

## CHECKLIST FOR FILING A UIC PERMIT APPLICATION

Please utilize this checklist to ensure you have prepared, completed, and enclosed all required documentation and payment to ensure a timely review of your submittal.

|                               |                |                     |  |
|-------------------------------|----------------|---------------------|--|
| Operator                      | HG Energy, LLC |                     |  |
| Existing UIC Permit ID Number | 2R08704AP      | UIC Well API Number |  |

| Office of Oil and Gas<br>Office Use Only |  |
|------------------------------------------|--|
| Permit Reviewer                          |  |
| Date Received                            |  |
| Administratively Complete Date           |  |
| Approved Date                            |  |
| Permit Issued                            |  |

**Please check the fees and payment included.**

| Fees                                           |                                     | Payment Type |                                     |
|------------------------------------------------|-------------------------------------|--------------|-------------------------------------|
| UIC Permit Fee: \$500                          | <input checked="" type="checkbox"/> | Check        | <input checked="" type="checkbox"/> |
| Groundwater Protection Plan (GPP) Fee: \$50.00 | <input checked="" type="checkbox"/> | Electronic   | <input type="checkbox"/>            |
|                                                |                                     | Other        | <input type="checkbox"/>            |

**Please check the items completed and enclosed.**

☒ Checklist

☒ UIC-1

☒ Section 1 – Facility Information

☒ Section 2 – Operator Information

☐ Section 3 – Application Information

☐ Section 4 – Applicant/Activity Request and Type

☐ Section 5 – Brief description of the Nature of the Business

☒ CERTIFICATION

☒ Section 6 – Construction

☒ Appendix A Injection Well Form

☒ Appendix B Storage Tank Inventory

☒ Section 7 – Area of Review

☒ Appendix C Wells Within the Area of Review

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- ☒ Appendix D Public Service District Affidavit
- ☒ Appendix E Water Sources
- ☒ Appendix F Area Permit Wells
- ☒ Section 8 – Geological Data on Injection and Confining Zones
- ☒ Section 9 – Operating Requirements / Data
- ☒ Appendix G Wells Serviced by Injection Well
- ☒ Section 10 – Monitoring
- ☒ Section 11 – Groundwater Protection Plan (GPP)
- ☒ Appendix H Groundwater Protection Plan (GPP)
- ☒ Section 12 – Plugging and Abandonment
- ☒ Section 13 – Additional Bonding N A
- ☒ Section 14 – Financial Responsibility
- ☒ Appendix I Financial Responsibility
- ☒ Section 15 – Site Security Plan
- ☒ Appendix J Site Security for Commercial Wells
- ☒ Section 16 – Additional Information
- ☒ Appendix K Other Permit Approvals

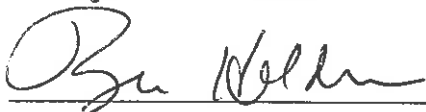
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**\*NOTE: For all 2D wells an additional bond in the amount of \$5,000 is required.**

Reviewed by (Print Name): Roger Heldman

Reviewed by (Sign): 

Date Reviewed: 10/31/14



WEST VIRGINIA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION  
**OFFICE OF OIL AND GAS**  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304  
(304) 926-0450  
[www.dep.wv.gov/oil-and-gas](http://www.dep.wv.gov/oil-and-gas)

**UNDERGROUND INJECTION CONTROL**  
**(UIC)**  
**PERMIT APPLICATION**

UIC PERMIT ID # UIC2R08704AP

API # \_\_\_\_\_

WELL # \_\_\_\_\_

**Section 1. Facility Information**

|                                                                                    |                                                                                                                             |          |                                       |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------|
| Facility Name:                                                                     | Clover Waterflood                                                                                                           |          |                                       |
| Address:                                                                           | Clover Road                                                                                                                 |          |                                       |
| City:                                                                              | Clover                                                                                                                      | State:   | WV Zip: 25276                         |
| County:                                                                            | Roane                                                                                                                       |          |                                       |
| Location description:                                                              | Smithfield District, Roane County. The Clover Waterflood is located approximately 6 miles Southwest of the town of Spencer. |          |                                       |
| Location of well(s) or approximate center of field/project in UTM NAD 83 (meters): |                                                                                                                             |          |                                       |
| Northing:                                                                          | 4,397,596                                                                                                                   | Easting: | 475,877                               |
| Environmental Contact Information:                                                 |                                                                                                                             |          |                                       |
| Name:                                                                              | Matt McGuire                                                                                                                | Title:   | Health, Safety, Environmental Manager |
| Phone:                                                                             | 304-420-1126                                                                                                                | Email:   | mmcguire@hgenergyllc.com              |

**Section 2. Operator Information**

|                |                  |                |                          |
|----------------|------------------|----------------|--------------------------|
| Operator Name: | HG Energy, LLC   |                |                          |
| Operator ID:   | 494497948        |                |                          |
| Address:       | 5260 Dupont Road |                |                          |
| City:          | Parkersburg      | State:         | WV Zip: 26101            |
| County:        |                  |                |                          |
| Contact Name:  | Roger Heldman    | Contact Title: | Operations Manager       |
| Contact Phone: | 304-420-1107     | Contact Email: | rheldman@hgenergyllc.com |

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### Section 3. Applicant Information

Ownership Status: ☒ PRIVATE ☐ PUBLIC ☐ FEDERAL ☐ STATE  
☐ OTHER (explain):

SIC code: ☒ 1311 (2D, 2H, 2R) ☐ 1479 (3S) ☐ OTHER (explain):

### Section 4. Applicant / Activity Request and Type:

- A. Apply for a new UIC Permit: ☐ 2D ☐ 2H ☐ 2R ☐ 3S  
B. Reissue existing UIC Permit: ☒ 2D ☐ 2H ☐ 2R ☐ 3S  
C. Modify existing UIC Permit: ☐ 2D ☐ 2H ☐ 2R ☐ 3S  
(Submit only documentation pertaining to the modification request)  
2D COMMERCIAL FACILITY: ☐ YES ☐ NO

### Section 5. Briefly describe the nature of business and the activities to be conducted:

Secondary recovery project to recover oil from Big Injun sand.  
Water is injected into several water injection wells and  
oil pumped from offset producers.

