



west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary
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 6H
47-009-00230-00-00

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.

A blue ink signature of James A. Martin, written in a cursive style.

James A. Martin
Chief

Operator's Well Number: BARRY GREATHOUSE A BRK 6H
Farm Name: BARRY GREATHOUSE
U.S. WELL NUMBER: 47-009-00230-00-00
Horizontal 6A New Drill
Date Modification Issued: April 16, 2019

Promoting a healthy environment.

WW-6B
(04/15)

API NO. 47-09 - 00230
 OPERATOR WELL NO. Barry Greathouse A BRK 6H
 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 494512924 009-Brooke Buffalo Bethany
 Operator ID County District Quadrangle

2) Operator's Well Number: Barry Greathouse A BRK 6H 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

[Handwritten Signature]
 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- 5890', Target Base TVD- 5931', Anticipated Thickness- 41', Associated Pressure- 3855

8) Proposed Total Vertical Depth: 5920'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18,878'

11) Proposed Horizontal Leg Length: 12724.85'

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12) Approximate Fresh Water Strata Depths: 275'

MAR 8 2019

13) Method to Determine Fresh Water Depths: salinity profile

WV Department of
Environmental Protection

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 6H
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#	18878'	18878'	Least 1742 cu ft 3025x108 min 20' 22'
Tubing							
Liners							

[Handwritten Signature] 2.22.19

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							

PACKERS

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Kind:					MAR 8 2019
Sizes:					WV Department of Environmental Protection
Depths Set:					

WW-6B
(10/14)

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

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill and stimulate any potential zones between and including the Benson to Marcellus. **If we should encounter a void place basket above and below void area- balance cement to bottom of void and grout from basket to surface. Run casing not less than 20' below void nor more than 50' below void. (*If freshwater is encountered deeper than anticipated it must be protected, set casing 50' below and cts.)

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Well will be perforated within the target formation and stimulated with a slurry of water, sand, and chemical additives at a high rate. This will be performed in stages with the plug and perf method along the wellbore until the entire lateral has been stimulated within the target formation. All stage plugs are then drilled out and the well is flowed back to surface. The well is produced through surface facilities consisting of high pressure production unites, vertical separation units, water and oil storage tanks. Max press and anticipated max rate- 9000 lbs @ 80 barrels a minute.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 7.8

22) Area to be disturbed for well pad only, less access road (acres): 7.0

23) Describe centralizer placement for each casing string:

All casing strings will be ran with a centralizer at a minimum of 1 per every 3 joints of casing.

24) Describe all cement additives associated with each cement type:

See Attachment ***

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25) Proposed borehole conditioning procedures:

All boreholes will be conditioned with circulation and rotation for a minimum of one hour continuing until operator is satisfied with borehole conditions.

WV Department of
Environmental Protection

*Note: Attach additional sheets as needed.

Southwestern Energy Company	Proposed Drilling Program
------------------------------------	----------------------------------

Well: BARRY GREATHOUSE A BRK 6	Re-entry Rig: TBD
Field: PANHANDLE FIELD WET	Prospect: PANHANDLE
County: BROOKE	State: WV
SHL: 40.1915 Latitude -80.6356 Longitude	
BHL: 40.1577 Latitude -80.6196 Longitude	
KB Elev: 1,163 ft MSL	KB: 26 ft AGL
	GL Elev: 1,136 ft MSL



