

04/19/2019



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west virginia department of environmental protection

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Office of Oil and Gas  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304  
(304) 926-0450  
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Tuesday, April 16, 2019  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

SWN PRODUCTION COMPANY, LLC  
POST OFFICE BOX 12359

SPRING, TX 773914954

Re: Permit Modification Approval for BARRY GREATHOUSE A BRK 8H  
47-009-00231-00-00

**Lateral Extension**

SWN PRODUCTION COMPANY, LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin  
Chief

A blue ink signature of James A. Martin, Chief, is written over the typed name and title. The signature is cursive and stylized.

Operator's Well Number: BARRY GREATHOUSE A BRK 8H  
Farm Name: BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE  
U.S. WELL NUMBER: 47-009-00231-00-00  
Horizontal 6A New Drill  
Date Modification Issued: April 16, 2019

Promoting a healthy environment.

March 7, 2019

Ms. Laura Adkins  
Office of Oil & Gas  
601 57<sup>th</sup> Street  
Charleston, WV 25304

**RE:** Modifications- Barry Greathouse A BRK 6H- API 47-009-00230  
Barry Greathouse A BRK 8H- API 47-009-00231

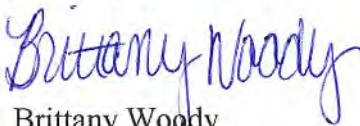
Dear Ms. Adkins

Enclosed please find the updated 6B, casing program, WBD, mylar, and leases for the above captioned wells. We are extending the laterals. These wells are situated on the Greathouse's property, in Buffalo District, Brooke County, West Virginia.

If you have any questions or desire additional information, please me at 304-884-1613

Thank you.

Sincerely,



Brittany Woody  
Regulatory Analyst  
Southwestern Energy Production Company, LLC

RECEIVED  
Office of Oil and Gas

MAR 8 2019

WV Department of  
Environmental Protection



WW-6B  
(04/15)

API NO. 47-09 - 00231  
OPERATOR WELL NO. Barry Greathouse A BRK 8H  
Well Pad Name: Barry Greathouse A BRK PAD

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
WELL WORK PERMIT APPLICATION

1) Well Operator: SWN Production Co., LLC

<u>494512924</u>	<u>009-Brooke</u>	<u>3-Buffero</u>	<u>641-Tiltonsville</u>
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Operator ID County District Quadrangle

2) Operator's Well Number: Barry Greathouse A BRK 8H Well Pad Name: Barry Greathouse A BRK PAD

3) Farm Name/Surface Owner: Barry L. & Patricia A. Greathouse Public Road Access: Gritty Run

4) Elevation, current ground: 1564' Elevation, proposed post-construction: 1564'

5) Well Type (a) Gas  Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_

(b) If Gas Shallow  Deep \_\_\_\_\_  
Horizontal  \_\_\_\_\_

6) Existing Pad: Yes or No Yes

*C-780* 3-7-19  
2-22-19

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Target Formation- Marcellus. Down-Dip Well to the South, LP Target Top TVD- 5891', Target Base TVD- 5932', Anticipated Thickness- 41', Associated Pressure- 3856

8) Proposed Total Vertical Depth: 5921'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 16,962'

11) Proposed Horizontal Leg Length: 10,545.67'

12) Approximate Fresh Water Strata Depths: 275'

13) Method to Determine Fresh Water Depths: salinity profile

14) Approximate Saltwater Depths: 384' salinity profile analyses

15) Approximate Coal Seam Depths: 292'

16) Approximate Depth to Possible Void (coal mine, karst, other): None that we are aware of.