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## CERTIFICATION

All permit applications must be signed by a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, or by a principal executive or ranking elected official for a public agency, or a <sup>1</sup>duly authorized representative in accordance with 47CSR13-13.11.b.

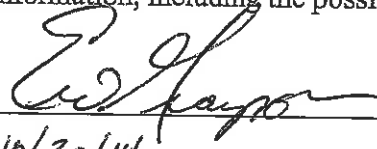
A. Name and title of person applying for permit:

Print Name: Eric Grayson

Print Title: Vice President Operations

B. Signature and Date.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments 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 and imprisonment.

Signature: 

Date: 10/30/14

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<sup>1</sup> A person is a duly authorized representative if:

The authorization is made in writing by a person described in subdivision 47CSR13-13.11.a.

The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of the plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility.

The written authorization is submitted to the Director.

## SECTION 6

1

The attached Figure No. 1 is a map of the Clover Field with pipe lines ( injection and production ) shown. The production and injection facilities are shown. A copy of the SPCC plan depicting the production and injection facilities is also shown ( Fig No. 1 A, B, C, D, E, F, G, H, I, J, K, L, M, & N ). There are no known intake and or discharge structures within this area. Fresh injection water for this project is supplied from the Clover Public Service District. The water produced with the oil is gathered at the Injection facility, treated as necessary, and re-injected into the Big Injun Sand at Lucy Webb 11 ( 47-087-02975).

2.

Attached with Appendix A is a cross sectional schematic for each type well construction in this field. The known sources of drinking water range from less than 20' to approximately 100'.

3.

Attached is Appendix B- Inventory list of above ground storage tanks associated with this UIC permit.

4.

All new wells drilled in this field are logged with Gamma Ray, Compensated Density, and Caliper logs at a minimum. There are currently two active injection wells in this field. The open hole logs indicate a fairly homogeneous Big Injun sand. There are several new wells planned for this field. The proposed wells will utilize some pad drilling with multiple wells drilled from one location. One or more of the proposed wells from each pad will be drilled directionally. Directional surveys will be run as part of this drilling process.

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## Section 7

2.

The attached Figure No 2 is a topographic map of the Clover Field with a ¼ mile AOR marked. The various categories of wells are shown along with API numbers where available. A listing of the wells is shown in Appendix C. The records of the wells drilled at the time of the original UIC permit application were provided with that application. Enclosed are WR 35's and WR 38's for the wells drilled or plugged since the last renewal of this permit in 2009. These well records are attached in Fig No 3.

Part of this area is service by the Clover PSD. The PSD water lines are shown on Figure No. 2. The USDWs were identified and sampled for analysis. The results of the analysis are shown in the attached Appendix E. The GPS data on the location of these wells was collected and those wells spotted on Fig No. 2.

3.

The depth of the USDWs in use in this area range from less than 20' to approximately 100'. Unfortunately most of the current residents don't know the depth of the wells as they are older wells that were in use when the current resident moved to the property. The TDS data is provided as part of the water analysis.

4.

All water supply wells located as part of this sampling program are shown on the attached Fig No. 2.

5.

Water samples from the USDWs were collected and analyzed in accordance with 40 CFR 136. Results are shown in Appendix E.

6.

There are no wells known to HG Energy in the AOR that fit the criteria to warrant corrective action.

7.

Please see Appendix F for a listing of the different categories of wells covered by this permit.

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## Section 8

The Clover Field is positioned on the western flank of the Arches Fork Anticline. The reservoir boundary, as determined from early drilling, was controlled on the west and down dip by water and on the east and up dip by a decrease in permeability. The Big Injun Sandstone is the productive interval in this field. The Keener is white to light gray, very fine to coarse grained, sub angular, moderate to poorly sorted, slightly calcareous well indurated sandstone with numerous quartz pebble conglomeritic zones and occasional horizontal shale laminations. The Keener is tightly cemented with a very low permeability. The Keener grades into the oil productive Pocono Big Injun Sandstone. The Big Injun is light gray to light green, very fine to medium grained, moderate to well sorted, sub angular, calcite or dolomite cemented sandstone. The Big Injun displays varying degrees of friability depending on the degree of cementation. The Big Lime overlays the Keener and the Pocono Shale underlies the Big Injun. Both formations are thick impermeable formations.

The Big Injun at Clover can be characterized as follows:

|                          |           |
|--------------------------|-----------|
| Gross sand thickness     | 18'-65'   |
| Pay thickness            | 13'-35'   |
| Permeability             | 1.5-20 md |
| Porosity                 | 15%-20%   |
| Connate Water Saturation | 30%-45%   |

The full core report and Big Injun Sand section of the open hole logs are attached in Figure No. 4.

A search of the West Virginia Geologic and Economic Survey web site revealed data on earthquakes from 1824-2014. There were no events recorded in Roane County. The surrounding counties had there such events recorded ( Kanawha ( magnitude 2.5 & 3.0 ) and Jackson ( 2.6 )). A copy of this data is included in Fig No. 5.

The attached Fig No. 6 is a map of the Clover Field with circles representing the area of influence form the injection wells outward. The attached Fig No. 7 is a Big Injun Sand Structure map. Fig No. 8 is a Big Injun Isopach map of this area.

Historically the shallow USDWs in the area were of limited quantity and mediocre quality. The Clover Public Service District serves this area and it is believed that those residences that have the PSD as an option utilize them for their water needs.

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## Section 9

1.

Based on the existing UIC Permit the following have been the historical operating criteria:

Max injection volume ( per well ): 150 bbls/ hr

Average daily volume ( per well ): 117 bbls/day ( Sept 2014 )

Max Bottom Hole Pressure: 1649 psig

Maximum Injection Pressure: 756 psig      based on A W Edgell 100's surface location.

Average injection pressure: 746 psig      based on A W Edgell 100 ( Sept 2014 )

Based on over 20 year experience operating this project by HG Energy and its predecessors there have been no known instances of communication with USDWs or other oil & gas producing formations.

