

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

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Office of Oil and Gas

JUN 9 2017

WV Department of
Environmental Protection

API 47-009-0167 County BROOKE District BUFFALO
Quad STEUBENVILLE EAST & BETHANY Pad Name BROOK COUNTY PARKS-BRK-PAD1 Field/Pool Name PANHANDLE FIELD
Farm name BROOKE CO. PARKS COMMISSION Well Number BROOKE COUNTY PARKS BRK 6H
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 4,456,765.570 Easting 538,447.276
Landing Point of Curve Northing 4,456,457.162 Easting 538,292.248
Bottom Hole Northing 4,454,305.079 Easting 539,172.561

Elevation (ft) 1205.60 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 12/10/2015 Date drilling commenced 10/13/2016 Date drilling ceased 10/26/2016
Date completion activities began 03/02/2017 Date completion activities ceased 03/30/2017
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 250' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1126' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 316' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

APPROVED

NAME: Eric Blend

Reviewed by:

DATE: 11-8-17

01/05/2018

API 47-009 - 0167 Farm name BROOKE CO. PARKS COMMISSION Well number BROOKE COUNTY PARKS BRK 6H

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	357	NEW	H-40/48#		Y; 22 BBLs RETURNED
Coal	SURFACE						
Intermediate 1	12.25	9.625	1692	NEW	J-55/36#		Y; 27 BBLs RETURNED
Intermediate 2							
Intermediate 3							
Production	8.75/8.50	5.5	14335	NEW	HCP-110/20#		Y
Tubing		2.375	6332	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	150	17.0		150	SURFACE	24
Surface	CLASS A	380	15.6	1.20	456	SURFACE	8
Coal	SEE INTERMEDIATE						
Intermediate 1	CLASS A	650	15.60	1.20	780	SURFACE	8
Intermediate 2							
Intermediate 3							
Production	CLASS A	895/1990	15.60	1.23/1.19	1100.85/2368.10	SURFACE	24
Tubing							

Drillers TD (ft) 14.335' Loggers TD (ft) 14.335'
 Deepest formation penetrated MARCELLUS Plug back to (ft) N/A
 Plug back procedure _____

Kick off depth (ft) 5.330'

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 _____

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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

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Well Name:

BROOKE COUNTY PARKS BRK 6H

47009001670000

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	N/A	N/A	250.00	250.00	
Top of Salt Water	1126.00	1126.00	N/A	N/A	
Pittsburgh Coal	316.00	316.00	321.00	321.00	
Big Injun (ss)	1425.00	1421.35	1632.00	1626.76	
Berea (siltstone)	1976.00	1967.20	5430.97	5365.83	
Rhinestreet (shale)	5430.97	5365.83	5693.43	5612.35	
Cashaqua (shale)	5693.43	5612.35	5759.00	5668.25	
Middlesex (shale)	5759.00	5668.25	5824.68	5719.98	
Burket (shale)	5824.68	5719.98	5855.95	5742.80	
Tully (ls)	5855.95	5742.80	5951.55	5805.30	
Mahantango (shale)	5951.55	5805.30	6217.10	5930.04	
Marcellus (shale)	6217.10	5930.04	N/A	N/A	GAS

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BROOKE COUNTY PARKS 6H
PERF SUMMARY

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
1	3/2/2017	14,030	14,230	42
2	3/3/2017	13,766	13,966	42
3	3/3/2017	13,502	13,704	42
4	3/3/2017	13,238	13,438	42
5	3/6/2017	12,974	13,174	42
6	3/6/2017	12,710	12,910	42
7	3/6/2017	12,444	12,646	42
8	3/6/2017	12,182	12,382	42
9	3/6/2017	11,918	12,118	42
10	3/6/2017	11,654	11,854	42
11	3/7/2017	11,390	11,590	42
12	3/7/2017	11,124	11,326	42
13	3/7/2017	10,862	11,062	42
14	3/11/2017	10,598	10,798	42
15	3/11/2017	10,332	10,534	42
16	3/12/2017	10,070	10,270	42
17	3/12/2017	9,806	10,006	42
18	3/12/2017	9,542	9,742	42
19	3/12/2017	9,278	9,478	42
20	3/13/2017	9,014	9,214	42
21	3/13/2017	8,750	8,950	42
22	3/13/2017	8,486	8,686	42
23	3/13/2017	8,222	8,422	42
24	3/14/2017	7,958	8,158	42
25	3/19/2017	7,694	7,894	42
26	3/20/2017	7,425	7,630	42
27	3/20/2017	7,166	7,366	42
28	3/20/2017	6,902	7,102	42
29	3/20/2017	6,638	6,838	42
30	3/20/2017	6,374	6,574	42

