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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

January 16, 2014

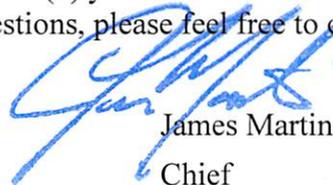
**WELL WORK PERMIT**  
**Horizontal 6A Well**

This permit, API Well Number: 47-4105685, 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: CAM17AHS  
Farm Name: KIRBY, LINDA  
**API Well Number: 47-4105685**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 01/16/2014

**Promoting a healthy environment.**

## 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.

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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 (USACOE). Through this permit, you are hereby being advised to consult with USACOE 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 fifty (50) 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.



041 05685

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west virginia department of environmental protection

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Oil and Gas Conservation Commission  
601 57<sup>th</sup> Street, SE Charleston, WV 25304  
(304)926-0499, Ext 1656

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

November 18, 2013

Department of Environmental Protection  
Office of Oil and Gas  
Charleston, WV 25304

RE: Application for Deep Well Permit – API #47-041-05685

COMPANY: CNX Gas Company, LLC

FARM: Linda Kirby – CAM 17 AHS

COUNTY: Lewis DISTRICT: Freemans Creek QUAD: Camden

The application for the above company is APPROVED FOR ORISKANY ONLY. **If operator wishes to drill deeper than the ORISKANY, additional approval must be obtained from the OGCC.**  
*Marcellus completion*

The applicant has complied with the provision of Chapter 22C-9, of the Code of West Virginia, nineteen hundred and thirty-one (1931), as amended, Oil and Gas Conservation Commission as follows:

1. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners; yes
2. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells, well name, and the name and address of the operator; none
3. Provided a plat showing that the proposed location is a distance of 400 feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

Cindy Raines  
Executive Assistant

**To avoid enforcement action and per 39CSR1.4.6 and 4.10 filing of wells logs and directional surveys are due within 90/60 days of completion of a deep well.**

WW - 6B  
(3/13)

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

41 3 276

1) Well Operator: CNX Gas Company LLC Operator ID 494458046 County Lewis District Freemans Creek Quadrange Camden

2) Operator's Well Number: CAM17AHS Well Pad Name: CAM17HS

3 Elevation, current ground: 1250' Elevation, proposed post-construction: 1244'

4) Well Type: (a) Gas [ ] Oil [ ] Underground Storage [ ]  
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 - 7090' (BOTTOM), Thickness - 60', Pressure - 4400#

7) Proposed Total Vertical Depth: 7490'

8) Formation at Total Vertical Depth: Oriskany Sand

9) Proposed Total Measured Depth: 14,950'

10) Approximate Fresh Water Strata Depths: 290', 347', 417'

11) Method to Determine Fresh Water Depth: Offset Wells

12) Approximate Saltwater Depths: None Anticipated

13) Approximate Coal Seam Depths: 135'

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

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill & stimulate new horizontal Marcellus well. Well to be drilled to a TMD of 14950'. Well to be drilled to a TVD of 7490', formation @ TVD - Oriskany Sand. Well to be plugged back to an approximate depth of 6500' (approximate due to exact Kick of point being unknown). Plugging back will be done using the displacement method and Class A type cement. A solid cement plug will be set from TD to KOP. 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. There will not be any production, perforation, or stimulation of any formations below the target formation.

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): 24.49 Acres

19) Area to be disturbed for well pad only, less access road (acres): 15.2 Acres

20)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	N	L.S.	81.3#	100	100	Grout to surface
Fresh Water	13 3/8"	N	J-55	54.5#	550	550	CTS w/ approved Class A Type Cement
Coal							
Intermediate	9 5/8"	N	J-55	36#	2700	2700	CTS w/ approved Class A Type Cement
Production	5 1/2"	N	P-110	20#	14950	14950	2400 cu. ft. w/ 50/50 POZ Lead & Class A Tail
Tubing	2 3/8"	N	J-55	4.7#	7600	7600	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
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 1/4"	0.352	3520	Class A Type	1.18
Production	5 1/2"	8 3/4" and 8 1/2"	0.361	12640	Class A Type	1.26
Tubing	2 3/8"	5 1/2" CSG	0.190	7700	.....	.....
Liners						

PACKERS

Kind:	None				RECEIVED Office of Oil and Gas
Sizes:	None				SEP 30 2013
Depths Set:	None				

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Environmental Protection

B.S. 9-18-13

WW - 6B  
(3/13)

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 casing 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 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 hole gets wet/damp during the drilling of all air holes with the exception of the conductor). Production - The hole will be 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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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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SEP 30 2013