2.

There are no brine disposal wells serviced by this permit. Some water is produced along with the oil from this project. The water is separated from the oil, filtered, and injected into one injection well.

3.

The injection waters ( fresh and produced ) were sampled and the results of the analysis included in Figure No. 9. The fresh water used for this project is purchased from the Clover PSD ( Edgell 100 Injection well ).

4.

Currently the following Baker Chemical products are utilized in the Clover Waterflood to control corrosion:

Baker Hughes CRW9214 at a rate of .5 Gallon Per Day.

The MSDS sheet is enclosed for this product in Figure No. 10.

5.

There are currently two injection wells in this waterflood unit. One well has fresh water with corrosion inhibitor between the casing / tubing annulus and the other is filled with air. The annuli are left open and observed for signs of mechanical integrity failure.

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6.

These injection wells have surface casing set below the USDWs and that casing annulus is filled with cement to surface. The long string (injection or production) casing is cemented in place. The wells are monitored for indications of mechanical integrity failure. In the event of a mechanical Integrity failure the injection well will be shut in until it is remediated.

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## Section 10

1.

The injection wells covered by this permit are visited by HG Energy employees several times weekly. A water meter and pressure ports are installed on all wellheads. This data is collected and submitted to WVDEP on form WR 40.

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**Section 11**

A Groundwater Protection Plan is attached in Appendix H.

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## Section 12

As these wells become uneconomical they have been and will continue to be plugged in a manner that meets the requirements of the WVDEP. A cement plug is set above the Big Injun Sand ( injection zone ), at the cut for removal of the long sting of casing, across the base of the surface casing, and at the top of the surface casing on newer style wells. For those older wells additional plugs will be set as necessary to protect the USDWs.

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Section 13

Not Applicable.

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Section 14

See Appendix I

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## Section 15

These injection facilities are locked and the access road is gated and locked during non-work hours. Key valves are secured to prevent illegal dumping or vandalism.

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Section 16

See Appendix K

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## APPENDIX A

### Injection Well Form

|                                                                                                                                            |                             |            |                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------|-------------------------------------------------------------------------------|
| 1) GEOLOGIC TARGET FORMATION <u>Big Injun</u>                                                                                              |                             |            |                                                                               |
| Depth                                                                                                                                      | <u>2050</u>                 | Feet (top) | <u>2080</u> Feet (bottom) <span style="float: right;">(varies by well)</span> |
| 2) Estimated Depth of Completed Well, (or actual depth of existing well): <u>2200</u> Feet                                                 |                             |            |                                                                               |
| 3) Approximate water strata depths: Fresh <u>80</u> Feet Salt <u>1800</u> Feet                                                             |                             |            |                                                                               |
| 4) Approximate coal seam depths: <u>None</u>                                                                                               |                             |            |                                                                               |
| 5) Is coal being mined in the area? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                    |                             |            |                                                                               |
| 6) Virgin reservoir pressure in target formation <u>1250</u> psig Source <u>Estimated</u>                                                  |                             |            |                                                                               |
| 7) Estimated reservoir fracture pressure <u>2650</u> psig (BHFP)                                                                           |                             |            |                                                                               |
| 8) MAXIMUM PROPOSED INJECTION OPERATIONS:                                                                                                  |                             |            |                                                                               |
| Injection rate (bbl/hour)                                                                                                                  | <u>25</u>                   |            |                                                                               |
| Injection volume (bbl/day)                                                                                                                 | <u>350</u>                  |            |                                                                               |
| Injection pressure (psig)                                                                                                                  | <u>760 (varies by well)</u> |            |                                                                               |
| Bottom hole pressure (psig)                                                                                                                | <u>1649</u>                 |            |                                                                               |
| 9) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES:                                                               |                             |            |                                                                               |
| <p>Fresh water &amp; produced water from Big Injun.<br/> Chemicals necessary to control water quality as necessary<br/> will be added.</p> |                             |            |                                                                               |
| Temperature of injected fluid: (°F) <u>Approx. 70°F.</u>                                                                                   |                             |            |                                                                               |
| 10) FILTERS (IF ANY)                                                                                                                       |                             |            |                                                                               |
| <p>Cartridge filters at injection facility and wellhead<br/> cartridge filters on each well.</p>                                           |                             |            |                                                                               |
| 11) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL                                                                     |                             |            |                                                                               |
| Corrosion control as necessary to maintain mechanical integrity.                                                                           |                             |            |                                                                               |
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Promoting a healthy environment.



TYPE 1  
**APPENDIX A (cont.)**

**12. Casing and Tubing Program**

| <u>TYPE</u>    | <u>Size</u> | <u>New or<br/>Used</u> | <u>Grade</u> | <u>Weight per ft.<br/>(lb/ft)</u> | <u>FOOTAGE:<br/>For Drilling</u> | <u>INTERVALS:<br/>Left in Well</u> | <u>CEMENT:<br/>Fill-up (Cu.<br/>Ft.)</u> |
|----------------|-------------|------------------------|--------------|-----------------------------------|----------------------------------|------------------------------------|------------------------------------------|
| Conductor      |             |                        |              |                                   |                                  |                                    |                                          |
| Fresh Water    | 8-5/8       | W                      | LS           | 24                                | 314                              | 314                                | CTS                                      |
| Coal           |             |                        |              |                                   |                                  |                                    |                                          |
| Intermediate 1 |             |                        |              |                                   |                                  |                                    |                                          |
| Intermediate 2 |             |                        |              |                                   |                                  |                                    |                                          |
| Production     | 4-1/2       | N                      | J-55         | 10.5                              | 2085                             | 2085                               | 180                                      |
| Tubing         | 2-3/8       | N                      | J-55         | 4.6                               | 1978                             | 1978                               |                                          |
| Liners         |             |                        |              |                                   |                                  |                                    |                                          |

