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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

August 01, 2013

**WELL WORK PERMIT**

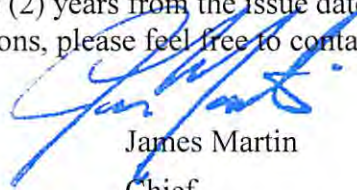
**Horizontal 6A Well**

This permit, API Well Number: 47-9703848, issued to CNX GAS 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: CENT 19 BHS  
Farm Name: ROHR, WILLIAM  
**API Well Number: 47-9703848**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 08/01/2013

**Promoting a healthy environment.**

**08/02/2013**

# PERMIT CONDITIONS

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.

## CONDITIONS

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1. 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 fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
2. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the fill material shall be within plus or minus 2% (unless soil test results show a greater range of moisture content is appropriate and 95% compaction can still be achieved) of the optimum moisture content as determined by the standard proctor density test, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. Each lift must meet 95 % compaction of the optimum density based on results from the standard proctor density test of the actual soils used in specific engineered fill sites. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.

**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION**

97 05 287

1) Well Operator: <u>CNX Gas Company, LLC.</u>	<u>494458046</u>	<u>Upshur</u>	<u>Warren</u>	<u>Century</u>
	Operator ID	County	District	Quadrangle

2) Operator's Well Number: CENT19BHS Well Pad Name: CENT19HS

3 Elevation, current ground: 1582.60' Elevation, proposed post-construction: 1585'

4) Well Type: (a) Gas  Oil   
 Other \_\_\_\_\_  
 (b) If Gas: Shallow  Deep \_\_\_\_\_  
 Horizontal

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Formation - Marcellus, Depth - 8015', Thickness - 90', Pressure - 3000#

7) Proposed Total Vertical Depth: 8015'

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 13293'

10) Approximate Fresh Water Strata Depths: 130', 550'

11) Method to Determine Fresh Water Depth: Reference offset wells (API #'s 47-097-00820 and 47-097-00556)

12) Approximate Saltwater Depths: None Reported

13) Approximate Coal Seam Depths: 105', 550'

14) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated ✓

15) Does land contain coal seams tributary or adjacent to, active mine? No

16) Describe proposed well work: Drill and stimulate new horizontal Marcellus well. Well to be drilled to a TMD of 13293'. Well to be drilled to a TVD of 8015', formation at TVD - Marcellus. If an unexpected void is encountered, plan will be to set casing at a minimum of 30' past void and cement to surface with approved Class A type cement.

17) Describe fracturing/stimulating methods in detail:  
The stimulation will be multiple stages divided over the lateral length of the well. Stage spacing is dependent upon engineering design. Slickwater fracturing technique will be utilized on each stage using sand, water, and chemicals.

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18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 25 Acres

19) Area to be disturbed for well pad only, less access road (acres): 16 Acres

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Environmental Protection

20)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft.</b>	<b>FOOTAGE: For Drilling</b>	<b>INTERVALS: Left in Well</b>	<b>CEMENT: Fill -up (Cu. Ft.)</b>
Conductor	20"	N	L.S.	81.3#	40'	40'	Sand In
Fresh Water	13 3/8"	N	J-55	54.5#	600'	600'	CTS w/ Approved Class A Type Cement
Coal							
Intermediate	9 5/8"	N	J-55	36#	2000'	2000'	CTS w/ Approved Class A Type Cement
Production	5 1/2"	N	P-110	20#	13293'	13293'	2400 cu. ft. W/ 50/50 POZ Lead & Class A Tail
Tubing	2 3/8"	N	J-55	4.7#	7865'	7865'	
Liners							

*Bill Hatfield 9/10/2012*

<b>TYPE</b>	<b>Size</b>	<b>Wellbore Diameter</b>	<b>Wall Thickness</b>	<b>Burst Pressure</b>	<b>Cement Type</b>	<b>Cement Yield</b>
Conductor	20"	26"	0.438	2110	Class A Type	1.18
Fresh Water	13 3/8"	17 1/2"	0.380	2730	Class A Type	1.39
Coal						
Intermediate	9 5/8"	12 3/8"	0.352	3520	Class A Type	1.18
Production	5 1/2"	8 3/4" & 8 1/2"	0.361	12640	Class A Type	1.26
Tubing	2 3/8"	8 3/4" & 8 1/2"	0.190	7700	-----	-----
Liners						

**PACKERS**

Kind:	None		
Sizes:	None		
Depths Set:	None		

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21) Describe centralizer placement for each casing string. Conductor - No centralizers used. Fresh Water & Coal - Bow spring centralizers on first joint then every fourth joint to 100 feet from surface. Intermediate - Bow spring centralizers one on the first two joints and every fourth joint until inside Surface casing. Production - Rigid bow spring centralizer on first joint then every 2 joints (free floating) through the lateral and the curve.  
 (Note: cementing the 5 1/2" casing completely in open hole lateral and curve.)