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**BROOKE COUNTY PARKS BRK 6H
FRAC STAGE SUMMARY**

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	3/2/2017	102	7,740	7,980	3,884	500,500	8,648	
2	3/3/2017	95	8,257	8,991	4,630	434,060	6,984	
3	3/3/2017	98	7,668	8,163	4,166	500,780	7,425	
4	3/3/2017	98	7,704	8,599	4,180	500,880	7,340	
5	3/6/2017	7,511	7,511	8,082	4,510	499,200	7,321	
6	3/6/2017	98	7,551	9,135	4,073	494,550	7,216	
7	3/6/2017	98	8,030	8,732	4,295	499,200	7,252	
8	3/6/2017	98	7,693	8,038	4,653	500,200	7,186	
9	3/6/2017	99	7,515	8,235	4,290	500,590	7,182	
10	3/6/2017	95	7,498	7,736	4,125	501,320	7,193	
11	3/7/2017	93	7,100	7,531	4,520	493,630	7,164	
12	3/7/2017	95	7,403	7,726	4,113	498,100	7,188	
13	3/7/2017	94	7,409	8,697	4,295	501,010	7,109	
14	3/11/2017	96	7,369	7,843	4,284	501,710	7,031	
15	3/11/2017	100	7,643	8,057	4,206	502,110	6,989	
16	3/12/2017	98	7,253	7,589	4,406	501,230	6,895	
17	3/12/2017	96	7,490	7,764	4,592	487,100	6,935	
18	3/12/2017	97	6,781	7,485	4,381	499,180	6,913	
19	3/12/2017	100	7,496	7,861	4,517	501,120	6,922	
20	3/13/2017	94	7,028	7,600	4,313	511,360	7,031	
21	3/13/2017	95	7,113	7,553	4,245	512,278	6,916	
22	3/13/2017	90	6,575	6,999	4,617	504,920	7,691	
23	3/13/2017	96	6,884	7,149	4,485	504,380	6,814	
24	3/14/2017	89	6,571	7,042	4,385	497,800	6,788	
25	3/19/2017	100	6,738	6,906	4,256	499,840	6,688	
26	3/20/2017	100	7,064	8,129	4,417	501,680	6,778	
27	3/20/2017	88	7,519	8,962	4,098	502,520	7,392	
28	3/20/2017	100	7,037	9,127	4,070	503,860	6,684	
29	3/20/2017	95	6,271	6,899	4,506	495,980	6,615	
30	3/20/2017	100	6,638	7,610	4,596	513,160	6,843	

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	3/3/2017
Job End Date:	3/21/2017
State:	West Virginia
County:	Brooke
API Number:	47-009-00167-00-00
Operator Name:	Southwestern Energy
Well Name and Number:	BROOKE COUNTY PARKS BRK 6H
Latitude:	40.26047000
Longitude:	-80.54786300
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,078
Total Base Water Volume (gal):	8,828,754
Total Base Non Water Volume:	0



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Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Southwestern Energy	Carrier/Base Fluid	Water	7732-18-5	100.00000	82.02344	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	16.66969	
HCL Acid (12.6%-17.5%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.40000	0.99775	
			Hydrogen Chloride	7647-01-0	17.50000	0.23197	
WFRA-2000	U.S. Well Services, LLC	Friction Reducer	Water	7732-18-5	60.00000	0.04000	
			2-Propenoic acid, polymer with 2 propenamide	9003-06-9	30.00000	0.02000	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01640	
AI-303	U.S. Well Services, LLC	Acid Corrosion Inhibitors	Ethylene glycol	107-21-1	40.00000	0.00033	
			Formic acid	64-18-6	20.00000	0.00012	
			Cinnamaldehyde	104-55-2	20.00000	0.00012	

			Butyl cellosolve	111-76-2	20.00000	0.00010
			Polyether	50828-78-6	10.00000	0.00006
			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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THRASHER