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SEP 20 2013

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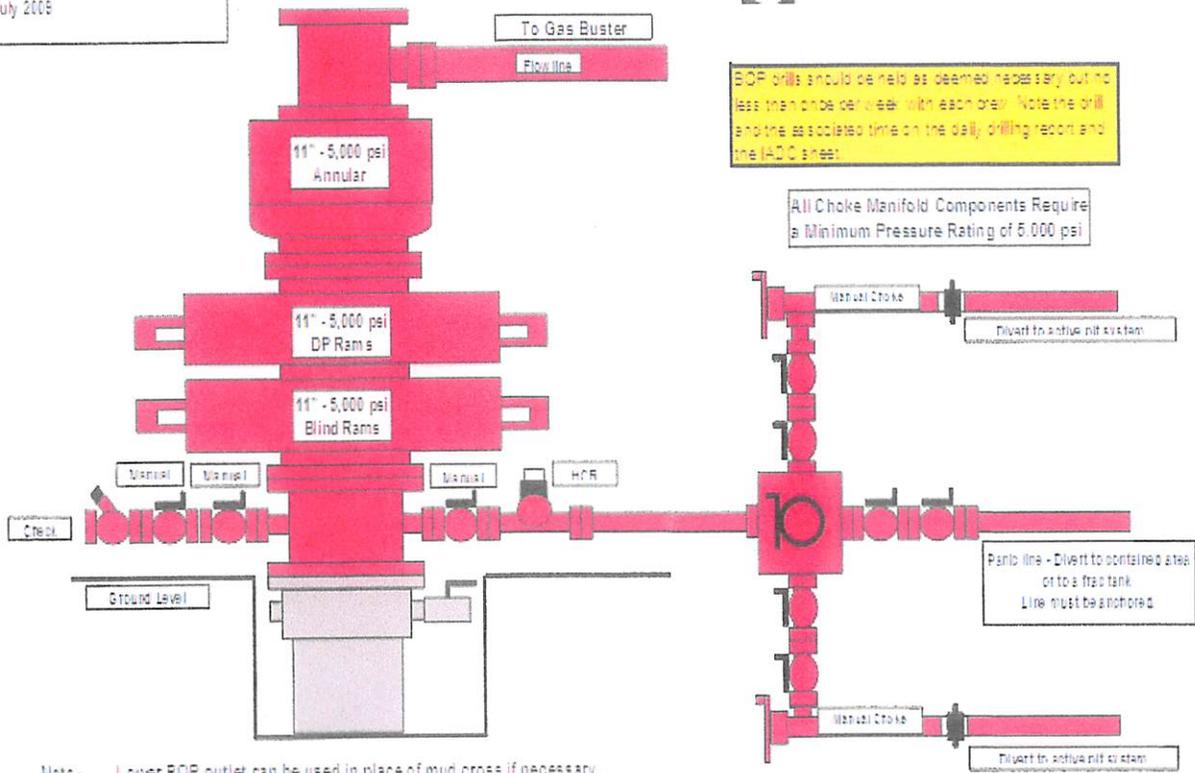
Waynesburg District  
Minimum BOP Requirements  
July 2009

HORIZONTAL RIG SETUP



BOP drills should be held as deemed necessary, but no less than once per week with each drill. Note the drill and the associated time on the daily drilling record and the IADC sheet.

All Choke Manifold Components Require a Minimum Pressure Rating of 8,000 psi



Note - Lower BOP outlet can be used in place of mud cross if necessary  
Choke manifold configuration may vary but must have 2 manual chokes and 8,000 psi rating  
The use of Coflex is acceptable

Remote Controls

Remote controls shall be readily accessible to the driller. Remote controls for all systems shall be capable of closing the preventer. Remote controls systems shall be capable of both opening and closing the preventer.

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WV Dept. of Environmental Protection



041 05685

Form WW-9

Operator's Well No. CAM17AHS

**CNX Gas Company LLC**

Proposed Revegetation Treatment: Acres Disturbed 24.4 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

Area I		Area II	
Seed Type	lbs/acre	Seed Type	lbs/acre
Orchard Grass	25	Orchard Grass	25
Birdsfoot Trefoil	15	Birdsfoot Trefoil	15
Ladino Clover	10	Ladino 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: Bary Stillip

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

Title: inspector

Date: 9-18-13

Field Reviewed? (  ) Yes (  ) No

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 SEP 30 2013  
 SEP 20 2013  
 WV Department of Environmental Protection



# Water Management Plan: Primary Water Sources



WMP- 01666

API/ID Number: 047-041-05685

Operator:

Consol Energy - WV

CAM17AHS

**Important:**

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP’s assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

**DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.**

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator’s responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

**APPROVED DEC 6 2013**

Source Summary

041 05685

WMP- 01666

API Number:

047-041-05685

Operator:

Consol Energy - WV

CAM17AHS

Stream/River

● Source Tygart Valley River Barbour Owner: Consol Energy

Start Date 12/30/2014 End Date 12/30/2015 Total Volume (gal) 5,277,944 Max. daily purchase (gal) Intake Latitude: 39.190421 Intake Longitude: -80.017423

Regulated Stream? Ref. Gauge ID: 3054500 TYGART VALLEY RIVER AT PHILIPPI, WV

Max. Pump rate (gpm): 1,470 Min. Gauge Reading (cfs): 355.01 Min. Passby (cfs) 344.41

DEP Comments:

● Source West Fork River @ Consol Energy Site 1 Lewis Owner: CONSOL ENERGY

Start Date 12/30/2014 End Date 12/30/2015 Total Volume (gal) 5,277,944 Max. daily purchase (gal) Intake Latitude: 39.068402 Intake Longitude: -80.456132

Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): 1,680 Min. Gauge Reading (cfs): 184.36 Min. Passby (cfs) 112.68

DEP Comments:

● Source West Fork River @ Consol Energy Site 2 Lewis Owner: CONSOL ENERGY

Start Date 12/30/2014 End Date 12/30/2015 Total Volume (gal) 5,277,944 Max. daily purchase (gal) Intake Latitude: 39.064668 Intake Longitude: -80.457541

Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): 1,680 Min. Gauge Reading (cfs): 184.36 Min. Passby (cfs) 112.68

DEP Comments:

Source Summary

**041**

**05685**

WMP-01666

API Number:

**047-041-05685**

Operator:

**Consol Energy - WV**

**CAM17AHS**

**Ground Water**

Source **PHL1 Groundwater Well** Barbour Owner: **Consol Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
<b>12/30/2014</b>	<b>12/30/2015</b>	<b>5,277,944</b>		<b>39.191287</b>	<b>-80.019039</b>

Regulated Stream? Ref. Gauge ID: **9999994** TYGART VALLEY RIVER AT PHILIPPI, WV

Max. Pump rate (gpm): **900** Min. Gauge Reading (cfs): **113.00** Min. Passby (cfs) **113.00**

DEP Comments: **Refer to USGS Stream Gauging Station 03054500**

Source Detail

041 05685

WMP- 01666

API/ID Number: 047-041-05685

Operator:

Consol Energy - WV

CAM17AHS

Source ID: 30822 Source Name: PHL1 Groundwater Well  
Consol Energy

Source Latitude: 39.191287

Source Longitude: -80.019039

HUC-8 Code: 5020001

Drainage Area (sq. mi.): 931.43 County: Barbour

Anticipated withdrawal start date: 12/30/2014

Anticipated withdrawal end date: 12/30/2015

- Endangered Species?
- Mussel Stream?
- Trout Stream?
- Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Total Volume from Source (gal): 5,277,944

Max. Pump rate (gpm): 900

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

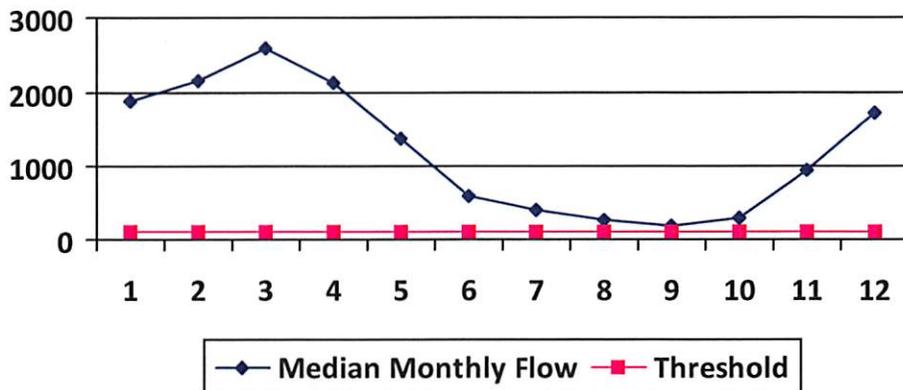
Reference Gaug: 9999994 TYGART VALLEY RIVER AT PHILIPPI, WV

Drainage Area (sq. mi.): 914.00

Gauge Threshold (cfs): 111

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	1,901.06	115.12	1,786.94
2	2,155.51	115.12	2,041.39
3	2,600.93	115.12	2,486.81
4	2,132.23	115.12	2,018.12
5	1,375.48	115.12	1,261.37
6	586.10	115.12	471.99
7	402.01	115.12	287.89
8	280.57	115.12	166.46
9	177.42	115.12	63.30
10	286.75	115.12	172.64
11	950.89	115.12	836.78
12	1,738.34	115.12	1,624.22

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 113.12

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.01

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 113.01

Passby at Location (cfs): 113.12

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

041 05685

WMP- 01666

API/ID Number: 047-041-05685

Operator: Consol Energy - WV

CAM17AHS

Source ID: 30819 Source Name Tygart Valley River  
Consol Energy

Source Latitude: 39.190421  
Source Longitude: -80.017423

HUC-8 Code: 5020001

Drainage Area (sq. mi.): 931.43 County: Barbour

- Endangered Species?
- Trout Stream?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?
- Mussel Stream?
- Tier 3?