22) Describe all cement additives associated with each cement type. Conductor - 2% CaCl2. Fresh Water/Coal - 2% CaCl2. Intermediate - 2% CaCl2. Production: 2.6% Cement extender, 0.7% Fluid Loss Additive 0.5% High Temperature Retarder, 0.2% Friction Reducer.

23) Proposed borehole conditioning procedures. Conductor - The hole is drilled w/ air and casing is ran in air. Apart from insuring the hole is clean via air circulation at TD there are no other conditioning procedures. Fresh Water/Coal - The hole is drilled w/ air and casing is ran in air. Once casing is on bottom the casing shoe will be cleared with fresh water and gel prior to cementing. Intermediate - The hole is drilled w/ air and casing is ran in air. Once casing is on bottom the casing shoe will be cleared with fresh water and gel prior to cementing. (Note: Drilling soap may be utilized if the hole gets wet/damp during the drilling of all air holes with the exception of the conductor). Production - The hole is drilled with synthetic oil base mud and once at TD the hole is circulated at a drilling pump rate until the hole is clean. Once casing is ran the hole is circulated for a minimum of one hole volume prior to pumping cement.

\*Note: Attach additional sheets as needed.

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 APR 5 2013  
 Department of  
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**Cement Additives**

- Conductor – 2% CaCl<sub>2</sub>
- Freshwater/Coal – 2% CaCl<sub>2</sub>
- Intermediate - 2% CaCl<sub>2</sub>
- Production -
  - 2.6% Cement extender
  - 0.7% Fluid Loss Additive
  - 0.5% High Temperature Retarder
  - 0.2% Friction Reducer

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APR 15 2013

Department of  
Environmental Protection

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

**CONSTRUCTION AND RECLAMATION PLAN AND SITE REGISTRATION APPLICATION FORM  
GENERAL PERMIT FOR OIL AND GAS PIT WASTE DISCHARGE**

Operator Name CNX Gas Company, LLC OP Code 494458046

Watershed Buckhannon River Quadrangle Century 7.5

Elevation 1582' County Upshur District Warren

Description of anticipated Pit Waste: Fluids associated with the drilling of new gas wells

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

Will a synthetic liner be used in the pit?  Yes  No. If so, what mil.? 60 ml

Proposed Disposal Method For Treated Pit Wastes:  
 Land Application  
 Underground Injection ( UIC Permit Number \_\_\_\_\_ )  
 Reuse (at API Number \_\_\_\_\_ )  
 Off Site Disposal (Supply form WW-9 for disposal location)  
 Other (Explain Recycle on other well on same pad or adjacent pads)

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Air and water based mud

-If oil based, what type? Synthetic, petroleum, etc. N/A

Additives to be used? Bactericide, Polymers and Weighting Agents

Will closed loop system be used?  No


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, N/A

-Landfill or offsite name/permit number? MeadowFill, S&S Landfill, and Northwestern Landfill

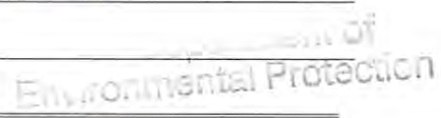
I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations 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 

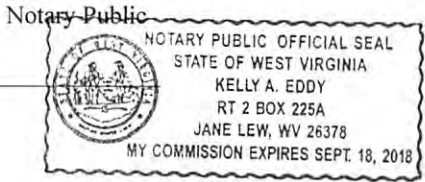
Company Official (Typed Name) Jeremy Jones

