



**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

May 20, 2014

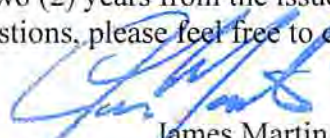
**WELL WORK PERMIT**  
**Horizontal 6A Well**

This permit, API Well Number: 47-10302987, 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: 406 N-3H  
Farm Name: DULANEY, DALE K.  
**API Well Number: 47-10302987**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 05/20/2014

**Promoting a healthy environment.**

**05/23/2014**

## 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.

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### CONDITIONS

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1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE 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.
9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to [DEPOOGNotify@wv.gov](mailto:DEPOOGNotify@wv.gov) within 30 days of commencement of drilling.

CK 617346  
5150

WW-6B  
(9/13)

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

4 254

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

2) Operator's Well Number: MA Miller 406 N-3H Well Pad Name: MA Miller 406

3) Farm Name/Surface Owner: MA Miller Public Road Access: SLS 58

4) Elevation, current ground: 1385' Elevation, proposed post-construction: 1369'

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

(b) If Gas Shallow  Deep   
Horizontal

DMH  
3-12-14

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):  
Marcellus Shale, Approximate TVD 7,080 feet, Anticipated Thickness 50 feet, Associated Gradient Pressure @ 1.1 psi/ft

8) Proposed Total Vertical Depth: TVD 7,080 feet

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: TMD 16,248 feet

11) Proposed Horizontal Leg Length: 8,554 feet

12) Approximate Fresh Water Strata Depths: 115 feet

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

14) Approximate Saltwater Depths: 2,175 feet

15) Approximate Coal Seam Depths: 1,265 feet

16) Approximate Depth to Possible Void (coal mine, karst, other): 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)

18)

**CASING AND TUBING PROGRAM**

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill-up (Cu. Ft.)</u>
Conductor	20"	New	H-40	94#	60'	60'	NA (Drilled in)
Fresh Water	13 3/8"	New	J-55	54.5#	1319'	1319'	1400, CTS
Coal							
Intermediate	9 5/8"	New	J-55	40#	3500'	3500'	1550, CTS
Production	5 1/2"	New	P-110	20#	16248'	16248'	4225
Tubing	2 3/8"	New	L-80 or N-80	4.7#	NA	8000'	NA
Liners							

DA 4  
3-19-14

<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 (cu. ft./k)</u>
Conductor	20"	20"	0.375"	1530#	NA	NA (Drilled In)
Fresh Water	13 3/8"	17 1/2"	0.38"	2740#	Class A	1.21
Coal						
Intermediate	9 5/8"	12 1/4"	0.395"	3950#	Gas Block - Class A	Tail - 1.18 Lead - 1.29
Production	5 1/2"	8 1/2"	0.361"	12640#	50/50 - ASC	Tail - 1.5 Lead - 1.31
Tubing	2 3/8"	4.778"	0.19"	11200#	NA	NA
Liners						

**PACKERS**

Kind:				
Sizes:				
Depths Set:				

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 the cased hole.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 10.62 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.39 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'

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

Conductor: NA - Drilled in (Casing while drilling, no annulus)  
Surface: Premium NE-1 (Class A Cement) (see attachment for complete description)  
Intermediate: Lead: Class A Cement / Tail: Class A Cement (see attachment for complete description)  
Production: Lead: Class A (50/50) / Tail: Class A (ASC) (see attachment for complete description)

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.

DMH

3-12-14

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\*Note: Attach additional sheets as needed.

**Cement Additives for WW-6B**

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

**Surface Casing:**

Premium NE – 1 (Class A Cement) + 3% bwoc calcium Chloride + 0.75 gals/100 sack FP-12L (ANTI-FOAM) + 0.25 Lbs/sack Cello Flake (Lost Circulation Material)

*Cement variance Attached -UKC*

**Intermediate Casing:**

**Lead:**

Type 1 Cement + 0.75 gals/100 sack FP (ANTI-FOAM)  
12L + 0.25 lbs/sack Cello Flake (Lost Circulation)

**Tail:** Gas-Blok Blend

Premium NE-1 (Class A Cement) + 0.55% bwoc BA-10A (Bonding Agent) + 1% bwoc EC-1 (Bonding Agent) + 0.5% bwoc Sodium Metasilicate (Viscosifier) + 0.25 lbs/sack Cello Flake (Lost Circulation) + 0.75 gals/100 sack FP-12L (Anti-Foam)