C. J. [Signature]

PROD TOC Lead @ 1,637' MD

PROD TOC Tail @ 5,100' MD

2-22-19

0' to 395'
Air / Mist

395' to 1,637'
Air / Mist

1,637' to 5,230'
Air / Mist

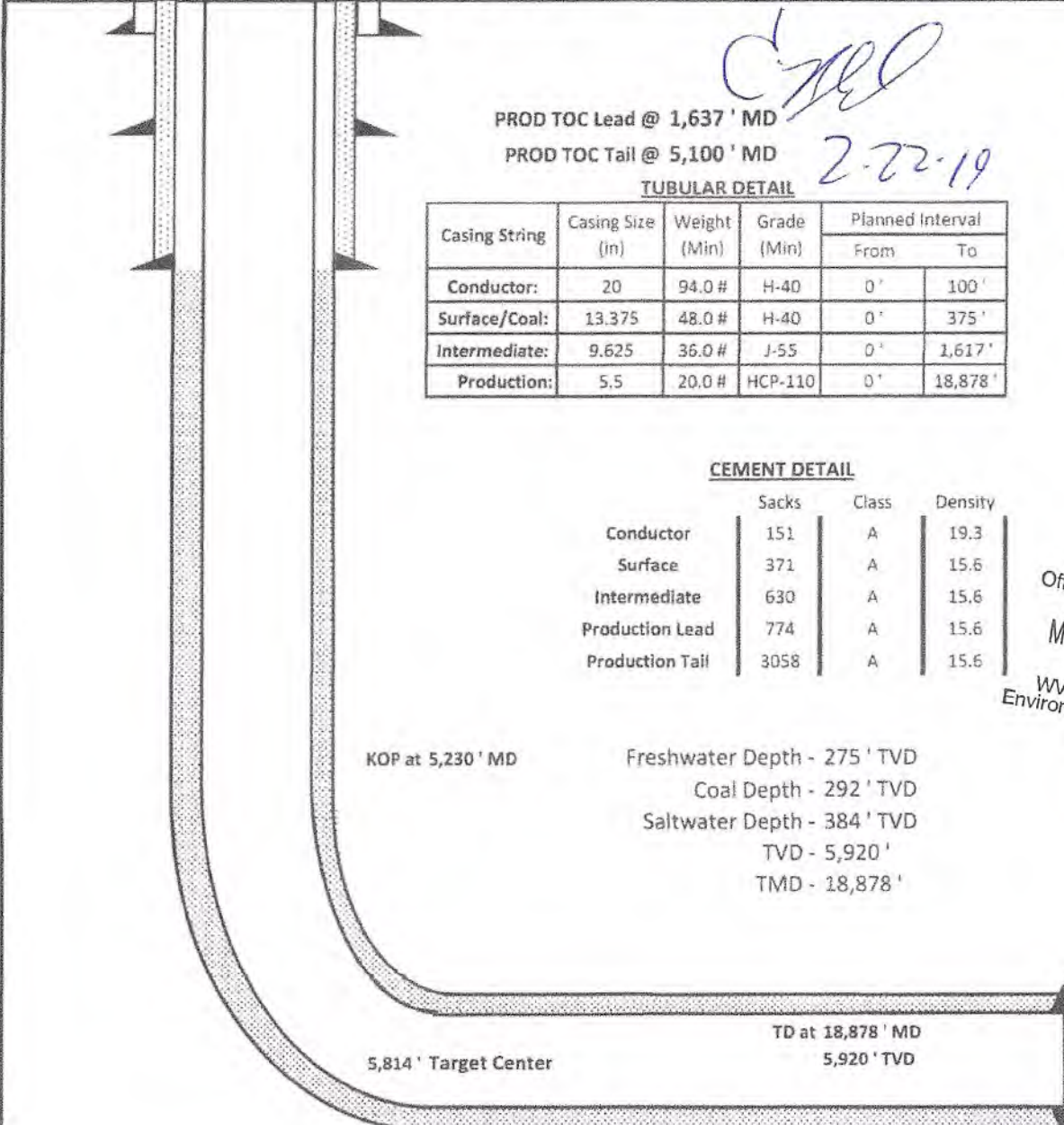
TUBULAR DETAIL

Casing String	Casing Size (In)	Weight (Min)	Grade (Min)	Planned Interval	
				From	To
Conductor:	20	94.0 #	H-40	0'	100'
Surface/Coal:	13.375	48.0 #	H-40	0'	375'
Intermediate:	9.625	36.0 #	J-55	0'	1,617'
Production:	5.5	20.0 #	HCP-110	0'	18,878'

CEMENT DETAIL

	Sacks	Class	Density
Conductor	151	A	19.3
Surface	371	A	15.6
Intermediate	630	A	15.6
Production Lead	774	A	15.6
Production Tail	3058	A	15.6

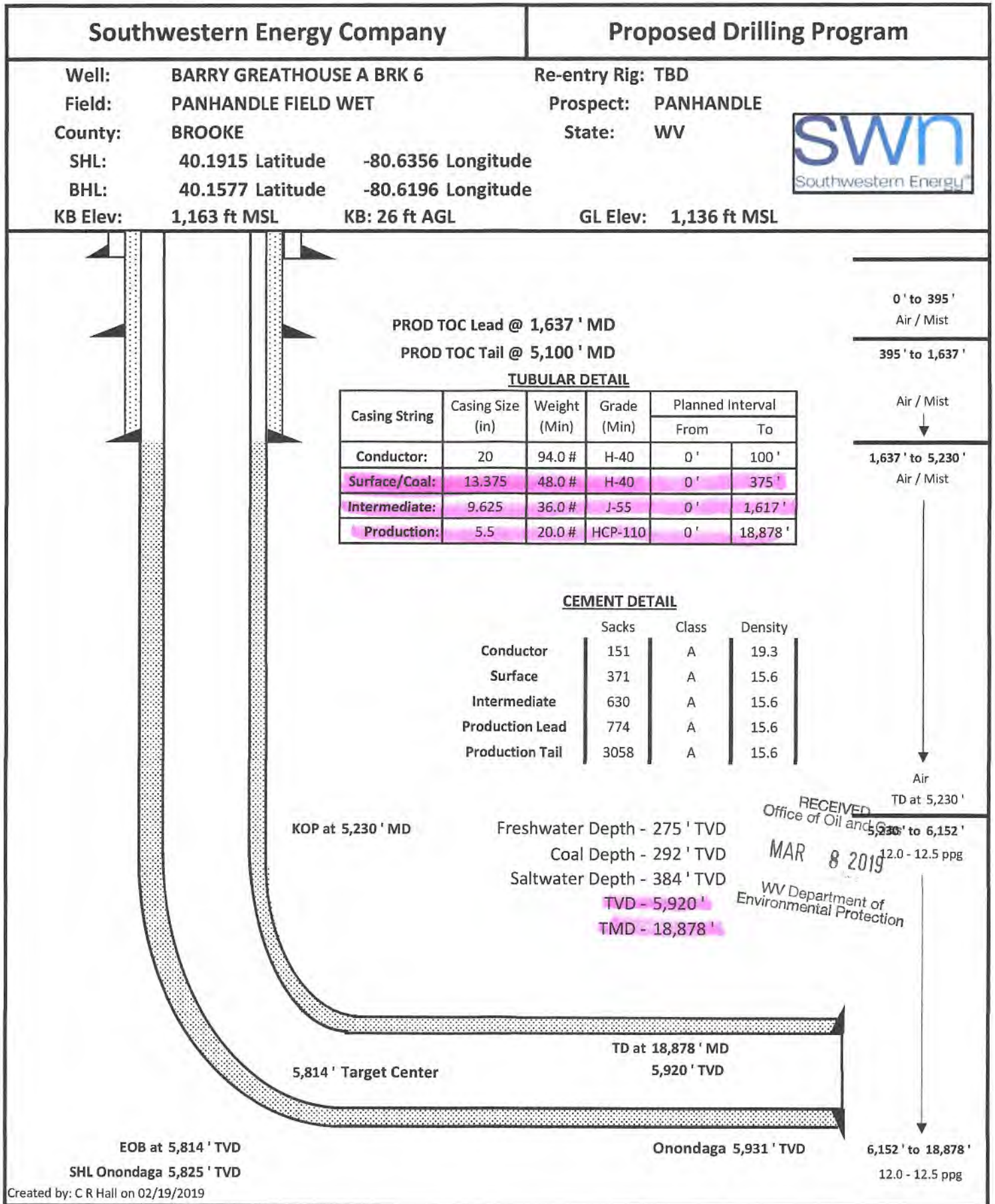
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MAR 8 2019
WV Department of Environmental Protection