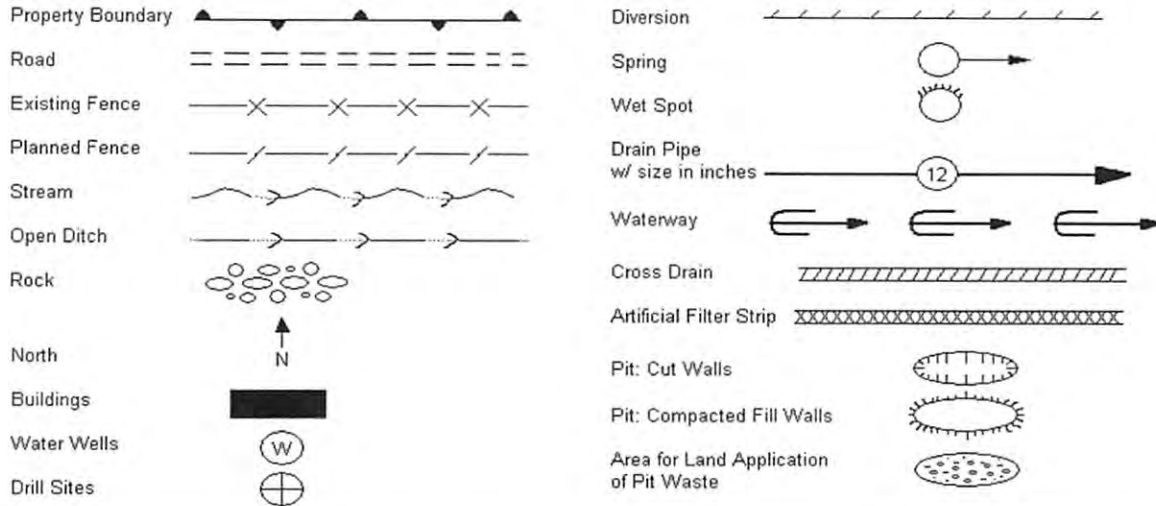
Company Official Title Designated Agent - General Manager WV Gas Operations



Subscribed and sworn before me this 3rd day of April, 2013

Kelly A. Eddy  
My commission expires September 18, 2018





Proposed Revegetation Treatment: Acres Disturbed 25 Prevegetation pH 6.5

Lime according to pH test Tons/acre or to correct to pH 7.0

Fertilizer (10-20-20 or equivalent) 500 lbs/acre (500 lbs minimum)

Mulch Hay or Straw / 2 Tons/acre

Seed Mixtures

Seed Type	Area I		Seed Type	Area II	
		lbs/acre			lbs/acre
Orchardgrass	25		Orchardgrass	25	
Birdsfoot Trefoil	15		Birdsfoot Trefoil	15	
Landino Clover	10		Landino Clover	10	

Attach:  
Drawing(s) of road, location, pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Bill Hatfield

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

Title: oil & gas inspector Date: \_\_\_\_\_

Field Reviewed?  Yes  No

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AUG 2 2013  
Department of Environmental Protection



✓ 4/22



## Water Management Plan: Secondary Water Sources



WMP- 01333

API/ID Number: 047-097-03848

Operator:

Consol Energy - WV

CENT19BHS

### Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

### Multi-site impoundment

Source ID:	20509	Source Name	Warder North Impoundment	Source start date:	12/1/2013
				Source end date:	12/1/2014
Source Lat:	39.192505	Source Long:	-80.025198	County	Barbour
Max. Daily Purchase (gal)		Total Volume from Source (gal):			3,696,000

DEP Comments:

The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.

Reference: WMP-189

APPROVED JUL 2 2 2013

**Important:**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 20510	Source Name	Warder South Impoundment	Source start date:	12/1/2013
			Source end date:	12/1/2014
	Source Lat:	39.19097	Source Long:	-80.025198
			County	Barbour
	Max. Daily Purchase (gal)		Total Volume from Source (gal):	3,570,000

## DEP Comments:

The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.

Reference: WMP-190

Source ID: 20511	Source Name	PHL28 Tank Pad	Source start date:	12/1/2013
			Source end date:	12/1/2014
	Source Lat:	39.201747	Source Long:	-80.034491
			County	Barbour
	Max. Daily Purchase (gal)		Total Volume from Source (gal):	6,000,000

## DEP Comments:

The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.

