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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](http://www.dep.wv.gov)

July 16, 2013

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-5101655, issued to NOBLE ENERGY, INC., 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: SHL 13CHS  
Farm Name: HEMSLEY, PAUL H. & ANNETTE  
**API Well Number: 47-5101655**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 07/16/2013

**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.

## 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.



51-1655

51-1655

SHL13

● Well Pad Location  
 ▨ Underground Mining Limits

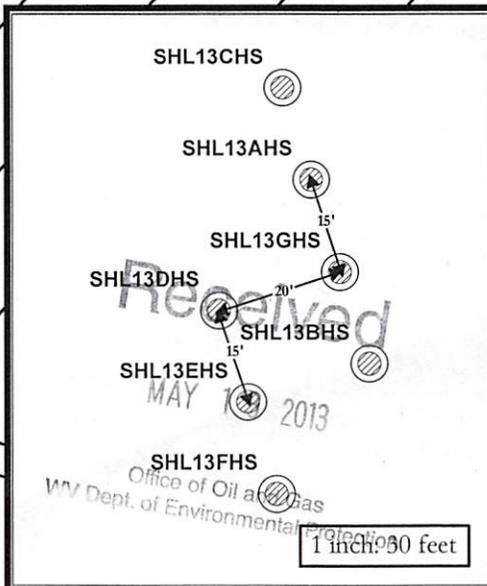
Depth To Pittsburgh Coal Seam Base = 773 Feet

Coal Pillar:  
Approx. 231,471 Sq. Ft.

243-FT.  
 97-FT.  
 120-FT.

321-FT.  
 988-FT.

SHL13 SURFACE LOCATION @ 15 FT SPACING



\*\* Notes:  
 - Measured distances cited on map are approximate.  
 - Mine data courtesy of WV Department of Environmental Protection and CNX Gas Company, LLC.

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

51 06 648

1) Well Operator: Noble Energy, Inc.

<u>494501907</u>	<u>Marshall</u>	<u>Sand Hill</u>	<u>Valley Grove</u>
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Operator ID County District Quadrangle

2) Operator's Well Number: SHL13CHS Well Pad Name: SHL13HS

3 Elevation, current ground: 1291.22 Elevation, proposed post-construction: 1283'

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

5) Existing Pad? Yes or No: Yes

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Target - Marcellus, Depth - 6741', Thickness - 50', Pressure - 2912#

7) Proposed Total Vertical Depth: 6890' (plug back from td to 200' above KOP)

8) Formation at Total Vertical Depth: Onondaga (plug back with solid cement to Marcellus) Drilling 99' into Onondaga.

9) Proposed Total Measured Depth: 12,486'

10) Approximate Fresh Water Strata Depths: 561', 763'

11) Method to Determine Fresh Water Depth: Closest well - Seneca Technology data base

12) Approximate Saltwater Depths: 1600'

13) Approximate Coal Seam Depths: Mahoning - 1266.74' - 1269.77', Pittsburgh 763' - 785.04 (drilling into pillar)

14) Approximate Depth to Possible Void (coal mine, karst, other): Pittsburgh 763 - 785.04 (Drilling into Pillar)

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: Yes, Shoemaker Mine see attached mine map

16) Describe proposed well work: Drill the vertical depth to the estimated KOP of 6,781 feet. Drill Horizontal Well in Marcellus Formation to an estimated length including the curve of 7123 feet. Total measured depth of 12486 feet. Drill pilot hole into Onondaga tvd 6890, plug back from td to 200' above KOP.  
\*\*If a unanticipated void is encountered we will set place baskets at least 30' but not more than 50' below bottom of void and grout to surface.

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. Stickwater 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): 18.6 acres

19) Area to be disturbed for well pad only, less access road (acres): 10 acres

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West Virginia Department of Environmental Protection  
W.P.H.  
4-25-13  
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WW - 6B  
(3/13)

20)

CASING AND TUBING PROGRAM

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft.</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill -up (Cu. Ft.)</u>
Conductor	30"	N	J55	94.0	40'	40'	CTS
Fresh Water	20"	N	J55	94	400'	400'	CTS
Coal	13 3/8"	N	J55	54.5	873'	873'	CTS
Intermediate	9 5/8"	N	J55	36.0	3218'	3218'	CTS
Production	5 1/2"	N	P110	20.0	12486'	12486'	200' above 9.625" shoe
Tubing							
Liners							

*WRH  
4-25-13*

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield</u>
Conductor	30"	36"	.25		Type 1	CTS
Fresh Water	20"	26"	.438	2730	Type 1	1.18
Coal	13 3/8"	17 1/2"	.380	2730	Type 1	1.18
Intermediate	9 5/8"	12 3/8"	.352	3520	Class A	1.19
Production	5 1/2"	8 3/4"	.361	12640	Class A	1.27
Tubing						
Liners						

PACKERS

Kind:				
Sizes:				
Depths Set:				

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21) Describe centralizer placement for each casing string. Conductor - No centralizers used. Fresh Water & Coal - Bow spring centralizers on first 2 joints then every third joint to 100 feet from surface. Intermediate - Bow spring centralizers one per joint to approximately 200 feet above the gas storage zone, then every third joint to 100 feet from surface. Production - Rigid bow spring centralizer on first joint then every 2 casing joints (free floating) through the lateral and the curve up to approximately 2450 feet.

22) Describe all cement additives associated with each cement type. Conductor - 1.15% CaCl<sub>2</sub>.  
 ✓ Fresh Water - 1.15% CaCl<sub>2</sub>. Coal - 1.15% CaCl<sub>2</sub>, 0.6% Gas migration control additive, 0.5% fluid loss additive, 0.4% Salt tolerant dispersant, and 0.3% defoamer. Intermediate - 10.0% BWOW NaCl, 0.2% BWOB Anti-foam, 0.3% BWOW Dispersant, 0.4% BWOB Cement retarder. 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 run in air. Apart from insuring the hole is clean via air circulation at TD, there are no other conditioning procedures. Fresh Water -The hole is drilled w/air and casing is run in air. Once casing is on bottom, the hole is filled w/ KCl water and a minimum of one hole volume is circulated prior to pumping cement. Coal - The hole is drilled w/air and casing is run in air. Once casing is at setting depth, the hole is filled w/ KCl water and a minimum of one hole volume is circulated prior to pumping cement. Intermediate - The hole is drilled w/ air and filled w/ KCl water once drilled to TD. The well is conditioned with KCl circulation prior to running casing. Once casing is at setting depth, the well is circulated drilled to TD. The well is conditioned with KCl circulation prior to running casing. Once casing is at setting depth, the well is circulated

\*Note: Attach additional sheets as needed.