| <u>TYPE</u>    | <u>Wellbore<br/>Diameter</u> | <u>Casing<br/>Size</u> | <u>Wall<br/>Thickness</u> | <u>Burst Pressure</u> | <u>Cement Type</u> | <u>Cement<br/>Yield (cu.<br/>ft./sk)</u> | <u>Cement to<br/>Surface ?<br/>(Y or N)</u> |
|----------------|------------------------------|------------------------|---------------------------|-----------------------|--------------------|------------------------------------------|---------------------------------------------|
| Conductor      |                              |                        |                           |                       |                    |                                          |                                             |
| Fresh Water    | 11"                          | 8-5/8                  | .264                      | 1340                  | Reg Neat           | 1.18                                     | Y                                           |
| Coal           |                              |                        |                           |                       |                    |                                          |                                             |
| Intermediate 1 |                              |                        |                           |                       |                    |                                          |                                             |
| Intermediate 2 |                              |                        |                           |                       |                    |                                          |                                             |
| Production     | 7-7/8"                       | 4-1/2                  | .224                      | 4790                  | 50/50 Pozmix       | 1.21                                     | N                                           |
| Tubing         |                              | 2-3/8                  | .190                      | 7700                  |                    |                                          |                                             |
| Liners         |                              |                        |                           |                       |                    |                                          |                                             |

| <u>PACKERS</u> | <u>Packer #1</u> | <u>Packer #2</u> | <u>Packer #3</u> | <u>Packer #4</u> |
|----------------|------------------|------------------|------------------|------------------|
| Kind:          | Parmaco Tension  |                  |                  |                  |
| Sizes:         | 4-1/2 x 2-3/8"   |                  |                  |                  |
| Depths Set:    | 1978             |                  |                  |                  |

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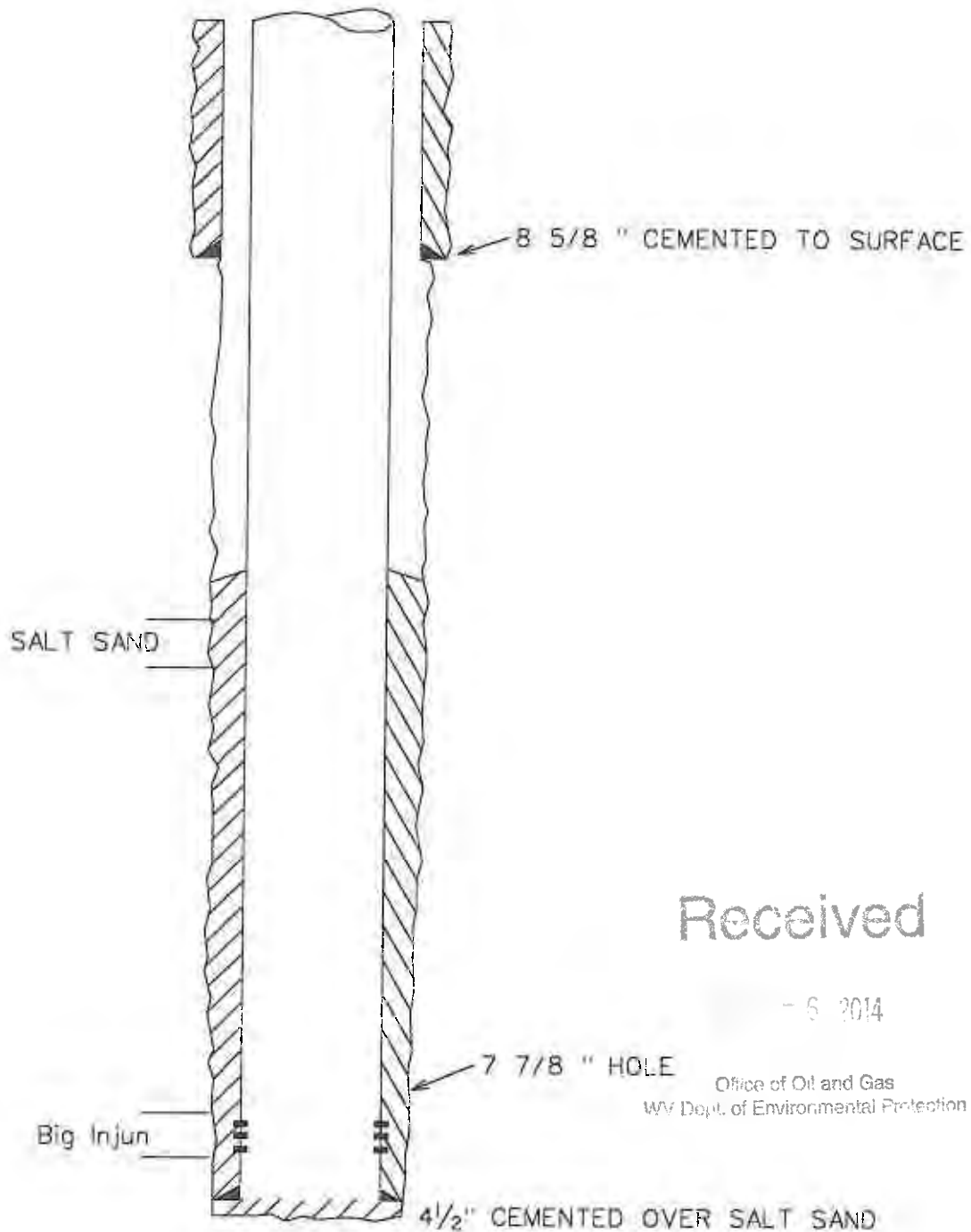
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# TYPE 1

## CLOVER

### Injector Completion

(May be directionally drilled)



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TYPE 2  
**APPENDIX A (cont.)**