**Production:**

**Lead #1**

(50:50) Poz (Fly Ash): Premium NE – 1 (Class A Cement) + 0.25% bwoc R-3 (Retarder) + 1% bwoc EC-1 (Bonding Agent) + 0.75 gals/100 0.25% bwoc R-3 (Retarder) + 1% bwoc EC-1 (Bonding Agent) + 0.75 gals/100 sack FP-12L (Anti-Foam) + 0.125 lbs/sack Cello Flake (Lost Circulation) + 0.5% bwoc MPA-170 (Multi Purpose Additive), ie Fluid Loss, Free Water and Stabilization

*DmH  
3-12-11*

**Lead #2**

676 sacks (50:50) Poz (Fly Ash): Premium NE-1 (Class A Cement) + 0.125 lbs/sack Cello Flake (Lost Circulation) + 0.3% bwoc CD-32 (Dispersant) + 0.4% bwoc BA-59 (Bonding Agent) + 0.5% bwoc MPA-170 (Multi Purpose Additive), sack + 7.5 lbs/sack BA-90 (Bonding Agent) +0.3% bwoc R-3 (Retarder) + 0.75 gals/100 sack FP-12L (Anti-Foam)

**Lead #3**

Premium NE-1 (Class A Cement) + 0.5% bwoc R-3 (Retarder) + 0.75 gals/100 sack FP-12L (Anti-Foam) + 0.125 lbs/sack Cello Flake (Lost Circulation) + 0.25% bwoc CD-32 (Dispersant) + 0.6% bwoc Sodium Metasilicate (Viscosifier) + 1.2% bwoc BA-10A (Bonding Agent) + 10 lbs/sack ASCA-1 (Solubility Aid).

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601 57<sup>th</sup> Street, SE  
Charleston, WV 25304  
(304) 926-0450  
(304) 926-0452 fax

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

October 31, 2013

Schlumberger  
Attn: Daniel L. Sikorski  
4600 J Barry Court  
Suite 200  
Canonsburg, PA 15317

RE: Cement Variance Request

Dear Sir:

This agency has approved a variance request for the cement blend listed below to be used on surface and coal protection casing only. The variance cannot be used without an oil and gas operator requesting its use on a permit application and approved by this agency:

- 2% Accelerator (S001)
- 0.2% Antifoam (D046)
- 0.125 lb/sk Polyester Flake (D0130)

If you have any questions regarding this matter feel free to contact me at 304-926-0499, ext. 1653.

Sincerely,

James Peterson  
Environmental Resources Analyst

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601 57<sup>th</sup> Street, SE  
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(304) 926-0450  
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Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
dep.wv.gov

**BEFORE THE OFFICE OF OIL AND GAS  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
STATE OF WEST VIRGINIA**

**IN THE MATTER OF A VARIANCE FROM )  
REGULATION 35 CSR § 4-11.4/11.5/14.1 )  
AND 35 CSR § 8-9.2.h. 4/5/6/8 OF THE )  
THE OPERATIONAL )  
REGULATIONS OF CEMENTING OIL )  
AND GAS WELLS )**

**ORDER NO. 2013-78**

**REPORT OF THE OFFICE**

Schlumberger requests approval of a different cement blend for use in cementing surface and coal protection casing of oil and gas wells.

**FINDINGS OF FACT**

1.) Schlumberger proposes the following cement blend:

- 2% Accelerator (S001)
- 0.2% Antifoam (D046)
- 0.125 lb/sk Polyester Flake (D130)

2.) Schlumberger laboratory testing results indicate that the blend listed in Fact No.1 will achieve a 500 psi compressive strength within 5 hours, 22 minutes and a 1200 psi compressive strength within 10 hours, 29 minutes.

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**CONCLUSIONS OF LAW**

Pursuant to Articles 6 and 6A, Chapter 22 of the Code of West Virginia, the Office of Oil and Gas has jurisdiction over the subject matter embraced in said notice, and the persons interested therein, and jurisdiction to promulgate the hereinafter prescribed Order.

Pursuant to 35 CSR § 4-11.5 and 35 CSR § 8-9.2.h.8 the Chief of the Office of Oil and Gas may approve different cement blends upon the well operator providing satisfactory proof that different cement types are adequate.

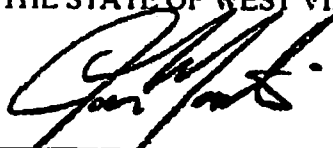
**ORDER**

It is ordered that Schlumberger may use the cement blend listed in Findings of Fact No. 1 for the cementing of surface and coal protection casing of oil and gas wells in the State as may be requested by oil and gas operators. The waiting time on the cement blend shall be 8 hours. The cement blend shall be mixed in strict accordance with the specifications for each blend and weight measurements made on-site to assure the cement slurries meet the minimum weight specifications. A sample shall be collected and, if after 8 hours the cement is not set up, additional time will be required. Schlumberger shall keep a record of cement blend jobs in which the cement blend approved under this order is to be used and made available to the Office of Oil and Gas upon request.