Taylor County PSD

Anticipated withdrawal start date: 12/30/2014

Anticipated withdrawal end date: 12/30/2015

Total Volume from Source (gal): 5,277,944

Max. Pump rate (gpm): 1,470

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm)

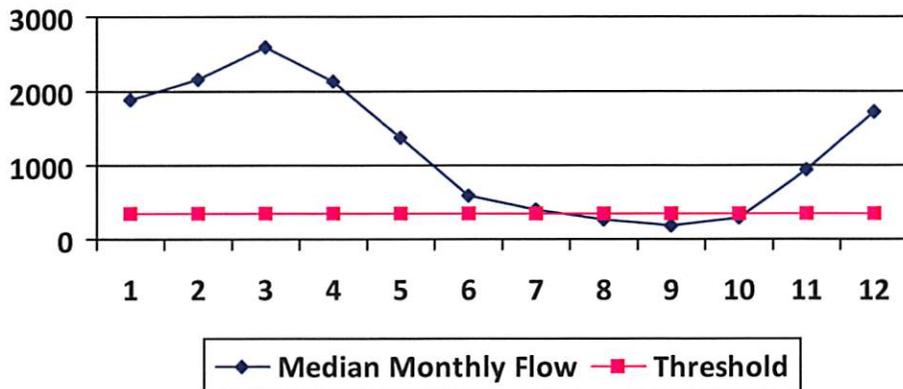
Reference Gaug 3054500 TYGART VALLEY RIVER AT PHILIPPI, WV

Drainage Area (sq. mi.) 914.00

Gauge Threshold (cfs): 341

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	1,901.06	361.51	1,542.64
2	2,155.51	361.51	1,797.09
3	2,600.93	361.51	2,242.51
4	2,132.23	361.51	1,773.82
5	1,375.48	361.51	1,017.07
6	586.10	361.51	227.69
7	402.01	361.51	43.59
8	280.57	361.51	-77.84
9	177.42	361.51	-181.00
10	286.75	361.51	-71.66
11	950.89	361.51	592.48
12	1,738.34	361.51	1,379.92

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 347.50

Upstream Demand (cfs): 10.73

Downstream Demand (cfs): 0.00

Pump rate (cfs): 3.28

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 355.01

Passby at Location (cfs): 347.50

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

041 05685

WMP-01666

API/ID Number: 047-041-05685

Operator: Consol Energy - WV

CAM17AHS

Source ID: 30820 Source Name: West Fork River @ Consol Energy Site 1  
 CONSOL ENERGY Source Latitude: 39.068402  
 Source Longitude: -80.456132

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 186.08 County: Lewis

Anticipated withdrawal start date: 12/30/2014

Anticipated withdrawal end date: 12/30/2015

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,277,944

Trout Stream?

Tier 3?

Max. Pump rate (gpm): 1,680

Regulated Stream?

Stonewall Jackson Dam

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

Gauged Stream?

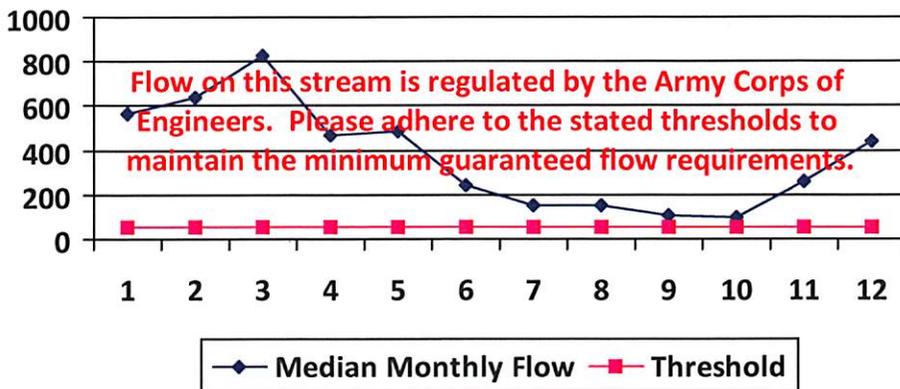
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	570.21	-	-
2	641.99	-	-
3	826.92	-	-
4	472.92	-	-
5	485.43	-	-
6	243.24	-	-
7	157.59	-	-
8	150.48	-	-
9	104.70	-	-
10	102.65	-	-
11	257.59	-	-
12	439.79	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -  
 Upstream Demand (cfs): 34.37  
 Downstream Demand (cfs): 34.37  
 Pump rate (cfs): 3.74  
 Headwater Safety (cfs): 14.34  
 Ungauged Stream Safety (cfs): 0.00  
 Min. Gauge Reading (cfs): -  
 Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

