



west virginia department of environmental protection

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

February 26, 2014

WELL WORK PERMIT

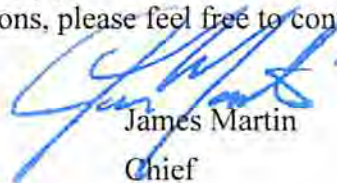
Horizontal 6A Well

This permit, API Well Number: 47-10302974, issued to HG ENERGY, LLC, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

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

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

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



James Martin
Chief

Operator's Well No: WJ CRISWELL 405 N-1H
Farm Name: YOHO, BERNARD LEE, JR.

API Well Number: 47-10302974

Permit Type: Horizontal 6A Well

Date Issued: 02/26/2014

Promoting a healthy environment.

02/28/2014

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.

WW-6B
(9/13)

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

1) Well Operator: HG Energy, LLC 494497948 Wetzel Grant Pine Grove 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: WJ Criswell 405 N-1H Well Pad Name: WJ Criswell 405

3) Farm Name/Surface Owner: WJ Criswell Public Road Access: SLS 58

4) Elevation, current ground: 1415' Elevation, proposed post-construction: 1393'

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):
Marcellus, Approximate TVD 7382 feet, approximate thickness 50 feet, associated pressure gradient @ 1.1 psi/foot

8) Proposed Total Vertical Depth: 7382 feet TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 16495 feet TMD

11) Proposed Horizontal Leg Length: 8703 feet

12) Approximate Fresh Water Strata Depths: 774 feet

13) Method to Determine Fresh Water Depths: Based on drilling history in nearby wells

14) Approximate Saltwater Depths: 1495 feet

15) Approximate Coal Seam Depths: 1199-1209 feet

16) Approximate Depth to Possible Coal Seam Depths: NA

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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WW-6B
(9/13)

103 02974

18)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	H-40	94#	60'	60'	NA
Fresh Water	13 3/8"	New	J-55	54.5#	1350'	1350'	1400, CTS
Coal							
Intermediate	9 5/8"	New	J-55	40 #	3500'	3500'	1550, CTS
Production	5 1/2"	New	P-110	20#	16450'	16450'	4225
Tubing	2 3/8"	New	L-80 or N-80	4.7#	NA	8000'	NA
Liners							

*AL per DMH
2/6/14*

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	20"	0.438"	1530#	NA	NA
Fresh Water	13 3/8"	17 1/2"	0.38"	2740#	Gas Block - Class A	1.21
Coal						
Intermediate	9 5/8"	12 1/4"	0.395"	3950#	Gas Block	Tail 1.30 Lead 1.33
Production	5 1/2"	8 1/2"	0.361"	12640#	ASC/Gas Block	Tail 1.49 Lead 1.23
Tubing	2 3/8"	4.778"	0.19"	11200#	NA	NA
Liners						

PACKERS

Kind:				
Sizes:				
Depths Set:				

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Environmental Protection

Page 2 of 3
02/28/2014

WW-6B
(9/13)

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, case, cement and complete a horizontal Marcellus well

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

Plan to hydraulically fracture/stimulate the well with "slickwater" frac technique. Will utilize a plug and perforation technique through cased hole.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 14.9 acres

22) Area to be disturbed for well pad only, less access road (acres): 5.9 acres

23) Describe centralizer placement for each casing string:

Conductor: NA Surface: Centralizer every 3 joints or 120'
 Intermediate: Centralizer every 3 joints or 120'
 Production Centralizer Program:
 Run 1 spiral centralizer every 120' from the 1st 5.5" long joint to the top of the curve
 Run 1 spiral centralizer every 200' from the top of the curve to surface

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

Conductor: NA - Drilled in/Sanded in (Casing while drilling, no annulus) (See Attach "Cement Additives" for complete desc)
 Surface: Cement Slurry Description - Gas Block, Class A - 2% CaCl2 + 0.25 lb/sk Unicele
 Intermediate: Lead: Type 1+3%Gel + 0.5% CR-3 + 0.25 lb/sk Unicele
 Production: Lead: Type 1 +3% Gel + 0.5% R-3+0.5% CFL - 117+0.25% Foam Chek + 1/8 lb/sk Unicele

25) Proposed borehole conditioning procedures:

The wellbore will be properly circulated at TD of each section until as much of the residual drill cuttings have been removed from the wellbore as possible, residual drilling gas has been circulated out and until the mud and wellbore are both constant and stable. Mud properties will be adjusted if needed. Hole cleaning times may vary from well to well, hole section to hole section.

