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**west virginia** department of environmental protection

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

Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
www.dep.wv.gov

November 23, 2015

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-5101871, issued to SWN PRODUCTION COMPANY, LLC, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.



James Martin  
Chief

Operator's Well No: BETTY SCHAFER MSH 401H  
Farm Name: SCHAFER, BETTY JANE  
**API Well Number: 47-5101871**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 11/23/2015

**PERMIT CONDITIONS 4705101871**

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

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**CONDITIONS**

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1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.
9. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.


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

- 1) Well Operator: SWN Production Co., LLC 49447757 51-Marshall 9- Sand 486- Moundsville  
Operator ID County District Quadrangle
- 2) Operator's Well Number: Betty Schafer MSH 401H Well Pad Name: Betty Schafer Pad
- 3) Farm Name/Surface Owner: Betty Jane Schafer Public Road Access: Big Wheeling Creek
- 4) Elevation, current ground: 849' Elevation, proposed post-construction: 849'
- 5) Well Type (a) Gas  Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_  
(b) If Gas Shallow  Deep \_\_\_\_\_  
Horizontal
- 6) Existing Pad: Yes or No yes *ju 10/14/15*
- 7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):  
Target Formation- Marcellus, Target Top TVD- 6076', Target Base TVD- 6024', Anticipated Thickness- 54', Associated Pressure- 3600
- 8) Proposed Total Vertical Depth: ~~5856'~~ 5108' DEW
- 9) Formation at Total Vertical Depth: Marcellus
- 10) Proposed Total Measured Depth: 13,899'
- 11) Proposed Horizontal Leg Length: 11,592'
- 12) Approximate Fresh Water Strata Depths: 106'
- 13) Method to Determine Fresh Water Depths: from log analysis and nearby water wells
- 14) Approximate Saltwater Depths: 2000'
- 15) Approximate Coal Seam Depths: 360'
- 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: Shoemaker  
Depth: 650  
Seam: Pittsburgh  
Owner: Shoemaker

4705101871

18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	20"	New	H-40	94#	100'	100'	CTS
Fresh Water	13 3/8"	New	J-55	54.5#	300'	300'	288 sx/CTS
Coal	9 5/8"	New	J-55	40#	1626'	1626'	630 sx/CTS
Intermediate	7"	New	J-55	20#	If Needed	If Needed	If Needed/As Needed
Production	5 1/2"	New	HCP-110	20#	18,899'	18,899'	Load 1123 sx tall 2717 sx/100' inside 
Tubing	2 3/8"	New	P-110	4.7#	Approx. 5988'	Approx. 5988'	
Liners							

*ju 10/14/15*

<b>TYPE</b>	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Max. Associated Surface Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
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	9 5/8"	12 1/4"	0.395	3950	1768	Class A	1.19/50% Excess
Intermediate	7"	8 3/4"	0.317	4360	3250	Class A	1.20/15% Excess
Production	5 1/2"	8 3/4"	0.361	12360	9500	Class A	1.20/15% Excess
Tubing	2 3/8"	4.778"	0.190				
Liners							

**PACKERS**

Kind:	10K Arrowset AS1-X			
Sizes:	5 1/2"			
Depths Set:				

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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'-75' below void. (\*If freshwater is encountered deeper than anticipated it must be protected, set casing 50'-75' 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): 4.9

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.

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

See Attachment \*\*\*

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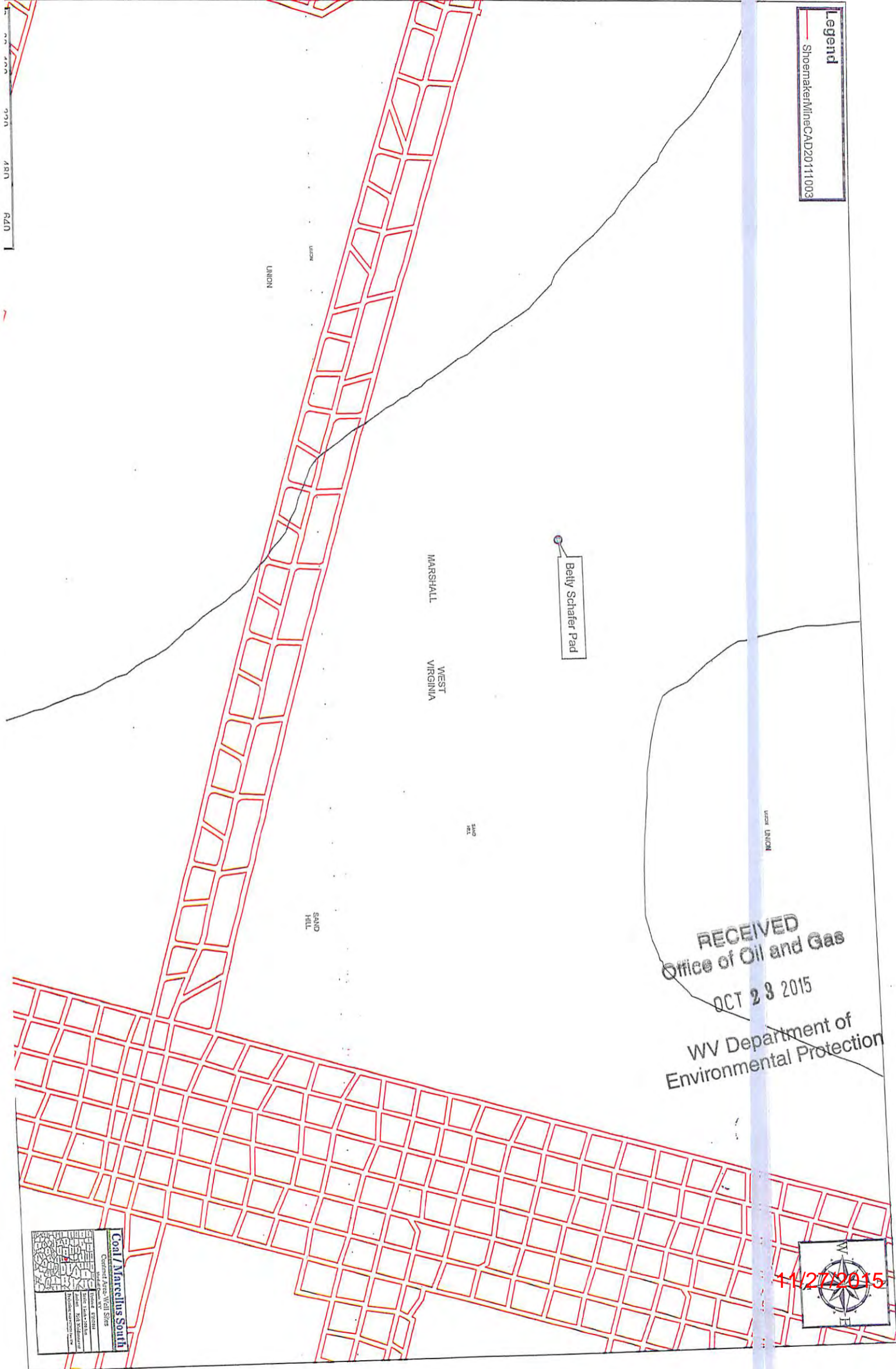
25) Proposed borehole conditioning procedures:

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

\*Note: Attach additional sheets as needed.

**Legend**

ShoemakerMineCAD20111003



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**Coal / Marcellus South**  
Contract Area: Well Sites  
Scale: 1 inch = 200 feet  
Author: R. B. [unreadable]  
Date: 11/27/2015

### Schlumberger Cement Additives

	Product Name	Product Use	Chemical Name	CAS Number
Surface	S001	accelerator	calcium chloride	10043-52-4
	S001	accelerator	calcium chloride	10043-52-4
Kick Off Plug	D080	dispersant	sodium polynaphthalene sulfonate	9008-63-3
	D801	retarder	aromatic polymer derivative	proprietary
	D047	antifoam	polypropylene glycol	25322-69-4
Production-Lead	D167	fluid loss	aliphatic amide polymer	proprietary
	D154	extender	non-crystalline silica	7631-86-9
	D400	gas migration	boric acid	10043-35-3
	D046	antifoam	polypropylene glycol	25322-69-4
			fullers earth (attapulgate)	8031-18-3
	D201	retarder	chrystalline silica	14808-60-7
			metal oxide	proprietary
D202	dispersant	sulphonated synthetic polymer	proprietary	
		formaldehyde (impurity)	proprietary	
Production-Tail	D046	antifoam	polypropylene glycol	25322-69-4
			fullers earth (attapulgate)	8031-18-3
	D167	fluid loss	aliphatic amide polymer	proprietary
	D065	dispersant	sodium polynaphthalene sulfonate	9008-63-3
			sodium sulfate	7757-82-6
	D201	retarder	chrystalline silica	14808-60-7
			metal oxide	proprietary
D153	anti-settling	chrystalline silica	14808-60-7	

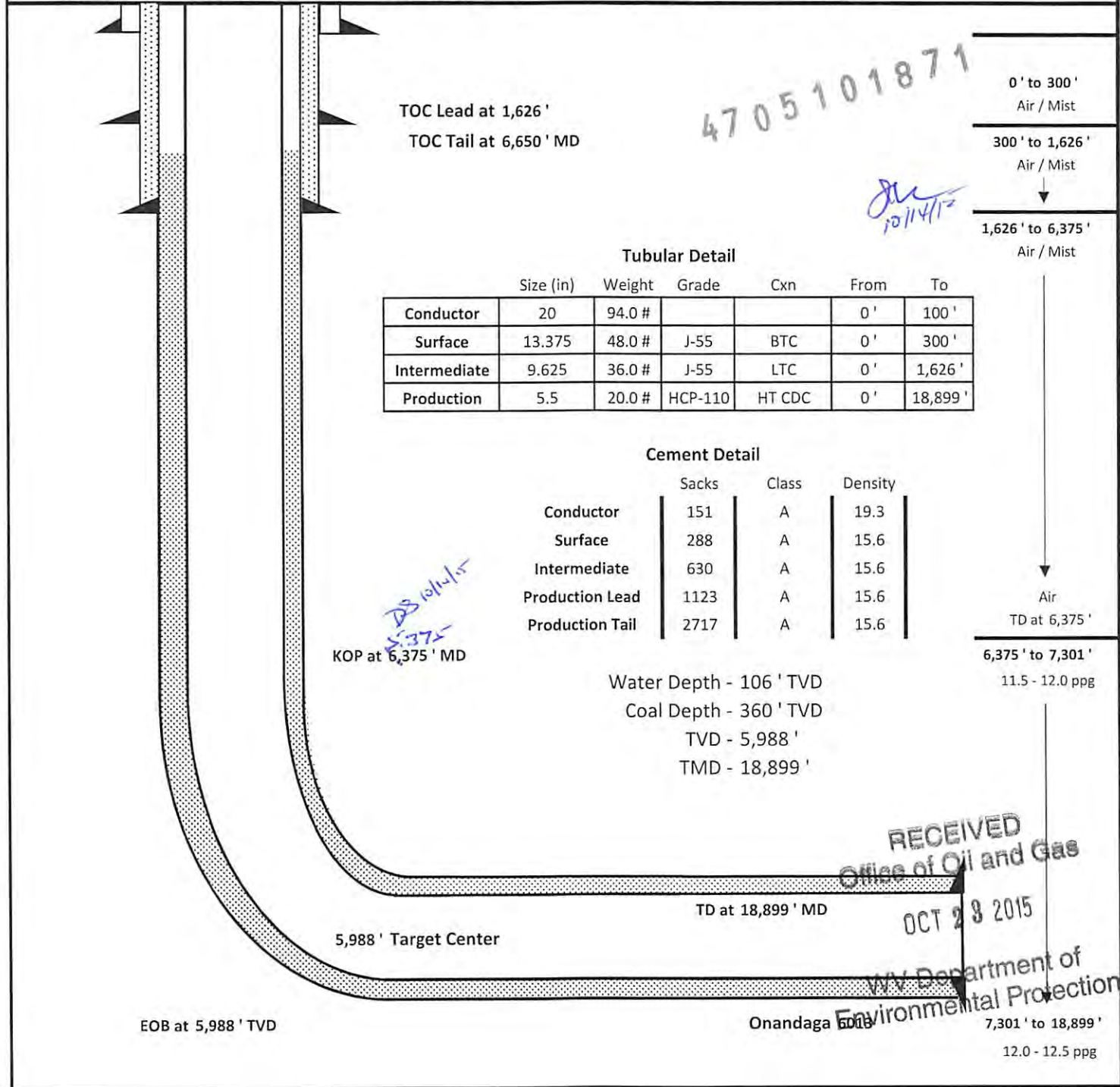
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**Southwestern Energy Company**