Dated this, the 31<sup>st</sup> day of October, 2013.

IN THE NAME OF THE STATE OF WEST VIRGINIA

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



James Martin, Chief  
Office of Oil and Gas

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**Laboratory Cement Test Report- 15.6 PPG SURFACE**  
**Weston District Laboratory**

Fluid No : WES13-364P3	Client : NOBLE	Location / Rig : N/A	Signatures
Date : Oct-06-2013	Well Name : WEST VIRGINIA	Field : N/A	McLaughlin

Job Type	SURFACE	Depth	700.0 ft	TVD	700.0 ft
BHST	63 degF	BHCT	78 degF	BHP	494 psi
Starting Temp.	80 degF	Time to Temp.	00:09 hr:mn	Heating Rate	-0.22 degF/min
Starting Pressure	179 psi	Time to Pressure	00:09 hr:mn	Schedule	9.2-1

<b>Composition</b>					
Slurry Density	16.60 lb/gal	Yield	1.20 ft <sup>3</sup> /sk	Mix Fluid	5.252 gal/sk
Solid Vol. Fraction	41.4 %	Porosity	58.6 %	Slurry type	Conventional
Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
D801 - API A		94 lb of BLEND	Blend	197.27 lb/ft <sup>3</sup>	08-13-13/6-20
Fresh water	5.252 gal/sk		Base Fluid		
S001	2.000 %BWOC		Accelerator		364AJ1632
D046	0.200 %BWOC		Antifoam		TU3G0700A0
D130	0.125 lb/sk		Lost circ		BULK

**Rheology**  
 Geometry: R1B1F1.0  
 S/N 10-1287-003

Temperature (F)	Up (dl/s)	Down (deg)	Average (dl/s)
300	63.0	63.0	63.0
200	66.0	67.0	66.5
100	46.0	49.0	47.5
80	41.0	46.0	43.5
30	33.0	43.0	38.0
6	20.6	27.7	24.2
3	16.6	20.5	18.5

10 sec Gel	23 deg - 24.55 lb/100R2
10 min Gel	53 deg - 56.57 lb/100R2
Rheo. computed	Viscosity: 25.792 cP Yield Point: 38.21 lb/100R2

**UCA Compressive Strength**  
 S/N 501R

Time	CS
05:22 hr:mn	500 psi
10:29 hr:mn	1200 psi

**Free Fluid**

1.0 mL/250mL in 2 hrs
At 78 degF and 0 deg incl
Sedimentation: None

**Comments**

General Comment:  
 Note: This is a pilot test. Field may differ after testing. Please read field report carefully and compare to pilot report and log sheet. Contact the laboratory with any questions or concerns.

Office of Oil and Gas

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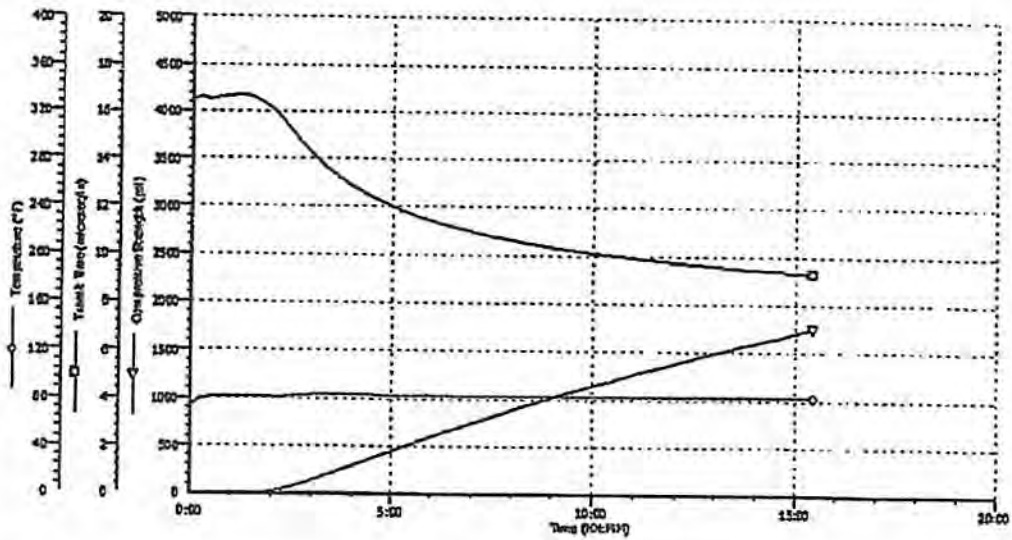