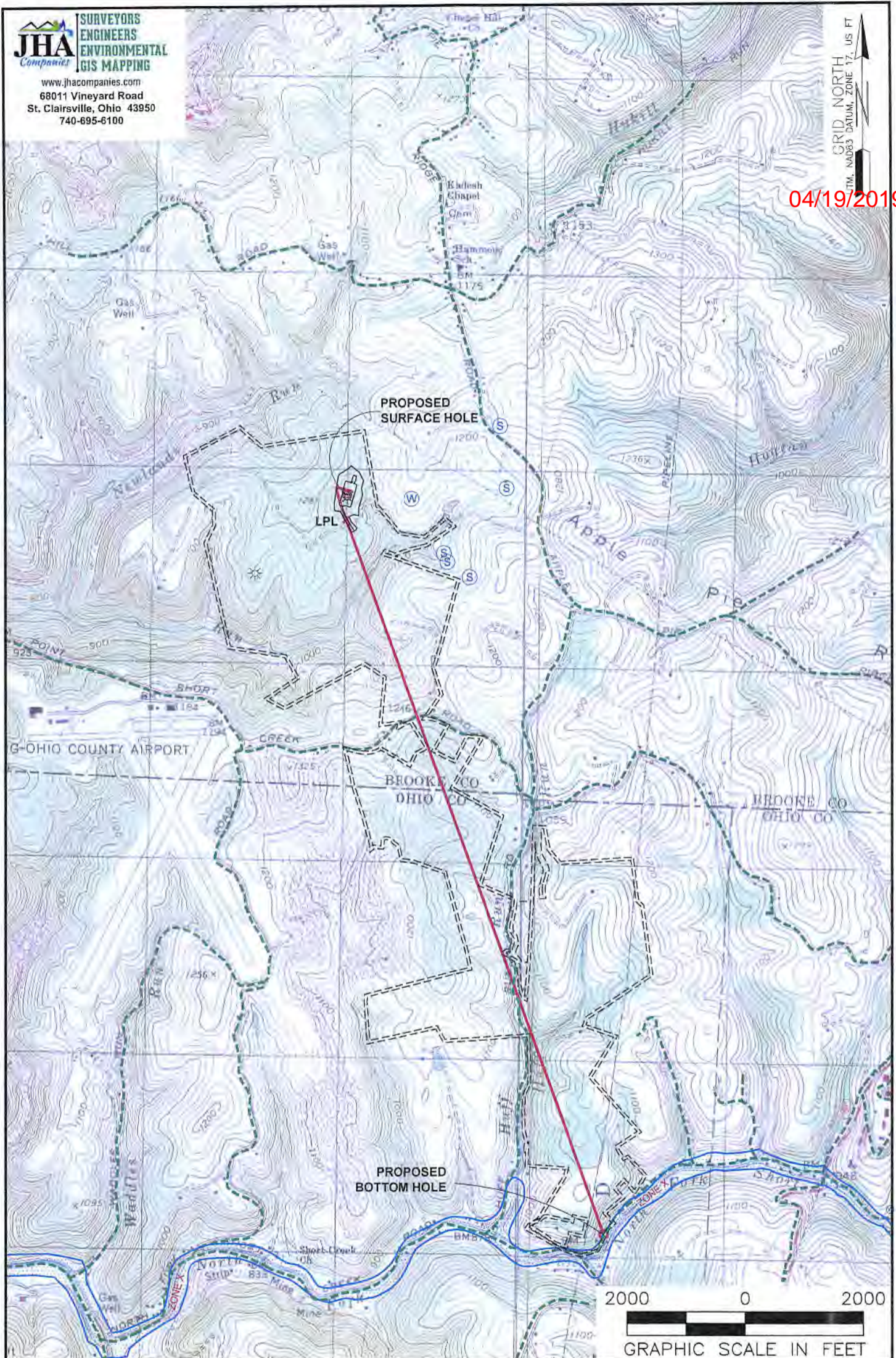
Freshwater Depth - 275' TVD
Coal Depth - 292' TVD
Saltwater Depth - 384' TVD
TVD - 5,920'
TMD - 18,878'