**Proposed Drilling Program**

Well: BETTY SCHAFER MSH 401 Re-entry Rig: 0  
 Field: PANHANDLE FIELD Prospect: PANHANDLE  
 County: MARSHALL State: WV  
 SHL: 39.9909 Latitude -80.63553 Longitude  
 BHL: 40.0185 Latitude -80.6625 Longitude  
 KB Elev: 875 ft MSL KB: 26 ft AGL GL Elev: 849 ft MSL



**Tubular Detail**

	Size (in)	Weight	Grade	Cxn	From	To
Conductor	20	94.0 #			0'	100'
Surface	13.375	48.0 #	J-55	BTC	0'	300'
Intermediate	9.625	36.0 #	J-55	LTC	0'	1,626'
Production	5.5	20.0 #	HCP-110	HT CDC	0'	18,899'

**Cement Detail**

	Sacks	Class	Density
Conductor	151	A	19.3
Surface	288	A	15.6
Intermediate	630	A	15.6
Production Lead	1123	A	15.6
Production Tail	2717	A	15.6

Water Depth - 106' TVD  
 Coal Depth - 360' TVD  
 TVD - 5,988'  
 TMD - 18,899'

11/27/2015



WW-9  
(9/13)

API Number 47 - 51 - \_\_\_\_\_  
Operator's Well No. Betty Schafer MSH 401H

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

4705101871

Operator Name SWN Production Co., LLC OP Code 49447757

Watershed (HUC 10) Middle Ohio North Quadrangle 486- Moundsville

Elevation 849' County 51-Marshall District 6- Sand Hill

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes  No

Will a pit be used? Yes  No

If so, please describe anticipated pit waste: closed loop system in place at this time- cuttings will be taken to a permitted landfill.

Will a synthetic liner be used in the pit? Yes  No  If so, what ml.? \_\_\_\_\_

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection ( UIC Permit Number 2D0072539/ 2D0413175/ 2D0610306/ 2D0610317 )
- Reuse (at API Number at next anticipated well, API# will be included with the WR-34/DDMR &/or permit addendum. )
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain flow back fluids will be put in steel tanks and reused or taken to a permitted disposal facility.)

Will closed loop system be used? If so, describe: Yes

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air drill to KOP, Fluid drill with SOBMs from KOP to TD

-If oil based, what type? Synthetic, petroleum, etc. Synthetic Oil Base

Additives to be used in drilling medium? see attached sheets

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) \_\_\_\_\_

-Landfill or offsite name/permit number? meadow SWF- 1032, SS Grading SWF- 4902, Northwestern SWF- 1025, Short Creek 1034/WW109517/CID28726, Carbon Limestone 28726/CID28726

Arden Landfill 100/2, American UZ-12954, Country Wide 38390/CID38390, Pine Grove 13688

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature \_\_\_\_\_

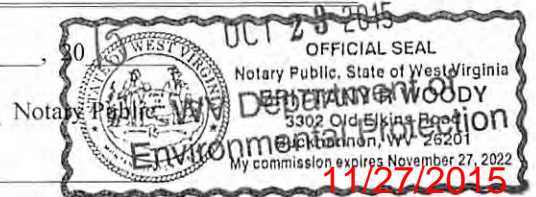
Company Official (Typed Name) Dee Southall

Company Official Title Regulatory Supervisor

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Subscribed and sworn before me this 11th day of June

Bethany R Woody  
My commission expires 11/27/2015



SWN Production Co., LLC

Proposed Revegetation Treatment: Acres Disturbed 7.8 Prevegetation pH \_\_\_\_\_

Lime as determined by pH test min. 2 \_\_\_\_\_ Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 600 lbs/acre

Mulch Hay/Straw 2.5 Tons/acre

Seed Mixtures

**Temporary**

**Permanent**

Seed Type	lbs/acre
White Grove	15
Red Top	15
Orchard Grass	20

Seed Type	lbs/acre
White Grove	15
Red Top	15
Orchard Grass	20

Attach:

Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

47 05 10 18 7 1

Plan Approved by: *James Anderson*

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Title: Oil and Gas Inspector

Date: 6/10/15

Field Reviewed? (  ) Yes (  ) No

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**Marcellus Well Drilling Procedures  
And Site Safety Plan**

SWN Production Co., LLC

47 - 051 -

Well name: Betty Schafer MSH 401H  
Moundsville, Quad  
Sand Hill, District  
Marshall County, West Virginia

4705101871

Submitted by:

Danielle Southall

6/6/2015

Date:

Title Regulatory Supervisor

SWN Production Co., LLC

Approved by:

Date:

6/7/15

Title: Oil & Gas Inspector

Approved by:

Date:

Title:

SWN Production Co., LLC – Confidential

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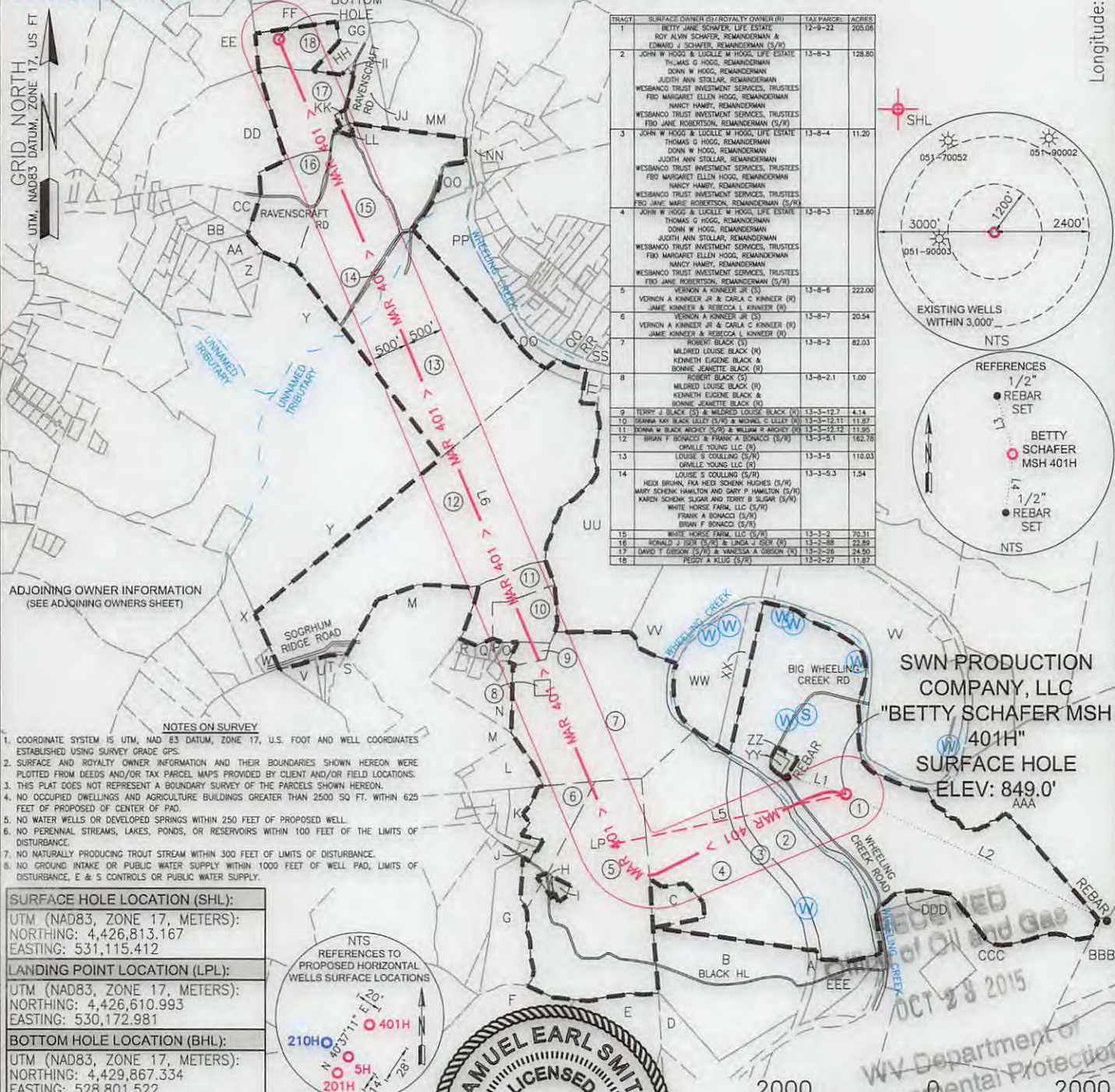
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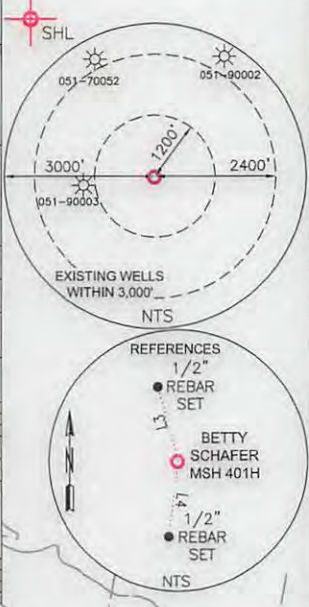
320 O'Bryan Lane • Van Buren, AR 72956  
Office: 479.474.7916 • Fax: 479.474.2450  
Surveying • handa-inc.com

LINE	BEARING	DISTANCE	DESCRIPTION	MONUMENT
L1	N 74°20'41" W	824.76'	SHL TO LANDMARK	FOUND 5/8" REBAR
L2	S 64°12'27" E	3872.88'	SHL TO LANDMARK	FOUND 1/2" REBAR
L3	N 15°34'51" W	294.41'	SHL TO REF. PNT.	1/2" REBAR SET
L4	S 07°18'59" W	292.69'	SHL TO REF. PNT.	1/2" REBAR SET
LINE	BEARING	DISTANCE	CURVE LENGTH	DESCRIPTION
L5	S 77°53'32" W	3162.31'		SHL TO LP
L6	N 22°50'21" W	11592.37'		LP TO BHL