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes \_\_\_\_\_ No

(a) If Yes, provide Mine Info: Name: \_\_\_\_\_  
Depth: \_\_\_\_\_  
Seam: \_\_\_\_\_  
Owner: \_\_\_\_\_

WW-6B  
(04/15)

API NO. 47- 09 -  
OPERATOR WELL NO. Barry Greathouse A BRK EH  
Well Pad Name: Barry Greathouse A BRK PAD

18) **CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	H-40	94#	100'	100'	CTS
Fresh Water	13 3/8"	New	H-40	48#	375'	375'	371 sx/CTS
Coal	See	Surface	Casing				
Intermediate	9 5/8"	New	J-55	36#	1617'	1617'	630 sx/CTS
Production	5 1/2"	New	HCP-110	20#	16962'	16962'	Least 774x and 2645x/100 inside interval
Tubing							
Liners							

*Handwritten signature and date: 3-7-19*

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	30"	0.25	2120	81	Class A	1.19/50% Excess
Fresh Water	13 3/8"	17.5"	0.380	2740	633	Class A	1.19/50% Excess
Coal	See	Surface	Casing				
Intermediate	9 5/8"	12 1/4"	0.395	3950	1768	Class A	1.19/50% Excess
Production	5 1/2"	8 3/4"	0.361	12360	9500	Class A	1.20/50% Excess
Tubing							
Liners							

