December 13, 2013

WELL WORK PERMIT
Horizontal 6A Well

This permit, API Well Number: 47-5101722, 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: WEB22GHS
Farm Name: TURLEY, TIM M. & JENKINS, TAI
API Well Number: 47-5101722
Permit Type: Horizontal 6A Well
Date Issued: 12/13/2013

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

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

1) Well Operator: **Noble Energy, Inc.** | 494501907 | Marshall | Webster | Majorsville
--- | --- | --- | --- | ---
Operator ID | County | District | Quadrangle

2) Operator’s Well Number: **WEB 22 GHS** | Well Pad Name: **WEB 22**

3) Farm Name/Surface Owner: **Tim Turley & Tammy Jenkins** | Public Road Access: **Dry Ridge Rd/CR 48**

4) Elevation, current ground: **1325’** | Elevation, proposed post-construction: **1340.25’**

5) Well Type
   - (a) Gas
   - Oil
   - Underground Storage
   - Other

   (b) If Gas
   - Shallow
   - Deep
   - Horizontal

6) Existing Pad: Yes or No | **No**

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
   - Target-Marcellus, Depth-8875’, Thickness-48”, Pressure-4569#

8) Proposed Total Vertical Depth: **6913’**

9) Formation at Total Vertical Depth: **Marcellus**

10) Proposed Total Measured Depth: **12,826’**

11) Proposed Horizontal Leg Length: **5,266’**

12) Approximate Fresh Water Strata Depths: **212’, 295’**

13) Method to Determine Fresh Water Depths: **Offset well data**

14) Approximate Saltwater Depths: **None noted in offsets**

15) Approximate Coal Seam Depths: **761’ to 771’ Pittsburgh**

16) Approximate Depth to Possible Void (coal mine, karst, other): **None anticipated, drilling in pillar-mine maps attached**

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? **Yes**

   (a) If Yes, provide Mine Info:
   - Name: **Bailey Mine**
   - Depth: **770’**
   - Seam: **Pittsburgh**
   - Owner: **Consolidated Coal Company an affiliate of Consol Energy**

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51-01722

Page 1 of 3
<table>
<thead>
<tr>
<th>TYPE</th>
<th>Size</th>
<th>New Used</th>
<th>Grade</th>
<th>Weight per ft. (lb/ft)</th>
<th>FOOTAGE: For Drilling</th>
<th>INTERVALS: Left in Well</th>
<th>CEMENT: Fill-up (Cu. Ft.)</th>
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<td>12,826'</td>
<td>TDC 300' above 8,520 casing plus</td>
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**PACKERS**

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<th>Kind:</th>
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<tbody>
<tr>
<td>Sizes:</td>
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<tr>
<td>Depths Set:</td>
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19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill the vertical depth to the Marcellus at an estimated total vertical depth of approximately 6,913 feet. Drill Horizontal leg to stimulate and produce the Marcellus Formation. If we should encounter an unanticipated void we will install casing at a minimum of 20’ below the void but not more than 100’ below the void, set a basket and grout to surface.

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

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. See attached list. Maximum pressure not to exceed 10,000 lb.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 18.5

22) Area to be disturbed for well pad only, less access road (acres): 8.45

23) Describe centralizer placement for each casing string:

No centralizers will be used with conductor casing. Surface casing will have bow spring centralizers on first 2 joints then every third joint to 100’ from surface. Intermediate casing will have bow spring centralizers on first 2 joints then every third joint to 100’ from surface. Production string will have a rigid bow spring every joint to KOP, rigid bow spring every third joint from KOP to top of cement.

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

Conductor-1.15% CaCl Surface and Coal- Class A Portland Cement CaCl Z with flake. Excess Yield=1.18 Intermediate- 15.6 ppg Class A +0.4% Ret, 0.15% Disp, 0.2% AntiFoam, 0.125Wk3 Lost circ 30% Excess Yield=1.19 to surface.
Production- 14.8 ppg class A 25:75:0 System +2.6% Cement extender, 0.7% Fluid Loss additive, 0.45% high temp retarder, 0.2% friction reducer 16% Excess Yield=1.27 TOC greater or equal to 200’ above 9.825’ shoe.