2943'  
Latitude: 40°00'00"  
Longitude: 80°37'30"  
3314'



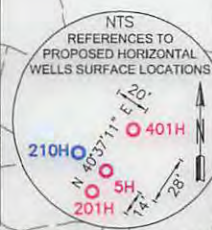
TRACT	SURFACE OWNER (S) / ROYALTY OWNER (R)	TAX PARCEL	ACRES
1	BETTY JANE SCHAFER, LIFE ESTATE; ROY ALVIN SCHAFER, REMANDERMAN & EDWARD J SCHAFER, REMANDERMAN (S/R)	12-9-22	200.09
2	JOHN W HOGG & LUCILLE W HOGG, LIFE ESTATE; THOMAS G HOGG, REMANDERMAN; DONN W HOGG, REMANDERMAN; JUDITH ANN STOLLAR, REMANDERMAN; WESSBACO TRUST INVESTMENT SERVICES, TRUSTEES; FBO MARGARET ELLEN HOGG, REMANDERMAN; NANCY HANBY, REMANDERMAN; WESSBACO TRUST INVESTMENT SERVICES, TRUSTEES; FBO JAMIE ROBERTSON, REMANDERMAN (S/R)	13-8-3	128.80
3	JOHN W HOGG & LUCILLE W HOGG, LIFE ESTATE; THOMAS G HOGG, REMANDERMAN; DONN W HOGG, REMANDERMAN; JUDITH ANN STOLLAR, REMANDERMAN; WESSBACO TRUST INVESTMENT SERVICES, TRUSTEES; FBO MARGARET ELLEN HOGG, REMANDERMAN; NANCY HANBY, REMANDERMAN; WESSBACO TRUST INVESTMENT SERVICES, TRUSTEES; FBO JAMIE ROBERTSON, REMANDERMAN (S/R)	13-8-4	11.20
4	JOHN W HOGG & LUCILLE W HOGG, LIFE ESTATE; THOMAS G HOGG, REMANDERMAN; DONN W HOGG, REMANDERMAN; JUDITH ANN STOLLAR, REMANDERMAN; WESSBACO TRUST INVESTMENT SERVICES, TRUSTEES; FBO MARGARET ELLEN HOGG, REMANDERMAN; NANCY HANBY, REMANDERMAN; WESSBACO TRUST INVESTMENT SERVICES, TRUSTEES; FBO JAMIE ROBERTSON, REMANDERMAN (S/R)	13-8-3	128.80
5	VERNON A KINNEER, JR & CARLA C KINNEER (R); JAMIE KINNEER & REBECCA L KINNEER (R)	13-8-6	222.00
6	VERNON A KINNEER, JR & CARLA C KINNEER (R); JAMIE KINNEER & REBECCA L KINNEER (R)	13-8-7	20.54
7	ROBERT BLACK (R); MILDRED LOUISE BLACK (R); KENNETH EUGENE BLACK & BONNIE JEANETTE BLACK (R)	13-8-2	82.03
8	MILDRED LOUISE BLACK (R); KENNETH EUGENE BLACK & BONNIE JEANETTE BLACK (R)	13-8-2.1	1.00
9	TERRY J BLACK (S) & MILDRED LOUISE BLACK (R)	13-3-12.7	4.14
10	DEANNA KAY BLACK LELLY (S/R) & MICHAEL G LELLY (R)	13-3-12.11	11.87
11	DEANNA W BLACK ARDREY (S/R) & WILLIAM W ARDREY (R)	13-3-12.12	11.87
12	BRIAN F BONACCI & FRANK A BONACCI (S/R); OMVILLE YOUNG LLC (R)	13-3-5.1	162.78
13	LOUISE S COULLING (S/R); OMVILLE YOUNG LLC (R)	13-3-5	110.03
14	LOUISE S COULLING (S/R); FRANK A BONACCI (S/R); BRIAN F BONACCI (S/R)	13-3-5.3	1.54
15	WHITE HORSE FARM, LLC (S/R)	13-3-2	70.31
16	RONALD J TISH (S/R) & LINDA J TISH (R)	13-3-88	22.89
17	DAVID T GIBSON (S/R) & YVONNE A GIBSON (R)	13-3-9	24.92
18	PEGGY A KLUG (S/R)	13-3-27	11.87



ADJOINING OWNER INFORMATION (SEE ADJOINING OWNERS SHEET)

- NOTES ON SURVEY
- COORDINATE 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/OR FIELD LOCATIONS.
  - THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARCELS SHOWN HEREON.
  - NO OCCUPIED DWELLINGS AND AGRICULTURE BUILDINGS GREATER THAN 2500 SQ FT. 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, OR RESERVOIRS WITHIN 100 FEET OF THE LIMITS OF DISTURBANCE.
  - NO NATURALLY PRODUCING TROUT STREAM WITHIN 300 FEET OF LIMITS OF DISTURBANCE.
  - NO GROUND INTAKE OR PUBLIC WATER SUPPLY WITHIN 1000 FEET OF WELL PAD, LIMITS OF DISTURBANCE, E & S CONTROLS OR PUBLIC WATER SUPPLY.

<b>SURFACE HOLE LOCATION (SHL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,426,813.167 EASTING: 531,115.412
<b>LANDING POINT LOCATION (LPL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,426,610.993 EASTING: 530,172.981
<b>BOTTOM HOLE LOCATION (BHL):</b>
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,429,867.334 EASTING: 528,801.522



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. 2315 *Samuel Earl Smith*

(+) 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 GRADE GPS ELEVATION: (NAVD 88, US FT)	COMPANY: <b>SWN</b> Production Company, LLC <b>SWN</b> Production Company™ BETTY SCHAFER MSH OPERATOR'S WELL #: 401H API WELL #: 47 51
	WELL TYPE: OIL <input type="checkbox"/> WASTE DISPOSAL <input type="checkbox"/> PRODUCTION <input 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"/>	WATERSHED: LITTLE WHEELING CREEK DISTRICT: SAND HILL COUNTY: MARSHALL SURFACE OWNER: BETTY JANE SCHAFER OIL & GAS ROYALTY OWNER: BETTY JANE SCHAFER, LE, ROY ALVIN SCHAFER, EDWARD J SCHAFER

WELL TYPE: OIL <input type="checkbox"/> WASTE DISPOSAL <input type="checkbox"/> PRODUCTION <input 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"/>	WATERSHED: LITTLE WHEELING CREEK DISTRICT: SAND HILL COUNTY: MARSHALL SURFACE OWNER: BETTY JANE SCHAFER OIL & GAS ROYALTY OWNER: BETTY JANE SCHAFER, LE, ROY ALVIN SCHAFER, EDWARD J SCHAFER	ELEVATION: 849.0' QUADRANGLE: MOUNDSVILLE, WV ACREAGE: ±205.06' ACREAGE: ±205.06'
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"/>	CONVERT <input type="checkbox"/> PLUG & ABANDON <input type="checkbox"/> CLEAN OUT & REPLUG <input type="checkbox"/> OTHER CHANGE (SPECIFY)	ESTIMATED DEPTH: 5,988' TVD 18,899' TMD

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

<b>LEGEND:</b> ○ PROPOSED SURFACE HOLE / BOTTOM HOLE ☼ EXISTING / PRODUCING WELLHEAD ⊗ ABANDONED WELL ⊗ PLUGGED & ABANDONED WELL △ CUT CONDUCTOR	(S) EXISTING SPRING (W) EXISTING WATER WELL --- LEASE BOUNDARY --- 500' DHP BUFFER --- MARCELLUS DHP --- ABANDONED PATH	<b>REVISIONS:</b> △ REVISED TVD & TMD, 10-15-2015 DATE: 10-12-2015 DRAWN BY: S. HUTTON SCALE: 1" = 2000' DRAWING NO: 59116 WELL LOCATION PLAT
---	--	---



320 O'Bryan Lane • Van Buren, AR 72956  
 Office: 479.474.7916 • Fax: 479.474.2450  
 Surveying • handa-inc.com

ADJOINING OWNERS

TRACT	SURFACE OWNER	TAX PARCEL	ACRES
A	CONSOLIDATION COAL COMPANY	13-8-4.1	2.40
B	CONSOLIDATION COAL COMPANY	13-8-3.1	51.93
C	VERNON A KINNEER	13-8-5	9.04
D	JOHN W HOGG & LUCILLE M HOGG, LIFE ESTATE	13-8-3	128.80
E	GEORGE A CUNNINGHAM	13-9-3	74.60
F	RICHARD A RITZ	13-9-6	77.51
G	JAMIE KINNEER	13-8-7.9	19.75
H	CONSOLIDATION COAL COMPANY	13-8-6.1	0.83
I	JAMIE KINNEER	13-8-6.2	1.13
J	CARL V MYERS	13-8-7.4	0.72
K	CARL V MYERS	13-8-7.8	4.45
L	MATTHEW G ROUSH	13-8-34	11.33
M	CAROL ANN LOY	13-8-1	82.48
N	KENNETH E BLACK	13-3-12	9.49
O	TERRY J BLACK	13-3-12.8	1.03
P	DEANNA K LILLEY	13-3-12.3	0.56
Q	MILDRED L BLACK	13-3-12.5	0.92
R	WILLIAM R ARCHEY	13-3-12.1	0.96
S	CHARLES D FUNK	13-8-32	12.76
T	JOSEPH J KOSTELECKY & CAROLYN KOSTELECKY	13-8-31.1	1.75
U	DARRELL R LANCASTER	13-8-31	0.98
V	THOMAS P ZAHNOW	13-8-30	3.28
W	EDITH VIRGINIA SAMPSON EST.	13-7-19	0.52
X	DURBIN KEYSTONE TRUST	13-7-18	12.67
Y	LOUISE S COULLING, HEIDI BRUHN, MARY SCHENK HAMILTON & GARY P HAMILTON, KAREN SCHENK SLIGAR & TERRY B SLIGAR, WHITE HORSE FARM, LLC, FRANK A BONACCI, & BRIAN F BONACCI	13-3-3	199.29
Z	MICHAEL W GAUGHAN ET UX	13-2-90	3.12
AA	JAMES R ABEL & SHERI L ABEL	13-2-89	4.29
BB	DAVID E MCLAUGHLIN & SHELLY L MCLAUGHLIN	13-2-87	2.73
CC	CHARLES R FOX & LINDA K FOX	13-2-29.2	5.11
DD	CHARLES ROBERT WILLIS ET AL	13-2-29	44.59
EE	RICHARD E LONG ET UX	13-2-34	20.92
FF	WILLIAM E GIBSON	13-2-28	14.73
GG	PEGGY A KLUG	13-2-27.1	2.68
HH	WILLIAM E GIBSON	13-2-24	3.54
II	JOHN C CLARK	13-2-25	0.08
JJ	JOHN A GARVIN	13-2-23	10.43
KK	DAVID T GIBSON	13-2-24.1	24.50
LL	GWAINE R FOLMAR	13-3-1	0.35
MM	COVENANT COMMUNITY CHURCH TRUSTEES	13-2-22	45.17
NN	KAREN SCHENK SLIGAR	12-1-5	55.65
OO	WHITE HORSE FARM LLC	13-3-6	6.01
PP	HEIDI SCHENK HUGHES	13-3-5.2	18.10
QQ	BRIAN MARTIN	12-1B-21	2.06
RR	THOMAS A DAWSON	12-1B-21.1	3.05
SS	ROBERT E MCADAMS & JODY L MCADAMS	12-1B-27.1	1.91
TT	CONSOLIDATION COAL COMPANY	13-3-7	2.00
UU	IRWIN BLACK	13-3-11	104.26
VV	JOHN ALVIN GRAY	13-3-14	126.24
WW	BETTY JANE SCHAFER, LIFE ESTATE	12-9-22	205.06
XX	BETTY JANE SCHAFER, LIFE ESTATE ROY ALVIN SCHAFER, REMAINDERMAN & EDWARD J SCHAFER, REMAINDERMAN	12-9-24	7.88
YY	BETTY JANE SCHAFER	12-9-23	0.50
ZZ	BETTY JANE SCHAFER	12-9-22.1	1.30
AAA	CHARLES B FISHER	12-9-2	132.66
BBB	CALVIN MERINAR	12-9-19	85.66
CCC	OLIVE GROSKOPF	12-10-1.2	85.43
DDD	EUGENE ROMAN	12-10-1	4.06
EEE	CONSOLIDATION COAL COMPANY	13-8-3.2	9.95