041 05685

WMP-01666

API/ID Number: 047-041-05685

Operator: Consol Energy - WV

CAM17AHS

Source ID: 30821 Source Name: West Fork River @ Consol Energy Site 2 Source Latitude: 39.064668  
 CONSOL ENERGY Source Longitude: -80.457541

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 185.9 County: Lewis

Anticipated withdrawal start date: 12/30/2014

Anticipated withdrawal end date: 12/30/2015

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,277,944

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 1,680

Regulated Stream? Stonewall Jackson Dam

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

Gauged Stream?

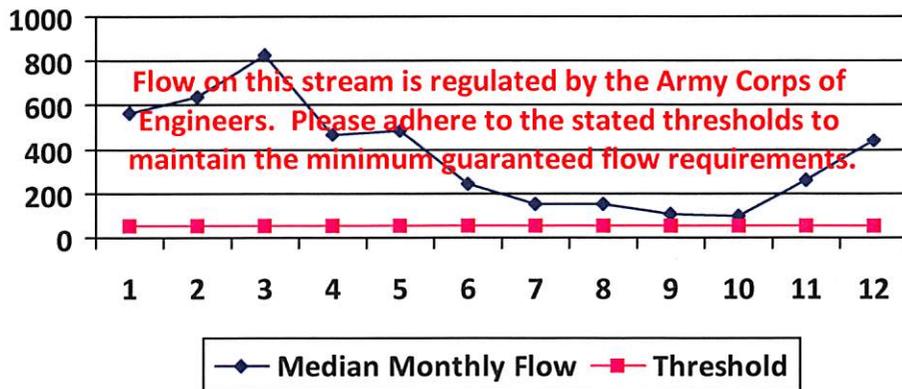
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	569.65	-	-
2	641.37	-	-
3	826.12	-	-
4	472.47	-	-
5	484.96	-	-
6	243.00	-	-
7	157.44	-	-
8	150.33	-	-
9	104.60	-	-
10	102.55	-	-
11	257.35	-	-
12	439.37	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -  
 Upstream Demand (cfs): 34.37  
 Downstream Demand (cfs): 34.37  
 Pump rate (cfs): 3.74  
 Headwater Safety (cfs): 14.33  
 Ungauged Stream Safety (cfs): 0.00  
 Min. Gauge Reading (cfs): -  
 Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Water Management Plan: Secondary Water Sources



WMP- 01666	API/ID Number	047-041-05685	Operator:	Consol Energy - WV
CAM17AHS				

**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.

### Lake/Reservoir

Source ID:	30824	Source Name	Little Hackers Creek Impoundment (WV83489)		Source start date:	12/30/2014
					Source end date:	12/30/2015
Source Lat:	39.1889	Source Long:	-80.0653	County	Barbour	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944			
DEP Comments:	Little Hackers Creek Impoundment (WV83489) used by Wolf Run Mining Company - Sentinel Mine					

WMP-01666 API/ID Number 047-041-05685 Operator: Consol Energy - WV

CAM17AHS

**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:

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- 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:	30825	Source Name	Warder North Impoundment		Source start date:	12/30/2014
					Source end date:	12/30/2015
Source Lat:	39.192505	Source Long:	-80.025198	County	Barbour	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944			
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

Source ID:	30826	Source Name	Warder South Impoundment		Source start date:	12/30/2014
					Source end date:	12/30/2015
Source Lat:	39.19097	Source Long:	-80.025198	County	Barbour	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944			
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

WMP-01666

API/ID Number 047-041-05685

Operator:

Consol Energy - WV

CAM17AHS

**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:	30827	Source Name	Alton 1 Freshwater Impoundment		Source start date:	12/30/2014	
					Source end date:	12/30/2015	
		Source Lat:	38.794961	Source Long:	-80.184542	County	Upshur
		Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944		
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-194

Source ID:	30828	Source Name	Alton 2 Freshwater Impoundment		Source start date:	12/30/2014	
					Source end date:	12/30/2015	
		Source Lat:	38.806146	Source Long:	-80.195108	County	Upshur
		Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944		
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-195

WMP-01666

API/ID Number

047-041-05685

Operator:

Consol Energy - WV

CAM17AHS

**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:

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- 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:	30823	Source Name	Fairmont Brine Processing	Source start date:	12/30/2014
			Commercial Supplier	Source end date:	12/30/2015
Source Lat:	39.5088	Source Long:	-80.126418	County	Marion
Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944		
DEP Comments:					

Source ID:	30829	Source Name	ALT 1 Flowback Pit	Source start date:	12/30/2014
				Source end date:	12/30/2015
Source Lat:	38.793967	Source Long:	80.183196	County	Barbour
Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944		
DEP Comments:					

WMP-01666

API/ID Number

047-041-05685

Operator:

Consol Energy - WV

CAM17AHS

**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:

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- 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:	30830	Source Name	PHL 1 Flowback Pit		Source start date:	12/30/2014	
					Source end date:	12/30/2015	
		Source Lat:	39.192372	Source Long:	-80.018833	County	Barbour
		Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944		
DEP Comments:							

Source ID:	30831	Source Name	PHL 13 Flowback Pit		Source start date:	12/30/2014	
					Source end date:	12/30/2015	
		Source Lat:	39.219211	Source Long:	-80.018059	County	Barbour
		Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944		
DEP Comments:							

WMP-01666

API/ID Number

047-041-05685

Operator:

Consol Energy - WV

CAM17AHS

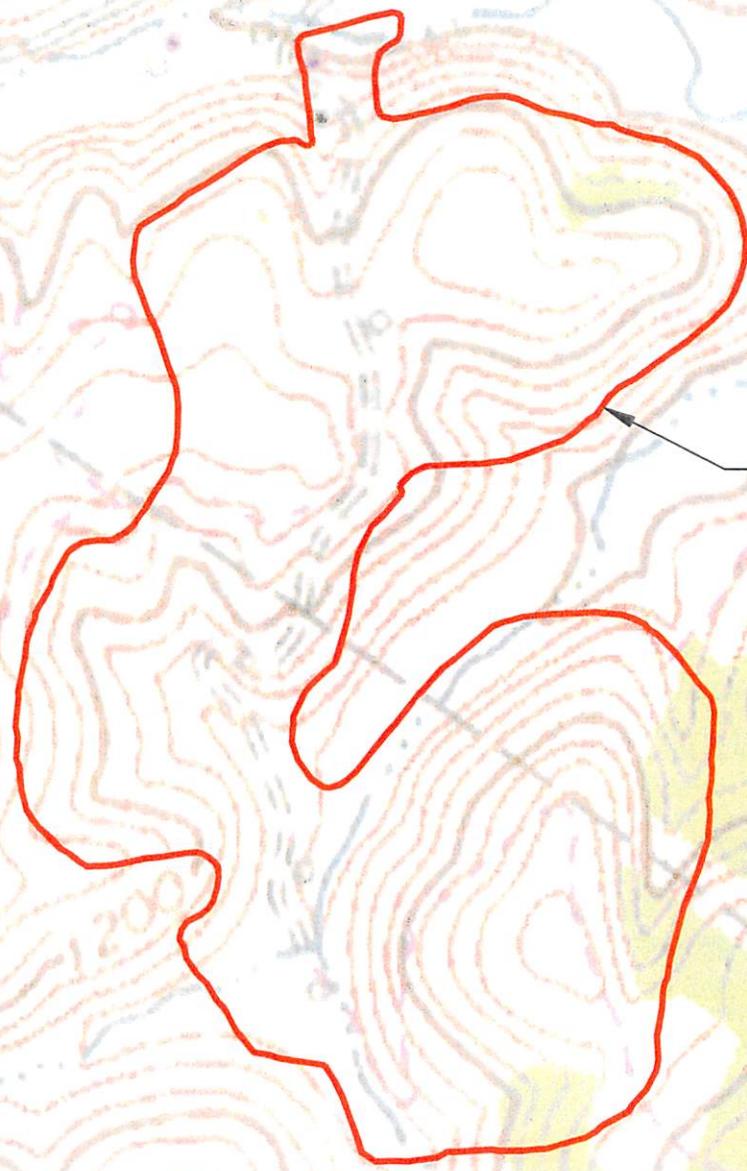
**Important:**

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:	30832	Source Name	Various	Source start date:	12/30/2014
				Source end date:	12/30/2015
	Source Lat:		Source Long:		County
	Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,277,944	
DEP Comments:	Sources include, but are not limited to, PHL4 well Pad				