**UCA Graph**

Well: 13-30-45-1 North West Virginia Surface  
 10/4/2013 4:23:02 PM  
 10/5/2013 8:04:31 AM  
 11.6 ppb  
 Compressive strength type B (more than 1.4 days)

MOBLE WY  
 Cylindrical MOBLE  
 D901APIA  
 2% GGI + 0.2% CDAS-0.125 ppb @ 1300  
 Surface  
 #1 RC-N7501R

Drill: 10" P  
 Dr: 1300 P  
 80 psi @ 1300  
 600 psi @ 1320  
 Current CR: 1743 psi



**SCHLUMBERGER**  
 Well & MVR Services Laboratory

Well File Name: 13-30-45-1 North West Virginia Surface  
 Print: 10/5/2013 12:33:02 PM

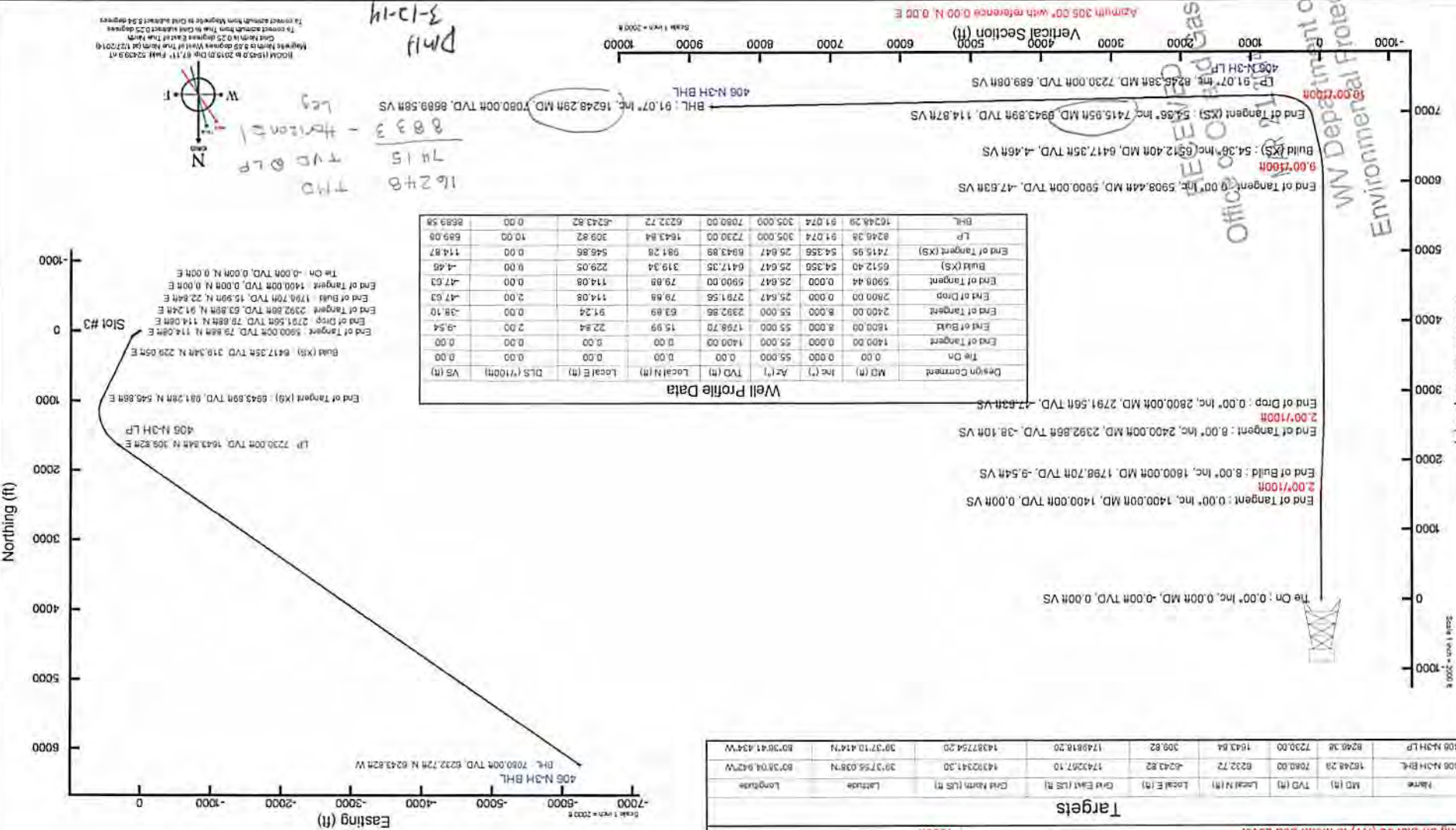
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103-02901