5,230' to 6,152'
12.0 - 12.5 ppb

04/19/2019



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★ LANDING POINT LOCATION
- ⬜ 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 # 6H	SERIAL # XXXX
ADDRESS: 1300 FORT PIERPONT DRIVE, SUITE 201, MORGANTOWN, WV 26508		COUNTY: BROOKE	CODE: 009	DISTRICT: BUFFALO	API # 47-009-XXXX
SURFACE OWNER: BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE		USGS 7 1/2 QUADRANGLE MAP NAME: TILTONVILLE, OH-WV & BETHANY, WV-PA			

(2000' SCALE) SURFACE HOLE LATITUDE 40°12'30" 10189' 2976'

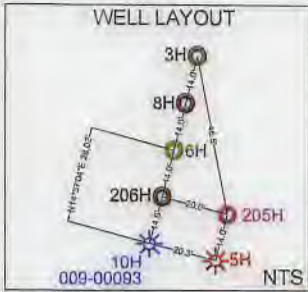
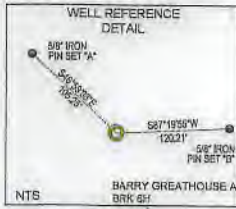
(2000' SCALE) BOTTOM HOLE LATITUDE 40°10'00" 10189'



www.jhacompanies.com
68011 Vineyard Road
St. Clairsville, Ohio 43950
740-595-6100

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

GRID NORTH
UTM, NAD83 DATUM, ZONE 17, U.S. FOOT
(2000' SCALE) BOTTOM HOLE LONGITUDE: -80°35'00"
(2000' SCALE) SURFACE HOLE LONGITUDE: -80°37'30"



SURFACE HOLE LOCATION (SHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4449079.29 EASTING: 531014.73
LANDING POINT LOCATION (LPL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4448949.85 EASTING: 531012.26
BOTTOM HOLE LOCATION (BHL): UTM (NAD83, ZONE 17, METERS): NORTHING: 4445329.04 EASTING: 532398.46

LINE	BEARING	DISTANCE
L1	S14°49'43"W	1111.88'
L2	N34°42'12"W	1125.65'



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 *Howard D. Kemp*

SWN Production Company, LLC Production Company™

<p>(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WVDEP OFFICE OF OIL & GAS 601 57TH STREET CHARLESTON, WV 25034</p>	MINIMUM DEGREE OF ACCURACY: 1/200 PROVEN SOURCE OF ELEVATION: SURVEY GRADE GPS (NAVD 88, US FT)	BARRY GREATHOUSE A BRK OPERATOR'S WELL #: 6H API WELL #: 47 009 00230M STATE COUNTY PERMIT
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WELL TYPE: OIL WASTE DISPOSAL PRODUCTION DEEP GAS LIQUID INJECTION STORAGE SHALLOW

WATERSHED: UPPER OHIO SOUTH ELEVATION: 1136.2'

DISTRICT: BUFFALO COUNTY: BROOKE QUADRANGLE: TILTONSVILLE, OH & BETHANY, WV

SURFACE OWNER: BARRY L. GREATHOUSE & PATRICIA A. GREATHOUSE ACREAGE: ±229.00

OIL & GAS ROYALTY OWNER: RAYLE COAL COMPANY ACREAGE: ±229.00

DRILL DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION

CONVERT PLUG & ABANDON CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY)

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: 5,920' TVD 18,878' 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: PROPOSED SURFACE HOLE / BOTTOM HOLE EXISTING / PRODUCING WELLHEAD LPL EXISTING WATER WELL EXISTING SPRING	SURVEYED BOUNDARY DRILLING UNIT LEASE BOUNDARY PROPOSED PATH	REVISIONS: DATE: 02-20-2019 API NO: 47-009-XXXX DRAWN BY: D. REED SCALE: 1" = 3000' DRAWING NO: 2017-422 WELL LOCATION PLAT
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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	DANNY GENE & VIRGINIA BRITT	03-B46-0027.0000
3	GRACE FRIEND	03-B46-0030.0000
4	TERRY L. CRUPE	03-B46-0033.0000
5	MY THREE SONS HOLDINGS, LP	03-B46-0024.0000
6	ULRICH UTT	04-R6-24.1
7	ULRICH UTT	04-R6-24.2
8	GARY & MARTHA HERCULES	04-R6-6.1
9	MARTHA HERCULES	04-R6-7
10	GARY & MARTHA HERCULES	04-R6-5
11	RAYLE COAL COMPANY	04-R6-17.3
12	WINDSOR COAL COMPANY	04-R6-12
13	WAYNE E. SHOOK	04-R6-15
14	CHARLES B. DAVIS, III & ELIZABETH MARIE DAVIS	04-R6-14.4
15	WINDELL H., II & GLADYS GOFF	04-R6-27.1
16	NICOLE L. CARENBAUER	04-R6-28.6
17	RANDALL L. CRABTREE & CYNTHIA S. KOVALSKI	04-R6-27.3
18	RANDALL CRABTREE	04-R6-28.8
19	CHARLES J. ROBINSON (L/E) & RANDALL CRABTREE	04-R6-27.2
20	RANDALL L. CRABTREE & CYNTHIA S. KOVALSKI	04-R6-27.4
21	RALPH D., JR. & GRACE A. ROBINSON	04-R6-27