a minimum of one hole volume prior to pumping cement. Production - The hole is drilled with synthetic oil base mud and once at TD the hole is circulated at a drilling pump rate for at least three hours. Once the torque and drag trends indicate the hole is clean the drilling BHA is pulled and casing is run. Once on bottom w/ casing the hole is circulated a minimum of one hole volume prior to pumping cemen

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Office of Oil and Gas  
WV Dept. of Environmental Protection



**DRILLING WELL PLAN**  
**SHL-13C-HS (Marcellus HZ)**  
**Macellus Shale Horizontal**  
**Marshall County, WV**

Ground Elevation		1283'		SHL-13C SHL (Lat/Long)		(549545.34N, 1709832.19E) (NAD27)			
Azm		339°		SHL-13C LP (Lat/Long)		(550117.53N, 1709631.53E) (NAD27)			
WELLBORE DIAGRAM		SHL-13C BHL (Lat/Long)		(554749.8N, 1706994.01E) (NAD27)					
HOLE	CASING	GEOLOGY	MD	TVD	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS
36	30" 94#	Conductor	40	40	AIR	To Surface	N/A	Ensure the hole is clean at TD.	Stabilize surface fill/soil. Conductor casing = 0.25" wall thickness
		Surface Casing	400	400	AIR	15.6 ppg Type 1 + 2% CaCl, 0.25# Lost Circ 30% Excess Yield = 1.18	Centralized every 3 joints to surface	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Surface casing = 0.438" wall thickness Burst=2730 psi
17 1/2	13-3/8" 54.5# J-55 BTC	Pittsburgh Coal	763	763	AIR	15.6 ppg Type 1 + 2% CaCl, 0.25# Lost Circ 30% Excess Yield = 1.18	Bow Spring on first 2 joints then every third joint to 100' from surface	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Intermediate casing = 0.380" wall thickness Burst=2730 psi
		Int. Casing	873	873	AIR	15.6 ppg Class A +0.4% Ret, 0.15% Disp, 0.2% AntiFoam, 0.125#/sk Lost Circ 20% Excess Yield=1.19 To Surface	Bow spring centralizers every third joint to 100' feet from surface.	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Casing to be ran 250' below the 5th Sand. Intermediate casing = 0.352" wall thickness Burst=3520 psi
12 3/8	9-5/8" 36# J-55 LTC	Big Lime	1857	1857	AIR	14.8ppg Class A 25:75:0 System +2.6% Cement extender, 0.7% Fluid Loss additive, 0.45% high temp retarder, 0.2% friction reducer	Rigid Bow Spring every third joint from KOP to TOC	Once at TD, circulate at max allowable pump rate for at least 6x bottoms up. Once on bottom with casing, circulate a minimum of one hole volume prior to pumping cement.	Production casing = 0.361" wall thickness Burst=12640 psi Note:Actual centralizer schedules may be changed due to hole conditions
		Big Injun	1950	1950					
		5th Sand Base	2968	2968	AIR	10% Excess Yield=1.27 TOC >= 200' above 9.625" shoe	Rigid Bow Spring every joint to KOP		
		Int. Casing	3218	3218					
8.75" Vertical		Warren Sand		4439	8.0ppg - 9.0ppg SOBM				
		Java		5062					
		Angola		5324					
		Rhinestreet		5954					
8.75" Curve	5-1/2" 20# HCP-110 TXP BTC	Cashaqua		6388	12.0ppg-12.5ppg SOBM				
		Middlesex		6483					
		West River		6519					
		Burkett		6574					
		Tully Limestone		6598					
Hamilton		6629							
8.75" - 8.5" Lateral		Marcellus		6741	12.0ppg-12.5ppg SOBM				
		TD	12486	6781					

LP @ 6781' TVD / 7123' MD

8.75 / 8.5 Hole - Cemented Long String  
 5-1/2" 20# HCP-110 TXP BTC

+/-5363' ft Lateral

TD @ +/-6781' TVD  
 +/-12486' MD

X=centralizers

*wkH*  
*4-25-13*

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Office of Oil and Gas  
 WV Dept. of Environmental Protection

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Noble Energy, Inc. OP Code 494501907

Watershed (HUC 10) Turkey Run Quadrangle Valley Grove

Elevation 1291.22 County Marshall District Sand Hill

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

Will a pit be used for drill cuttings? Yes \_\_\_\_\_ No X

If so, please describe anticipated pit waste: None - Closed Loop System

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

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection ( UIC Permit Number \_\_\_\_\_ )
- Reuse (at API Number at next anticipated well )
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain \_\_\_\_\_)

Will closed loop system be used? Yes

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Top hole Air and Freshwater / lateral SOB

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

Additives to be used in drilling medium? Bactericide, polymers and weighing agents

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All cuttings will be taken to an off site approved facility.

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

-Landfill or offsite name/permit number? See attached - Site Water/Cuttings Disposal

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 [Signature]

Company Official (Typed Name) Dee Swiger

Company Official Title Regulatory Analyst

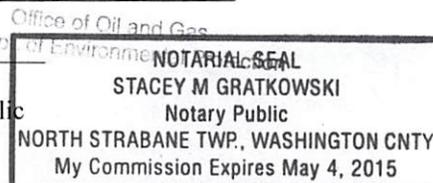
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Subscribed and sworn before me this 1 day of May, 2013

[Signature]  
Notary Public

My commission expires 5-4-15



51-1655

Form WW-9

Operator's Well No. SHL13CHS

**Noble Energy, Inc.**

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

Lime 2 to 3 tons Tons/acre or to correct to pH \_\_\_\_\_

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

Mulch hay or straw at 2 tons Tons/acre

Seed Mixtures

Seed Type	Area I lbs/acre
Tall Fescue	40
Ladino Clover	5

Seed Type	Area II lbs/acre
Tall Fescue	40
Ladino Clover	5

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *William H. ...*

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

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Title: Oil and Gas Inspector

Date: 4-25-13 MAY 13 2013

Field Reviewed?  Yes  No

Office of Oil and Gas  
WV Dept. of Environmental Protection

# Site Water/Cuttings Disposal

## Cuttings

### Haul off Company:

Eap Industries, Inc. DOT # 0876278  
1575 Smith Twp State Rd. Atlasburg PA 15004  
1-888-294-5227

### Disposal Locations:

Apex Environmental, LLC Permit # 06-08438  
11 County Road 78  
Amsterdam, OH 43903  
740-543-4389

Westmoreland Waste, LLC Permit # 100277  
111 Conner Lane  
Belle Vernon, PA 15012  
724-929-7694

## Water

### Haul off Company:

Dynamic Structures, Clear Creek DOT # 720485  
3790 State Route 7  
New Waterford, OH 44445  
330-892-0164

### Disposal Location:

Solidification  
Waste Management, Arden Landfill Permit # 100172  
200 Rangos Lane  
Washington, PA 15301  
724-225-1589