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*Note: Attach additional sheets as needed.

Conductor: N/A – Drilled in / Sanded in (Casing While Drilling, no annulus)

Surface:

Cement Slurry Description

Gas Block- 2% CaCl₂ + 0.25 lb/sk Unicele

Note: CaCl₂ is an Accelerator and Unicele is a Lost Circulation additive

Intermediate:

Lead:

Lead Slurry - Type 1 + 2% Gel + 0.25% CR-3 + 0.25 lb/sk Unicele

Note: Gel is an extender and Unicele is a Lost Circulation additive and CR-3 is a retarder/dispersant

Tail:

Tail Slurry -Gas Block- 2% CaCl₂ + 0.3% CR-3 + 0.25 lb/sk Unicele

Note: CaCl₂ is an Accelerator and Unicele is a Lost Circulation additive and CR-3 is a retarder/dispersant

Production:

Lead:

Type 1 + 3% Gel + 0.5% CR-3 + 0.5% CFL-117 + 0.25% Foam Chek + 1/8 lb/sk Unicele

Note: Gel is an extender and Unicele is a Lost Circulation additive and CR-3 is a retarder/dispersant and CFL-117 is for fluid loss and Foam Chek is a defoamer

Tail:

Acid Soluble Cement + 0.75% CR-3 + 0.75% CFL-117 + 1/8 lb/sk Unicele

Note: Unicele is a Lost Circulation additive and CR-3 is a retarder/dispersant and CFL-117 is for fluid loss

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NOV 09 2013
WW DMH
Environment
10-7-13
Production

WELL: W.J. Criswell 405 N -1H

Horizontal Marcellus Casing Schematic

DRAWING NOT TO SCALE



Hole Size	Csg Size	Wt (ppf)	Capacity (bpf)	Grade	Conn	Nom. ID (in)	Drift ID (in)	Burst Rating (psi)	Collapse Rating (psi)	Tube Tension Rating (k lb)	Conn. Tension Rating (k lb)
20"	20"	94	0.3552	H-40	weld	19.12	18.94	1530	520		
17-1/2"	13-3/8"	54.5	0.1546	J-55	STC	12.62	12.46	2730	1130	853	514
12-1/4"	9-5/8"	40	0.0758	J-55	LTC	8.835	8.679	3950	2570	630	520
8-1/2"	5-1/2"	20	0.0221	P-110	TTRS1	4.778	4.653	12640	11080	641	667

Casing	Hole Size	Top of Cement	Cement Type	Float Equipment
20"	20"	N/A	Sanded in/ Drilled in (dual rotary)	N/A
13-3/8"	17-1/2"	surface	Gas Block + 2% CaCl ₂ + .3% CR-2 + .25 lb/sx Unicele cemented with 50% excess	Cement nosed guide shoe, centralizer every 3 joints or 120', insert goes in top of first joint in hole
9-5/8"	12-1/4"	surface	Gas Block + 2% CaCl ₂ + .3% CR-3 + .25 lb/sx Unicele cemented with 50% excess	Cement nosed guide shoe, centralizer every 3 joints or 120', insert goes in top of first joint in hole

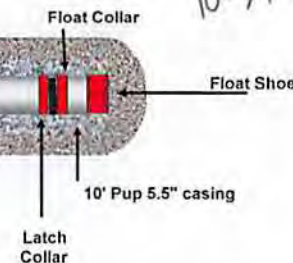
5-1/2" Production Casing Cement Plan					
Lead- Class A, 4% Gel, 14.5 ppg			Tail- Acid Soluble, 14.9 ppg, 20% OHE		
Code	Conc.	Function	Code	Conc.	Function
D020	4%	Extender	D151	30%	CaCO ₃ Weight
D207	0.50%	Fluid Loss	D207	0.50%	Fluid Loss
D065	0.40%	Dispersant	D046	0.20%	Anti-Foam
D013	0.50%	Retarder	D013	0.50%	Retarder
D046	0.20%	Anti-Foam	D065	0.40%	Dispersant
D153	0.20%	Anti-Setting			

Production Centralizer Program

Run 1 spiral centralizer every 120' from the 1st 5.5" long joint to the top of the curve.