04/19/2019

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	DALE T. WOOD & MARY R. WOOD	03-B41-0084.0000
D	JAMES B. GEBHARDT & MELISSA D. GEBHARDT	03-B46-0029.0000
E	RACHEL R. BAXTER	03-B46-0028.0000
F	CRAIG ALLEN PITNER	03-B46-0031.0000
G	CHARLES P. GEBHARDT, FREIDA GEBHARDT & JAMES GEBHARDT	03-B46-0032.0000
H	RICHARD A. HARRIS	03-B46-0034.0000
I	ALFRED & DONNA L. SCHELL	03-B46-0037.0000
J	MELISSA KERNS, CHRISTINA A. KERNS, TIMOTHY E. KERNS & JEANETTE M. KERNS	03-B46-0040.0001
K	TIMOTHY E. KERNS & JEANETTE M. KERNS	04-R6-8.1
L	MELISSA ANN KERNS	04-R6-8
M	FLORENCE E. WHITE & JOHN M. WHITE	04-R6-10
N	GARY & MARTHA HERCULES	04-R6-6
O	GARY HERCULES	04-R6-16
P	MARK A. WADE & MARY IVA WADE-SMITH	03-B47-0004.0000
Q	MARK A. WADE & MARY IVA WADE-SMITH	04-R6-11
R	DALE M. SAMPSON	03-L1-2
S	DALE M. SIMPSON	04-R6-13
T	MADONA DAVIS	04-R6-14
U	SUZANNE D. & CHAD D. CLUTTER	04-R6-14.6
V	SUZANNE D. & CHAD D. CLUTTER	04-R6-14.5
W	CHARLES B. DAVIS, III & ELIZABETH MARIE DAVIS	04-R6-14.3
X	CHARLES & ELIZABETH M. DAVIS	04-R6-14.2
Y	DUANE RUPERT & LAURIE RUPERT	04-R6-31
Z	DUANE RUPERT & LAURIE RUPERT	04-R6-30
AA	STEVEN M. & E.K. WHITMIRE	04-R6-28.1
AB	STEVEN M. & E.K. WHITMIRE	04-R6-28.5
AC	CALVARY BAPTIST CHURCH, TRUSTEES	04-R6-28.4
AD	ADAM J. SHUBA	04-R6-35
AE	LARRY & TERRY BOYNES	04-R9-22.9
AF	ROBERT L., II & JENNIFER JEWELL; JANE ANN AMONS	04-R6-40
AG	LESLIE A. HUNT	04-R6-29
AH	DOUGLAS & JACQUELINE HUDSON	04-R6-28.7
AI	RALPH D., JR. & G.A. ROBINSON	04-R6-28.2
AJ	RANDALL L. CRABTREE & CYNTHIA S. KOVALSKI	04-R6-28.9
AK	DOUGLAS & JACQUELINE HUDSON	04-R6-28.3
AL	WINDELL H., II & GLADYS GOFF	04-R6-24.3
AM	SHORT CREEK COAL COMPANY	04-R6-17.4
AN	SHORT CREEK COAL COMPANY	04-R6-17
AO	OHIO COUNTY BOARD OF COMMISSIONERS	04-R5-55
AP	MARC SEAMON	04-R6-2
AQ	GARY & MARTHA HERCULES	04-R6-4.1
AR	GARY & MARTHA HERCULES	04-R6-4
AS	BRUCE D. BONAR & WILLIAM BONAR	03-B46-0020.0000
AT	TRACY GILBERT	03-B46-0023.0001
AU	BUSTER T. & BARBARA A. BLAKE	03-B46-0023.0000
AV	GARY L. & MARGIE WILLIAMS	03-B46-0025.0000
AW	REBECCA FRIEND	03-B46-0026.0000
AX	TRACY GILBERT	03-B46-0022.0000
AY	TRACY GILBERT	03-B46-0022.0001
AZ	OHIO COUNTY BOARD OF COMMISSIONERS	04-R5-10
BA	STACY ANN HAYMAN & PATRICIA ANN GREATHOUSE	03-B46-0041.0000
BB	BARRY L. & PATRICIA A. GREATHOUSE	03-B41-0083.0000
BC	FREDERICK C. HAYMAN, JR. & STACEY A. HAYMAN	03-B41-0083.0001
BD	BARRY L. & PATRICIA A. GREATHOUSE	03-B41-0032.0000

