMAN SPEECE BRK 205H SURFACE HOLE



GRAPHIC SCALE IN FEET

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. 2270 *[Signature]* 5/3/18

<p>(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS</p> <p>WVDEP OFFICE OF OIL & GAS 601 57TH STREET CHARLESTON, WV 25034</p>	<p>MINIMUM DEGREE OF ACCURACY: 1/200</p> <p>PROVEN SURVEY SOURCE OF GRADE GPS ELEVATION: (NAVD 88, US FT)</p>	<p>COMPANY: SWN Production Company, LLC</p> <p>THURMAN SPEECE OPERATOR'S WELL #: BRK 205H</p> <p>API WELL #: 47 STATE 009 COUNTY 00186 PERMIT</p>
	<p>WELL TYPE: OIL WASTE DISPOSAL PRODUCTION <input checked="" type="checkbox"/> DEEP GAS <input checked="" type="checkbox"/> LIQUID INJECTION STORAGE SHALLOW <input checked="" type="checkbox"/></p> <p>WATERSHED: BUFFALO CREEK</p> <p>DISTRICT: BUFFALO COUNTY: BROOKE</p> <p>SURFACE OWNER: THURMAN O. SPEECE JR & GOLDIE M. STANLEY</p> <p>OIL & GAS ROYALTY OWNER: THURMAN O. SPEECE JR & GOLDIE M. STANLEY</p> <p>DRILL <input checked="" type="checkbox"/> DRILL DEEPER REDRILL FRACTURE OR STIMULATE <input checked="" type="checkbox"/> PLUG OFF OLD FORMATION PERFORATE NEW FORMATION</p> <p>CONVERT PLUG & ABANDON CLEAN OUT & REPLUG OTHER CHANGE <input checked="" type="checkbox"/> (SPECIFY) AS-DRILLED</p> <p>TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: 5,860' TWD 16,460' TMD</p>	<p>WELL OPERATOR: SWN PRODUCTION COMPANY, LLC</p> <p>ADDRESS: P.O. BOX 1300</p> <p>CITY: JANE LEW STATE: WV ZIP CODE: 26378</p> <p>DESIGNATED AGENT: DEE SOUTHALL</p> <p>ADDRESS: P.O. BOX 1300</p> <p>CITY: JANE LEW STATE: WV ZIP CODE: 26378</p>
<p>LEGEND:</p> <ul style="list-style-type: none"> ○ PROPOSED SURFACE HOLE / BOTTOM HOLE ⊙ EXISTING / PRODUCING WELLHEAD LPL* LANDING POINT LOCATION ⊙ EXISTING WATER WELL ⊙ EXISTING SPRING — SURVEYED BOUNDARY — DRILLING UNIT --- LEASE BOUNDARY — PROPOSED PATH — AS-DRILLED PATH 	<p>REVISIONS:</p> <p>DATE: 05-03-2018</p> <p>DRAWN BY: K. POTH</p> <p>SCALE: 1" = 2000'</p> <p>DRAWING NO: 030-2888</p> <p>WELL LOCATION PLAT</p>	

WELL LOCATION PLAN	DRAWING NO. 030-2888
SCALE: 1" = 3000'	DRAWN BY: K. POTH
REVISIONS:	DATE: 02-03-2018
CITY: JANE LEW	STATE: WV
ZIP CODE: 26378	ADDRESS: P.O. BOX 1300
DESIGNATED AGENT: DEE SOUTHALL	
WELL OPERATOR: SWN PRODUCTION COMPANY, LLC	
TARGET FORMATION: MARCELLUS	
CONVERT	PLOG & ABANDON
DRILL DEEPER	REDRILL
DRILL DEEPER	REDRILL
WATERSHED: BUFFALO CREEK	DISTRICT: BUFFALO
WELL TYPE: OIL	WASTE DISPOSAL
PRODUCTION	DEEP
LIQUID INJECTION	GAS
STORAGE	SHALLOW