**Well Profile Data**

Design Comment	MD (ft)	Inc (?)	Ac (?)	Local E (ft)	Local N (ft)	Local E (ft)	Local N (ft)	VS (ft)
The On	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00
End of Tangent	1400.00	0.000	0.00	1400.00	0.00	0.00	0.00	0.00
End of Build	1800.00	8.000	1798.70	15.99	22.84	2.00	-9.54	2.00
End of Tangent	2400.00	8.000	2392.86	63.89	91.24	0.00	-38.10	0.00
End of Drop	2600.00	0.000	2791.56	79.88	114.08	2.00	-47.63	2.00
End of Tangent	5908.44	0.000	5900.00	79.89	114.08	0.00	-47.63	0.00
Build (XS)	6512.40	54.356	25.647	319.34	229.05	0.00	-4.46	0.00
End of Tangent (XS)	7415.95	54.356	25.647	6943.89	981.28	546.86	114.87	0.00
LP	8246.38	91.074	305.000	7230.00	1643.84	309.82	10.00	689.08
BHL	16248.29	91.074	305.000	7080.00	6202.72	-5243.82	0.00	689.58

**Location Information**

Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
MA Miller 406 Pad	1749496.100	14386138.400	39.3654.453°N	80.3654.640°W
Slot #3	-27.41	12.40	1749508.500	14386111.000
Rig on Slot #3 (RT) to Mud line (At Slot: Slot #3)	0ft			
Mean Sea Level to Mud line (At Slot: Slot #3)	-1369ft			
Rig on Slot #3 (RT) to Mean Sea Level	1369ft			

**Targets**

Name	MD (ft)	TVD (ft)	Local E (ft)	Local N (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
406 N-3H BHL	16248.29	7080.00	6202.72	-5243.82	14379241.20	1749267.10	39.3755.638°N	80.3604.642°W
406 N-3H LP	8246.38	7230.00	1643.84	309.82	14387754.20	1749818.20	39.3710.414°N	80.3641.434°W

**Plot reference wellpath is MA Miller 406 N-3H Permit (01.27.14)**

True vertical depths are referenced to Rig on Slot #3 (RT)  
 Measured depths are referenced to Rig on Slot #3 (RT)  
 North Reference: Grid north  
 Scale: True distance  
 Depths are in feet  
 Coordinates are in feet referenced to Slot  
 Created By: steward on 1/26/2014

**HG ENERGY**

Location: Wetzel County, WV  
 Field: Wetzel (UTM 17N NAD 27)  
 Well: MA Miller 406 N-3H  
 Slot: Slot #3  
 Wellbore: MA Miller 406 N-3H (PW B)

Facility: MA Miller 406 Pad  
 Office of Oil and Gas  
 WV Department of Environmental Protection



Vertical Section (ft)  
 Azimuth 305.00° with reference 0.00° N, 0.00° E  
 Scale 1 inch = 2000 ft



16248  
 7415  
 8833  
 Horizontal  
 Leg

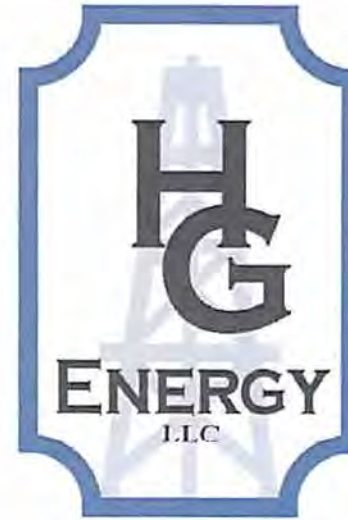
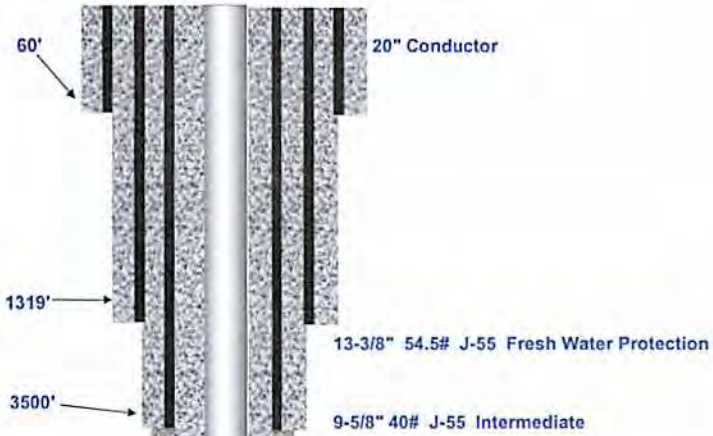
End of Tangent: 0.00° Inc, 5908.44ft MD, 5900.00ft TVD, -47.63ft VS  
 Build (XS): 54.36° Inc, 6512.40ft MD, 6417.35ft TVD, -4.46ft VS  
 End of Tangent (XS): 54.36° Inc, 7415.95ft MD, 6943.89ft TVD, 114.87ft VS  
 LP: 91.07° Inc, 8246.38ft MD, 7230.00ft TVD, 689.08ft VS  
 BHL: 91.07° Inc, 16248.29ft MD, 7080.00ft TVD, 8689.58ft VS