Run 1 spiral centralizer every 200' from the top of the curve to surface.

Production Casing: Approx. 16,450' of 5-1/2" 20# P-110 Production



WV Department of Environmental Protection
 NOV 08 2013
 OIL AND GAS

103 02974

WW-9
(9/13)

103 02974

API Number 47 - _____ - _____
Operator's Well No. WJ Criswell 405 N-1H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name HG Energy, LLC OP Code 494497948

Watershed (HUC 10) North Fork of Fishing Creek Quadrangle Big Run 7.5'

Elevation 1393' County Wetzel District Grant

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

Will a pit be used? Yes No

If so, please describe anticipated pit waste: NA

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

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number _____)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain NA _____)

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

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air, Fresh Water

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

Additives to be used in drilling medium? Water, soap, KCl, barite

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

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

-Landfill or offsite name/permit number? All cuttings to be shipped to the Wetzel County Landfill (Permit # 1110222-WV52)

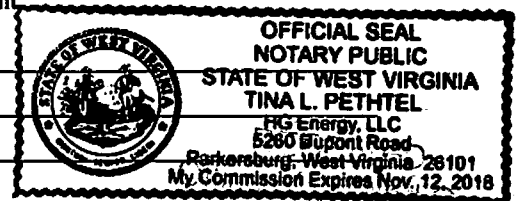
I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations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

Company Official (Typed Name) Diane White

Company Official Title Accountant



Subscribed and sworn before me this 2 day of Oct, 2013

Tina L. Pethel

Notary Public _____

My commission expires Nov 12, 2018

02/28/2014

DWH
10-3-13

103 02974

Form WW-9

Operator's Well No. WJ Criswell 405 N-1H

HG Energy, LLC

Proposed Revegetation Treatment: Acres Disturbed Approximately 10 Prevegetation pH _____

Lime 2 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Tall Fescue	40
Ladino Clover	5

Seed Type	lbs/acre
Tall Fescue	40
Ladino Clover	5

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: [Signature]

Comments: _____

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West Virginia Department of
Environmental Protection

Title: Oil & Gas Inspector Date: 10-3-13

Field Reviewed? Yes No

02/28/2014

405 Site Safety Plan



The Following includes a Well Drilling Procedures and Site Safety Plan submitted by:

Name: Matthew J. McGuire Date: _____

Title: HSE Manager, HG Energy, LLC.

WV DEP Approval by: [Signature] Date: 10-7-12

Title: Oil + Gas Inspector, West Virginia DEP

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Water Management Plan: Primary Water Sources



WMP- 01691

API/ID Number: 047-103-02974

Operator:

HG Energy, LLC

WJ Criswell 405 N-1H

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.

APPROVED DEC 12 2013

02/28/2014

Source Summary

103 02974

WMP- 01691

API Number: 047-103-02974

Operator:

HG Energy, LLC

WJ Criswell 405 N-1H

Ground Water

● Source	Rial #2 WSW		Wetzel	Owner:	Phillip Rial
Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
2/1/2015	2/1/2016	14,000,000		39.61861	-80.87972
<input checked="" type="checkbox"/> Regulated Stream?	Ohio River Min. Flow	Ref. Gauge ID:	9999999	Ohio River Station: Willow Island Lock & Dam	
Max. Pump rate (gpm):	500	Min. Gauge Reading (cfs):		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	WSW #3 (New Martinsville Plant)		Wetzel	Owner:	CSX Real Property, Inc.
Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
2/1/2015	2/1/2016	14,000,000		39.619329	-80.878867
<input checked="" type="checkbox"/> Regulated Stream?	Ohio River Min. Flow	Ref. Gauge ID:	9999999	Ohio River Station: Willow Island Lock & Dam	
Max. Pump rate (gpm):	400	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	WSW #4 (New Martinsville Plant)		Wetzel	Owner:	CSX Real Property, Inc.
Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
2/1/2015	2/1/2016	14,000,000		39.619788	-80.878281
<input checked="" type="checkbox"/> Regulated Stream?	Ohio River Min. Flow	Ref. Gauge ID:	9999999	Ohio River Station: Willow Island Lock & Dam	
Max. Pump rate (gpm):	400	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					