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 Environmental Protection  
 11/27/2015

REVISIONS:	COMPANY:	<b>SWN</b> Production Company, LLC	<b>SWN</b> Production Company™
	OPERATOR'S	BETTY SCHAFER MSH	DATE: 10-12-2015
	WELL #:	401H	DRAWN BY: S. HUTSON
	LOCATION:	SAND HILL DISTRICT, MARSHALL COUNTY, WEST VIRGINIA	SCALE: N/A
			DRAWING NO: 59116
			ADJOINING OWNERS

**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"

4705101871

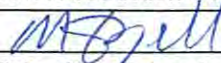
**Acknowledgement of Possible Permitting/Approval  
In Addition to the Office of Oil and Gas**

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

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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 Company LLC  
 By:   
 Its: Michael Ezell, Landman

Attached hereto and made part of the State of West Virginia Oil and Gas Permit Form WW-6A1 by SWN Production Company, LLC, Operator  
 Betty Schafer MSH 401H  
 Marshall County, West Virginia

Exhibit "A"

Tract #	Tax Parcel	Lessor/Grantor	Lessee	Royalty	BK/PG
1)	12-9-22	Betty Jane Schafer, Life Estate;	TriEnergy Holdings, LLC	18.00%	722/505
		Roy Alvin Schafer, remainderman;	NPAR, LLC		24/199
		Edward J. Schafer, remainderman;	Chevron USA, Inc.		756/332
		TriEnergy Holdings, LLC	Statoil USA Onshore Properties, Inc.		30/494
		NPAR, LLC	Chesapeake Appalachia, LLC		30/532
		Chevron USA, Inc.	SWN Production Company, LLC		33/110
		Statoil USA Onshore Properties, Inc.	Chesapeake Appalachia, LLC		834/204
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		John W. Hogg and Lucille M. Hogg	Chesapeake Appalachia, LLC		836/579
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110
2)	13-8-3	Thomas G. Hogg - remainderman	Chesapeake Appalachia, LLC	18.00%	834/210
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110
		Donn W. Hogg - remainderman	Chesapeake Appalachia, LLC		837/66
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		Judith Ann Stollar, Remainderman	Chesapeake Appalachia, LLC		836/563
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110
		WesBanco Trust Investment Services, Trustees under Trust Agreement dated February 29, 2012 fbo Margaret Ellen Hogg-Remainderman	Chesapeake Appalachia, LLC		836/585
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110
		Nancy Hamby - Remainderman	Chesapeake Appalachia, LLC		836/573
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110

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 OCT 23 2015

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Attached hereto and made part of the State of West Virginia Oil and Gas Permit Form WW-GA1 by SWN Production Company, LLC, Operator  
 Betty Schafer MSH 401H  
 Marshall County, West Virginia

Exhibit "A"

WV Department of Environmental Protection  
 Office of Oil and Gas  
 2/3 2015

Tract #	Taxi Parcel	Lessor/Grantor	Lessee	Royalty	BK/PG
3)	13-8-4	John W. Hogg and Lucille M. Hogg, Life Estate	Chesapeake Appalachia, LLC	18.00%	840/541
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		Thomas G. Hogg, Remainderman	Chesapeake Appalachia, LLC	18.00%	840/619
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		Donn W. Hogg, Remainderman	Chesapeake Appalachia, LLC	18.00%	840/613
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		Judith Ann Stollar, Remainderman	Chesapeake Appalachia, LLC	18.00%	840/606
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		WesBanco Trust Investment Services, Trustees under Trust Agreement dated February 29, 2012 fbo Margaret Ellen Hogg-Remainderman	Chesapeake Appalachia, LLC	18.00%	840/625
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		Nancy Hamby, Remainderman	Chesapeake Appalachia, LLC	18.00%	843/65
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
4)	13-8-3	WesBanco Trust Investment Services, Trustees under Trust Agreement dated February 29, 2012 fbo Jane Marie Robertson, Remainderman	Chesapeake Appalachia, LLC	18.00%	840/600
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		John W. Hogg and Lucille M. Hogg	Chesapeake Appalachia, LLC	18.00%	834/204
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		Thomas G. Hogg - remainderman	Chesapeake Appalachia, LLC	18.00%	836/579
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110
		Donn W. Hogg - remainderman	Chesapeake Appalachia, LLC	18.00%	834/210
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110
		Judith Ann Stollar, Remainderman	Chesapeake Appalachia, LLC	18.00%	837/66
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		35/32
		WesBanco Trust Investment Services, Trustees under Trust Agreement dated February 29, 2012 fbo Margaret Ellen Hogg-Remainderman	Chesapeake Appalachia, LLC	18.00%	836/563
		Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110
Nancy Hamby - Remainderman	Chesapeake Appalachia, LLC	18.00%	836/585		
Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110		
WesBanco Trust Investment Services, Trustees under Trust Agreement dated February 29, 2012 fbo Jane Robertson, Remainderman	Chesapeake Appalachia, LLC	18.00%	836/573		
Chesapeake Appalachia, LLC	SWN Production Company, LLC		33/110		

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Attached hereto and made part of the State of West Virginia Oil and Gas Permit Form WW-6A1 by SWN Production Company, LLC, Operator  
 Betty Schafer MSH 401H  
 Marshall County, West Virginia

Exhibit "A"

WV Department of  
 Environmental Protection

Tract #	Tax Parcel	Lessor/Grantor	Lessee	Royalty	BK/PG
5)	13-8-6	Vernon A. Kinneer, Jr. and Carla C. Kinneer Chesapeake Appalachia, LLC Jamie Kinneer and Rebecca L Kinneer Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC	12.50% 12.50%	681/571 33/110 681/571 33/110
6)	13-8-7	Vernon A. Kinneer, Jr. and Carla C. Kinneer Chesapeake Appalachia, LLC Jamie Kinneer and Rebecca L Kinneer Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC	12.50%	681/566 33/110 681/566 33/110
7)	13-8-2	Mildred Louise Black aka Mildred Louis Black Chesapeake Appalachia, LLC Kenneth Eugene Black and Bonnie Jeanette Black Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC	18.00% 18.00%	773/98 33/110 774/30 33/110
8)	13-8-2.1	Mildred Louise Black aka Mildred Louis Black Chesapeake Appalachia, LLC Kenneth Eugene Black and Bonnie Jeanette Black Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC	18.00% 18.00%	773/98 33/110 774/30 33/110
9)	13-3-12.7	Mildred Louise Black TriEnergy Inc. AB Resources, LLC Chevron USA, Inc. Chesapeake Appalachia, LLC	TriEnergy Inc. AB Resources, LLC Chevron USA, Inc. Chesapeake Appalachia, LLC SWN Production Company, LLC	12.50%	655/538 19/623 756/397 30/532 33/110
10)	13-3-12.11	Deanna Kay Black Lilley and Michael C Lilley Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC	18.00%	834/152 33/110
11)	13-3-12.12	Donna M Black Archey and William R. Archey Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC	12.50%	681/581 33/110
12)	13-3-5.1	Brian F. Bonacci Chesapeake Appalachia, LLC Frank A. Bonacci Chesapeake Appalachia, LLC Orville Young LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC SWN Production Company, LLC	18.75% 18.75%	782/393 33/110 782/385 33/110 868/394

Attached hereto and made part of the State of West Virginia Oil and Gas Permit Form WW-6A1 by SWN Production Company, LLC, Operator  
 Exhibit "A"  
 Betty Schafer MSH 401H  
 Marshall County, West Virginia

Tract #	Tax Parcel	Lessor/Grantor	Lessee	Royalty	BK/PG
13)	13-3-5	Louise Coulling Chesapeake Appalachia, LLC Orville Young LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC SWN Production Company, LLC	18.75% 18.75%	767/473 33/110 868/394
14)	13-3-5.3	Louise S. Coulling Chesapeake Appalachia, LLC Heidi Bruhn, fka Heidi Schenk Hughes Chesapeake Appalachia, LLC Mary Schenk Hamilton and Gary P. Hamilton Chesapeake Appalachia, LLC Karen Schenk Sligar and Terry B. Sligar Chesapeake Appalachia, LLC White Horse Farm, LLC Chesapeake Appalachia, LLC Frank A. Bonacci Chesapeake Appalachia, LLC Brian F. Bonacci Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC Chesapeake Appalachia, LLC SWN Production Company, LLC	18.75% 18.75% 18.75% 18.75% 18.75% 18.75% 18.75% 18.75% 18.75% 18.75% 18.75% 18.75% 18.75% 18.75%	767/445 33/110 767/455 33/110 767/456 33/110 768/208 33/110 771/378 33/110 782/385 33/110 782/393 33/110
15)	13-3-2	White Horse Farm, LLC Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC	18.75%	770/603 33/110
16)	13-2-88	Ronald J. Iser and Linda J. Iser Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC	12.50%	722/610 33/110
17)	13-2-26	David T. Gibson and Vanessa A. Gibson Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC	14.00%	678/523 33/110
18)	13-2-27	Peggy A. Klug Chesapeake Appalachia, LLC	Chesapeake Appalachia, LLC SWN Production Company, LLC	14.00%	678/524 33/110

WV Department of Environmental Protection  
 OCT 28 2015

# SWN

Southwestern Energy®

PO Box 1300  
Jane Lew, WV 26378  
PHONE: (832) 796-1610

4705101871

October 13, 2015

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

**RE:** SWN's proposed Betty Schafer MSH 401H in Marshall County, West Virginia, Drilling under Big Wheeling Creek Road and Ravenscraft 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 Big Wheeling Creek Road and Ravenscraft 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,



Michael Ezell, CPL  
Senior Staff Landman  
SWN Production Company, LLC  
PO Box 1300  
Jane Lew, WV 26378