Reference: WMP-1332

**Important:**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

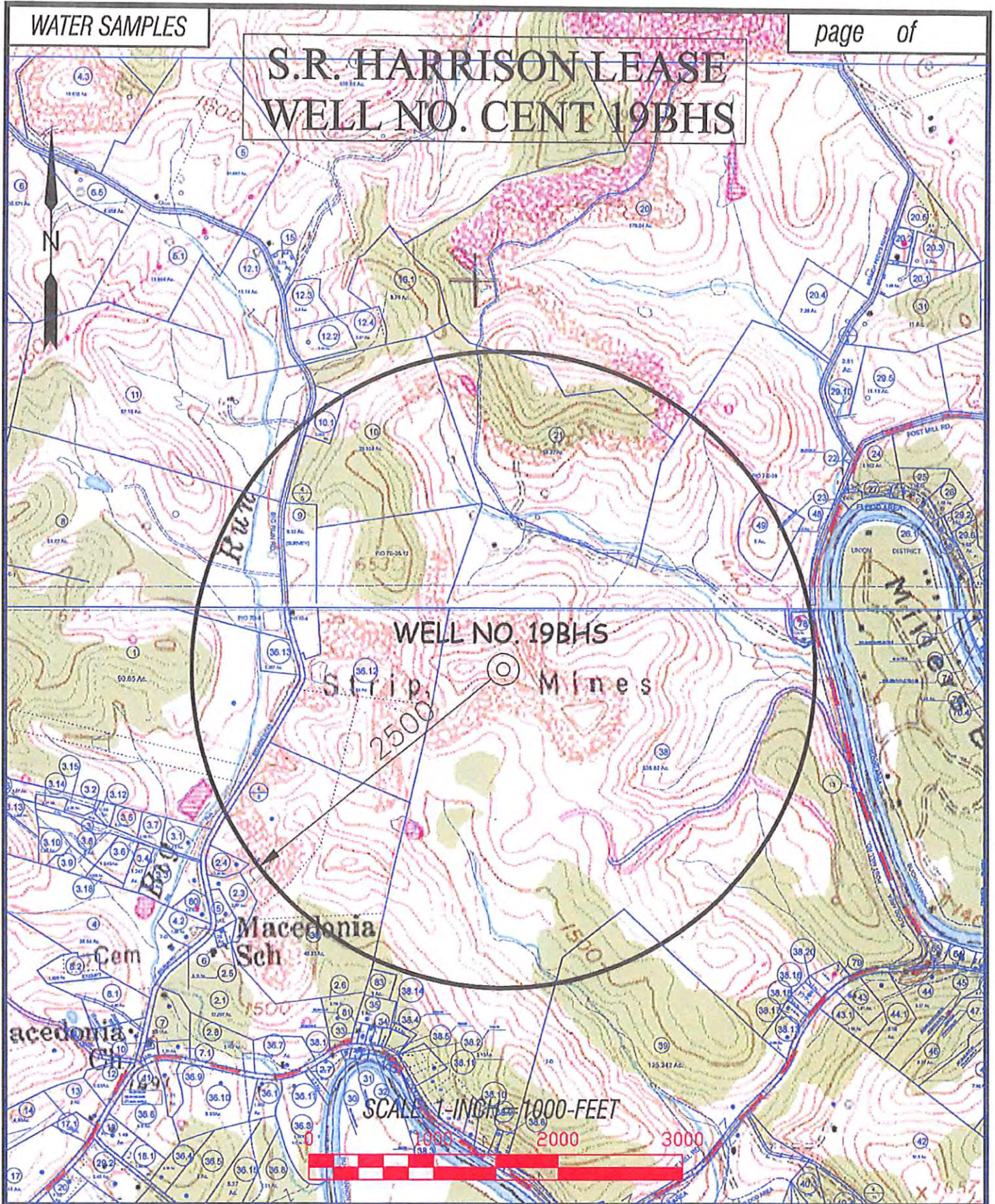
**Recycled Frac Water**

Source ID:	20512	Source Name:	PHL13 Pad	Source start date:	12/1/2013
				Source end date:	12/1/2014
Source Lat:		Source Long:		County:	
Max. Daily Purchase (gal):		Total Volume from Source (gal):		100,000	
DEP Comments:					

WATER SAMPLES

page of

# S.R. HARRISON LEASE WELL NO. CENT 19BHS



**SLS**  
 SMITH LAND SURVEYING, INC.  
 P.O. BOX 150 GLENVILLE, WV. 26351  
 PH: (304) 462-5634 FAX: (304) 462-5656 E-MAIL: sls@toll.net