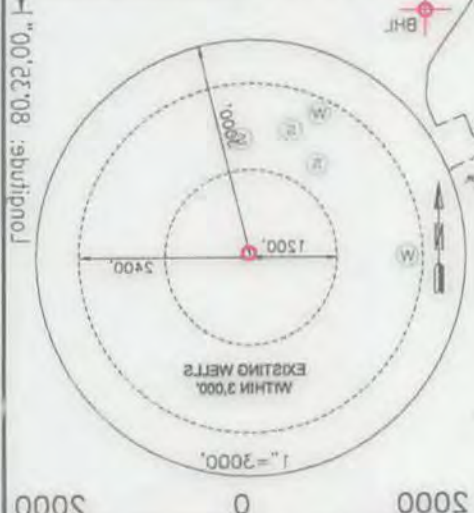
CITY: JANE LEW STATE: WV ZIP CODE: 26378 ADDRESS: P.O. BOX 1300 DESIGNATED AGENT: DEE SOUTHALL	WELL OPERATOR: SWN PRODUCTION COMPANY, LLC TARGET FORMATION: MARCELLUS CONVERT PLOG & ABANDON DRILL DEEPER REDRILL DRILL DEEPER DRILL DEEPER WASTE DISPOSAL PRODUCTION DEEP GAS LIQUID INJECTION STORAGE SHALLOW	OIL & GAS ROYALTY OWNER: THURMAN O. SPEECE JR & GOLDIE M. STANLEY SURFACE OWNER: THURMAN O. SPEECE JR & GOLDIE M. STANLEY COUNTY: BROOKE DISTRICT: BUFFALO WATERSHED: BUFFALO CREEK WELL TYPE: OIL WDEP OFFICE OF OIL & GAS 601 27TH STREET CHARLESTON, WV 25034	ELEVATION: (NAVD 88, US FT) SOURCE OF GRADE GPS PROVEN SURVEY ACCURACY: 1/300 DEGREE OF MINIMUM	OPERATOR'S WELL #: BRK 205H THURMAN SPEECE SWN PRODUCTION COMPANY, LLC COMPANY:	API WELL #: 47 COUNTY PERMIT: 009 00188 STATE: WV COUNTY: BROOKE
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I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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. 2. 2270

Michael S. Wolfe

BOTTOM HOLE LOCATION (BHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4421184.205 EASTING: 234121.088	SURFACE HOLE LOCATION (SHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4448882.599 EASTING: 234882.273
LANDING POINT LOCATION (LPL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4449403.020 EASTING: 232282.619	SURFACE HOLE LOCATION (SHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4448882.599 EASTING: 234882.273