RECEIVED  
Office of Oil and Gas

MAR 8 2019

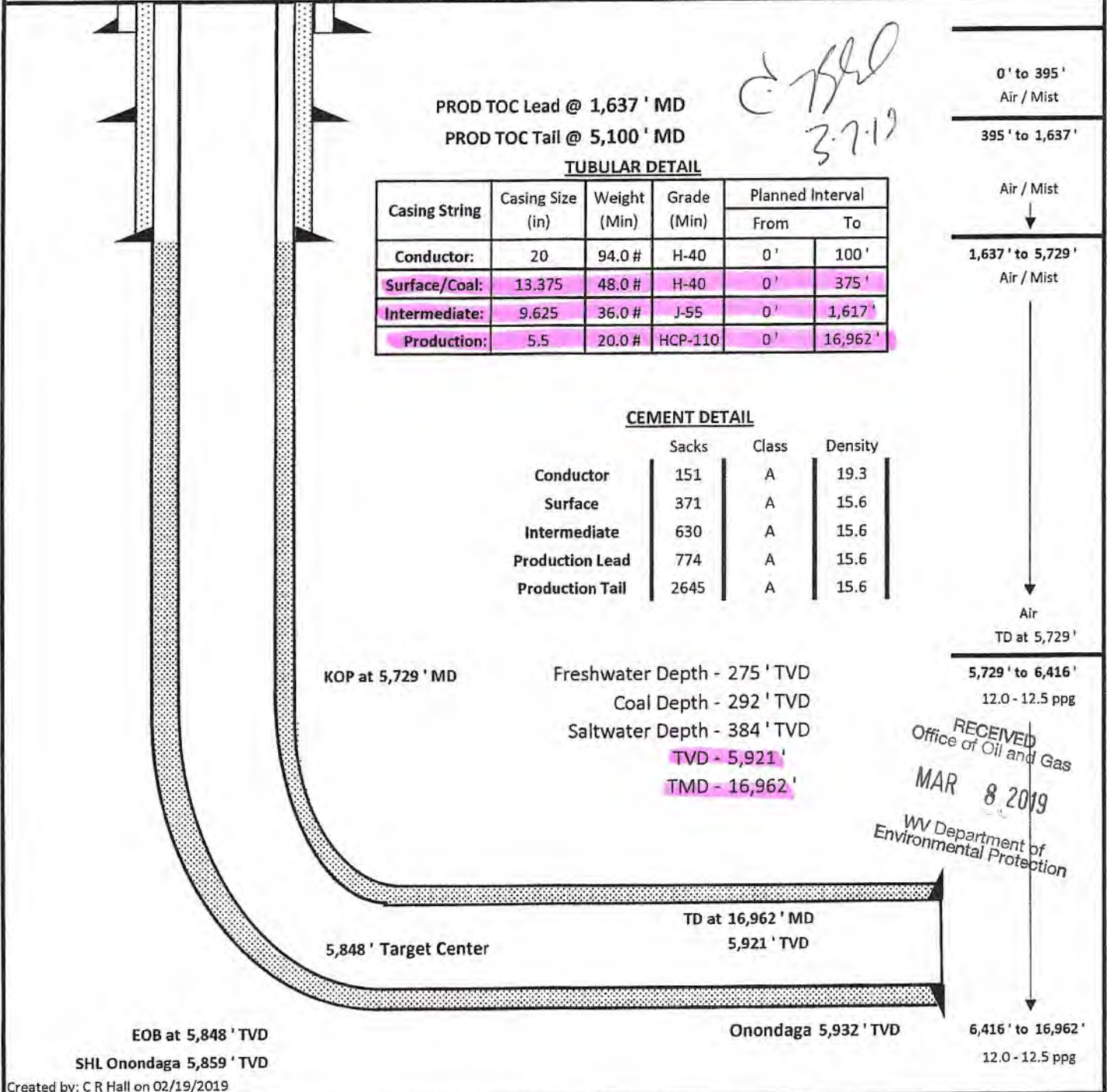
**PACKERS**

WV Department of  
Environmental Protection

Kind:				
Sizes:				
Depths Set:				

<b>Southwestern Energy Company</b>	<b>Proposed Drilling Program</b>
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Well: <b>BARRY GREATHOUSE A BRK 8</b> Field: <b>PANHANDLE FIELD WET</b> County: <b>BROOKE</b> SHL: <b>40.1916 Latitude -80.6356 Longitude</b> BHL: <b>40.1606 Latitude -80.6181 Longitude</b> KB Elev: <b>1,163 ft MSL</b>	Re-entry Rig: <b>TBD</b> Prospect: <b>PANHANDLE</b> State: <b>WV</b> GL Elev: <b>1,136 ft MSL</b>
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0' to 395' Air / Mist

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395' to 1,637' Air / Mist

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1,637' to 5,729' Air / Mist

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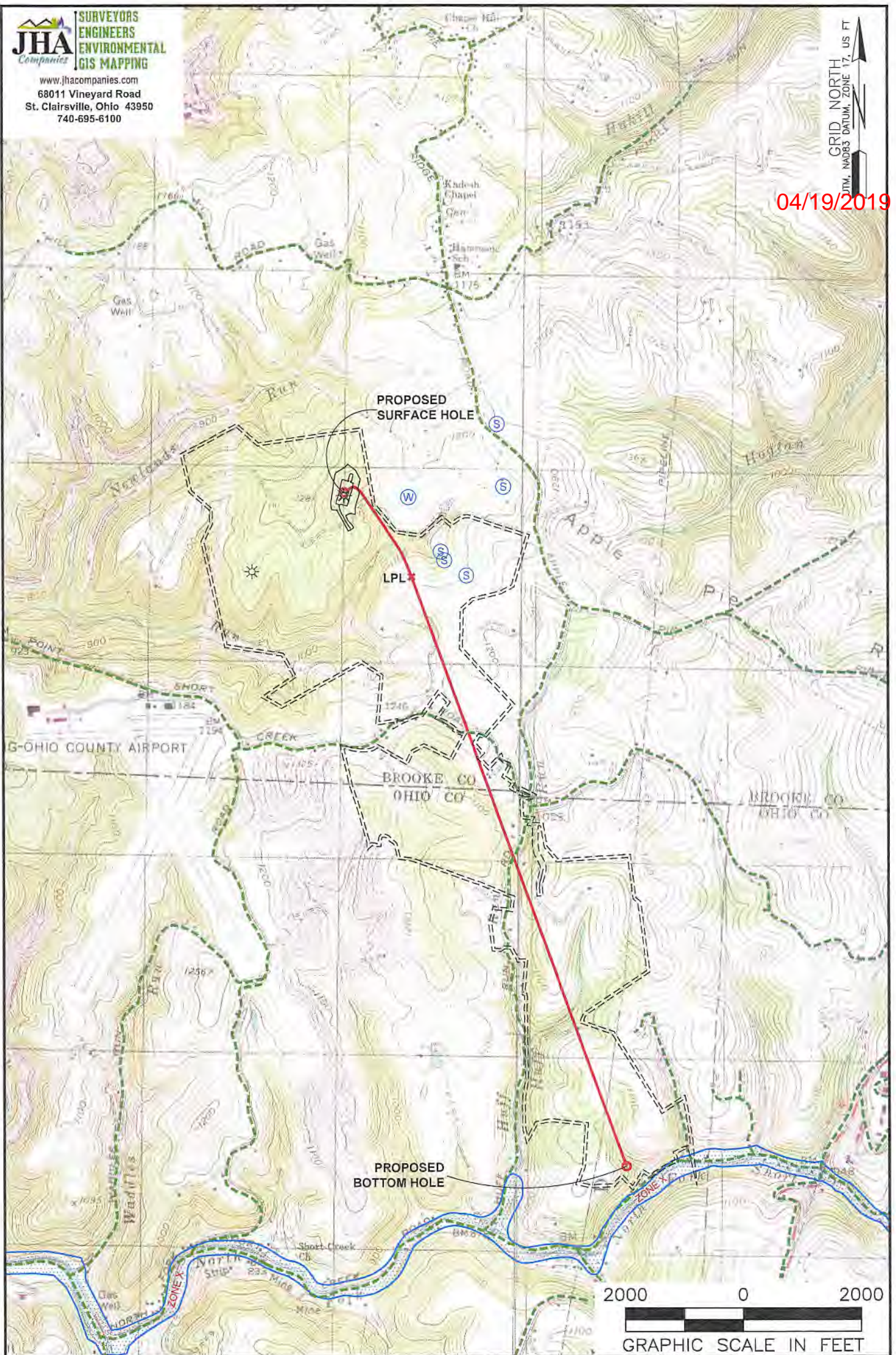
5,729' to 6,416' 12.0 - 12.5 ppg