Solidification/Incineration  
Soil Remediation, Inc. Permit # 02-20753  
6065 Arrel-Smith Road  
Lowelville, OH 44436  
330-536-6825

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WV Dept. of Environmental Protection

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# Water Management Plan: Primary Water Sources



WMP- 01239	API/ID Number:	047-051-01655	Operator:	Noble Energy, Inc
		SHL13CHS		

**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 JUN 1 2 2013**

## Source Summary

WMP- 01239

API Number:

047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

### Stream/River

● Source **Wheeling Creek Pump Station 1 @ CNX Land Resources** Owner: **Consol Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	5,000,000		39.95205	-80.56189

Regulated Stream? Ref. Gauge ID: 3111955 Wheeling Creek near Majorville, WV

Max. Pump rate (gpm): **1,000** Min. Gauge Reading (cfs): **18.23** Min. Passby (cfs) **16.63**

DEP Comments:

● Source **Wheeling Creek Pump Station 2 @ CNX Land Resources** Owner: **CNX Land Resources, Inc.**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	4,000,000		39.949578	-80.531256

Regulated Stream? Ref. Gauge ID: 3111955 Wheeling Creek near Majorville, WV

Max. Pump rate (gpm): **1,000** Min. Gauge Reading (cfs): **18.23** Min. Passby (cfs) **16.24**

DEP Comments:

## Source Summary

WMP- 01239

API Number:

047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

## Purchased Water

● Source **West Virginia American Water - Weston Water Treatment Plant** Owner: **West Virginia American Water**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	7,000,000	500,000	-	-

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

Max. Pump rate (gpm): Min. Gauge Reading (cfs): **170.57** Min. Passby (cfs)

DEP Comments:

● Source **Bethlehem Water Department** Owner: **Bethlehem Water Department**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	3,000,000	200,000	-	-

Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999999 Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm): Min. Gauge Reading (cfs): **6,468.00** Min. Passby (cfs)

DEP Comments: Bethlehem Water Department purchases all its water from the City of Wheeling. Thresholds are set based on the location of the City of Wheeling's raw water intake.

● Source **Wellsburg Water Department** Owner: **Wellsburg Water Department**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	3,000,000	200,000	-	-

Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999999 Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm): Min. Gauge Reading (cfs): **6,468.00** Min. Passby (cfs)

DEP Comments: This alluvial groundwater well is, to some extent, under the influence of the Ohio River. Please adhere to stated minimum flow requirements on the Ohio River for withdrawals. <http://www.erh.noaa.gov/er/ohrfc/flows.shtml>

Source      **Moundsville Water Board**      Owner:      **Moundsville Water Treatment Plant**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	3,000,000	2,000,000	-	-

Regulated Stream?      Ohio River Min. Flow      Ref. Gauge ID:      9999999      Ohio River Station: Willow Island Lock & Dam

**Max. Pump rate (gpm):**      **Min. Gauge Reading (cfs):**      **6,468.00**      **Min. Passby (cfs)**

DEP Comments:      This alluvial groundwater well is, to some extent, under the influence of the Ohio River. Please adhere to stated minimum flow requirements on the Ohio River for withdrawals. <http://www.erh.noaa.gov/er/ohrfc/flows.shtml>

Source      **Dean's Water Service**      Owner:      **Dean's Water Service**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	3,000,000	600,000	-	-

Regulated Stream?      Ohio River Min. Flow      Ref. Gauge ID:      9999999      Ohio River Station: Willow Island Lock & Dam

**Max. Pump rate (gpm):**      **Min. Gauge Reading (cfs):**      **6,468.00**      **Min. Passby (cfs)**

DEP Comments:

Source      **Wheeling Water Department**      Owner:      **Wheeling Water Department**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	5,400,000	17,500	-	-

Regulated Stream?      Ohio River Min. Flow      Ref. Gauge ID:      9999999      Ohio River Station: Willow Island Lock & Dam

**Max. Pump rate (gpm):**      **Min. Gauge Reading (cfs):**      **6,468.00**      **Min. Passby (cfs)**

DEP Comments:      Refer to the specified sation on the National Weather Service's Ohio River forecasts at the following website: <http://www.erh.noaa.gov/ohrfc//flows.shtml>

Source **Ohio County PSD**

Owner: **Ohio county PSD**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/28/2013	5/28/2015	3,000,000	720,000	-	-

Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: **9999999** Ohio River Station: **Willow Island Lock & Dam**

**Max. Pump rate (gpm):** **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: **Refer to the specified station on the National Weather Service's Ohio River forecast website: <http://www.erh.noaa.gov/ohrfc//flows.shtml>**

## Source Summary

WMP- 01239

API Number:

047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

### Ground Water

Source **Shoemaker Groundwater Well #3** Owner: **Consol Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	288,000		40.0222	-80.73389

Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: **9999999** Ohio River Station: **Willow Island Lock & Dam**

**Max. Pump rate (gpm): 800** **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: This alluvial groundwater well is, to some extent, under the influence of the Ohio River. Please adhere to stated minimum flow requirements on the Ohio River for withdrawals. <http://www.erh.noaa.gov/er/ohrfc/flows.shtml>

Source **Shoemaker Groundwater Well #4** Owner: **Consol Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	288,000		40.02293	-80.733586

Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: **9999999** Ohio River Station: **Willow Island Lock & Dam**

**Max. Pump rate (gpm): 800** **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: This alluvial groundwater well is, to some extent, under the influence of the Ohio River. Please adhere to stated minimum flow requirements on the Ohio River for withdrawals. <http://www.erh.noaa.gov/er/ohrfc/flows.shtml>

Source **Shoemaker Groundwater Well #5** Owner: **Consol Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	288,000		40.021256	-80.734568

Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: **9999999** Ohio River Station: **Willow Island Lock & Dam**

**Max. Pump rate (gpm): 800** **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: This alluvial groundwater well is, to some extent, under the influence of the Ohio River. Please adhere to stated minimum flow requirements on the Ohio River for withdrawals. <http://www.erh.noaa.gov/er/ohrfc/flows.shtml>

Source **Shoemaker Groundwater Well #6**

Owner: **Consol Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
5/20/2013	5/20/2014	288,000		40.02076	-80.73397

Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: **9999999** **Ohio River Station: Willow Island Lock & Dam**

**Max. Pump rate (gpm): 800** **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: **This alluvial groundwater well is, to some extent, under the influence of the Ohio River. Please adhere to stated minimum flow requirements on the Ohio River for withdrawals. <http://www.erh.noaa.gov/er/ohrfc/flows.shtml>**

## Source Detail

WMP- 01239

API/ID Number: 047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

Source ID: 18058 Source Name Shoemaker Groundwater Well #3  
Consol Energy

Source Latitude: 40.0222

Source Longitude: -80.73389

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 County: Marshall

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 288,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 800

Regulated Stream? Ohio River Min. Flow

Max. Simultaneous Trucks:

Proximate PSD?