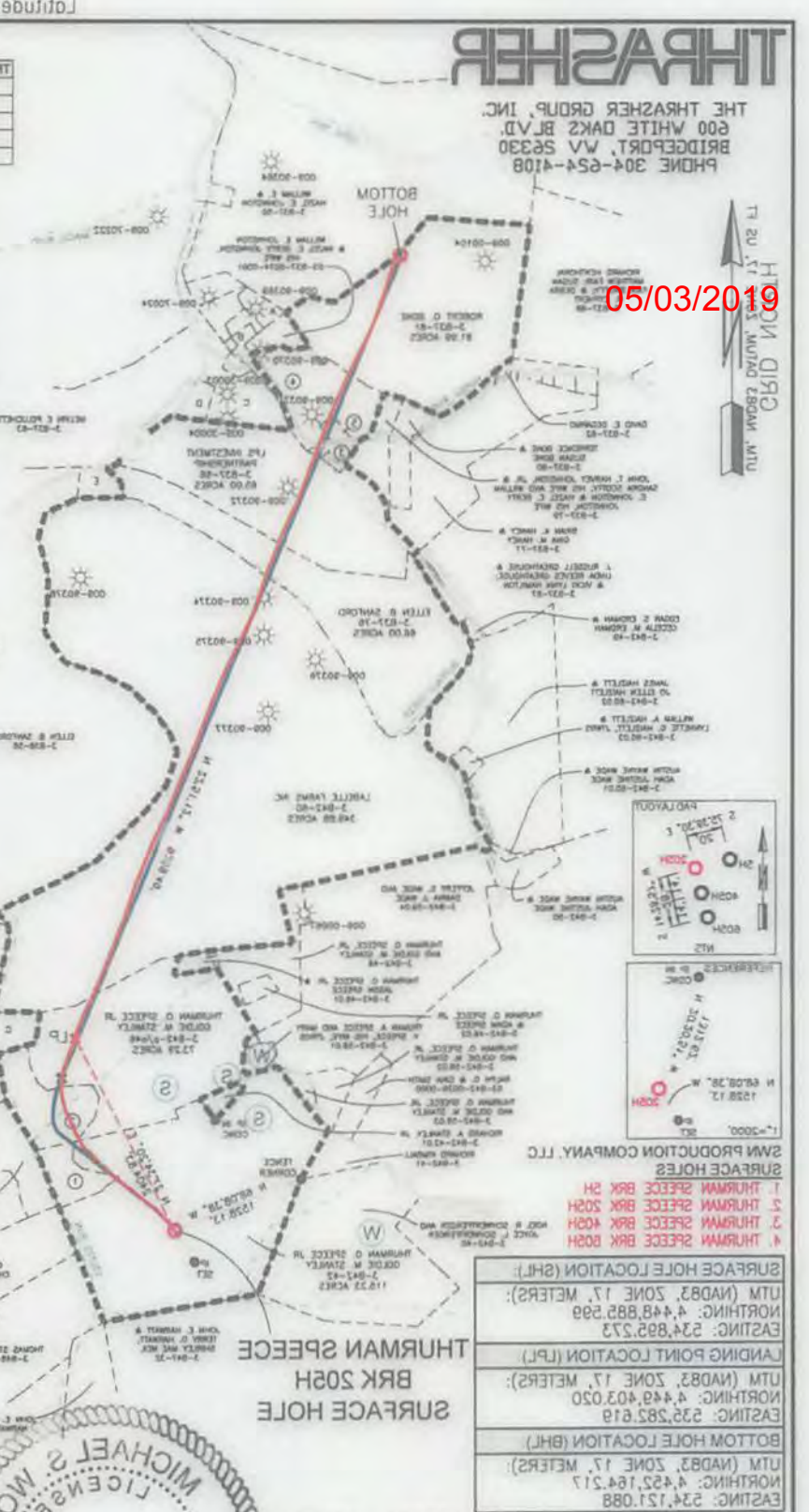
ID	ACRES	TAX PARCEL
1	0.00	2-843-43
2	0.00	2-843-44
3	0.00	2-843-45
4	0.00	2-843-46
5	0.00	2-843-47
6	0.00	2-843-48
7	0.00	2-843-49
8	0.00	2-843-50
9	0.00	2-843-51
10	0.00	2-843-52

TRACT	SURFACE OWNER	TAX PARCEL	ACRES
1	THURMAN O. SPEECE JR, GOLDIE M. STANLEY	2-843-43	12.21
2	THURMAN O. SPEECE JR, GOLDIE M. STANLEY	2-843-44	14.20
3	WILLIAM A. SPERINGER II & DENIA L. SPERINGER	2-843-45	3.26
4	BENJAMIN M. MOSA & CHRISTINE L. HEZE	2-843-46	54.41
5	BENJAMIN M. MOSA & CHRISTINE L. HEZE	2-843-47	1.29

NOTES ON SURVEY

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- THIS PLAN DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARCELS SHOWN HEREON.
- NO DWELLINGS AND BUILDINGS WITHIN 625 FEET OF PROPOSED OF CENTER OF PAD.
- NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF PROPOSED WELL.
- NO PERMANENT STREAMS, LAKES, PONDS, RESERVOIRS OR WETLANDS WITHIN 100 FEET OF THE LIMITS OF DISTURBANCE.
- NO NATURALLY OCCURRING TROUT STREAM WITHIN 300 FEET OF LIMITS OF DISTURBANCE.

SURFACE HOLE LOCATION (SHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4448882.599 EASTING: 234882.273	LANDING POINT LOCATION (LPL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4449232.561 EASTING: 232282.619	BOTTOM HOLE LOCATION (BHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4421184.205 EASTING: 234121.088
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SURFACE HOLE 4408'
 BOTTOM HOLE 11510'
 Latitude: 40°12'00" SURFACE HOLE 1925'
 Longitude: 80°32'00"

SURFACE HOLE 4408'
 BOTTOM HOLE 11510'
 Latitude: 40°12'00" SURFACE HOLE 1925'
 Longitude: 80°32'00"

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05/03/2019