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6,416' to 16,962' 12.0 - 12.5 ppg

**RECEIVED**  
 Office of Oil and Gas  
**MAR 8 2019**  
 WV Department of Environmental Protection

04/19/2019



**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.

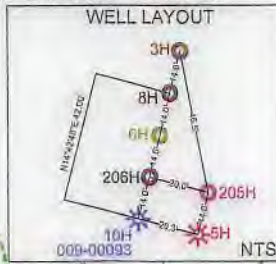
**LEGEND:**

- PROPOSED SURFACE HOLE / BOTTOM HOLE
- EXISTING / PRODUCING WELLHEAD
- LPL
- FLOOD PLAIN
- ACCESS ROAD
- PUBLIC ROAD
- ACCESS ROAD TO PREV. SITE
- LEASE BOUNDARY
- PROPOSED PATH

WELL OPERATOR: SWN PRODUCTION COMPANY, LLC		WELL (FARM) NAME: BARRY GREATHOUSE A BRK		WELL # 8H	SERIAL # XXXX
ADDRESS: 1300 FORT PIERPONT DRIVE, MORGANTOWN, WV 26508		COUNTY: BROOKE	CODE: 009	DISTRICT: BUFFALO	API # 47-009-00231
SURFACE OWNER: BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE		USGS 7 1/2 QUADRANGLE MAP NAME: TILTONVILLE, OH-WV & BETHANY, WV-PA			



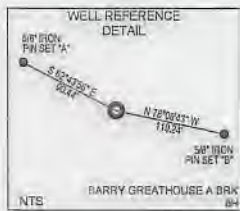
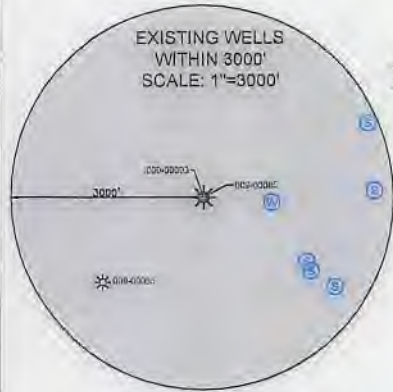
www.jhacompanies.com  
68011 Vineyard Road  
St. Clairsville, Ohio 43950  
740-695-6100