12. 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      |       |             |       |                        |                       |                         |                           |
| Fresh Water    | 9-5/8 | N           | LS    | 32                     | 384                   | 384                     | CTS                       |
| Coal           |       |             |       |                        |                       |                         |                           |
| Intermediate 1 |       |             |       |                        |                       |                         |                           |
| Intermediate 2 |       |             |       |                        |                       |                         |                           |
| Production     | 7     | N           | J-55  | 23                     | 2489                  | 2489                    | 130                       |
| Tubing         |       |             |       |                        |                       |                         |                           |
| Liners         |       |             |       |                        |                       |                         |                           |

| TYPE           | Wellbore Diameter | Casing Size | Wall Thickness | Burst Pressure | Cement Type | Cement Yield (cu. ft./sk) | Cement to Surface ? (Y or N) |
|----------------|-------------------|-------------|----------------|----------------|-------------|---------------------------|------------------------------|
| Conductor      |                   |             |                |                |             |                           |                              |
| Fresh Water    | 12-3/8            | 9-5/8       | .312           | 2270           | Reg Neat    | 1.18                      | Y                            |
| Coal           |                   |             |                |                |             |                           |                              |
| Intermediate 1 |                   |             |                |                |             |                           |                              |
| Intermediate 2 |                   |             |                |                |             |                           |                              |
| Production     | 8-3/4             | 7           | .317           | 4360           | Reg Neat    | 1.18                      | N                            |
| Tubing         |                   |             |                |                |             |                           |                              |
| Liners         |                   |             |                |                |             |                           |                              |

| PACKERS     | Packer #1 | Packer #2 | Packer #3 | Packer #4 |
|-------------|-----------|-----------|-----------|-----------|
| Kind:       |           |           |           |           |
| Sizes:      |           |           |           |           |
| Depths Set: |           |           |           |           |

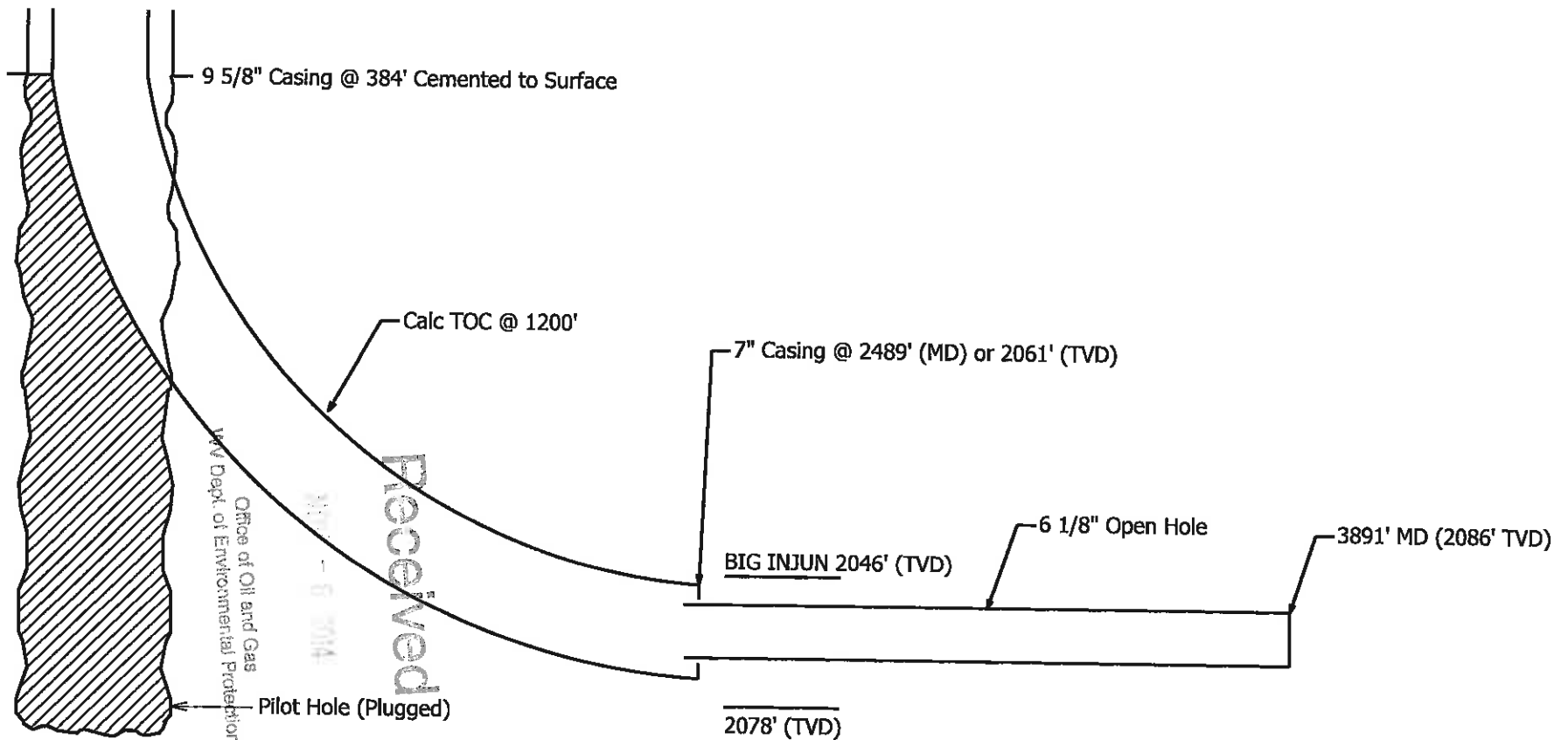
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# CLOVER FIELD AW Edgell #100