The On: 0.00° Inc, 0.00ft MD, -0.00ft TVD, 0.00ft VS  
 End of Tangent: 0.00° Inc, 1400.00ft MD, 1400.00ft TVD, 0.00ft VS  
 End of Build: 8.00° Inc, 1800.00ft MD, 1798.70ft TVD, -9.54ft VS  
 End of Tangent: 8.00° Inc, 2400.00ft MD, 2392.86ft TVD, -38.10ft VS  
 End of Drop: 0.00° Inc, 2600.00ft MD, 2791.56ft TVD, -47.63ft VS  
 End of Tangent: 0.00° Inc, 5908.44ft MD, 5900.00ft TVD, -47.63ft VS  
 Build (XS): 54.36° Inc, 6512.40ft MD, 6417.35ft TVD, -4.46ft VS  
 End of Tangent (XS): 54.36° Inc, 7415.95ft MD, 6943.89ft TVD, 114.87ft VS  
 LP: 91.07° Inc, 8246.38ft MD, 7230.00ft TVD, 689.08ft VS  
 BHL: 91.07° Inc, 16248.29ft MD, 7080.00ft TVD, 8689.58ft VS

WELL: M.A. Miller 406 N -3H

Horizontal Marcellus Casing Schematic

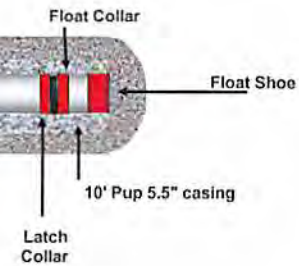
DRAWING NOT TO SCALE



**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. 16,225' of 5-1/2" 20# P-110 Production

Environmental Protection  
WV Department of  
REC  
M.A. Miller



Dmit  
3-12-14

103-02987

WW-9  
(9/13)

API Number 47 - 103 - 02987  
Operator's Well No. MA Miller 406 N-3H

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 1369' 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

*DWH  
3-12-14*

-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 12 day of March, 2014

*Tina L. Pethel*

My commission expires NOV. 12, 2018



*05/23/2014*

Form WW-9

Operator's Well No. MA Miller 406 N-3H

**HG Energy, LLC**

Proposed Revegetation Treatment: Acres Disturbed Approximately 11 Prevegetation pH \_\_\_\_\_

Lime 2 Tons/acre or to correct to pH 6.5

10/20/20

Fertilizer type \_\_\_\_\_

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: 