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Office of Oil and Gas  
The Right People doing the Right Things,  
wisely investing the cash flow from  
our underlying Assets, will create Value+  
OCT 23 2015  
WV Department of  
Environmental Protection  
11/27/2015

**STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
NOTICE CERTIFICATION**

Date of Notice Certification: 10/22/15

API No. 47- 51 -  
Operator's Well No. Betty Schafer MSH 401H  
Well Pad Name: Betty Schafer Pad

**Notice has been given:**

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State: <u>WV</u>	UTM NAD 83	Easting: <u>531115</u>
County: <u>51-Marshall</u>		Northing: <u>4426813</u>
District: <u>6- Sand Hill</u>	Public Road Access: <u>Big Wheeling Creek</u>	
Quadrangle: <u>486- Moundsville</u>	Generally used farm name: <u>Betty Schafer</u>	
Watershed: <u>Middle Ohio North</u>		

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input checked="" type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p><b>OOG OFFICE USE ONLY</b></p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
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**Required Attachments:**

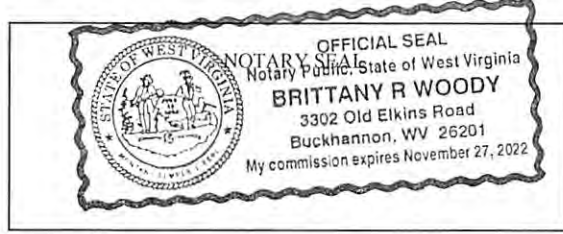
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class Oil Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

**11/27/2015**

**Certification of Notice is hereby given:**

THEREFORE, I \_\_\_\_\_, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	<u>SWN Production Co., LLC</u>	Address:	<u>P.O. Box 1300</u>
By:	<u>Dee Southall</u>		<u>Jane Lew, WV 26378</u>
Its:	<u>Regulatory Supervisor</u>	Facsimile:	<u>304-471-2497</u>
Telephone:	<u>832-796-1610</u>	Email:	<u>Dee_Southall@swn.com</u>



Subscribed and sworn before me this 11<sup>th</sup> day of June 2015.

Brittany R Woody Notary Public

My Commission Expires 11/27/2020

**Oil and Gas Privacy Notice:**

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).

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WV Department of  
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**STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
NOTICE OF APPLICATION**

**Notice Time Requirement:** notice shall be provided no later than the **filing date of permit application.**

**Date of Notice:** 10/27/15 **Date Permit Application Filed:** 10/22/15

**Notice of:**

- PERMIT FOR ANY WELL WORK
- CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

**Delivery method pursuant to West Virginia Code § 22-6A-10(b)**

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- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice  WSSP Notice  E&S Plan Notice  Well Plat Notice is hereby provided to:

SURFACE OWNER(s)

Name: Betty Jane Schafer  
 Address: RR 6 Box 285  
Wheeling, WV 26003  
 Name: \_\_\_\_\_  
 Address: \_\_\_\_\_

COAL OWNER OR LESSEE

Name: Murray American Energy, INC C/O Alex P. O'Neill  
 Address: 6126 Energy Road  
Moundsville, WV 26041

COAL OPERATOR

Name: Shoemaker  
 Address: \_\_\_\_\_

SURFACE OWNER(s) (Road and/or Other Disturbance)

Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Name: \_\_\_\_\_  
 Address: \_\_\_\_\_

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)

Name: \*\*\* See Attachment #1  
 Address: \_\_\_\_\_

SURFACE OWNER(s) (Impoundments or Pits)

Name: \_\_\_\_\_  
 Address: \_\_\_\_\_

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: \_\_\_\_\_  
 Address: \_\_\_\_\_

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\*Please attach additional forms if necessary

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11/27/2015

Attachment #1

3

Property Owner(s)	Owner Address	City	State	Zip
FISHER, CHARLES B. & CARLA S.	1726 SORGHUM RIDGE ROAD	WHEELING	WV	26003
GRAY, JOHN ALVIN	3103 BIG WHEELING CREEK RD	WHEELING	WV	26003
SCHAFFER, BETTY JANE - LIFE	RR 6 BOX 285	WHEELING	WV	26003
TESTERS COURT 13 INC.	413 TOMLINSON AVE	GLEN DALE	WV	26036
HOGG, JOHN W. & LUCILLE M. - LIFE	RR 6 BOX 283	WHEELING	WV	26003

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**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

**This Notice Shall Include:**

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

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**Well Location Restrictions**

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

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examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

**Water Well Testing:**

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

**Water Testing Laboratories:**

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

**Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:**

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

**Written Comment:**

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section 11 of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas  
Department of Environmental Protection  
601 57<sup>th</sup> St. SE  
Charleston, WV 25304  
(304) 926-0450

Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

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**Time Limits and Methods for Filing Comments.**

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

**Comment Requirements**

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

**Permit Denial or Condition**

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

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WV Department of  
Environmental Protection

WW-6A  
(8-13)

API NO. 47- 51 -  
OPERATOR WELL NO. Betty Schafer MSH 401H  
Well Pad Name: Betty Schafer Pad

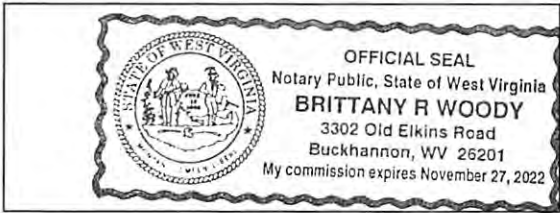
**Notice is hereby given by:**

Well Operator: SWN Production Co., LLC  
Telephone: 832-796-1610  
Email: Dee\_Southall@swn.com

Address: P.O. Box 1300  
Jane Lew, WV 26378  
Facsimile: 304-471-2497

**Oil and Gas Privacy Notice:**

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).



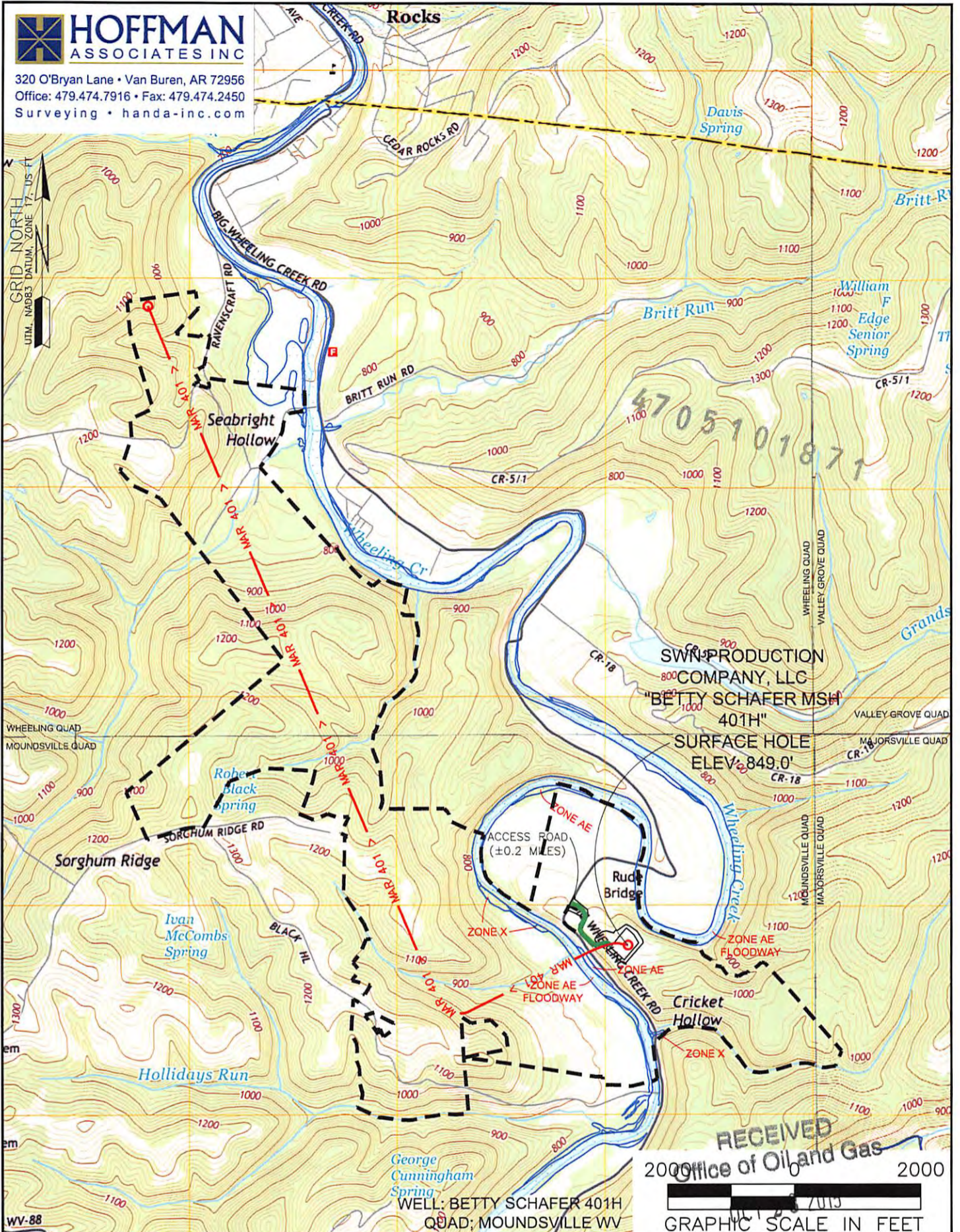
Subscribed and sworn before me this 11th day of June 2015.  
Brittany R Woody Notary Public  
My Commission Expires 11/27/2022

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WV Department of  
Environmental Protection