NOTES ON SURVEY

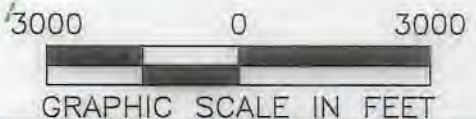
1. COORDINATE SYSTEM IS UTM NAD 83 DATUM, ZONE 17, U.S. FOOT AND WELL COORDINATES ESTABLISHED USING SURVEY GRADE GPS.
2. SURFACE AND ROYALTY OWNER INFORMATION AND THEIR BOUNDARIES SHOWN HEREON WERE PLOTTED FROM DEEDS AND/OR TAX PARCEL MAPS PROVIDED BY CLIENT AND/OR FIELD LOCATIONS.
3. THIS PLAT DOES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

04/19/2019



<b>SURFACE HOLE LOCATION (SHL):</b>
UTM (NAD83, ZONE 17, METERS):
NORTHING: 4449083.44
EASTING: 531015.71
<b>LANDING POINT LOCATION (LPL):</b>
UTM (NAD83, ZONE 17, METERS):
NORTHING: 4448656.41
EASTING: 531370.15
<b>BOTTOM HOLE LOCATION (BHL):</b>
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	MINIMUM DEGREE OF ACCURACY: 1/200	BARRY GREATHOUSE A BRK
	WVDEP OFFICE OF OIL & GAS 601 57TH STREET CHARLESTON, WV 25034	PROVEN SOURCE OF ELEVATION: SURVEY GRADE GPS (NAVD 88, US FT)	OPERATOR'S WELL #: 8H
		API WELL #:	47 009 00231
		STATE	COUNTY
		PERMIT	

WELL TYPE: OIL <input type="checkbox"/> WASTE DISPOSAL <input type="checkbox"/> PRODUCTION <input checked="" type="checkbox"/> DEEP <input type="checkbox"/> GAS <input checked="" type="checkbox"/> LIQUID INJECTION <input type="checkbox"/> STORAGE <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/>	ELEVATION: 1,136.1'
WATERSHED: UPPER OHIO SOUTH	DISTRICT: BUFFALO COUNTY: BROOKE
SURFACE OWNER: BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE	QUADRANGLE: TILTONVILLE, OH & BETHANY, WV
OIL & GAS ROYALTY OWNER: RAYLE COAL COMPANY	ACREAGE: ±229.00
DRILL <input checked="" type="checkbox"/> DRILL DEEPER <input type="checkbox"/> REDRILL <input type="checkbox"/> FRACTURE OR STIMULATE <input checked="" type="checkbox"/> PLUG OFF OLD FORMATION <input type="checkbox"/> PERFORATE NEW FORMATION <input type="checkbox"/>	ACREAGE: ±229.00
CONVERT <input type="checkbox"/> PLUG & ABANDON <input type="checkbox"/> CLEAN OUT & REPLUG <input type="checkbox"/> OTHER CHANGE <input type="checkbox"/> (SPECIFY)	
TARGET FORMATION: MARCELLUS	ESTIMATED DEPTH: 5,921' TVD 16,962' 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

<b>LEGEND:</b>	<b>REVISIONS:</b>	DATE: 02-27-2019
PROPOSED SURFACE HOLE / BOTTOM HOLE	SURVEYED BOUNDARY	API NO: 47-009-00231
EXISTING / PRODUCING WELLHEAD	DRILLING UNIT	DRAWN BY: D. REED
LPL	LEASE BOUNDARY	SCALE: 1" = 3000'
EXISTING WATER WELL	PROPOSED PATH	DRAWING NO: 2017-422
EXISTING SPRING		WELL LOCATION PLAT