25) Proposed borehole conditioning procedures:

Conductor-The hole is drilled w/air and casing is run on air. Apart from insuring the hole is clean via air circulation at TD, there are no other conditioning procedures. Surface-The hole is drilled w/air and casing is run on air. 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. Coal The hole is drilled with cased w/air or on Freshwater based mud. 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-Once surface casing is set and cemented, intermediate hole is drilled either on air or SOBM and filled with KCl water once drilled to TD. Production- The hole is drilled with SOBM and once to TD, circulated at maximum 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.

*Note: Attach additional sheets as needed.
<table>
<thead>
<tr>
<th>WELLBORE DIAGRAM</th>
<th>HOLE</th>
<th>CASING</th>
<th>GEOLOGY</th>
<th>RS</th>
<th>TVD</th>
<th>MUD</th>
<th>CEMENT</th>
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<th>CONDITIONING</th>
<th>COMMENTS</th>
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<td>36</td>
<td>30&quot; 1-1/8&quot;</td>
<td>AR</td>
<td>To Surface</td>
<td>N/A</td>
<td>Ensure hole is clean at TD. Surface casing cement = 0.25&quot; wall thickness.</td>
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<td>24</td>
<td>25&quot; 6&quot;</td>
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<td>To Surface</td>
<td>N/A</td>
<td>Centralize every 3 joints to surface. FIB with KCl water since drilled to TD. Once casing at setting depth, calculate a minimum of one hole volume prior to pumping cement.</td>
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<td>17 1/2</td>
<td>13-3/8&quot; 5-1/2&quot; J-06 BHC</td>
<td>AR</td>
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<td>Surface cementing = 0.63&quot; wall thickness. BoreID 2300 psi.</td>
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<td>Pittsburgh Clay</td>
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<td>6-5/8&quot; 3-1/2&quot; J-06 BHC</td>
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<td>6.75&quot; Curve</td>
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<tr>
<td>5-1/2&quot; 3-1/2&quot; HCP-110 TSP-8TC</td>
<td>AR</td>
<td></td>
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<td>A 3&quot; trip Cement 9.0% Float Loss, 0.6% High Set Friction reducer. Once on bottom with casing, calculate a minimum of one hole volume prior to pumping cement.</td>
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FLUIDS/CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name: Noble Energy, Inc.  
OP Code: 494501907  

Watershed (HUC 10): Dunkard Fork (HUC 10)  Quadrangle: Majorsville  
Elevation: 1340'  County: Marshall  District: Webster

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 [X]  No

If so, please describe anticipated pit waste: Closed Loop-No pit to be utilized

Will a synthetic liner be used in the pit?  Yes [X]  No  If so, what ml?

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number__)
- Reuse (at API Number: TBD-Next anticipated well)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain__)

Will closed loop system be used?  [X]

Drilling medium anticipated for this well?  Air, freshwater, oil based, etc. Air thru intermediate string, then SOBM

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

Additives to be used in drilling medium?  Please see attached list

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

- If left in pit and plan to solidify what medium will be used?  (cement, lime, sawdust)
- Landfill or offsite name/permit number?  Please see attached list

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): Jessica Leska  
Company Official Title: Regulatory Technician

Subscribed and sworn before me this 13th day of December, 2013  
Notary Public  
My commission expires November 23, 2015

12/13/2013
Noble Energy, Inc.

Proposed Revegetation Treatment: Acres Disturbed 18.5 acres  Prevegetation pH 

2 to 3 Tons/acre or to correct to pH 10-20-20

Fertilizer type 

Fertilizer amount 500 lbs/acre 

Mulch Hay or straw at 2 Tons/acre

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<td>See site plans for full list</td>
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<td>Ladino Clover</td>
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<tr>
<td>See site plans for full list</td>
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</tbody>
</table>

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

Photocopied section of involved 7.5° topographic sheet.