CAM-17  
USGS TOPO



PROJECT  
LIMITS

Received  
SEP 30 2013

SCALE  
1 INCH = 500-FEET



Professional Energy Consultants  
A DIVISION OF SMITH LAND SURVEYING

SURVEYORS PROJECT MGMT. **SLS** ENGINEERS ENVIRONMENTAL

226 West Main St.  
P.O. Box 120  
Charlestown, WV 26031  
(204) 462-0634

56065 Clives Bottom Road  
Sharpsville, OH 43947  
(614) 671-0911

HONESTY. INTEGRITY. QUALITY

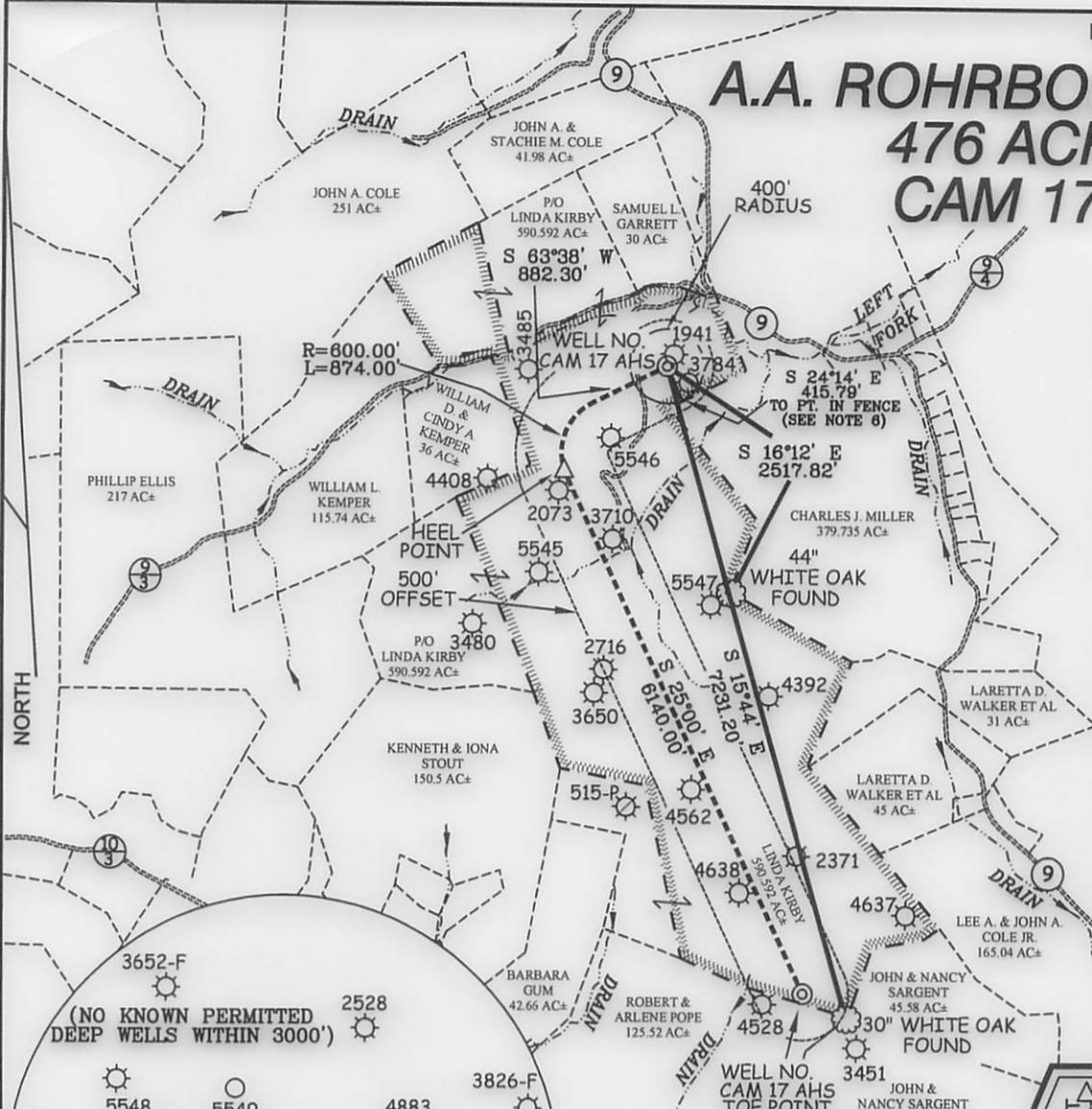
Office of Oil and Gas  
Department of Environmental Protection

FILE NO: 8011	DATE 9-4-13	CADD FILE: 8011-CAM-ROI-V3.DWG
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# A.A. ROHRBOUGH LEASE