Max. Truck pump rate (gpm)

Gauged Stream?

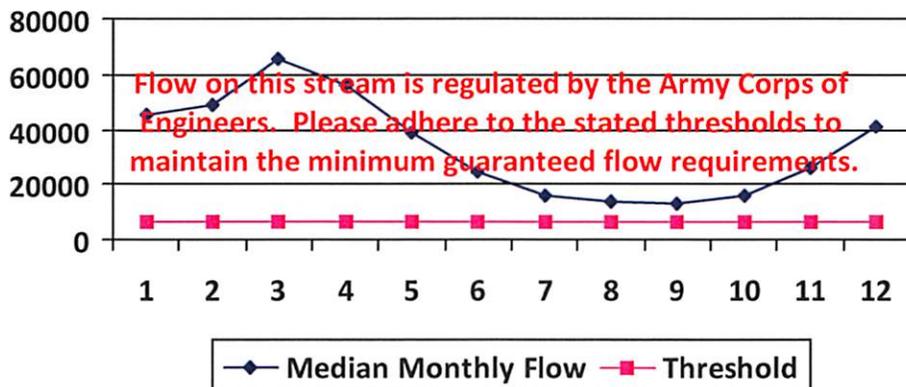
Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.) 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 1.78

Headwater Safety (cfs): 0.00

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

WMP-01239

API/ID Number: 047-051-01655

Operator: Noble Energy, Inc

SHL13CHS

Source ID: 18059 Source Name: Shoemaker Groundwater Well #4  
Consol Energy

Source Latitude: 40.022293  
Source Longitude: -80.733586

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 County: Marshall

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 288,000

Trout Stream?

Tier 3?

Max. Pump rate (gpm): 800

Regulated Stream? Ohio River Min. Flow

Max. Simultaneous Trucks:

Proximate PSD?

Max. Truck pump rate (gpm):

Gauged Stream?

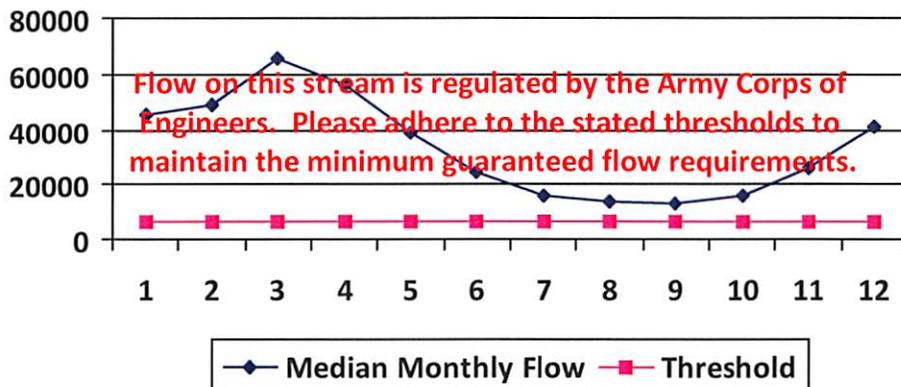
Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 1.78

Headwater Safety (cfs): 0.00

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

WMP-01239      API/ID Number: 047-051-01655      Operator: Noble Energy, Inc  
 SHL13CHS

Source ID: 18060      Source Name: Shoemaker Groundwater Well #5      Source Latitude: 40.021256  
 Consol Energy      Source Longitude: -80.734568

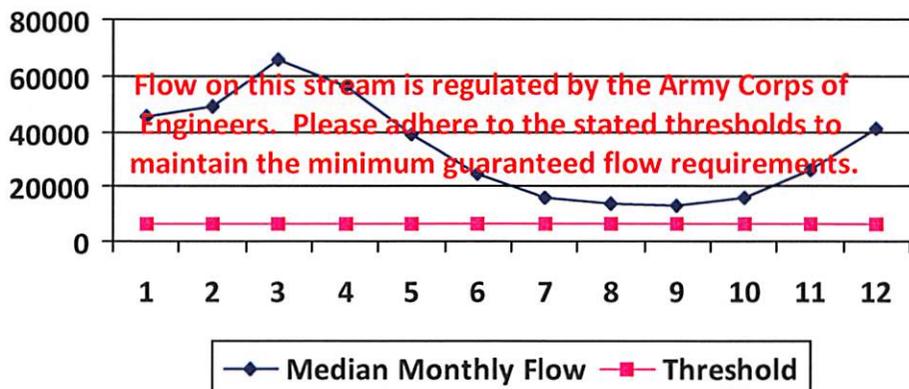
HUC-8 Code: 5030106      Anticipated withdrawal start date: 5/20/2013  
 Drainage Area (sq. mi.): 25000      County: Marshall      Anticipated withdrawal end date: 5/20/2014

Endangered Species?       Mussel Stream?  
 Trout Stream?       Tier 3?  
 Regulated Stream?      Ohio River Min. Flow      Total Volume from Source (gal): 288,000  
 Proximate PSD?      Max. Pump rate (gpm): 800  
 Gauged Stream?      Max. Simultaneous Trucks:   
 Max. Truck pump rate (gpm):

Reference Gaug: 9999999      Ohio River Station: Willow Island Lock & Dam  
 Drainage Area (sq. mi.): 25,000.00      Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



#### Water Availability Assessment of Location

Base Threshold (cfs):   
 Upstream Demand (cfs):   
 Downstream Demand (cfs):   
 Pump rate (cfs):   
 Headwater Safety (cfs):   
 Ungauged Stream Safety (cfs):   
 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

WMP-01239

API/ID Number: 047-051-01655

Operator: Noble Energy, Inc

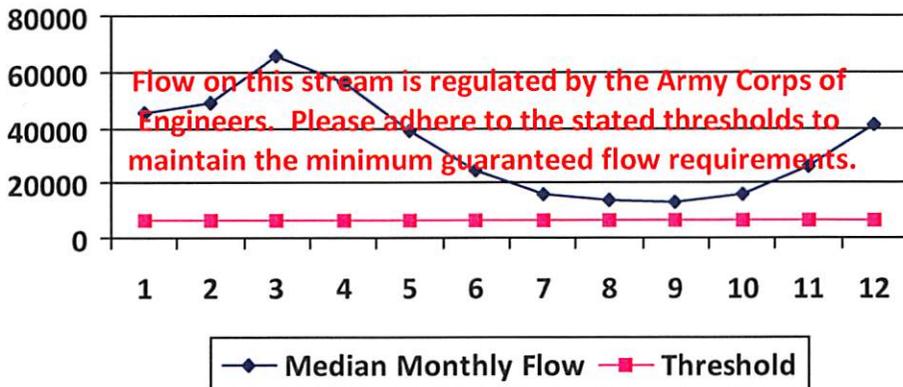
SHL13CHS

Source ID: 18061	Source Name: Shoemaker Groundwater Well #6 Consol Energy	Source Latitude: 40.02076
		Source Longitude: -80.73397
HUC-8 Code: 5030106	Drainage Area (sq. mi.): 25000	County: Marshall
<input type="checkbox"/> Endangered Species? <input type="checkbox"/> Trout Stream? <input checked="" type="checkbox"/> Regulated Stream? <input type="checkbox"/> Proximate PSD? <input checked="" type="checkbox"/> Gauged Stream?	<input type="checkbox"/> Mussel Stream? <input type="checkbox"/> Tier 3? Ohio River Min. Flow	Anticipated withdrawal start date: 5/20/2013 Anticipated withdrawal end date: 5/20/2014 Total Volume from Source (gal): 288,000 Max. Pump rate (gpm): 800 Max. Simultaneous Trucks: <input type="text"/> Max. Truck pump rate (gpm): <input type="text"/>