Plan Approved by: 

Comments: 

Received 

OCT 30 2013

Office of Oil and Gas
WV Dept. of Environmental Protection

Title: Inspector 

Date: 11/11/13

Field Reviewed? ( ) Yes ( ) No
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

Sycamore Landfill (Allied Waste) R30-07900105-2010
4301 Sycamore Ridge Road
Hurricane, WV  25526
304-562-2611

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
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 multiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interpreted 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.
### Source Summary

<table>
<thead>
<tr>
<th>WMP-01669</th>
<th>API Number: 047-051-01722</th>
<th>Operator: Noble Energy, Inc</th>
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<tr>
<td></td>
<td>WEB22GHS</td>
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### Purchased Water

<table>
<thead>
<tr>
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<th>Water Provider</th>
<th>Owner</th>
<th>Owner Location</th>
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<tbody>
<tr>
<td></td>
<td><strong>West Virginia American Water - Weston Water Treatme</strong></td>
<td>Lewis</td>
<td>West Virginia American Water</td>
</tr>
<tr>
<td></td>
<td><strong>Bethlehem Water Department</strong></td>
<td>Ohio</td>
<td>Bethlehem Water Department</td>
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<td><strong>Wellsburg Water Department</strong></td>
<td>Brooke</td>
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</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Date</th>
<th>Total Volume (gal)</th>
<th>Max. daily purchase (gal)</th>
<th>Intake Latitude</th>
<th>Intake Longitude</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

**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:**

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.

**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](http://www.erh.noaa.gov/er/ohrfc/flows.shtml)

---

**West Virginia Department of Environmental Protection**

12/9/2013 2:03:58 PM
Moundsville Water Board

<table>
<thead>
<tr>
<th>Source</th>
<th>Marshall</th>
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</thead>
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<tr>
<td>Start Date</td>
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<td>8/15/2014</td>
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</table>


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

Dean's Water Service

<table>
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<th>Owner: Dean's Water Service</th>
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<tbody>
<tr>
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Max. Pump rate (gpm): Min. Gauge Reading (cfs): 6,468.00 Min. Passby (cfs)

DEP Comments:

Wheeling Water Department

<table>
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<th>Source</th>
<th>Ohio</th>
<th>Owner: Wheeling Water Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Date</td>
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<td>Total Volume (gal)</td>
</tr>
<tr>
<td>8/15/2013</td>
<td>8/15/2014</td>
<td>11,000,000</td>
</tr>
</tbody>
</table>


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 forecasts at the following website: http://www.erh.noaa.gov/ohrfc/flows.shtml
<table>
<thead>
<tr>
<th>Start Date</th>
<th>End Date</th>
<th>Total Volume (gal)</th>
<th>Max. daily purchase (gal)</th>
<th>Intake Latitude</th>
<th>Intake Longitude</th>
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</thead>
<tbody>
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<td>11,000,000</td>
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</table>

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

**Max. Pump rate (gpm)**: 0

**Min. Gauge Reading (cfs)**: 6,468.00

**Min. Passby (cfs)**: 0

**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](http://www.erh.noaa.gov/ohrfc//flows.shtml)
Source Detail

WMP-01669
API/ID Number: 047-051-01722
Operator: Noble Energy, Inc
WEB22GHS

Source ID: 30885  Source Name: West Virginia American Water - Weston Water Treat
West Virginia American Water

HUC-8 Code: 5020002
Drainage Area (sq. mi.): 104.83 County: Lewis

Anticipated withdrawal start date: 8/15/2013
Anticipated withdrawal end date: 8/15/2014
Total Volume from Source (gal): 11,000,000
Max. Pump rate (gpm):
Max. Simultaneous Trucks:
Max. Truck pump rate (gpm):

Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV
Drainage Area (sq. mi.) 759.00
Gauge Threshold (cfs): 234

Month Median monthly flow (+ 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 58.96 - -
10 57.83 - -
11 145.12 - -
12 247.76 - -

Water Availability Profile

Flow on this stream is regulated by the Army Corps of Engineers. Please adhere to the stated thresholds to maintain the minimum guaranteed flow requirements.

"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 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): -

12/13/2013
west virginia department of environmental protection
12/9/2013 2:03:58 PM
Flow on this stream is regulated by the Army Corps of Engineers. Please adhere to the stated thresholds to maintain the minimum guaranteed flow requirements.