11/27/2015

GRID NORTH  
UTM, NAD83 DATUM, ZONE 17, US FT



<p><b>NAME AND DISTANCE TO THE NEAREST STREAM:</b> BIG WHEELING CREEK IS LOCATED ±0.1 MILES NORTHEAST OF THE CENTER OF THE DRILL PAD.</p>		<p><b>STREAM CROSSING COORDINATES (NAD 83):</b> NO NEW CROSSINGS.</p>		<p><b>COMPANY:</b> <b>SWN</b> Production Company, LLC wv Department of Environmental Protection</p>	
<p><b>WELL RESTRICTIONS:</b> WELL PAD, LOD, &amp; E &amp; S CONTROL FEATURES TO PERENNIAL STREAM, LAKE, POND, RESERVOIR OR WETLAND: &gt;100 FEET WELL PAD, LOD, &amp; E &amp; S CONTROL FEATURES TO NATURALLY PRODUCING TROUT STREAM: &gt;300 FEET WELL PAD, LOD, &amp; E &amp; S CONTROL FEATURES TO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY: &gt;1000 FEET WELL SHL TO EXISTING WATER WELL OR DEVELOPED SPRING: &gt;250 FEET CENTER OF PAD TO OCCUPIED DWELLING STRUCTURE: &gt;625 FEET CENTER OF PAD TO AGRICULTURAL BUILDINGS LARGER THAN 2500 SQ FT: &gt;625 FEET</p>		<p><b>OPERATOR'S</b> BETTY SCHAFER MSH</p>		<p><b>WELL #:</b> 401H</p>	
<p><b>FEMA FLOOD INFORMATION:</b> BY GRAPHIC PLOTTING ONLY FEMA FIRM INCORPORATED AREA OF MARSHALL COUNTY, WEST VIRGINIA; MAP NUMBER 54051C0085E, 5451C0019E, 54051C0018E; EFFECTIVE DATE: SEPTEMBER 25, 2009.</p>		<p><b>LOCATION:</b> SAND HILL DISTRICT, MARSHALL COUNTY, WEST VIRGINIA</p>		<p><b>SURFACE HOLE LOCATION:</b> GEOGRAPHIC (NAD83): LATITUDE: 39.990921° LONGITUDE: -80.635528° <b>11/27/2015</b></p>	
<p><b>LEGEND:</b></p> <ul style="list-style-type: none"> <li>○ PROPOSED SURFACE HOLE / BOTTOM HOLE</li> <li>⊙ EXISTING / PRODUCING WELLHEAD</li> <li>⊗ ABANDONED WELL</li> <li>⊗ PLUGGED &amp; ABANDONED WELL</li> <li>△ CUT CONDUCTOR</li> <li>○ EXISTING SPRING</li> <li>○ EXISTING WATER WELL</li> <li>— ACCESS ROAD</li> <li>— ACCESS ROAD TO PREV. SITE</li> <li>— HIGHWAY/INTERSTATE</li> <li>— COUNTY ROAD</li> </ul>		<p><b>BOTTOM HOLE LOCATION:</b> GEOGRAPHIC (NAD83): LATITUDE: 40.018520° LONGITUDE: -80.662496°</p>		<p><b>REVISIONS:</b></p>	
				<p><b>DATE:</b> 10-12-2015</p>	
				<p><b>DRAWN BY:</b> S. HUTSON</p>	
				<p><b>SCALE:</b> 1" = 2000'</p>	
				<p><b>DRAWING NO:</b> 59116</p>	
				<p><b>TOPOGRAPHIC MAP</b></p>	

**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF INTENT TO DRILL**

Pursuant to W. Va. Code § 22-6A-16(b), the Notice of Intent to Drill is only required if the notice requirements of W. Va. Code § 22-6A-10(a) have NOT been met or if the Notice of Intent to Drill requirement has NOT been waived in writing by the surface owner.

**Notice Time Requirement:** Notice shall be provided at least **TEN (10)** days prior to filing a permit application.

**Date of Notice:** 10/09/2015      **Date Permit Application Filed:** 10/22/15

**Delivery method pursuant to West Virginia Code § 22-6A-16(b)**

- HAND DELIVERY       CERTIFIED MAIL RETURN RECEIPT REQUESTED

Pursuant to W. Va. Code § 22-6A-16(b), at least ten days prior to filing a permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner notice of its intent to enter upon the surface owner's land for the purpose of drilling a horizontal well: *Provided*, That notice given pursuant to subsection (a), section ten of this article satisfies the requirements of this subsection as of the date the notice was provided to the surface owner: *Provided, however*, That the notice requirements of this subsection may be waived in writing by the surface owner. The notice, if required, shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative.

**Notice is hereby provided to the SURFACE OWNER(s):**

Name: Betty Jane Schafer  
Address: 3604 Big Wheeling Creek Road  
Wheeling, WV 26003

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-16(b), notice is hereby given that the undersigned well operator has an intent to enter upon the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83 Easting:	<u>531,115.412</u>
County:	<u>Marshall</u>	UTM NAD 83 Northing:	<u>4,426,813.167</u>
District:	<u>Sand Hill</u>	Public Road Access:	<u>Big Wheeling Creek Road</u>
Quadrangle:	<u>Moundsville</u>	Generally used farm name:	_____
Watershed:	<u>Little Wheeling Creek</u>		

**This Notice Shall Include:**

Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

**Notice is hereby given by:**

Well Operator: SWN Production Company, LLC  
Address: PO Box 1300, 179 Innovation Drive  
Jane Lew, WV 26378  
Telephone: 304-884-1611  
Email: Micah\_Feather@SWN.com  
Facsimile: \_\_\_\_\_

Authorized Representative: Danielle Southall  
Address: PO Box 1300, 179 Innovation Drive  
Jane Lew, WV 26378  
Telephone: 304-884-1611  
Email: Dee\_Southall@SWN.com  
Facsimile: \_\_\_\_\_

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Environmental Protection  
OCT 23 2015

**Oil and Gas Privacy Notice:**

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).

**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF PLANNED OPERATION**

**Notice Time Requirement:** notice shall be provided no later than the filing date of permit application.

**Date of Notice:** 10/09/2015      **Date Permit Application Filed:** 10/23/15

**Delivery method pursuant to West Virginia Code § 22-6A-16(c)**

- CERTIFIED MAIL                                       HAND  
RETURN RECEIPT REQUESTED                                      DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

**Notice is hereby provided to the SURFACE OWNER(s)**

(at the address listed in the records of the sheriff at the time of notice):

Name: Betty Jane Schafer  
Address: 3604 Big Wheeling Creek Road  
Wheeling, WV 26003

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>531,115.412</u>
County:	<u>Marshall</u>		Northing:	<u>4,426,813.167</u>
District:	<u>Sand Hill</u>	Public Road Access:	<u>Big Wheeling Creek Rd</u>	
Quadrangle:	<u>Moundsville</u>	Generally used farm name:	_____	
Watershed:	<u>Little Wheeling Creek</u>			

**This Notice Shall Include:**

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by **W. Va. Code § 22-6A-10(b)** to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

Well Operator: SWN Production Company, LLC  
Telephone: 304-884-1614  
Email: Dee\_Southall@SWN.com

Address: PO Box 1300, 179 Innovation Drive  
Jane Lew, WV 26378  
Facsimile: 304-472-4225

**Oil and Gas Privacy Notice:**

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).

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OCT 23 2015  
WV Department of  
Environmental Protection



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110  
Charleston, West Virginia 25305-0430 • (304) 558-3505

Earl Ray Tomblin  
Governor

Paul A. Mattox, Jr., P. E.  
Secretary of Transportation/  
Commissioner of Highways

October 9, 2015

4705101871

James A. Martin, Chief  
Office of Oil and Gas  
Department of Environmental Protection  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304

Subject: DOH Permit for the Betty Schafer Pad, Marshall County

Betty Schafer MSH 401H

Dear Mr. Martin,

The West Virginia Division of Highways has issued Permit #06-2014-0640 for the subject site to Southwestern Energy for access to the State Road for the well site located off of Marshall County Route 5 SLS.

The operator has signed an OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

Gary K. Clayton, P.E.  
Regional Maintenance Engineer  
Central Office Oil & Gas Coordinator  
Office of Oil and Gas

Cc: Brittany Woody  
Southwestern Energy  
CH, OM, D-6  
File

OCT 23 2015

WV Department of  
Environmental Protection

11/27/2015

Supplier Name	Product Name	Product Use	Chemical Name	CAS Number
NALCO ONESOURCE	EC6110A	Biocide	Ethanol	000064-17-5
			Glutaraldehyde (Pentanediol)	000111-30-8
			Quaternary Ammonium Compounds	N/A-063
	EC6629A	Biocide	No Hazardous Components	NONE
WEATHERFORD	WBK-133 OXIDIZER	Breaker	Ammonium Persulfate	007727-54-0
	WBK-134	Breaker	Ammonium Persulfate	007727-54-0
			Crystalline Silica (Quartz Sand, Silicon Dioxide)	014808-60-7
	WCS-631LC	Clay Stabilizer	Proprietary Non Hazardous Salt	N/A-229
			Water	007732-18-5
	WFR-55LA	Friction Reducer	No Hazardous Components	NONE
	WGA-15L	Gel	Petroleum Distillate Hydrotreated Light	064742-47-8
	WPB-584-L	Buffer	Potassium Carbonate	000584-08-7
			Potassium Hydroxide	001310-58-3
	WXL-101LE	Corsslinker	No Hazardous Components	NONE
	WXL-101LM	Crosslinker	Petroleum Distillate Hydrotreated Light	064742-47-8
	WXL-105L	Crosslinker	Water	007732-18-5
Ethylene Glycol			000107-21-1	
Boric Acid			010043-35-3	
Ethanolamine			000141-43-5	
SCHLUMBERGER	B244 Green-Cide 25G	Biocide	Glutaraldehyde	111-30-8
	L071 Temporary Clay Stabilizer	Clay Stabilizer	Cholinium Chloride	67-48-1
	Breaker J218	Breaker	Diammonium Peroxidisulphate	7727-54-0
	EB-Clean* J475 Breaker		Diammonium Peroxidisulphate	7727-54-0
	Friction Reducer B315	Friction Reducer	Distillates (petroleum), Hydrotreated light Aliphatic Alcohol Glycol Ether	64742-47-8 Proprietary
	Friction Reducer J609		Ammonium Sulfate	7783-20-2

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Supplier Name	Product Name	Product Use	Chemical Name	CAS Number
SCHLUMBERGER	Water Gelling Agent J580	Gel	Carbohydrate Polymer	Proprietary
	Scale Inhibitor B317	Scale Inhibitor	Trisodium ortho phosphate Ethane-1, 2-diol	7601-54-9 107-21-1
	Borate Crosslinker J532	Crosslinker	Aliphatic polyol Sodium tetraborate decahydrate	Proprietary 1303- 96-4
	Crosslinker J610		Aliphatic polyol Potassium hydroxide	Proprietary 1310- 58-3

4-037018/1

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Environmental Protection  
Environmental Protection  
11/27/2015

Supplier Name	Product Name	Product Use	Chemical Name	CAS Number
BAKER HUGHES	ALPHA 1427	Biocide	Didecyl Dimethyl Ammonium Chloride	007173-51-1
			Ethanol	000064-17-5
			Glutaraldehyde (Pentenediol)	000111-30-8
			Quaternary Ammonium Compound	068424-85-1
			Water	007732-18-5
	BF-7L	Buffer	Potassium Carbonate	000584-08-7
	ClayCare	Clay Stabilizer	Choline Chloride	000067-48-1
			Water	007732-18-5
	Enzyme G-I	Breaker	No Hazardous Components	NONE
	ENZYME G-NE	Breaker	No Hazardous Components	NONE
	FRW-18	Friction Reducer	Petroleum Distillate Hydrotreated Light	064742-47-8
	GW-3LDF	Gel	Petroleum Distillate Blend	N/A-014
			Polysaccharide Blend	N/A-021
	SCALETROL 720	Scale Inhibitor	Diethylene Glycol	000111-46-6
Ethylene Glycol			000107-21-1	
XLW-32	Crosslinker	Boric Acid	010043-35-3	
		Methanol (Methyl Alcohol)	000067-56-1	
FRAC TECH SERVICES	APB01 (AMMONIUM PERSUFATE BREAKER)	Breaker	Ammonium Persulfate	007727-54-0
	B05 (LOW PH BUFFER)	Buffer	Acetic acid	000064-19-7
	BXL03 Borate XL Delayed High Temp	Crosslinker	No Hazardous Components	NONE
	FRW-200	Friction Reducer	No Hazardous Components	NONE
	HVG01 (TURQUOISE-1 BULK)	Gelling Agent	Petroleum Distillate Hydrotreated Light	064742-47-8
	KCLS-4	Clay Stabilizer	No Hazardous Components	NONE
	LTB-1	Breaker	Ammonium Persulfate	N/A