Reference Gaug: 9999999	Ohio River Station: Willow Island Lock & Dam
Drainage Area (sq. mi.): 25,000.00	Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	1.78
Headwater Safety (cfs):	0.00
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

WMP- 01239

API/ID Number: 047-051-01655

Operator: Noble Energy, Inc

SHL13CHS

Source ID: 18062 Source Name: West Virginia American Water - Weston Water Treat  
West Virginia American Water

Source Latitude: -  
Source Longitude: -

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 104.83 County: Lewis

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 7,000,000

Trout Stream?

Tier 3?

Max. Pump rate (gpm):

Regulated Stream? Stonewall Jackson Dam

Max. Simultaneous Trucks:

Proximate PSD? Weston WTP

Max. Truck pump rate (gpm):

Gauged Stream?

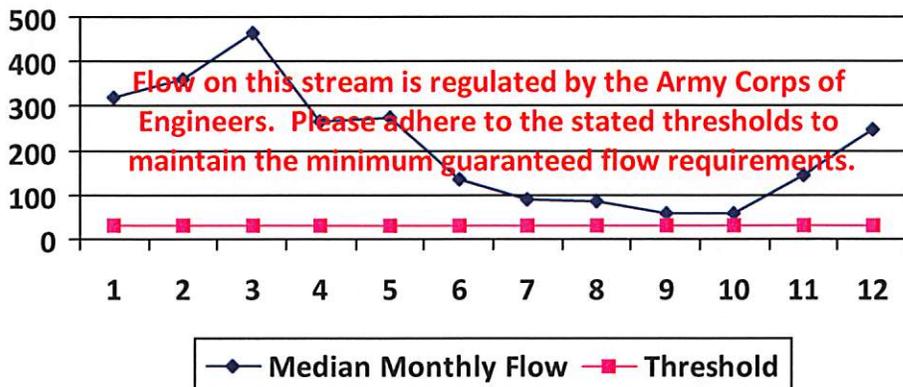
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	321.23	-	-
2	361.67	-	-
3	465.85	-	-
4	266.43	-	-
5	273.47	-	-
6	137.03	-	-
7	88.78	-	-
8	84.77	-	-
9	58.98	-	-
10	57.83	-	-
11	145.12	-	-
12	247.76	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 24.32

Downstream Demand (cfs): 0.00

Pump rate (cfs):

Headwater Safety (cfs): 8.08

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

WMP- 01239

API/ID Number: 047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

Source ID: 18063 Source Name: Bethlehem Water Department  
Bethlehem Water Department Source Latitude: -  
Source Longitude: -

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 County: Ohio

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Total Volume from Source (gal): 3,000,000

Endangered Species?  Mussel Stream?

Trout Stream?  Tier 3?

Regulated Stream? Ohio River Min. Flow

Proximate PSD? City of Wheeling

Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

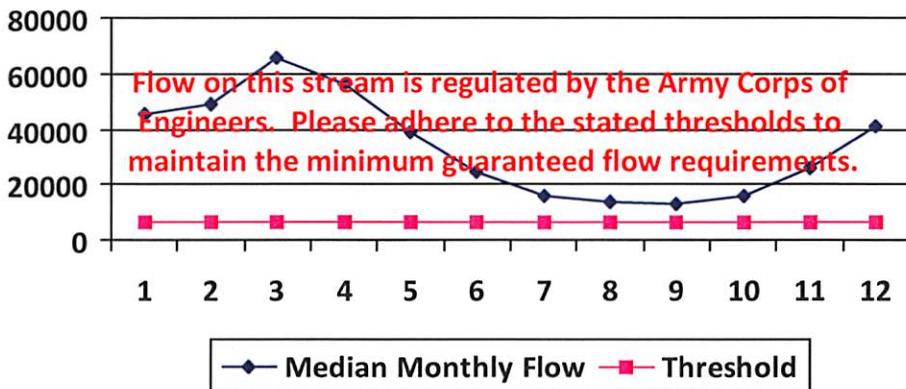
Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

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

WMP-01239

API/ID Number: 047-051-01655

Operator: Noble Energy, Inc

SHL13CHS

Source ID: 18064 Source Name: Wellsburg Water Department  
 Wellsburg Water Department Source Latitude: -  
 Source Longitude: -

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 County: Brooke

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Total Volume from Source (gal): 3,000,000

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

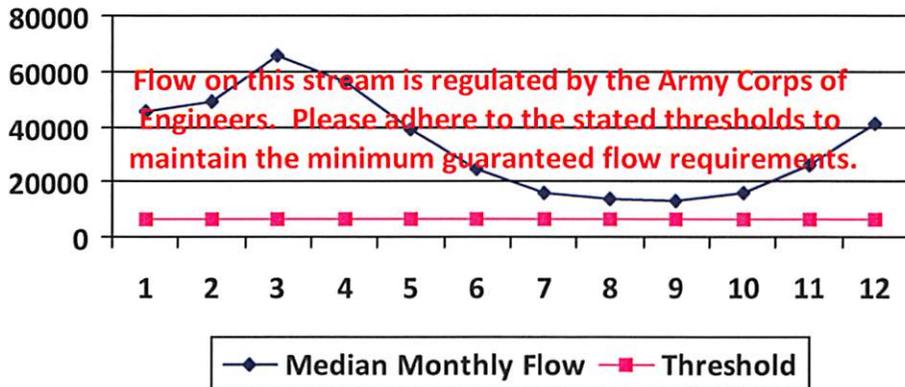
- Endangered Species?
- Trout Stream?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?
- Mussel Stream?
- Tier 3?
- Ohio River Min. Flow
- Wellsburg Water Department

Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00 Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

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

WMP-01239

API/ID Number: 047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

Source ID: 18065    Source Name: Moundsville Water Board  
 Moundsville Water Treatment Plant    Source Latitude: -  
 Source Longitude: -

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000    County: Marshall

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Endangered Species?     Mussel Stream?