REVISIONS:

COMPANY:

SWN
Production Company, LLC

SWN ^{Re-Adv+}
Production Company™

OPERATOR'S BARRY GREATHOUSE A BRK

WELL #: 6H

DISTRICT:
BUFFALO

COUNTY:
BROOKE

STATE:
WV

DATE: 02-20-2019
API NO: 47-009-XXXX
DRAWN BY: D. REED
SCALE: N/A
DRAWING NO: 2017-422
WELL LOCATION PLAT

PROPERTY NUMBER 2501166093
PAD ID 3001156331

47-009-00230

WW-6A1
(5/13)

Barry Greathouse A
BRK 6H
Operator's Well No. _____

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that--

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
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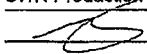
See Exhibit A

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: SWN Production Co., LLC
 By:  Gary Nuckolls
 Its: Staff Landman

Page 1 of _____

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Office of Oil and Gas
MAR 8 2019

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Environmental Protection

EXHIBIT "A"

Attached to and made a part of the State of West Virginia Oil and Gas Permit Form, WW-6A1, by SWN Production Company, LLC., Operator
 Barry Greathouse A BRK 6H
 Brooke County, West Virginia

#	TMP	SURFACE OWNER	LESSOR	LESSEE	ROYALTY	BK/PG	
1)	03-0B41-0082-0000-0000	Barry L. Greathouse and Patricia A. Greathouse	Rayle Coal Company	Chesapeake Appalachia, LLC	15.50%	10/751	
				SWN Production Company, LLC		32/384	
				Great Lakes Energy Partners, LLC	15.50%	26/649	
				Range Resources-Appalachia, LLC		20/733	
				Chesapeake Appalachia, LLC		10/552	
2)	03-0B46-0027-0000-0000	Danny Gene Britt and Virginia Margaret Britt	Danny Gene Britt and Virginia Margaret Britt	SWN Production Company, LLC		33/492	
				Great Lakes Energy Partners, LLC	12.50%	10/109	
				Range Resources-Appalachia, LLC		20/733	
3)	03-0B46-0030-0000-0000	Grace Laverta Friend	Charles Friend and Grace Friend	Chesapeake Appalachia, LLC	18.00%	20/86	
				SWN Production Company, LLC		30/480	
				Chesapeake Appalachia, LLC		10/552	
4)	03-0B46-0033-0000-0000	Terry L. Crupe	Terry Lee Crupe	SWN Production Company, LLC		30/480	
				Chesapeake Appalachia, LLC	18.00%	11/307	
5)	03-0B46-0024-0000-0000	My Three Sons Holdings, LP	David Brandimarte	Chesapeake Appalachia, LLC	18.00%	23/516	
				SWN Production Company, LLC		30/480	
				Gregory Brandimarte and Susan Brandimarte	Chesapeake Appalachia, LLC	18.00%	23/511
				SWN Production Company, LLC		30/480	
				Josephine Jordan	Chesapeake Appalachia, LLC	18.00%	22/166
				SWN Production Company, LLC		30/480	
				Patrick Villinger and Teaua Villinger	Chesapeake Appalachia, LLC	18.00%	23/625
				SWN Production Company, LLC		30/480	
				Brandt Price and Linda Price	Chesapeake Appalachia, LLC	18.00%	23/212
				SWN Production Company, LLC		30/480	
				Brian Mokricky and Myra Mockricky	Chesapeake Appalachia, LLC	18.00%	24/684
				SWN Production Company, LLC		30/480	
				Anna Wilson	Chesapeake Appalachia, LLC	18.00%	25/367
SWN Production Company, LLC		30/480					
Donna Yost	Chesapeake Appalachia, LLC	18.00%	22/161				
SWN Production Company, LLC		30/480					
Marie P. Fisher and Lulu Fisher				Great Lake Energy Partners, LLC	15.50%	9/637	
				Range Resources-Appalachia, LLC		20/733	
				Chesapeake Appalachia, LLC		10/552	
				SWN Production Company, LLC		30/480	

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EXHIBIT "A"

Attached to and made a part of the State of West Virginia Oil and Gas Permit Form, WW-6A1, by SWN Production Company, LLC., Operator
Barry Greathouse A BRK 6H
Brooke County, West Virginia