"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-01669**
- **API/ID Number:** 047-051-01722
- **Operator:** Noble Energy, Inc
- **HUC-8 Code:** 5030106
- **Drainage Area (sq. mi.):** 25000
- **County:** Brooke
- **Source Name:** Wellsburg Water Department
- **Anticipated withdrawal start date:** 8/15/2013
- **Anticipated withdrawal end date:** 8/15/2014
- **Total Volume from Source (gal):** 11,000,000
- **Max. Pump rate (gpm):**
- **Max. Simultaneous Trucks:**
- **Max. Truck pump rate (gpm):**

**Reference Gaug**

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

**Water Availability Profile**

*Flow on this stream is regulated by the Army Corps of Engineers. Please adhere to the stated thresholds to maintain the minimum guaranteed flow requirements.*

"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 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):**

*12/13/2013*
Source Detail

Source ID: 30888  Source Name: Moundsville Water Board
Moundsville Water Treatment Plant

HUC-8 Code: 5030106  Drainage Area (sq. mi.): 25000  County: Marshall

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

Anticipated withdrawal start date: 8/15/2013  Anticipated withdrawal end date: 8/15/2014
Total Volume from Source (gal): 11,000,000
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

<table>
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<tr>
<th>Month</th>
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<th>Estimated Available water (cfs)</th>
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<td>1</td>
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<td>49,200.00</td>
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<td>45,700.00</td>
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<td>4</td>
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<td>8</td>
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<td>10</td>
<td>15,500.00</td>
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<td>11</td>
<td>26,300.00</td>
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<td>12</td>
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</tr>
</tbody>
</table>

Water Availability Profile

Flow on this stream is regulated by the Army Corps of Engineers. Please adhere to the stated thresholds to maintain the minimum guaranteed flow requirements.

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 ID: 30889  Source Name: Dean's Water Service

HUC-8 Code: 5030106  County: Ohio

Drainage Area (sq. mi.): 25000

Endangered Species?  □  Mussel Stream?
□ Trout Stream?  □ Tier 3?
☑ Regulated Stream?  □ Ohio River Min. Flow
□ Proximate PSD?
☑ Gauged Stream?

Anticipated withdrawal start date: 8/15/2013
Anticipated withdrawal end date: 8/15/2014
Total Volume from Source (gal): 11,000,000
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

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Water Availability Profile

"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.

Flow on this stream is regulated by the Army Corps of Engineers. Please adhere to the stated thresholds to maintain the minimum guaranteed flow requirements.

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): -
Source Detail

Source ID: 30891  Source Name: Wheeling Water Department

HUC-8 Code: 5030106  Drainage Area (sq. mi.): 25000  County: Ohio

Endangered Species?  Mussel Stream?  Trout Stream?  Tier 3?

Regulated Stream?  Ohio River Min. Flow  Proximate PSD?  Wheeling Water Department

Gauged Stream?

Anticipated withdrawal start date: 8/15/2013  Total Volume from Source (gal): 11,000,000

Anticipated withdrawal end date: 8/15/2014  Max. Pump rate (gpm):

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

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

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.

Flow on this stream is regulated by the Army Corps of Engineers. Please adhere to the stated thresholds to maintain the minimum guaranteed flow requirements.

12/13/2013
**Source Detail**

- **WMP:** 01669
- **API/ID Number:** 047-051-01722
- **Operator:** Noble Energy, Inc

**Source ID:** 30892  **Source Name:** Ohio County PSD

- **HUC-8 Code:** 5030106
- **Drainage Area (sq. mi.):** 25000  **County:** Ohio

**Endangered Species?**  ✔ Mussel Stream?
**Trout Stream?**  □
**Regulated Stream?**  ✔
**Proximate PSD?**  ✔
**Gauged Stream?**