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Title: Oil & Gas Inspector

Date: 3-12-14

Field Reviewed?  Yes  No

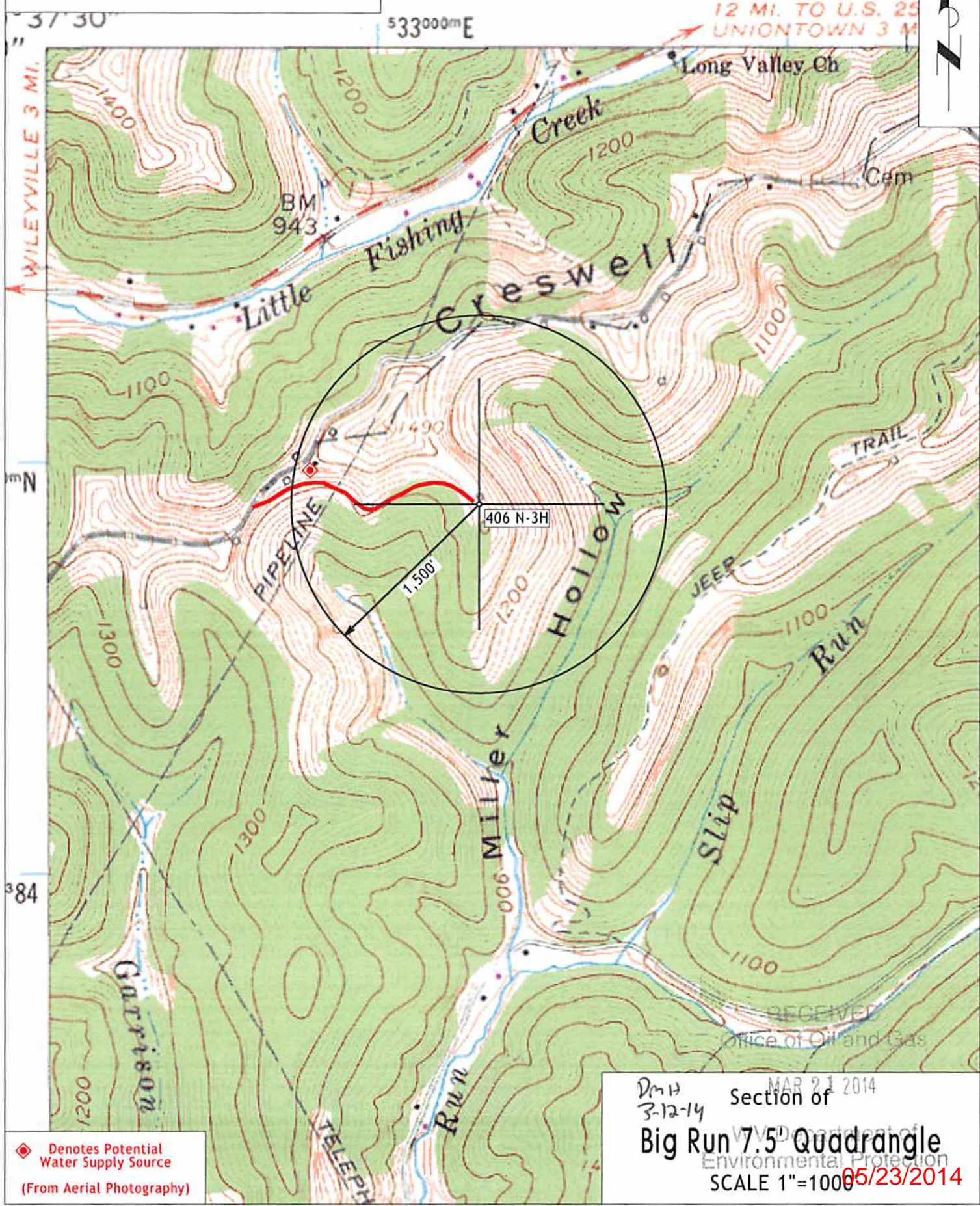
RECEIVED  
Office of Oil and Gas

MAR 21 2014

WV Department of  
Environmental Protection

SUBJECT WELL  
Mary A. Miller 406 N-3H

# OF THE INTERIOR AL SURVEY



◆ Denotes Potential Water Supply Source  
(From Aerial Photography)

DMH Section of  
3-12-14  
Big Run 7.5 Quadrangle  
Environmental Protection  
SCALE 1"=1000' 05/23/2014



BOTTOM HOLE: LON:-80°38'04.9"

LON: -80°36'45.5"

8255

LAT: 39°37'30"

MAP OF H.G. ENERGY, LLC -MILLER 406 UNIT-

LON: 80°35'00"

3625

LAT:39°36'54.2"

BOTTOM HOLE: LAT:39°37'56.0"

**SURVEY NOTES**

1 - Well ties and Latitude and Longitude were measured by DGPS (Sub-meter Mapping Grade). Bearings are referenced to UTM Grid North (Zone 17 North - NAD 1927).

2 - Surface owners & adjoiners information obtained from Wetzel Co. Assessors' Office. Lease names, & line mapping provided by HGE GIS system. Ends of unit lines mapped by MLS LLC & HGE.

3 - No Title Opinion was provided to the Surveyor during this survey. This survey is subject to a complete title Opinion.

**UTM Coordinates (Zone 17N-NAD 1983)**

Surface N-4,385,114m. E-533,266m.