02/28/2014

Source Detail

103 02974

WMP-01691

API/ID Number: 047-103-02974

Operator: HG Energy, LLC

WJ Criswell 405 N-1H

Source ID: 31558 Source Name: Rial #2 WSW
Phillip Rial

Source Latitude: 39.61861
Source Longitude: -80.87972

HUC-8 Code: 5030201

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

Anticipated withdrawal start date: 2/1/2015

Anticipated withdrawal end date: 2/1/2016

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

Total Volume from Source (gal): 14,000,000

Max. Pump rate (gpm): 500

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

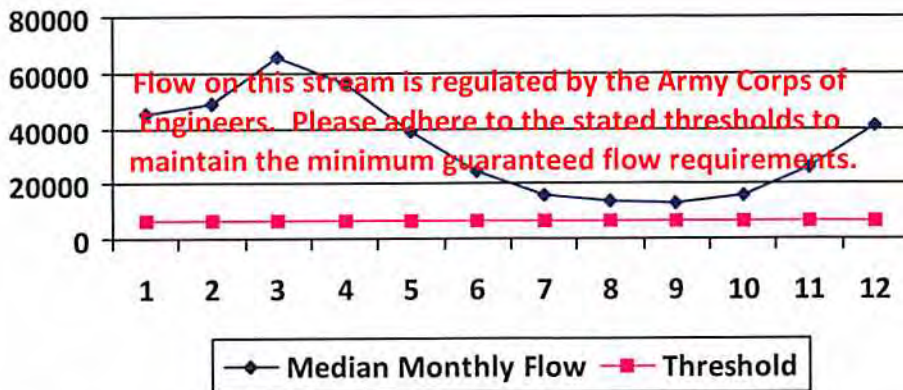
Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

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): 6,468.00
 Pump rate (cfs): 1.11
 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.

02/28/2014

Source Detail

WMP- 01691

API/ID Number: 047-103-02974

Operator:

103 02974
HG Energy, LLC

WJ Criswell 405 N-1H

Source ID: 31559 Source Name: WSW #3 (New Martinsville Plant)
CSX Real Property, Inc.

Source Latitude: 39.619329

Source Longitude: -80.878867

HUC-8 Code: 5030101

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

Anticipated withdrawal start date: 2/1/2015

Anticipated withdrawal end date: 2/1/2016

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

Total Volume from Source (gal): 14,000,000

Max. Pump rate (gpm): 400

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

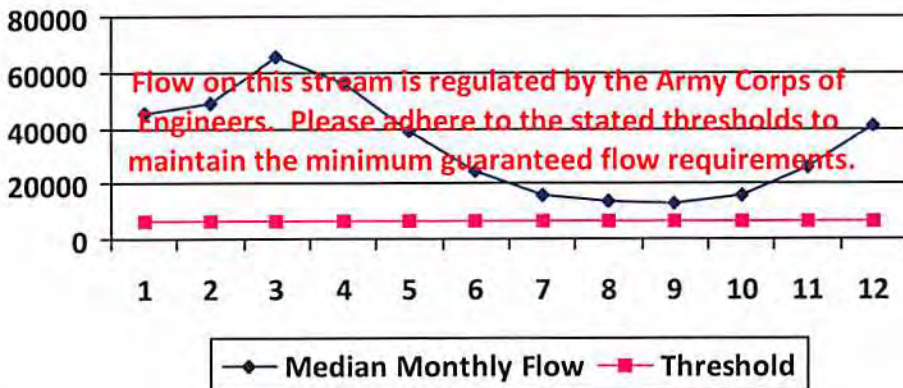
Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

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):	0.89
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.