4705101871

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Environmental Protection  
11/27/2015

# EROSION AND SEDIMENT CONTROL PLAN FOR BETTY SCHAFER MSH PAD SAND HILL DISTRICT, MARSHALL COUNTY, WEST VIRGINIA

API# 5101776  
API# 5101777

### GENERAL NOTES

- THE BOUNDARY AND TOPOGRAPHIC SURVEY FOR THE PROJECT AREA WERE PERFORMED BY RETIEW ASSOCIATES IN JUNE 2014.
- PROPERTY BOUNDARIES, LANDOWNER INFORMATION AND ROAD NETWORKS SHOWN ON THIS PLAN ARE BASED ON AVAILABLE COUNTY GIS DATA.
- EXISTING STRUCTURES, TREE LINES AND ROADWAYS HAVE BEEN LOCATED PER AVAILABLE ONLINE AERIAL PHOTOGRAPHY.
- THE HORIZONTAL DATUM IS WEST VIRGINIA STATE PLANE, NORTH AMERICAN DATUM 1983 (NAD 83), NORTH ARIZONA ZONE.
- THE VERTICAL DATUM IS WEST VIRGINIA STATE PLANE, NORTH AMERICAN VERTICAL DATUM 1988 (NAV 88) WHICH ORIGINATES FROM FIELD RUN TOPOGRAPHIC SURVEY.
- A WETLANDS SURVEY WAS PERFORMED BY RETIEW ASSOCIATES IN JUNE 2014 AND UPDATED JULY 2014.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING PRIOR TO CONSTRUCTION ALL NECESSARY CONSTRUCTION PERMITS REQUIRED BY FEDERAL, STATE AND LOCAL GOVERNMENT AGENCIES.
- THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS, INCLUDING ALL SAFETY REQUIREMENTS.
- CHESAPEAKE OPERATING, INC. RESERVES THE RIGHT TO ACCEPT OR REJECT ANY AND ALL BIDS AT ITS DISCRETION. ALL WORK WILL BE PERFORMED UPON AND SUBJECT TO THE TERMS AND CONDITIONS OF CHESAPEAKE OPERATING, INC.'S MASTER SERVICE AGREEMENT EXECUTED BETWEEN THE COMPANIES. THIS IS A LUMP SUM BID. SHOULD CONTRACTOR UNDERESTIMATE, CONTRACTOR SHALL PROVIDE ADDITIONAL LABOR AND MATERIALS TO COMPLETE THE WORK AT NO COST TO CHSK. ALL MEASUREMENTS ARE ESTIMATES GIVEN FOR PLANNING PURPOSES.
- THE CONSTRUCTION START DEADLINE IS BEING PROVIDED AS THE DATE CHESAPEAKE MAY LOSE ITS RIGHTS TO COMMENCE WORK UNDER THIS BID AND DRILL THE PROPOSED WELL. THE WORK PROVIDED FOR UNDER THIS BID IS NOT TIMELY COMMENCED. BY SUBMITTING THIS BID, CONTRACTOR IS AGREEING TO COMMENCE THE WORK PRIOR TO THE DEADLINE PROVIDED HEREIN. FAILURE TO TIMELY COMMENCE THE WORK PROVIDED FOR HEREIN MAY CAUSE DAMAGES TO CHESAPEAKE FOR WHICH CONTRACTOR SHALL BE HELD RESPONSIBLE.
- THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL PROJECT BONDING REQUIREMENTS WHEN CONSTRUCTING PUBLIC INFRASTRUCTURE. ALL PRIVATE CONSTRUCTION FOR CHESAPEAKE SHALL INCLUDE A MINIMUM 1-YEAR WARRANTY OF PERFORMANCE.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PREVENT ANY DAMAGE TO PRIVATE PROPERTY, PROVIDE ACCESS TO ALL DRIVES DURING CONSTRUCTION, NOTIFY UTILITY COMPANIES AND VERIFY LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION, AND PROTECT ALL UTILITIES TO REMAIN IN SERVICE.
- BARRICADING AND TRAFFIC CONTROL DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL CONFORM TO THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). TRAFFIC FLOW AND ACCESS SHALL BE MAINTAINED DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TRAFFIC SAFETY MEASURES FOR WORK ON THE PROJECT.
- THE CONTRACTOR SHALL ABIDE BY ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS GOVERNING EXCAVATION. THE CONTRACTOR SHALL PROVIDE DETAILED PLANS AND SPECIFICATIONS FOR TRENCH SAFETY SYSTEMS THAT COMPLY WITH APPLICABLE LAWS GOVERNING EXCAVATION WHEN APPLICABLE TO THE PROJECT. THESE PLANS SHALL BE SEALED BY AN ENGINEER EXPERIENCED IN THE DESIGN OF TRENCH SAFETY SYSTEMS AND LICENSED BY THE STATE IN WHICH THE WORK IS OCCURRING. CONTRACTOR SHALL SUBMIT THE PLAN TO CHESAPEAKE PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS FOR WORK RELATED TO EXCAVATION.
- ANY DAMAGES THAT MAY OCCUR TO PROPERTY OR EXISTING IMPROVEMENTS SHALL BE RESTORED BY THE CONTRACTOR TO AT LEAST THE SAME CONDITION THAT THE PROPERTY OR IMPROVEMENTS WERE IN PRIOR TO THE DAMAGES. IN THE EVENT OF SUCH DAMAGE, CONTRACTOR SHALL NOTIFY CHESAPEAKE IMMEDIATELY PRIOR TO THE RESTORATION. THIS RESTORATION SHALL BE SUBJECT TO THE OWNER'S APPROVAL; HOWEVER, THIS RESTORATION SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION TO THE CONTRACTOR.
- THE MAXIMUM ALLOWABLE SLOPE FOR EARTHEN AREAS IS 3-TO-1 HORIZONTAL-TO-VERTICAL, UNLESS SPECIFIED OTHERWISE IN A SITE-SPECIFIC GEOTECHNICAL REPORT.
- PRIOR TO FILL PLACEMENT, EXISTING SUBGRADE SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 4", MOISTURE ADJUSTED TO OPTIMUM, AND RE-COMPACTED TO THE SAME DENSITY AND MOISTURE CONTENT AS THE PROPOSED FILL.
- IMPORTED SELECT FILL IS DEFINED AS UNIFORMLY BLENDED SANDY CLAY TO CLAYEY SAND WITH A LIQUID LIMIT (LL) OF LESS THAN 35 PERCENT AND A PLASTICITY INDEX (PI) OF BETWEEN 6 AND 15. FILL MATERIAL SHALL BE PLACED IN LIFTS NOT EXCEEDING EIGHT (8) INCHES IN LOOSE THICKNESS.
- FILL MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT MAXIMUM STANDARD PROCTOR DRY DENSITY (ASTM D 698) IN CONJUNCTION WITH THE COMPACTING OPERATION. FILL MATERIAL SHALL BE BROUGHT TO OPTIMUM MOISTURE CONTENT.
- STORM DRAINAGE PIPING SHALL BE CONSTRUCTED OF A MINIMUM OF CLASS III REINFORCED CONCRETE PIPE (RCP), CORRUGATED METAL PIPE (CMP), OR HIGH-DENSITY POLYETHYLENE (HDPE) PIPE. A MINIMUM OF 1.0' OR 1/2" OF COVER SHALL BE MAINTAINED WHEN USING CMP OR HDPE PIPE. MINIMUM CMP WALL THICKNESS SHALL BE 0.064" OR 18 GAUGE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE CONSTRUCTION SITE CLEAR OF ALL TRASH AND DEBRIS.
- PRIOR TO ANY EARTHWORK EXCAVATION OR TOPSOIL REMOVAL, ADEQUATE EROSION CONTROL MEASURES SHALL BE PROPERLY INSTALLED.
- THE CONTRACTOR SHALL INSPECT STABILIZATION AND EROSION CONTROL MEASURES AT A MINIMUM OF ONCE EVERY 7 DAYS OR WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.5 INCHES OF RAINFALL OCCURS.
- SILT FENCE AND SEDIMENT BARRIERS SHALL REMAIN IN PLACE UNTIL RE-VEGETATION HAS BEEN COMPLETELY ESTABLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS UNTIL PROJECT COMPLETION.
- DISTURBED AREAS THAT ARE SEEDER OR SOODED SHALL BE CHECKED PERIODICALLY TO SEE THAT GRASS COVERAGE IS PROPERLY MAINTAINED UNTIL THE CONTRACTOR IS RELEASED FROM THE JOB SITE. DISTURBED AREAS SHALL BE WATERED, FERTILIZED, AND RESEEDER OR RE-SOODED, IF NECESSARY.



7.5 MIN. QUADRANGLE MAP: MOUNDSVILLE, WV  
**LOCATION MAP**  
SCALE = 1"=2000'

### STAKING FLAG LEGEND

- TOP OF CUTS (YELLOW)
- GRADE AT TOP OF PAD/FROAD/LOT (YELLOW & ORANGE)
- IDES OF FILL (ORANGE)
- TOP HOLE LOCATION (PINK)
- VERTICAL CUT & FILL AT PAD/ROAD/PT CORNER OR EDGE (PINK & BLACK STRIPE)
- LIMITS OF DISTURBANCE (BLUE & WHITE STRIPE)
- VERTICAL CUT & FILL AT CENTERLINE OF ACCESS DRIVE (ORANGE & BLACK STRIPE)
- EROSION & SEDIMENT CONTROL STRUCTURES (PINK & WHITE STRIPE)
- TOPSOIL STOCKPILE LOCATION (ORANGE & WHITE STRIPE)
- CENTERLINE OF DITCH & BOTTOM OF SEDIMENT TRAPS (BLUE)



**OPERATOR**  
CHESAPEAKE APPALACHIA, LLC  
ATTN: NATHAN SMARR  
179 CHESAPEAKE DRIVE  
JANE LEE, WV 26378  
(304) 577-1416

### SOILS CLASSIFICATION

- C2s CHAGRIN SILT LOAM, 0 TO 3% SLOPES (HYDRIC INCLUSIONS)
- D2s CULLEWA-DORMONT COMPLEX, 15 TO 25% SLOPES
- D2e DORMONT SILT LOAM, 15 TO 25% SLOPES
- D2f DORMONT-CULLEOKA COMPLEX, 25 TO 35% SLOPES
- D2g DORMONT-CULLEOKA COMPLEX, 35 TO 70% SLOPES, VERY STONY

### CUT & FILL

	PAD SITE	DRIVE	SITE
CUT	+12,807 CY	+ 692 CY	+13,499 CY
FILL	-13,043 CY	- 656 CY	-13,699 CY
NET	- 236 CY	+ 236 CY	= 0 CY
STONE	+ 4,306 CY	+ 710 CY	= 5,016 CY
TOPSOIL	+ 3,057 CY	+ 60 CY	= 3,117 CY

- NOTES:**
- THE TOP SOIL DEPTH FOR THE ACCESS DRIVE IS 1" (ASSUMED), THE TOP SOIL DEPTH FOR THE PAD IS 6".
  - THE CUT & FILL SUMMARY CALCULATIONS PRESENTED ON THIS PLAN ARE FOR INFORMATIONAL PURPOSES ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY EXISTING GRADES AND VERIFY EARTHWORK VOLUMES, METHODS AND PROCEDURES. ANY ISSUES ARE TO BE BROUGHT TO THE ENGINEER'S AND OWNER'S ATTENTION PRIOR TO COMMENCEMENT OF WORK.