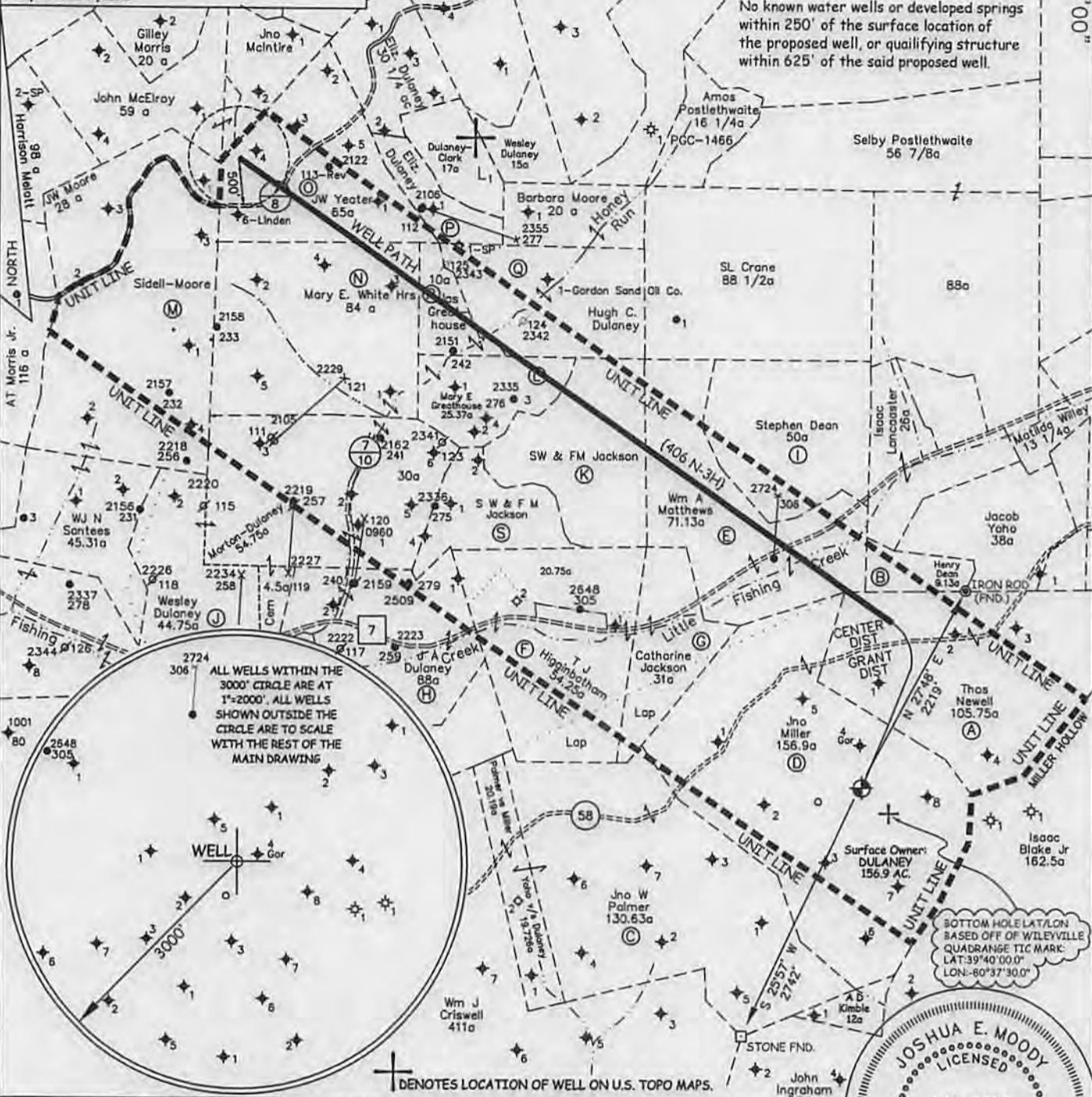
Bottom Hole N-4,387,013m. E-531,364m.

**NAD83 LOCATION REFERENCES**

N 42°24' W 531' 5/8" REBAR

S 21°23' E 205' SPIKE

No known water wells or developed springs within 250' of the surface location of the proposed well, or qualifying structure within 625' of the said proposed well.



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



JOSHUA E. MOODY, P.S. 2020  
 DATE 1/27/14  
 OPERATOR'S WELL # 406 N-3H

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  HORIZONTAL   
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
 LOCATION: ELEVATION 1369' WATERSHED NORTH FOR, FISHING CREEK API WELL # 47-103-02997 HLG  
 DISTRICT GRANT COUNTY WETZEL STATE COUNTY PERMIT  
 QUADRANGLE BIG RUN 7.5'

SURFACE OWNER DALE K. DULANEY (surface hole) ACREAGE 156.9 AC. +/-  
 OIL & GAS ROYALTY OWNER ARTHUR MILLER et al LEASE ACREAGE 156.9 AC. +/-  
 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= 7,080' MD= 16,248'  
 WELL OPERATOR H.G. ENERGY, LLC DESIGNATED AGENT MIKE KIRSCH  
 ADDRESS 5260 DuPONT ROAD ADDRESS 5260 DuPONT ROAD  
 PARKERSBURG, WV 26101 PARKERSBURG, WV 26101

05/23/2014