Total Volume from Source (gal): 3,000,000

Trout Stream?     Tier 3?

Max. Pump rate (gpm):

Regulated Stream?    Ohio River Min. Flow

Max. Simultaneous Trucks:

Proximate PSD?

Max. Truck pump rate (gpm):

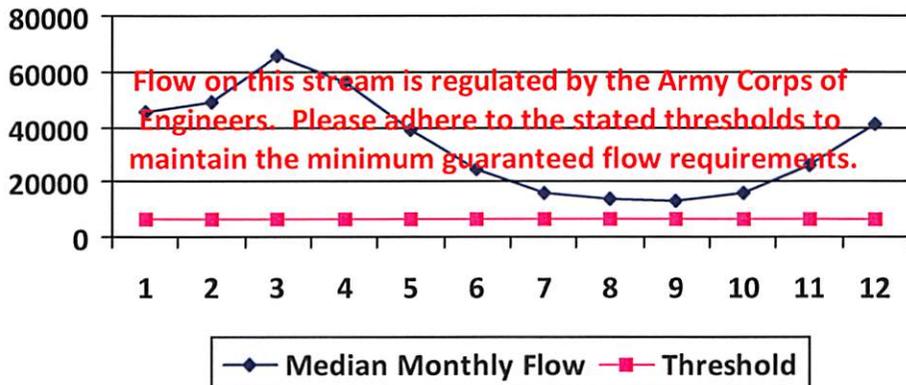
Gauged Stream?

Reference Gaug: 9999999    Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00    Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

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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

WMP- 01239

API/ID Number: 047-051-01655

Operator: Noble Energy, Inc

SHL13CHS

Source ID: 18066 Source Name: Dean's Water Service Source Latitude: -  
 Dean's Water Service Source Longitude: -

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 County: Ohio

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 3,000,000

Trout Stream?

Tier 3?

Max. Pump rate (gpm):

Regulated Stream? Ohio River Min. Flow

Max. Simultaneous Trucks:

Proximate PSD?

Max. Truck pump rate (gpm):

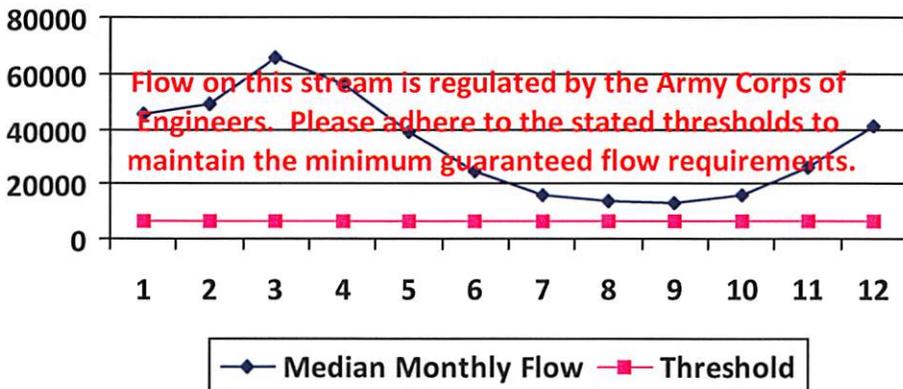
Gauged Stream?

Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00 Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs):

Headwater Safety (cfs): 0.00

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

WMP-01239

API/ID Number: 047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

Source ID: 18068    Source Name: Wheeling Water Department    Source Latitude: -  
 Wheeling Water Department    Source Longitude: -

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000    County: Ohio

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Endangered Species?     Mussel Stream?

Total Volume from Source (gal): 5,400,000

Trout Stream?     Tier 3?

Max. Pump rate (gpm):

Regulated Stream?    Ohio River Min. Flow

Max. Simultaneous Trucks:

Proximate PSD?    Wheeling Water Department

Max. Truck pump rate (gpm):

Gauged Stream?

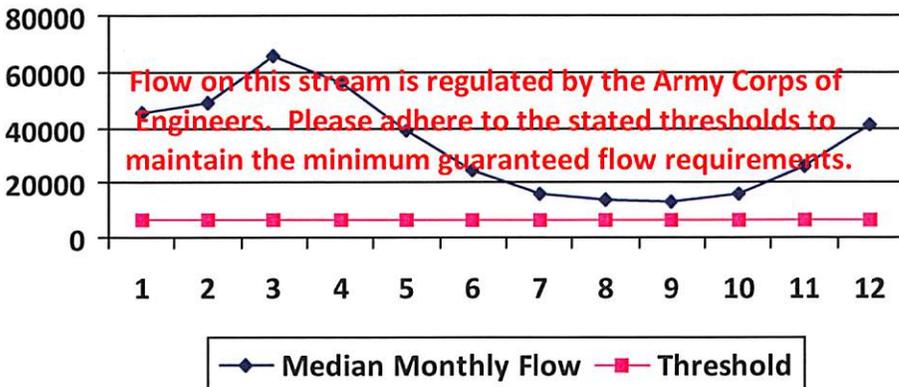
Reference Gaug: 9999999    Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

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

WMP-01239

API/ID Number: 047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

Source ID: 18069 Source Name: Ohio County PSD Source Latitude: -  
 Ohio county PSD Source Longitude: -

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 County: Ohio

Anticipated withdrawal start date: 5/28/2013

Anticipated withdrawal end date: 5/28/2015

Total Volume from Source (gal): 3,000,000

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

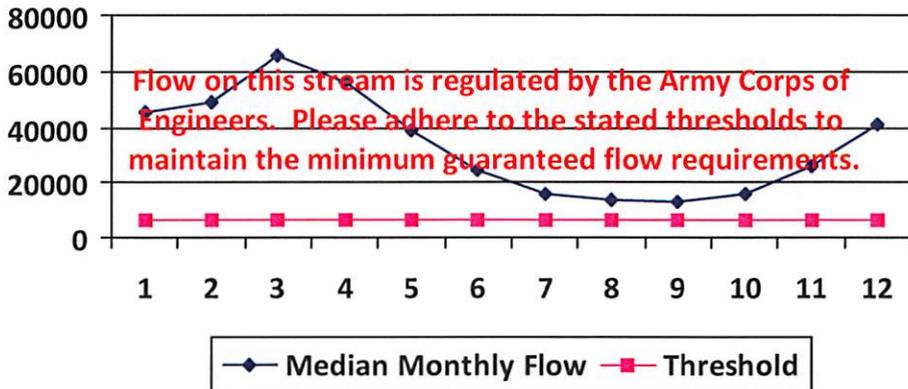
- Endangered Species?
- Trout Stream?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?
- Mussel Stream?
- Tier 3?
- Ohio River Min. Flow
- Wheeling Water Department

Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00 Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

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

WMP- 01239

API/ID Number: 047-051-01655

Operator: Noble Energy, Inc

SHL13CHS

Source ID: 18056 Source Name: Wheeling Creek Pump Station 1 @ CNX Land Resour  
Consol Energy

Source Latitude: 39.95205  
Source Longitude: -80.56189

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 156.06 County: Marshall

Anticipated withdrawal start date: 5/20/2013

Anticipated withdrawal end date: 5/20/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,000,000

Trout Stream?