## Wellbore Schematic (Type 2) API 47-087-04481



DRAWING NO TO SCALE  
10/8/14

## TYPE 3

## APPENDIX A (cont.)

12. 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      |       |             |       |                        |                       |                         |                           |
| Fresh Water    |       |             |       |                        |                       |                         |                           |
| * Coal         | 7"    | N           | LS    | 17                     | 350                   |                         | CTS                       |
| Intermediate 1 |       |             |       |                        |                       |                         |                           |
| Intermediate 2 |       |             |       |                        |                       |                         |                           |
| * Production   | 4-1/2 | N           | J-55  | 10.5                   | 2100                  |                         | 180                       |
| * Tubing       | 2-3/8 | N           | J-55  | 4.6                    |                       |                         |                           |
| Liners         |       |             |       |                        |                       |                         |                           |

| TYPE           | Wellbore Diameter | Casing Size | Wall Thickness | Burst Pressure | Cement Type  | Cement Yield (cu. ft./sk) | Cement to Surface ? (Y or N) |
|----------------|-------------------|-------------|----------------|----------------|--------------|---------------------------|------------------------------|
| Conductor      |                   |             |                |                |              |                           |                              |
| Fresh Water    |                   |             |                |                |              |                           |                              |
| Coal           | 8-3/4             | 7           | .231           | 1500           | Reg Neat     | 1.18                      | Y                            |
| Intermediate 1 |                   |             |                |                |              |                           |                              |
| Intermediate 2 |                   |             |                |                |              |                           |                              |
| Production     | 6-1/2             | 4-1/2       | .224           | 4790           | 50/50 Pozmix | 1.21                      | N                            |
| Tubing         |                   | 2-3/8       | .190           | 7700           |              |                           |                              |
| Liners         |                   |             |                |                |              |                           |                              |

| PACKERS     | Packer #1                         | Packer #2 | Packer #3 | Packer #4 |
|-------------|-----------------------------------|-----------|-----------|-----------|
| Kind:       | Parmaco Tension                   |           |           |           |
| Sizes:      | 2-3/8" x 4-1/2"                   |           |           |           |
| Depths Set: | Approx. 100' above Big Injun Sand |           |           |           |

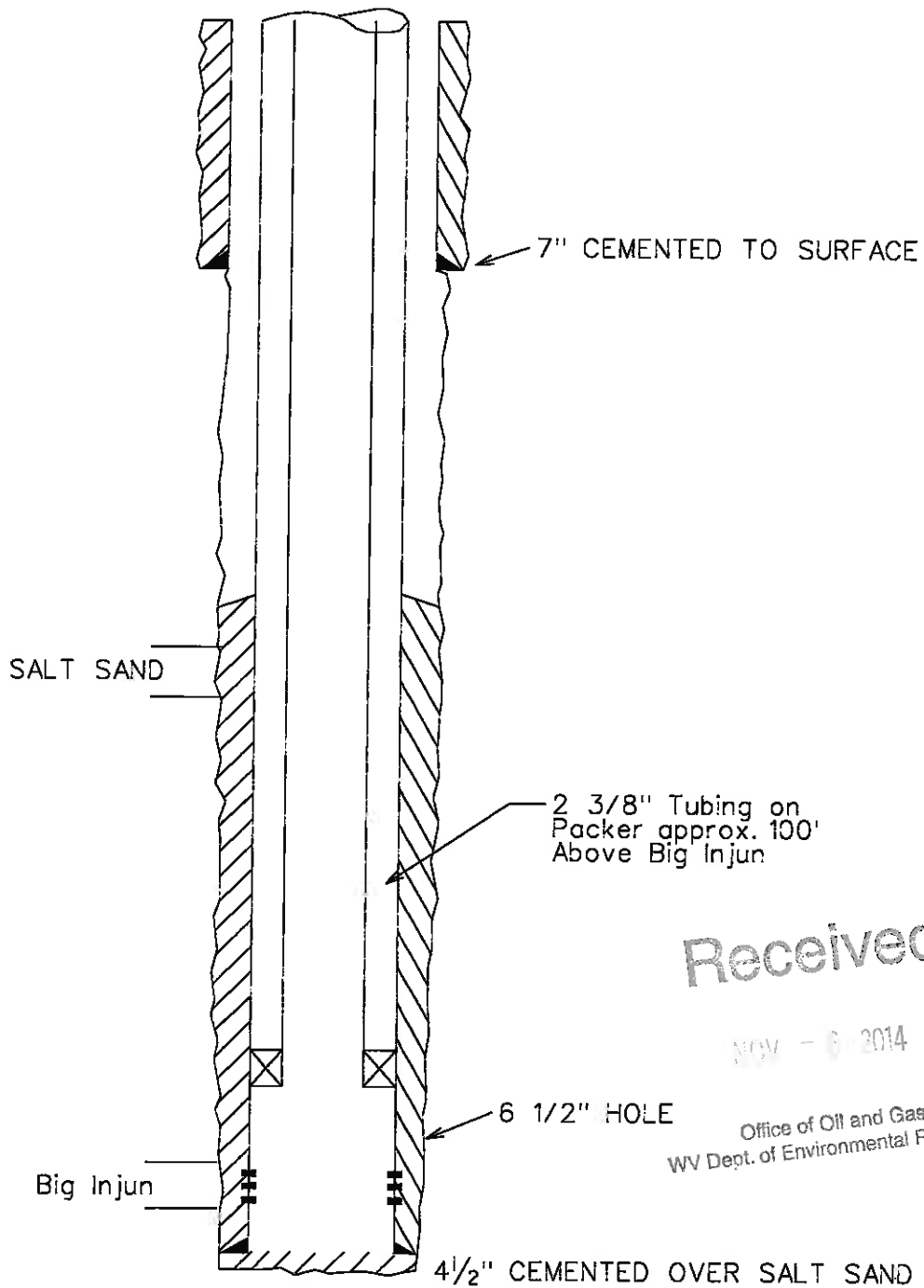
\* Depths of casing will vary.

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# TYPE 3

## CLOVER

Injector Completion  
(May be directionally drilled)