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

NOTES ON SURVEY

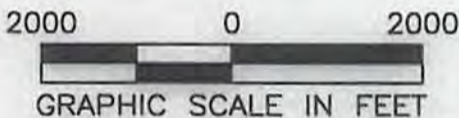
- COORDINATES SYSTEM IS UTM, NAD 83 DATUM, ZONE 17, U.S. FOOT AND WELL COORDINATES ESTABLISHED USING SURVEY GRADE GPS.
- SURFACE AND ROYALTY OWNER INFORMATION AND THEIR BOUNDARIES SHOWN HEREON WERE PLOTTED FROM DEEDS AND/OR TAX PARCEL MAPS PROVIDED BY CLIENT AND FIELD LOCATIONS.
- THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARCELS SHOWN HEREON.
- NO DWELLINGS AND BUILDINGS WITHIN 625 FEET OF PROPOSED OF 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.

TRACT	SURFACE OWNER (S) / ROYALTY OWNER (R)	TAX PARCEL	ACRES
1	(S) BROOKE COUNTY PARK COMMISSION (R) RICHARD P. GIST (R) VIRGINIA GIST ABLITT (R) ANN GIST LEVIN	05-03-028-0084-0000	135.00
2	(S) STARBUCK INDUSTRIES	05-03-038-0083-0000	15.25
3	(S) BROOKE COUNTY PARK AND RECREATION COMMISSION (R) JAMES ROBERT HERVEY & KAREN L. HERVEY (R) WILLIAM JUDSON HERVEY II & TERESA J. HERVEY (R) FRED L. HERVEY & CARY J. HERVEY (R) MARY KATHERYN HERVEY DECARO & ALAN H. DECARO (R) RUSSELL D. HERVEY & LISA K. HERVEY	05-03-028-0080-0000	101.61
4	(S) PHOENIX-GREENLAWN PARTNERS LIMITED PARTNERSHIP (R) USA INC (R) JAMES ROBERT HERVEY & KAREN L. HERVEY (R) WILLIAM JUDSON HERVEY II & TERESA J. HERVEY (R) FRED L. HERVEY & CARY J. HERVEY (R) MARY KATHERYN HERVEY DECARO & ALAN H. DECARO (R) RUSSELL D. HERVEY & LISA K. HERVEY	05-03-033-0113-0000	101.35
5	(S) JOHN C. WILES SR & BARBARA A. WILES	05-03-034-0017-0000	170.40

LINE	BEARING	DISTANCE	DESCRIPTION	MONUMENT
L1	N 09°12'43" W	27.99'	SHL TO REF. PNT.	BRK 6H #09-00111
L2	S 14°07'52" W	297.10'	SHL TO REF. PNT.	REBAR SET
L3	N 04°11'50" E	2005.89'	SHL TO REF. PNT.	REBAR SET
L4	N 31°52'10" E	3941.40'	SHL TO REF. PNT.	REBAR FOUND
LINE	BEARING	DISTANCE	CURVE LENGTH	DESCRIPTION
L5	S 35°22'03" W	878.72'		SHL TO LP
L6	S 21°26'12" E	7902.58'		LP TO BHL



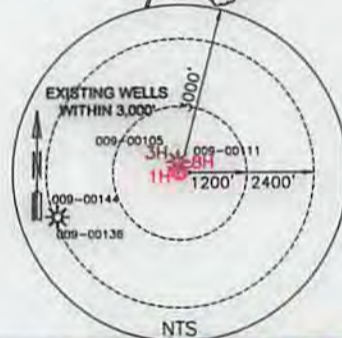
SURFACE HOLE LOCATION (SHL):	SURFACE HOLE LOCATION (SHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,456,765.570 EASTING: 538,447.276	UTM (NAD83, ZONE 17, METERS): NORTHING: 4,456,765.533 EASTING: 538,447.303
LANDING POINT LOCATION (LPL):	LANDING POINT LOCATION (LPL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,456,457.162 EASTING: 538,292.248	UTM (NAD83, ZONE 17, METERS): NORTHING: 4,456,558.209 EASTING: 538,287.413
BOTTOM HOLE LOCATION (BHL):	BOTTOM HOLE LOCATION (BHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,454,305.079 EASTING: 539,172.561	UTM (NAD83, ZONE 17, METERS): NORTHING: 4,454,290.933 EASTING: 539,177.956



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

Michael S. Wolf 5/12/17



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS
BHL
WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25034