## 476 ACRES ±

### CAM 17 AHS

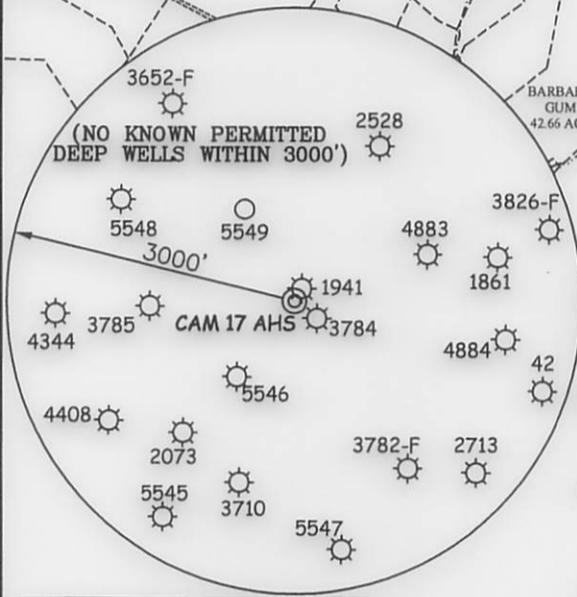
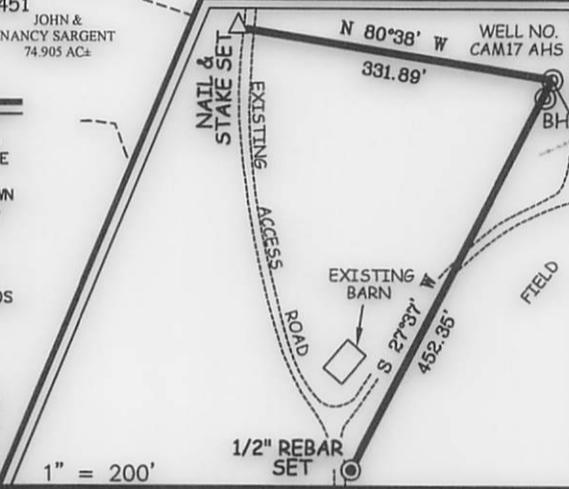


**CAM 17 AHS**  
**STATE PLANE COORDINATES**  
**SOUTH ZONE (NAD 27)**  
 N. 757,431.5  
 E. 2,117,254.2  
 LAT=(N) 39.079283  
 LONG=(W) 80.587001  
**UTM (NAD'83)(METERS)**  
 N. 4,325,666.2  
 E. 535,738.1

**CAM 17 AHS**  
**HEEL POINT**  
**STATE PLANE COORDINATES**  
**SOUTH ZONE (NAD 27)**  
 N. 756,306.2  
 E. 2,116,147.2  
 LAT=(N) 39.076207  
 LONG=(W) 80.590918  
**UTM (NAD'83)(METERS)**  
 N. 4,325,323.3  
 E. 535,400.9

**CAM 17 AHS**  
**TOE POINT**  
**STATE PLANE COORDINATES**  
**SOUTH ZONE (NAD 27)**  
 N. 750,741.5  
 E. 2,118,742.1  
 LAT=(N) 39.060898  
 LONG=(W) 80.581867  
**UTM (NAD'83)(METERS)**  
 N. 4,323,628.0  
 E. 536,191.7

### REFERENCES



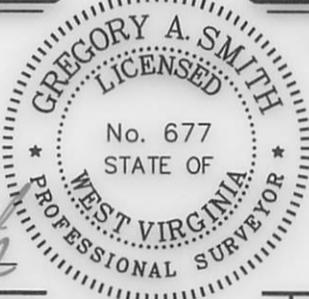
### NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES AND CORNERS ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM SOUTH ZONE NAD '27.
2. HIGHLIGHTED LEASE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 569 AT PAGE 810 AND ADJOINING WELL PLATS.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF LEWIS COUNTY IN JULY, 2013.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SURVEY GRADE).
5. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250'. NO APPLICABLE DWELLINGS OR BUILDINGS WITHIN 625'.
6. PROPOSED WELL AHS IS GREATER THAN 400' FROM LEASE BOUNDARY.



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. 677  
*Gregory A. Smith*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE OCTOBER 7, 20 13  
 OPERATORS WELL NO. CAM 17 AHS  
 API WELL NO. 47 — 041 — 0568546A  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 8011PAHSR2(457-23)  
 PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE) SCALE 1" = 2000'

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: ELEVATION 1,248' WATERSHED LEFT FORK OF FREEMANS CREEK  
 DISTRICT FREEMANS CREEK COUNTY LEWIS QUADRANGLE CAMDEN 7.5'

SURFACE OWNER LINDA KIRBY ACREAGE 590.592±  
 ROYALTY OWNER A.A. ROHRBOUGH LEASE ACREAGE 476±  
 PROPOSED WORK: LEASE NO. 53276  
 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 7,490' TVD / 14,950' TMD

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