6)	04-R06-0024-0001-0000	Ulrich Utt	Ulrich Utt	Chesapeake Appalachia, LLC SWN Production Company, LLC	18.00%	818/485 884/681
7)	04-R06-0024-0002-0000	Ulrich Utt	Ulrich Utt	Chesapeake Appalachia, LLC SWN Production Company, LLC	18.00%	818/332 884/681
8)	04-R06-0006-0001-0000	Gary Hercules and Martha Hercules	Gary Hercules and Martha Hercules	SWN Production Company, LLC	16.00%	926/87
9)	04-R06-0007-0000-0000	Martha Hercules	Martha Hercules	SWN Production Company, LLC	16.00%	926/87
10)	04-R06-0005-0000-0000	Gary Hercules and Martha Hercules	Gary Hercules and Martha Hercules	SWN Production Company, LLC	16.00%	926/87
11)	04-R06-0017-0003-0000	Rayle Coal Company	Rayle Coal Company	Chesapeake Appalachia, LLC SWN Production Company, LLC	18.00%	808/334 883/403
12)	04-R06-0012-0000-0000	Windsor Coal Company	Noble Energy, Inc.	Chesapeake Appalachia, LLC SWN Production Company, LLC	16.00%	876/156 916/558
13)	04-R06-0015-0000-0000	Wayne E. Shook	Wayne E. Shook	Chesapeake Appalachia, LLC SWN Production Company, LLC	18.00%	813/570 884/421
14)	04-R06-0014-0004-0000	Elizabeth Marie Davis	Charles B. Davis, Jr. and Madona Davis	Chesapeake Appalachia, LLC	18.00%	808/332
				SWN Production Company, LLC		883/391
			Elizabeth Marie Davis	Chesapeake Appalachia, LLC	18.00%	808/332
				SWN Production Company, LLC		883/391
15)	04-R06-0027-0001-0000	Windell H. Goff and Gladys Goff	Windell H. Goff and Gladys Goff	Chesapeake Appalachia, LLC SWN Production Company, LLC	18.00%	813/688 884/421
16)	04-R06-0028-0006-0000	Nicole L. Carenbauer	Nicole L. Carenbauer	SWN Production Company, LLC	18.00%	929/79
17)	04-R06-0027-0003-0000	Randall L. Crabtree and Cythnia S. Kovalski	Golden Eagle Resources, LLC	SWN Production Company, LLC	18.00%	See attached Memorandum of Oil and Gas Lease
18)	04-R06-0028-0008-0000	Randall Crabtree	Randall Crabtree	SWN Production Company, LLC	16.00%	920/910
19)	04-R06-0027-0002-0000	Charles J. Robinson & Randall Crabtree	Charles J. Robinson & Randall Crabtree	SWN Production Company, LLC	16.00%	922/432
20)	04-R06-0027-0004-0000	Randall L. Crabtree and Cythnia S. Kovalski	Golden Eagle Resources, LLC	SWN Production Company, LLC	18.00%	See attached Memorandum of Oil and Gas Lease
21)	04-R06-0027-0000-0000	Ralph D. Robinson, Jr. & Grace A. Robinson	Ralph D. Robinson, Jr. & Grace A. Robinson	SWN Production Company, LLC	14.00%	925/360

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MEMORANDUM OF OIL AND GAS LEASE

This Memorandum of Oil and Gas Lease made this 4th day of March, 2019, by and between Golden Eagle Resources, LLC of 1801 Smith Street, Suite 2000 Houston, TX 77002, hereinafter collectively called "Lessor," and SWN Production Company, LLC, a Texas limited liability company, 10000 Energy Drive, Spring, Texas 77389, hereinafter called "Lessee."

WITNESSETH

For and in consideration of the sum of Ten Dollars (\$10.00) cash in hand paid, and other good and valuable consideration, Lessor did make and execute in favor of Lessee an Oil and Gas lease dated March 4, 2019, and made effective March 4, 2019, which provides for a Five (5) year primary term covering Lessor's interest limited to the Marcellus and Utica/Point Pleasant Formations as further defined in the Lease and in the following described lands in Richland District(s), Ohio County, West Virginia:


DESCRIPTION: The Leasehold is located in the District of Richland, in the County of Ohio, in the State of West Virginia, and described as follows:

Tax Map No(s): 04-00R6-0027-0003 and is bounded substantially by lands now or formerly owned as follows:
On the North By: 04-00R6-0014-0004
On the East By: 04-00R6-0014-0002
On the South By: 04-00R6-0031-0000 & 04-00R6-0028-0008
On the West By: 04-00R6-0027-0001 & 04-00R6-0028-0006


including lands acquired from James E. O'Donnell and Pauline O'Donnell by virtue of deed dated 02/09/2015, and recorded in Book 892, Page 327, and described for the purposes of this agreement as containing a total of 15.66 Leasehold acres, whether actually more or less, and including contiguous lands owned by Lessor. This lease may be extended beyond the primary term by certain activities including, without limitation, conducting operations, producing oil or gas, or making prescribed payments. ~~This lease also grants to Lessee a Right of First Refusal to match any offer to top lease the leased premises, which right may be exercised by Lessee within fifteen (15) days after receipt of proper notice from Lessor.~~

This Memorandum of Oil and Gas Lease is being made and filed for the purposes of giving third parties notice of the existence of the Lease described above. The execution, delivery and recordation of this Memorandum of Oil and Gas Lease shall have no effect upon, and is not intended as an amendment of the terms and conditions of the Lease. It is the intent of the Lessor to lease all of Lessor's interest in and to the properties described herein, whether or not the tracts recited herein are properly described, and further it is understood this lease includes all rights owned by the Lessor in the properties described herein.


IN WITNESS WHEREOF this memorandum of Oil and Gas Lease is executed as of the date first above written.