02/28/2014

Source Detail

103 02974
HG Energy, LLC

WMP 01691

API/ID Number: 047-103-02974

Operator:

WJ Criswell 405 N-1H

Source ID: 31560 Source Name WSW #4 (New Martinsville Plant)
CSX Real Property, Inc.

Source Latitude: 39.619788

Source Longitude: -80.878281

HUC-8 Code: 5030201

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

Anticipated withdrawal start date: 2/1/2015

Anticipated withdrawal end date: 2/1/2016

Total Volume from Source (gal): 14,000,000

Max. Pump rate (gpm): 400

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

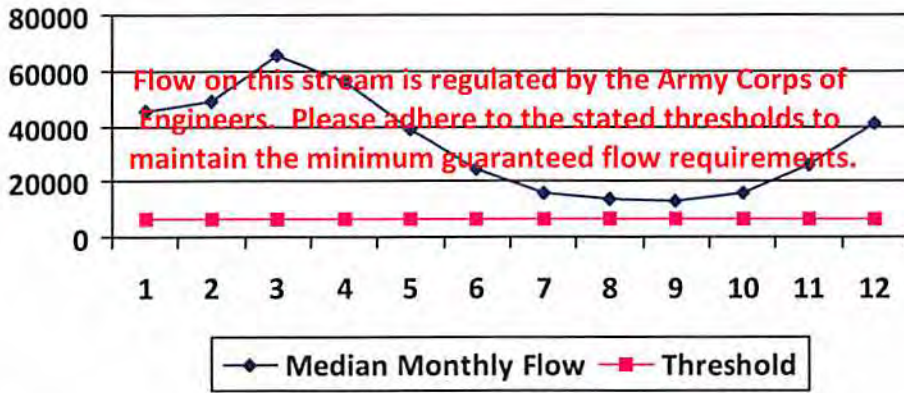
Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

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):	0.89
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.

02/28/2014



Water Management Plan: Secondary Water Sources



WMP- 01691

API/ID Number 047-103-02974

Operator:

HG Energy, LLC

WJ Criswell 405 N-1H

Important:

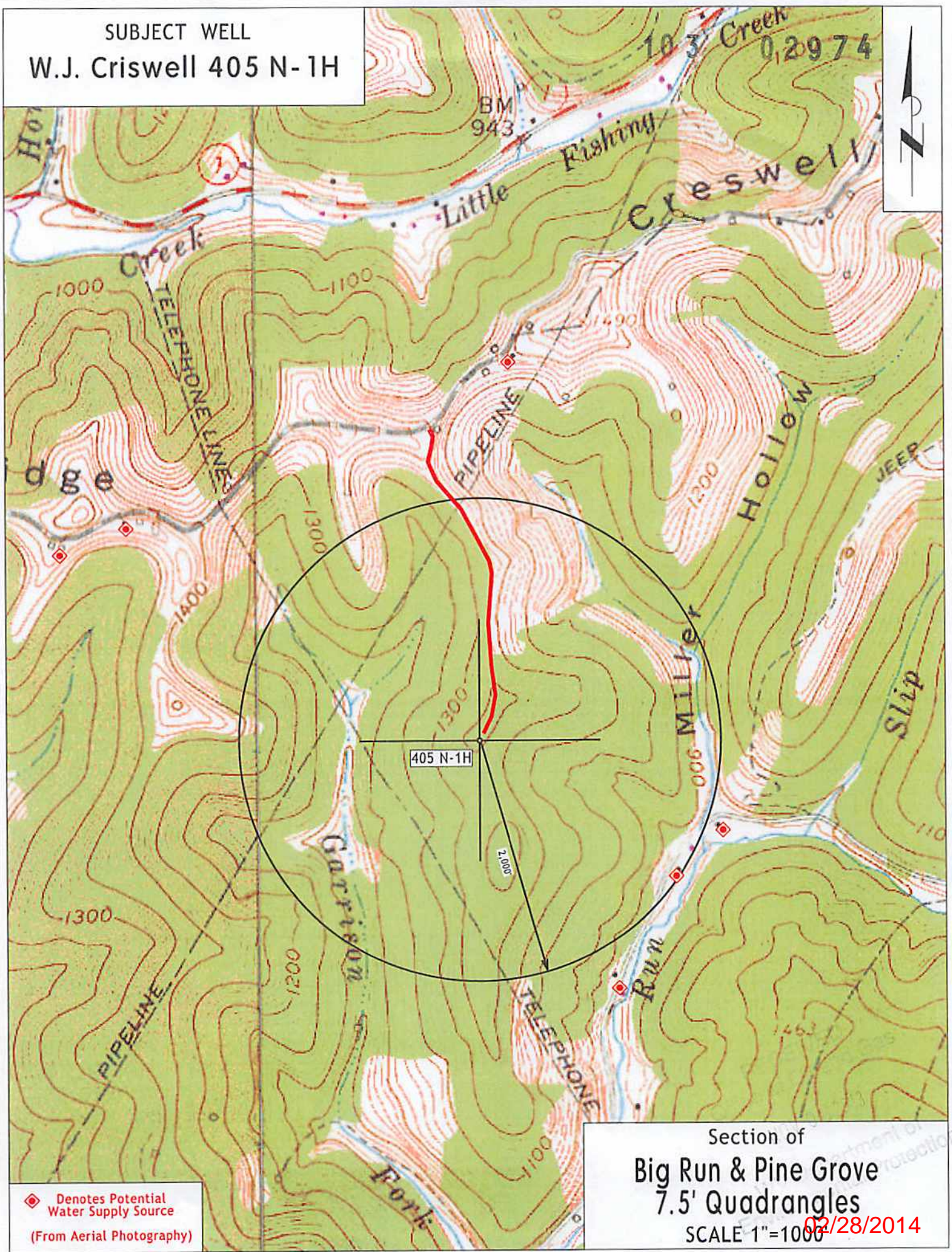
For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. 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:	31561	Source Name	Various	Source start date:	2/1/2015
				Source end date:	2/1/2016
	Source Lat:		Source Long:		County
	Max. Daily Purchase (gal)		Total Volume from Source (gal):		14,000,000
DEP Comments:					