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

COMPANY: **SWN** Production Company, LLC
SWN Production Company™

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

WATERSHED: BUFFALO CREEK ELEVATION: 1205.60'

DISTRICT: BUFFALO COUNTY: BROOKE QUADRANGLE: STEUBENVILLE EAST & BETHANY

SURFACE OWNER: BROOKE COUNTY PARKS COMMISSION ACREAGE: ±135.00

OIL & GAS ROYALTY OWNER: RICHARD P. GIST, VIRGINIA GIST ABLITT, ANN GIST LEVIN ACREAGE: ±523.81

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: 5,947' TVD 14,335' TMD

WELL OPERATOR: SWN PRODUCTION COMPANY, LLC DESIGNATED AGENT: DEE SOUTHALL
ADDRESS: P.O. BOX 1300 ADDRESS: P.O. BOX 1300
CITY: JANE LEW STATE: WV ZIP CODE: 26378 CITY: JANE LEW STATE: WV ZIP CODE: 26378

LEGEND:	REVISIONS:	DATE:
○ PROPOSED SURFACE HOLE / BOTTOM HOLE	----- LEASE BOUNDARY	05-11-2017
★ EXISTING / PRODUCING WELLHEAD	----- PROPOSED PATH	SHEET 1 OF 3
✘ ABANDONED WELL	----- AS-DRILLED PATH	DRAWN BY: K. POTH
✘ PLUGGED & ABANDONED WELL	----- ABANDONED PATH	SCALE: 1" = 2000'
△ CUT CONDUCTOR		DRAWING NO: 050-5525
		WELL LOCATION PLAT

THRASHER

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

TRACT	ADJOINER	TAX PARCEL
A	MARK OWEN WEAVER & VIRGINIA BEALL KREUTZ	05-03-B34-0049-0000
B	DENZIL & MARY LOU CONLEY	05-03-B33-0108-0000
C	MARLENE K. HUKILL	05-03-B33-0109-0000
D	JOHN C WALES SR & BARBARA A WALES	05-03-B33-0110-0000
E	JAMES H. STEWART & PAMELA JO STEWART	05-03-B33-0031-0000
F	STARVAGGI INDUSTRIES INC.	05-03-B33-0026-0000
G	STARVAGGI INDUSTRIES INC.	05-03-B33-0025-0000
H	STARVAGGI INDUSTRIES INC.	05-03-B28-0062-0000
I	RUSSELL D. HERVEY	05-03-B28-0045-0000
J	BERNARD J. KNORR III & NICHOLE C. KNORR	05-03-B28-0059-0000
K	RUBY FAYE KNORR & BERNARD JOHN KNORR JR	05-03-B28-0058-0000
L	BERNARD J. KNORR JR & RUBY F KNORR	05-03-B28-0057-0001
M	COUNTY COURT OF BROOKE COUNTY	05-03-B28-0066-0000
N	COUNTY COURT OF BROOKE COUNTY	05-03-B28-0065-0000
O	COUNTY COURT OF BROOKE COUNTY	05-03-B28-0061-0000
P	KEITH SMITH & KATHY SMITH	05-03-B34-0001-0000
Q	BROOKE COUNTY PARK & RECREATION COMMISSION	05-03-B33-0117-0000
R	KEITH SMITH & KATHY SMITH	05-03-B34-0016-0001
S	KEITH R. SMITH & KATHY J. SMITH	05-03-B33-0114-0000
T	BRIAN SMITH	05-03-B33-0114-0001
U	DAVID L. RAGAN	05-03-B34-0016-0003
V	DAVID RAGAN	05-03-B34-0016-0000
W	DAVID RAGAN	05-03-B34-0015-0000
X	NANCY J AMBROSE	05-03-B34-0014-0000
Y	CARMAN FANASE	05-03-B34-0018-0000
Z	JAMES L. & LAURA INMAN	05-03-B34-0019-0000
AA	BRIAN E. & JENNIFER B. PLANTS	05-03-B34-0048-0000

01/05/2018

COMPANY:
SWN **SWN** ^{R₁-V⁺}
Production Company, LLC Production Company™

REVISIONS:	DATE: 05-11-2017
	SHEET 2 OF 3
	DRAWN BY: K. POTH
	SCALE: 1" = 2000'
	DRAWING NO: 050-5525
	WELL LOCATION PLAT