### LIST OF DRAWINGS

- 1 OF 17 ..... COVER SHEET & GENERAL NOTES
- 2 OF 17 ..... LAYOUT PLAN
- 3 OF 17 ..... EROSION & SEDIMENT CONTROL PLAN
- 4 OF 17 ..... WV DEP EAS PLAN
- 5 OF 17 ..... ACCESS DRIVE PROFILE
- 6 OF 17 ..... WELL PAD CROSS SECTIONS
- 7 OF 17 ..... CROSS SECTIONS PLAN VIEW
- 8 OF 17 ..... CROSS SECTIONS - ACCESS DRIVE
- 9 OF 17 ..... CROSS SECTIONS - ACCESS DRIVE
- 10 OF 17 ..... CROSS SECTIONS - PAD
- 11 OF 17 ..... CROSS SECTIONS - PAD
- 12 OF 17 ..... RECLAMATION PLAN
- 13 OF 17 ..... EVALUATION ROUTE PLAN
- 14 OF 17 ..... EVALUATION ROUTE PLAN - USGS
- 15 OF 17 ..... NOTES & DETAILS
- 16 OF 17 ..... DETAILS
- 17 OF 17 ..... OVERALL LAYOUT PLAN



AT LEAST 48 HOURS, BUT NOT MORE THAN 10 WORKING DAYS (EXCLUDING WEEKENDS AND HOLIDAYS), PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THESE ACTIVITIES SHALL CONTACT MISS UTILITY OF WEST VIRGINIA AT 811 OR 1-800-245-4848.

DATE: 08/19/2014 TICKET# 1412039617



Electronic version of these plans may be viewed at: Q:\OIL GAS\ISA FILES\REVIEWS

MANAGER: PATRICK G. BIRNBOIM, P.E.  
DESIGN BY: CHD BY: FID  
DRAWN BY: MEB  
DATE: 08/26/2014  
SCALE: AS SHOWN  
DATE: 08/26/2014  
SCALE: AS SHOWN

NO. DATE REVISIONS PER WV DEP COMMENTS

1	12/20/14	REVISIONS PER WV DEP COMMENTS	REVISION
---	----------	-------------------------------	----------

FOR RETIEW ASSOCIATES BY:  
REFS:  
08/26/14-2014

CLIENT:  
CHESAPEAKE APPALACHIA, LLC  
ATTN: NATHAN SMARR  
179 CHESAPEAKE DRIVE  
JANE LEE, WV 26378  
(304) 577-1416

PROJECT:  
BETTY SCHAFER MSH PAD

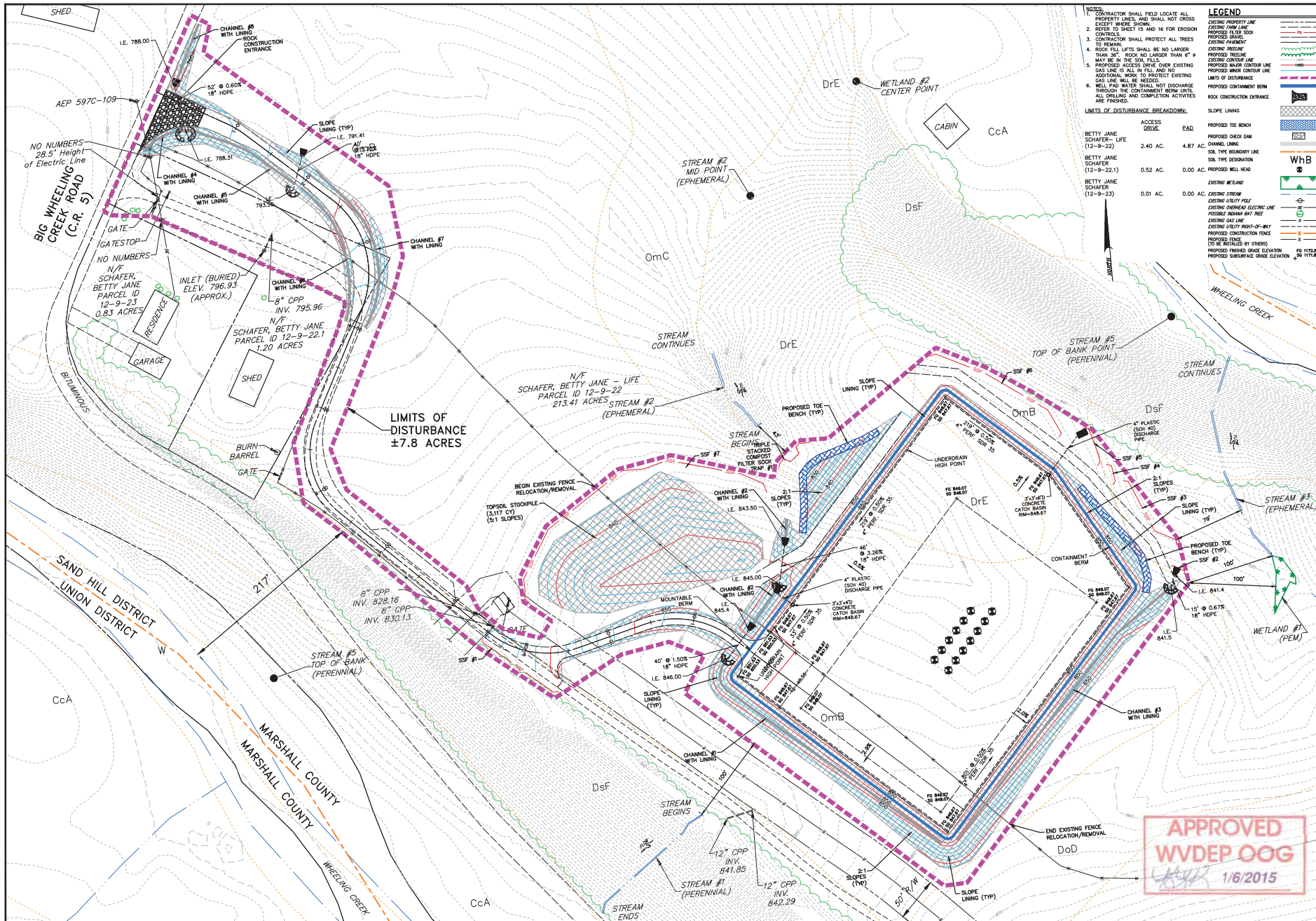
COVER SHEET & GENERAL NOTES  
BETTY SCHAFER  
MSH PAD

MARSHALL COUNTY, WV  
SAND HILL DISTRICT

DATE: 08/26/2014

SHEET NO. 1 OF 17

DWG. NO. 08S416643



- NOTES:
- CONTRACTOR SHALL FIELD LOCATE ALL PROPERTY LINES, AND SHALL NOT CROSS EXCEPT WHERE SHOWN.
  - REFER TO SHEET 15 AND 16 FOR EROSION CONTROLS.
  - CONTRACTOR SHALL PROTECT ALL TREES TO REMAIN.
  - ROOT FELLS CUTS SHALL BE NO LARGER THAN 36". ROOT NO. LARGER THAN 6" 641' IN. IS TO BE SAILED AND NO ADDITIONAL WORK TO PROTECT EXISTING GAS LINE WILL BE NEEDED.
  - PROPOSED ACCESS DRIVE OVER EXISTING GAS LINE WILL BE NEEDED.
  - WELL PAD WATER SHALL NOT DISCHARGE THROUGH THE CONTAINMENT BERM UNTIL ALL DRILLING AND COMPLETION ACTIVITIES ARE FINISHED.

**LEGEND**

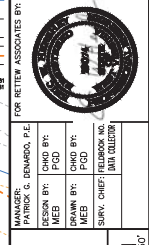
EXISTING PROPERTY LINE	---
PROPOSED FILTER SOCK	---
EXISTING FENCE	---
PROPOSED TIELINE	---
PROPOSED MAJOR CONTOUR LINE	---
PROPOSED MINOR CONTOUR LINE	---
LIMITS OF DISTURBANCE	---
PROPOSED CONTAINMENT BERM	---
ROCK CONSTRUCTION ENTRANCE	---
SLOPE LINING	---
PROPOSED TOE BENCH	---
PROPOSED CHECK DAM	---
PROPOSED CHANNEL LINING	---
SOIL TYPE BOUNDARY LINE	---
EXISTING WETLAND	---
PROPOSED WELL HEAD	---
EXISTING STREAM	---
EXISTING UTILITY POLE	---
EXISTING OVERHEAD ELECTRIC LINE	---
POSSIBLE HAZARDOUS MATERIAL	---
EXISTING GAS LINE	---
EXISTING UTILITY RIGHT-OF-WAY	---
PROPOSED CONSTRUCTION FENCE	---
PROPOSED FINISHED GRADE ELEVATION (TO BE RECALLED BY OWNER)	---
PROPOSED PROPOSED GRADE ELEVATION	---
PROPOSED SURFACE GRADE ELEVATION	---

LIMITS OF DISTURBANCE BREAKDOWN:

ACCESS DRIVE	EAD	PROPOSED TOE BENCH
BETTY JANE SCHAFER - LIFE (12-9-22)	2.40 AC.	4.87 AC.
BETTY JANE SCHAFER (12-9-22.1)	0.52 AC.	0.00 AC.
BETTY JANE SCHAFER (12-9-23)	0.01 AC.	0.00 AC.

FOR REVIEW ASSOCIATES BY:

MANAGER: PATRICK G. BRIMMO, P.E.	DESIGNER: GUYTON P. SMITH, P.E.
DESIGN BY: MEIB	DRAWN BY: JAMES W. HARRIS, P.E.
CHECKED BY: JAMES W. HARRIS, P.E.	DATE: 1/12/2014
DATE: 1/12/2014	REVISIONS PER: WJ, REP, COMMENTS
NO.	DATE



CLIENT: CHESAPEAKE APPALACHIA, LLC  
 ATTN: NATHAN SMARR  
 179 CHESAPEAKE DRIVE  
 JAMAICA, WV 26051  
 (304) 517-1416

SCALE: 1" = 50'

REVIEW ASSOCIATES, INC.  
 105 W. 10th Street, Suite 11100  
 Charleston, WV 25301  
 Phone: (304) 444-7728 • Fax: (304) 444-7125  
 Email: review@review.com  
 Website: www.review.com

**APPROVED WVDEP OOG**  
 1/6/2015

EROSION & SEDIMENT CONTROL PLAN  
 FOR  
**BETTY SCHAFER**  
**MSH PAD**

SAND HILL DISTRICT MARSHALL COUNTY, WV

DATE: 08/26/2014  
 SHEET NO. 3 OF 17  
 DWG. NO. 085416643