**Anticipated withdrawal start date:** 8/15/2013  **Total Volume from Source (gal):** 11,000,000

**Anticipated withdrawal end date:** 8/15/2014  **Max. Pump rate (gpm):**

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

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

### Median monthly flow (cfs)

<table>
<thead>
<tr>
<th>Month</th>
<th>Median monthly flow (cfs)</th>
<th>Threshold (+ pump)</th>
<th>Estimated Available water (cfs)</th>
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<td>1</td>
<td>45,700.00</td>
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<td>12</td>
<td>41,300.00</td>
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<td>-</td>
</tr>
</tbody>
</table>

### 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):** -

**Flow on this stream is regulated by the Army Corps of Engineers. Please adhere to the stated thresholds to maintain the minimum guaranteed flow requirements.**

"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

**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

<table>
<thead>
<tr>
<th>Source ID:</th>
<th>30893</th>
<th>Source Name:</th>
<th>SHL #3 Pad Tank Farm</th>
<th>Source start date:</th>
<th>8/15/2013</th>
<th>Source end date:</th>
<th>8/15/2014</th>
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<tbody>
<tr>
<td></td>
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<td>Total Volume from Source (gal):</td>
<td>11,000,000</td>
<td>DEP Comments:</td>
<td></td>
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</table>

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-1435
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: 30894  
Source Name: SHL #4 Pad Tank Farm  
Source start date: 8/15/2013  
Source end date: 8/15/2014  
Source Lat: 39.956739  
Source Long: -80.5515  
County: Marshall  
Max. Daily Purchase (gal):  
Total Volume from Source (gal): 11,000,000

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-1436

### Source ID: 30895  
Source Name: SHL #1 Centralized Freshwater Impoundment  
Source start date: 8/15/2013  
Source end date: 8/15/2014  
Source Lat: 39.979696  
Source Long: -80.579465  
County: Marshall  
Max. Daily Purchase (gal):  
Total Volume from Source (gal): 11,000,000

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
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.

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### Source 1:

- **Source ID:** 30896
- **Source Name:** SHL #2 Centralized Waste Pit
- **Source Lat:** 39.966973
- **Source Long:** -80.561377
- **County:** Marshall
- **Max. Daily Purchase (gal):**
- **Total Volume from Source (gal):** 11,000,000
- **DEP Comments:** WV51-WPC-00001

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

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### Source 2:

- **Source ID:** 30897
- **Source Name:** SHL #3 Centralized Waste Pit
- **Source Lat:** 39.974133
- **Source Long:** -80.55527
- **County:** Marshall
- **Max. Daily Purchase (gal):**
- **Total Volume from Source (gal):** 11,000,000
- **DEP Comments:** WV51-WPC-00002

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
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.

<table>
<thead>
<tr>
<th>Source ID</th>
<th>Source Name</th>
<th>Source start date</th>
<th>Source end date</th>
</tr>
</thead>
<tbody>
<tr>
<td>30898</td>
<td>SHL #4 Centralized Waste Pit</td>
<td>8/15/2013</td>
<td>8/15/2014</td>
</tr>
<tr>
<td>Source Lat: 39.963284</td>
<td>Source Long: -80.562743</td>
<td>County: Marshall</td>
<td>Total Volume from Source (gal): 11,000,000</td>
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<tr>
<td>DEP Comments: WV51-WPC-00003</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Source ID</th>
<th>Source Name</th>
<th>Source start date</th>
<th>Source end date</th>
</tr>
</thead>
<tbody>
<tr>
<td>30890</td>
<td>Bridgeport Ohio Water Department</td>
<td>8/15/2013</td>
<td>8/15/2014</td>
</tr>
<tr>
<td></td>
<td>Public Water Provider</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source Lat: 40.08348</td>
<td>Source Long: -80.736488</td>
<td>County: Marshall</td>
<td>Total Volume from Source (gal): 11,000,000</td>
</tr>
<tr>
<td>Max. Daily Purchase (gal): 200,000</td>
<td>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.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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: 30899  Source Name: Various
Source start date: 8/15/2013  Source end date: 8/15/2014
Source Lat:  Source Long: County
Max. Daily Purchase (gal) Total Volume from Source (gal): 11,000,000
DEP Comments: Sources include, but are not limited to, the WEB22 well pad.