WITNESS:



Cecile Cao


LESSOR(s):


Golden Eagle Resources, LLC
By: Michael Faust
Authorized Member

WITNESS:


Paul M. Lynch

LESSEE:
SWN Production Company, LLC
A Texas limited liability company


Michael K. Bishop
Land Manager


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CORPORATE ACKNOWLEDGMENT

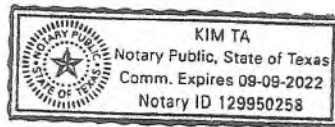
STATE OF TEXAS

COUNTY OF HARRIS

On this, the 5th day of March, 2019, before me, the undersigned officer, personally appeared Michael Faust, who acknowledged himself to be the Authorized Member of Golden Eagle Resources, LLC, and that he as such Authorized Member, being authorized to do so, executed foregoing instrument for the purpose therein contained by signing the name of the corporation by himself as Authorized Member.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission Expires: 9/9/2022
Signature/Notary Public: [Signature]
Name/Notary Public (print): Kim Ta



CORPORATE ACKNOWLEDGMENT

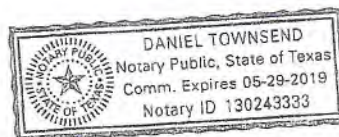
STATE OF TEXAS

COUNTY OF HARRIS

On this, the 5 day of March, 2019, before me, the undersigned officer, personally appeared Michael K. Bishop, who acknowledged himself to be the Land Manager of SWN Production Company LLC, a Texas Limited Liability Company, and that he as such Land Manager, being authorized to do so, executed foregoing instrument for the purpose therein contained by signing the name of the corporation by himself as Land Manager.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission Expires: May 29, 2019
Signature/Notary Public: [Signature]
Name/Notary Public (print): Daniel Townsend



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Tax Map No(s): 04-00R6-0027-0004 and is bounded substantially by lands now or formerly owned as follows:
On the North By: 04-00R6-0027-0002
On the East By: 04-00R6-0027-0000
On the South By: 04-00R6-0027-0000
On the West By: 04-00R6-0027-0000

including lands acquired from James E. O'Donnell and Pauline O'Donnell by virtue of deed dated 02/09/2015, and recorded in Book 892, Page 327, and described for the purposes of this agreement as containing a total of 1.852 Leasehold acres, whether actually more or less, and including contiguous lands owned by Lessor. This lease may be extended beyond the primary term by certain activities including, without limitation, conducting operations, producing oil or gas, or making prescribed payments. ~~This lease also grants to Lessee a Right of First Refusal to match any offer to re-lease the leased premises, which right may be exercised by Lessee within fifteen (15) days after receipt of proper notice from Lessor.~~

This Memorandum of Oil and Gas Lease is being made and filed for the purposes of giving third parties notice of the existence of the Lease described above. The execution, delivery and recordation of this Memorandum of Oil and Gas Lease shall have no effect upon, and is not intended as an amendment of the terms and conditions of the Lease. It is the intent of the Lessor to lease all of Lessor's interest in and to the properties described herein, whether or not the tracts recited herein are properly described, and further it is understood this lease includes all rights owned by the Lessor in the properties described herein.

IN WITNESS WHEREOF this memorandum of Oil and Gas Lease is executed as of the date first above written.

WITNESS:
Cecile
Cecile Cao

LESSOR(s):
Michael Faust
Golden Eagle Resources, LLC
By: Michael Faust
Authorized Member

WITNESS:
Paul M. Kach
PAUL M. KACH

LESSEE:
SWN Production Company, LLC
A Texas limited liability company
Michael K. Bishop
Michael K. Bishop
Land Manager
p.m.b

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CORPORATE ACKNOWLEDGMENT

STATE OF TEXAS

COUNTY OF HARRIS

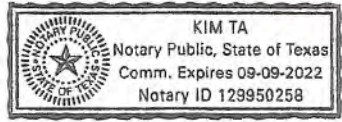
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IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission Expires: 9/9/2022

Signature/Notary Public: [Signature]

Name/Notary Public (print): Kim Ta



CORPORATE ACKNOWLEDGMENT

STATE OF TEXAS

COUNTY OF HARRIS

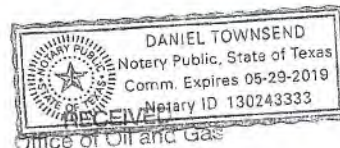
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IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission Expires: May 29, 2019

Signature/Notary Public: [Signature]

Name/Notary Public (print): Daniel Townsend



MAR 8 2019

WV Department of Environmental Protection

February 18, 2019

Ms. Laura Adkins
WV DEP Office of Oil & Gas
601 57th St., SE
Charleston, WV 25304

RE: SWN's proposed New Well: Barry Greathouse A BRK 6H in Brooke County, West Virginia, Drilling under Girty's Point Road, Huft Run Road, and Short Creek Road.

Dear Ms. Adkins:

SWN Production Company, LLC ("SWN") is applying for a drilling permit for the above referenced well. The State of West Virginia has raised some concern as to SWN's right to drill under Girty's Point Road, Huft Run Road, and Short Creek Road. Please be advised that SWN has leased all mineral owners under said route as it relates to the above-referenced well and unit.

Thank you.

Sincerely,



Gary Nuckolls
Staff Landman
SWN Production Company, LLC

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The Right People doing the Right Things,
wisely investing the cash flow from our
underlying Assets, will create Value+®