SUBJECT WELL
W.J. Criswell 405 N-1H



◆ Denotes Potential Water Supply Source
(From Aerial Photography)

Section of
Big Run & Pine Grove
7.5' Quadrangles

SCALE 1"=1000' 02/28/2014

BOTTOM HOLE: LON:-80°38'45.2"

LON: -80°37'06.5"

9900

LAT: 39°37'30"

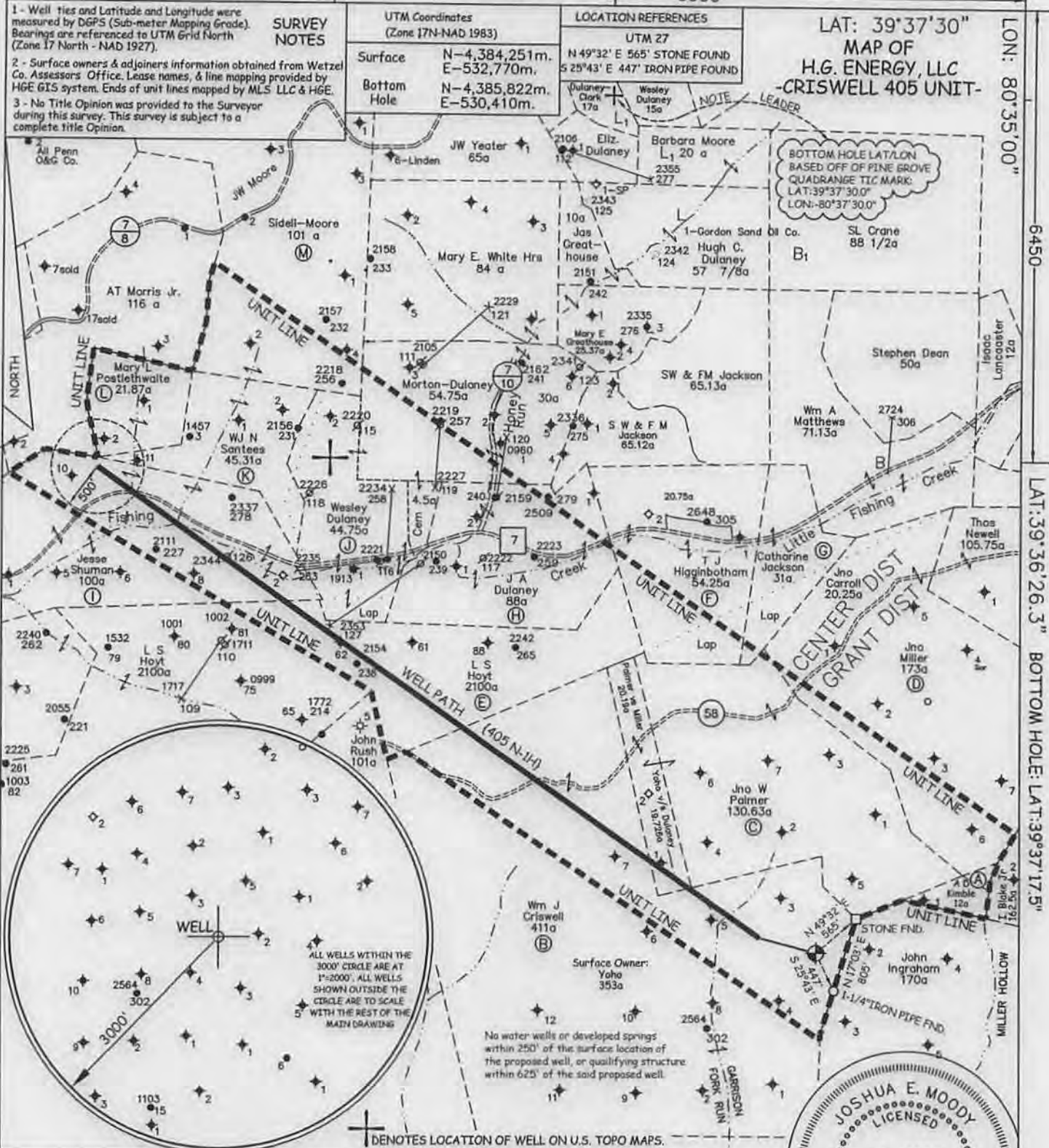
MAP OF H.G. ENERGY, LLC -CRISWELL 405 UNIT-

LON: 80°35'00"

6450

LAT:39°36'26.3"

BOTTOM HOLE: LAT:39°37'17.5"



JOB # 13-001
 DRAWING # 13HG405B 406B
 SCALE 1" = 1500'
 MINIMUM DEGREE OF ACCURACY 1/200'
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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 PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
 MOODY LAND SURVEYING, LLC
 ST. MARYS, WV 26170



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF OIL AND GAS

REV.1
 JOSHUA E. MOODY, P.S. 2020
 DATE 8/26/13
 OPERATOR'S WELL # 405 N-1H

WELL TYPE: OIL GAS LIQUID INJECTION ___ WASTE DISPOSAL ___ HORIZONTAL
 (IF "GAS") PRODUCTION STORAGE ___ DEEP ___ SHALLOW
 LOCATION: ELEVATION 1393' WATERSHED NORTH FOR, FISHING CREEK API WELL # 47 - 103 - 02974 H6A
 DISTRICT GRANT COUNTY WETZEL STATE COUNTY PERMIT

QUADRANGLE BIG RUN 7.5'
 SURFACE OWNER BERNARD LEE YOHO, JR. (surface hole) ACREAGE 353 ACRES +/-
 OIL & GAS ROYALTY OWNER OXY USA, INC. ET AL. LEASE ACREAGE 490.45 ACRES +/-
 PROPOSED WORK: DRILL CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR
 STIMULATE PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___
 OTHER PHYSICAL CHANGE IN WELL (SPECIFY) _____
 PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
 TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD= 7,230' MD= 16,495'
 WELL OPERATOR H.G. ENERGY, LLC DESIGNATED AGENT MIKE KIRSCH
 ADDRESS 5260 DuPONT ROAD ADDRESS 5260 DuPONT ROAD
 PARKERSBURG, WV 26101 PARKERSBURG, WV 26101

FORM WW-6

LEASE # 107665-00

02/28/2014