DRAWN BY	FILE NO.	DATE	CADD FILE:
C.P.M.	7830	06-24-12	7830WATERBHS.DWG

TOPO SECTION OF:  
CENTURY, WV 7.5' QUAD

COUNTY	DISTRICT	TAX MAP-PARCEL NO.
UPSHUR	WARREN	7E-38

OPERATOR:  
 CNX GAS COMPANY  
 P.O. BOX 1248  
 JANE LEW, WV 26378

08/02/2013

JOSEPH T. AND MARY R. CARPINO 47.54 AC.±

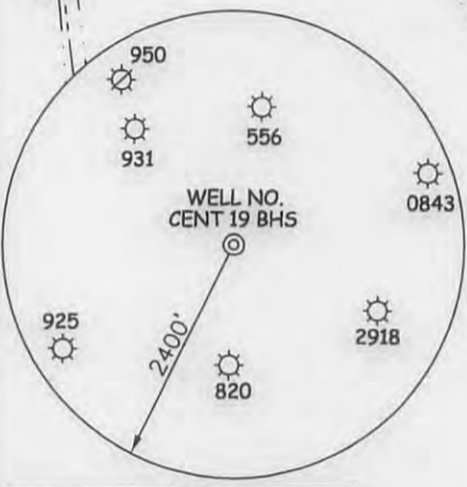
ANDREW W. AND KAREN J. CALL 46.93 AC.±

WELL NO. CENT 19 BHS

# S. R. HARRISON LEASE WELL NO. CENT 19 BHS

## NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES, AND CORNERS ARE BASED ON GRID SOUTH FOR THE WV STATE PLANE COORDINATE SYSTEM SOUTH ZONE NAD '27.
2. LEASE BOUNDARY SHOWN HEREON TAKEN FROM A DEED BOOK 85 PAGE 259 AND ADJOINING DEEDS.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF UPSHUR COUNTY IN JULY, 2012.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SURVEY GRADE).



WELL NO. CENT 19 BHS  
HEEL POINT  
STATE PLANE COORDINATES  
SOUTH ZONE (NAD 27)  
N. 740,813  
E. 2,237,053

HEEL POINT (NAD'27)  
LAT=(N) 39.03145  
LONG=(W) 80.16558

HEEL POINT UTM (NAD'83)  
N. 4,320,608  
E. 572,239

WELL NO. CENT 19 BHS  
TOE POINT  
STATE PLANE COORDINATES  
SOUTH ZONE (NAD 27)  
N. 736,486  
E. 2,238,628

TOE POINT (NAD'27)  
LAT=(N) 39.01953  
LONG=(W) 80.16018

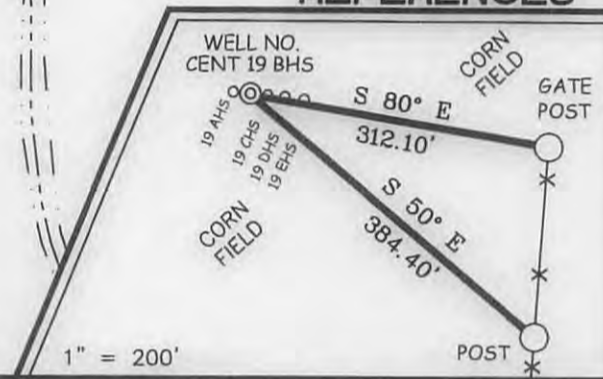
TOE POINT UTM (NAD'83)  
N. 4,319,290  
E. 572,719

WELL NO. CENT 19 BHS  
TOP HOLE  
STATE PLANE COORDINATES  
SOUTH ZONE (NAD 27)  
N. 741,478  
E. 2,236,951

LAT=(N) 39.03327  
LONG=(W) 80.16592

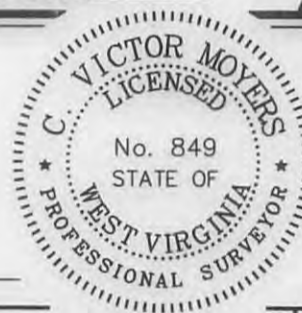
UTM (NAD'83)  
N. 4,320,811  
E. 572,208

## REFERENCES



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 THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 849 *C. Victor Moyers*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE APRIL 8, 20 13  
OPERATORS WELL NO. CENT 19 BHS  
API WELL NO. 47 - 97 - 3848 HG A  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7830P19BHSR4 (422-02)  
PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE) SCALE 1" = 1000'

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

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

LOCATION: GROUND  PROPOSED   
ELEVATION 1582.6' 1585' WATERSHED BUCKHANNON RIVER

DISTRICT WARREN COUNTY UPSHUR QUADRANGLE CENTURY 7.5'

SURFACE OWNER WILLIAM ROHR ACREAGE 338.82±

ROYALTY OWNER S.R. HARRISON, J.R. ET AL LEASE ACREAGE 485±, 207.46±, 45.30±

PROPOSED WORK:  
DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION   
PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS  
ESTIMATED DEPTH TVD 8,015' / TMD 13,293'

WELL OPERATOR CNX GAS COMPANY, LLC. DESIGNATED AGENT JEREMY JONES  
ADDRESS P.O. BOX 1248 ADDRESS P.O. BOX 1248  
JANE LEW, WV 26378 JANE LEW, WV 26378

COUNTY NAME PERMIT

08/02/2013