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| APPENDIX B                                                                                                                       |         |                   |           |                   |                   |              |                    |                                  |               |
|----------------------------------------------------------------------------------------------------------------------------------|---------|-------------------|-----------|-------------------|-------------------|--------------|--------------------|----------------------------------|---------------|
| Storage Tank Inventory                                                                                                           |         |                   |           |                   |                   |              |                    |                                  |               |
| API #                                                                                                                            | Tank ID | Tank Location     |           | Installation Date | Tank Age (Months) | Construction |                    | Volume of Fluid Stored (gallons) | Tank Type     |
|                                                                                                                                  |         | UTM NAD 83 Meters |           |                   |                   | Material     | Capacity (gallons) |                                  |               |
|                                                                                                                                  |         | Northing          | Easting   |                   |                   |              |                    | Type of Fluid Stored             | Single/Double |
| 47-087-03016                                                                                                                     | 302     | -81.285200        | 38.712248 | 1997              | 240               | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-02435                                                                                                                     | 304     | -81.282242        | 38.722200 | 2006              | 96                | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-03046/47-087-2509/47-087-02533/47-087-02534/47-087-03172/47-087-02615/47-087-03080/47-087-02866/47-087-02533/47-087-02868 | 310     | -81.281526        | 38.727950 | 2008              | 72                | Steel        | 8820               | Crude Oil                        | Single        |
| 47-087-03046/47-087-2509/47-087-02533/47-087-02534/47-087-03172/47-087-02615/47-087-03080/47-087-02866/47-087-02533/47-087-02868 | 311     | -81.281479        | 38.727952 | 2008              | 72                | Steel        | 8820               | Crude Oil                        | Single        |
| 47-087-03046/47-087-2509/47-087-02533/47-087-02534/47-087-03172/47-087-02615/47-087-03080/47-087-02866/47-087-02533/47-087-02868 | 312     | -81.281479        | 38.727600 | 2008              | 72                | Steel        | 2520               | Crude Oil                        | Single        |
| 47-087-03046/47-087-2509/47-087-02533/47-087-02534/47-087-03172/47-087-02615/47-087-03080/47-087-02866/47-087-02533/47-087-02868 | 313     | -81.281478        | 38.727876 | 2008              | 72                | Fiberglass   | 8820               | Water                            | Single        |
| 47-087-02519                                                                                                                     | 316     | -81.275446        | 38.708355 | 2007              | 84                | Steel        | 8820               | Crude Oil                        | Single        |
| 47-087-03037                                                                                                                     | 317     | -81.278022        | 38.710565 | 2007              | 84                | Steel        | 8820               | Crude Oil                        | Single        |
| 47-087-03089                                                                                                                     | 318     | -81.278159        | 38.717832 | 2013              | 168               | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-03021                                                                                                                     | 319     | -81.285841        | 38.719310 | 1973              | 492               | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-03039                                                                                                                     | 332     | -81.278127        | 38.715433 | 1973              | 492               | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-03017                                                                                                                     | 333     | -81.282057        | 38.718755 | 2014              | 6                 | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-03065/43-087-02708/47-087-03073                                                                                           | 340     | -81.285699        | 38.729478 | 1985              | 348               | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-03168                                                                                                                     | 341     | -81.278743        | 38.732373 | 2013              | 18                | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-02440                                                                                                                     | 342     | -81.286554        | 38.727475 | 2012              | 120               | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-01120                                                                                                                     | 343     | -81.289885        | 38.732899 | 2013              | 18                | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-01858                                                                                                                     | 344     | -81.289569        | 38.711844 | 1985              | 348               | Steel        | 4200               | Crude Oil                        | Single        |
| 47-087-03028                                                                                                                     | 345     | -81.289933        | 38.713949 | 1985              | 348               | Steel        | 4200               | Crude Oil                        | Single        |