Tier 3?

Max. Pump rate (gpm): 1,000

Regulated Stream?

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm)

Gauged Stream?

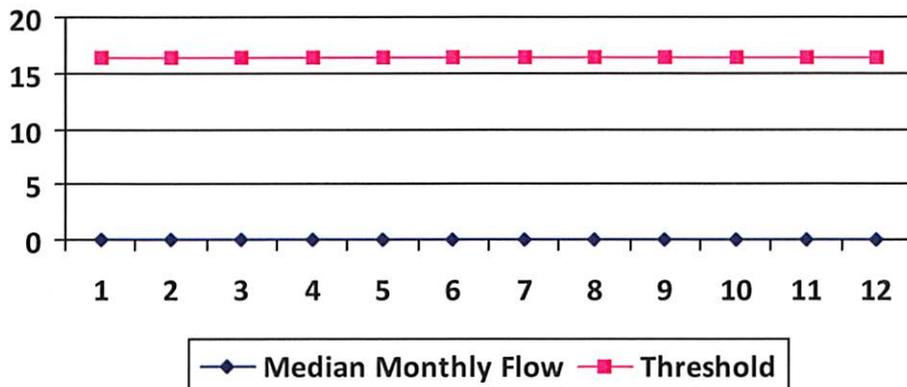
Reference Gaug: 3111955 Wheeling Creek near Majorsville, WV

Drainage Area (sq. mi.): 152.00

Gauge Threshold (cfs): 16

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	0.00	18.66	-
2	0.00	18.66	-
3	0.00	18.66	-
4	0.00	18.66	-
5	0.00	18.66	-
6	0.00	18.66	-
7	0.00	18.66	-
8	0.00	18.66	-
9	0.00	18.66	-
10	0.00	18.66	-
11	0.00	18.66	-
12	0.00	18.66	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 16.43

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 18.23

Passby at Location (cfs): 16.43

"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

WMP- 01239      API/ID Number: 047-051-01655      Operator: Noble Energy, Inc  
 SHL13CHS

Source ID: 18057      Source Name: Wheeling Creek Pump Station 2 @ CNX Land Resources, Inc.      Source Latitude: 39.949578  
 Source Longitude: -80.531256

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 152.4      County: Marshall

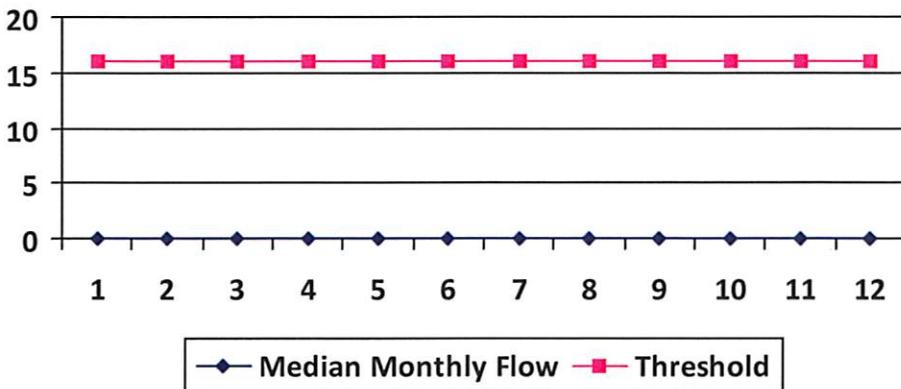
- Endangered Species?       Mussel Stream?
- Trout Stream?       Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Anticipated withdrawal start date: 5/20/2013  
 Anticipated withdrawal end date: 5/20/2014  
 Total Volume from Source (gal): 4,000,000  
 Max. Pump rate (gpm): 1,000  
 Max. Simultaneous Trucks: 0  
 Max. Truck pump rate (gpm):

Reference Gaug: 3111955      Wheeling Creek near Majorville, WV  
 Drainage Area (sq. mi.): 152.00      Gauge Threshold (cfs): 16

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	0.00	18.27	-
2	0.00	18.27	-
3	0.00	18.27	-
4	0.00	18.27	-
5	0.00	18.27	-
6	0.00	18.27	-
7	0.00	18.27	-
8	0.00	18.27	-
9	0.00	18.27	-
10	0.00	18.27	-
11	0.00	18.27	-
12	0.00	18.27	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 16.04  
 Upstream Demand (cfs): 0.00  
 Downstream Demand (cfs): 0.00  
 Pump rate (cfs): 2.23  
 Headwater Safety (cfs): 0.00  
 Ungauged Stream Safety (cfs): 0.00  


---

 Min. Gauge Reading (cfs): 18.23  
 Passby at Location (cfs): 16.04

"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- 01239	API/ID Number	047-051-01655	Operator:	Noble Energy, Inc
SHL13CHS				

### 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:	18070	Source Name	SHL #1 Impoundment		Source start date:	5/20/2013
					Source end date:	5/20/2014
Source Lat:	39.979696	Source Long:	-80.579465	County	Marshall	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	3,400,000			
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-200

WMP-01239

API/ID Number

047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

**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:	18071	Source Name	SHL #2 Impoundment (WV51-WPC-00001)		Source start date:	5/20/2013
					Source end date:	5/20/2014
	Source Lat:	39.966973	Source Long:	-80.561377	County	Marshall
	Max. Daily Purchase (gal)		Total Volume from Source (gal):	4,100,000		
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-201

Source ID:	18072	Source Name	SHL #3 Impoundment (WV51-WPC-00002)		Source start date:	5/20/2013
					Source end date:	5/20/2014
	Source Lat:	39.974133	Source Long:	-80.55527	County	Marshall
	Max. Daily Purchase (gal)		Total Volume from Source (gal):	4,300,000		
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-202

WMP- 01239

API/ID Number

047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

**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:	18073	Source Name	SHL #4 Impoundment (WV51-WPC-00003)		Source start date:	5/20/2013
					Source end date:	5/20/2014
	Source Lat:	39.963284	Source Long:	-80.562743	County	Marshall
	Max. Daily Purchase (gal)		Total Volume from Source (gal):			4,100,000
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-204

**Purchased Water**

Source ID:	18067	Source Name	Bridgeport Ohio Water Department Public Water Provider		Source start date:	5/20/2013
					Source end date:	5/20/2014
	Source Lat:	40.08348	Source Long:	-80.736488	County	
	Max. Daily Purchase (gal)	200,000	Total Volume from Source (gal):			3,000,000
DEP Comments:	Please ensure that purchases from this source are approved by, and completed in accordance with, requirements set forth by the State of Ohio Department of Environmental Protection.					

WMP-01239

API/ID Number

047-051-01655

Operator:

Noble Energy, Inc

SHL13CHS

**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.

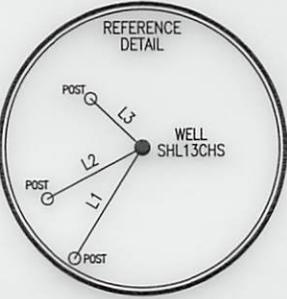
**Recycled Frac Water**

Source ID:	18074	Source Name	SHL3 Centralized Pit		Source start date:	5/20/2013
					Source end date:	5/20/2014
Source Lat:		Source Long:		County		
Max. Daily Purchase (gal)		Total Volume from Source (gal):	1,000,000			
DEP Comments:						



Received  
 MAY 13 2015  
 Office of Oil and Gas  
 Department of Environmental Protection  
 GREENE CO. CO.

Well is located on topo map 13,640' feet south of Latitude: 40° 02' 30"



SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83 N:4428334.88 E:539638.46
NAD27, WV NORTH N:549545.34 E:1709832.19

APPROX. LANDING POINT
UTM 17-NAD83 N:4428508.18 E:539574.41
NAD27, WV NORTH N:550117.54 E:1709631.53

BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83 N:4429294.90 E:539003.66
NAD27, WV NORTH N:552730.53 E:1707801.89

Well is located on topo map 10,033' feet west of Longitude: 80° 30' 00"

LINE	BEARING	DISTANCE
L1	S 31°59'05" W	279.65'
L2	S 62°04'24" W	235.32'
L3	N 46°29'18" W	155.35'

**NOTES:**

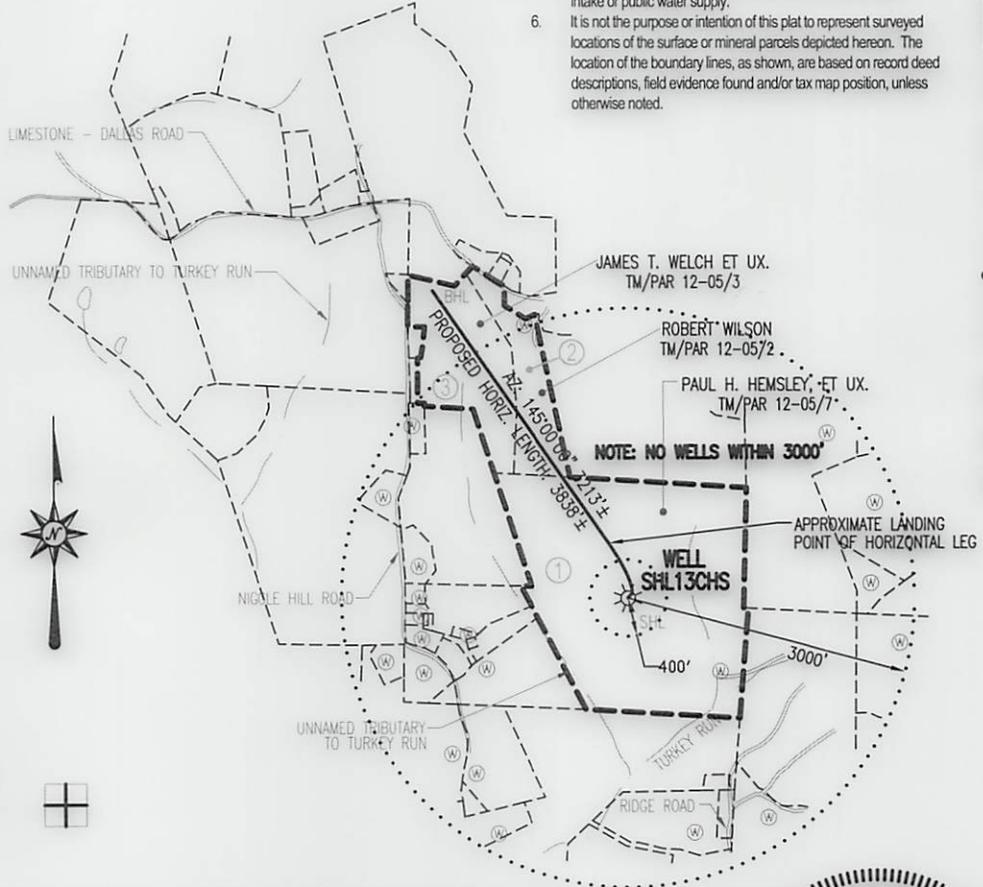
1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is located 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

**LEGEND**

- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED.
- WATER SOURCE
- LEASE NUMBER BASED ON ATTACHED WW-6A1
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE

**WELLS WITHIN 3000'**

- EXISTING WELLS
- PLUGGED WELLS



**Blue Mountain Engineering**  
11023 MASON DIXON HIGHWAY  
BURTON, WV 26562  
PHONE: (304) 662-6486

FILE #: SHL13CHS  
 DRAWING #: SHL13CHS  
 SCALE: 1" = 2000'  
 MINIMUM DEGREE OF ACCURACY: 1/2500  
 PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

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 DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: *George D. Six*  
 R.P.E.: \_\_\_\_\_ L.L.S.: P.S. No. 2000

**GEORGE D. SIX**  
 LICENSED  
 No. 2000  
 STATE OF  
 WEST VIRGINIA  
 PROFESSIONAL SURVEYOR

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25304



DATE: MAY 7, 2013  
 OPERATOR'S WELL #: SHL13CHS  
 API WELL #: 47 51 1655HGA  
 STATE COUNTY PERMIT

Well Type:  Oil  Waste Disposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: TURKEY RUN ELEVATION: 1283.00'  
 COUNTY/DISTRICT: MARSHALL / SAND HILL QUADRANGLE: VALLEY GROVE, WV 7.5'  
 SURFACE OWNER: PAUL H. & ANNETTE A. HEMSLEY ACREAGE: 121.65±  
 OIL & GAS ROYALTY OWNER: SEE ATTACHED WW-6A1 ACREAGE: 172.454±

DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
 PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON   
 CLEAN OUT & REPLUG  OTHER CHANGE  (SPECIFY): \_\_\_\_\_

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6781'± TMD: 10,313'±  
 WELL OPERATOR NOBLE ENERGY INC. DESIGNATED AGENT STEVEN M. GREEN  
 Address 333 TECHNOLOGY DRIVE, SUITE 116 Address 500 VIRGINIA STREET EAST, UNITED CENTER SUITE 590  
 City CANONSBURG State PA Zip Code 15317 City CHARLESTON State WV Zip Code 25301