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| HG Energy - Clover Field (AP# 2R08704) |        |       |    |           |                  |                                  |                                                                                     | UPDATED COORDINATES                                                                                                       |           |           |
|----------------------------------------|--------|-------|----|-----------|------------------|----------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------|-----------|
| Well Name                              | Well # | API # |    | Well Type | Status           | Notes                            | RESPONSE                                                                            | NORTH                                                                                                                     | EAST      | ELEVATION |
| LEWIS, ASBURY                          | 2      | 47    | 87 | 00027     | Producer         | ?                                | same well as 03003? Need updated records and status, update map if same location    | HGE carries this well as 00027. WVDEP DB reports 03003 "STATUS - NEVER ISSUED"                                            |           |           |
| WEBB, L.D.                             | 1      | 47    | 87 | 00752     | Producer         | Plugged                          | Redrill record indicates well could not be drilled past 540' and well was abandoned | Not in Unit and not an HGE well. 775' from BHL of 04764 10" casing ( open ). Bottom plug below 6 5/8" csng                |           |           |
| WEBB, LD                               | 3      | 47    | 87 | 00755     | Producer         | Plugged                          | copy of WR-38 from plugging before redrill                                          | Not in Unit and not an HGE well. 1625' from BHL of 04765. 4 1/2" casing cemented in redrill. See comment on redrill WR 35 |           |           |
| WEBB, C.A.                             | 1      | 47    | 87 | 00789     | Producer         | Active                           | Location/Coords need updated                                                        | See Corrected Values                                                                                                      | 4,285,550 | 476,703   |
| LEWIS, ASBURY                          | 5      | 47    | 87 | 01026     | Producer         | Aband                            | LOCATION/COORDS NEED UPDATED                                                        | See Corrected Values                                                                                                      | 4,287,513 | 474,776   |
| Himes                                  | 1      | 47    | 87 | 01082     | Producer         | Plugged                          | casing pulled?                                                                      | 4 1/2", 8", & 10" pulled                                                                                                  |           |           |
| ELLIS-LEWIS                            | 2      | 47    | 87 | 02017     | Producer         | Aband                            | location/coords need updated                                                        | Not an HGE well -Field Located 9/27/16                                                                                    | 4,286,841 | 476,536   |
| ELLIS, MAUD                            | 3      | 47    | 87 | 02019     | Producer         | Aband                            | location/coords need updated                                                        | Not an HGE well -Field Located 9/27/16                                                                                    | 4,287,053 | 476,421   |
| NICHOLS, FELIX                         | 1      | 47    | 87 | 02021     | Producer         | Active                           | location/coords need updated                                                        | Not an HGE well -Field Located 9/27/16                                                                                    | 4,287,521 | 476,492   |
| Cox, J M                               | 1      | 47    | 87 | 02400     | Producer         | Plugged                          | WR-38 NEEDED                                                                        | Not HG well- no records found                                                                                             |           |           |
| Chambers, CB                           | 4      | 47    | 87 | 02435     | Producer         | Active                           | Operator to monitor 3 1/2" & 6 5/8" annulus because Big Injun shot hole is open     | Monitor quarterly w/ echometer                                                                                            |           |           |
| Ferrell, CB                            | 1      | 47    | 87 | 02524     | Producer         | Plugged                          | Location/Coords need updated                                                        | See Corrected Values                                                                                                      | 4,285,627 | 475,803   |
| Fisher, ES                             | 4      | 47    | 87 | 02534     | Producer         | Active                           | Need Records                                                                        | attached                                                                                                                  |           |           |
| Holt, Lewis                            | 1      | 47    | 87 | 02552     | Producer         | Active                           | NEED WR-35, WELL LOG                                                                | attached                                                                                                                  |           |           |
| Lewis, GL                              | 3      | 47    | 87 | 02615     | Producer         | Active                           | Location/Coords need updated                                                        | See Corrected Values                                                                                                      | 4,286,848 | 476,077   |
| McGraw, CH                             | 2      | 47    | 87 | 02765     | Producer         | Active                           | ERIS comments: duplicate well 8703248, both wells shown on map, update map          | HGE carries this well as 02975. WVDEP DB reports 03248 "STATUS - NEVER DRILLED"                                           |           |           |
| Webb, Lucy J                           | 1      | 47    | 87 | 02866     | Producer         | Active                           | Need Records                                                                        | attached                                                                                                                  | 4,286,513 | 475,631   |
| Webb, Lucy J                           | 6      | 47    | 87 | 02870     | Producer         | Active                           | Need Records                                                                        | attached                                                                                                                  | 4,286,150 | 475,488   |
| Webb, Lucy J                           | 7      | 47    | 87 | 02871     | Producer         | Active                           | Need Records                                                                        | attached                                                                                                                  | 4,286,087 | 475,284   |
| Webb, RA                               | 2      | 47    | 87 | 02872     | Observation      | Active                           | Need Records                                                                        | none found                                                                                                                | 4,286,872 | 475,731   |
| Webb, Lucy J                           | 11     | 47    | 87 | 02975     | Injection        | Active                           | need copy of WR-35's, Well is on an Agreed Order? update map as injector            | Was on ERI agreed order - on injection since 2009- WR 35 & WR 37 enclosed                                                 |           |           |
| Fisher, ES                             | 16     | 47    | 87 | 02976     | Secondary Recove | Plugged                          | Location/Coords need updated                                                        | See Corrected Values                                                                                                      | 4,286,249 | 475,750   |
| CHAMBERS HEIRS                         | 15     | 47    | 87 | 02993     | Producer         | Active                           | Location/Coords need updated                                                        | See Corrected Values                                                                                                      | 4,287,816 | 475,850   |
| LEWIS, ASBURY                          | 2      | 47    | 87 | 03003     | ?                | ?                                | same well as 00027? Need updated records and status, update map if same location    | HGE carries this well as 00027. WVDEP DB reports 03003 "STATUS - NEVER ISSUED"                                            |           |           |
| CHAMBERS HEIRS                         | 1      | 47    | 87 | 03050     | Producer         | Active                           | Location/Coords need updated                                                        | See Corrected Values / WR 35 Atatched                                                                                     | 4,287,627 | 476,238   |
| Chambers, CB                           | 5      | 47    | 87 | 03060     | Producer         | Inactive<br>Aband                | abandoned well, work order to plug but no affidavit                                 | worked over 1970 -4 1/2 " cemented w/ 50 sks. May be utilized in future expansion                                         |           |           |
| NEVER DRILLED                          |        | 47    | 87 | 03248     | NA               | NA                               | NEVER DRILLED, remove from map/list                                                 | Not on Map as an HGE API (only shows up as a WVGES tic mark)                                                              |           |           |
| SMITH, G.W.                            | 5      | 47    | 87 | 03255     | NA               | NA                               | NEVER DRILLED, remove from map/list                                                 | HGE Carries this API No. on well G.W. Smith No.5                                                                          |           |           |
| FISHER, I.M.                           | 1      | 47    | 87 | 04072     | Producer         | Plugged                          | SAME WELL AS 8702959? UPDATE MAP/LIST                                               | Not the same well as 02959. Forget it                                                                                     |           |           |
| SMITH, G.W.                            | 2      | 47    | 87 | 04075     | Producer         | Plugged                          | Well status says plugged but records provided are for a different API/well          | HGE carries this well as 004075. WVDEP DB carries it as 30516.                                                            |           |           |
| Chambers CB                            | 10     | 47    | 87 | 04089     | Injection        | Inactive<br>Aband                | NEED WR-35 AND WR-37, RBDMS status as Abandoned/Ordered                             | BFU? Inactive WIW north of current flood area                                                                             |           |           |
| Kincaid                                | 387    | 47    | 87 | 04212     | ?                | Active                           | Need Records                                                                        | DEP say " Boggs " - no records found                                                                                      |           |           |
| Edgell, AW                             | 100    | 47    | 87 | 04481     | Injection        | Active                           | should have tubing and packer?                                                      | Drilled 2006- 7" casing cemented in Big Injun                                                                             |           |           |
| Bays, PA                               | 101    | 47    | 87 | 04724     | Injection        | Active Inactive<br>Well Canceled | Permit was canceled on 3/15/2016. remove from map/list                              | Not sure about cancellation WR 35 & WR 37 attached                                                                        |           |           |
| KINKEAD, S.B.                          | 103    | 47    | 87 | 04745     | Injection        | Active                           | NEED WR-37-                                                                         | attached                                                                                                                  |           |           |
| CARR-NICHOLS                           | 102    | 47    | 87 | 04747     | Injection        | Active                           | NEED WR-37-                                                                         | attached                                                                                                                  |           |           |
| KINKEAD, S.B.                          | 108    | 47    | 87 | 04749     | Injection        | Active                           | NEED WR-37-                                                                         | attached                                                                                                                  |           |           |

| Well Name        | Well # | API # |    | Well Type | Status    | Notes     | RESPONSE                                                    | NORTH                                                                  | EAST      | ELEVATION |
|------------------|--------|-------|----|-----------|-----------|-----------|-------------------------------------------------------------|------------------------------------------------------------------------|-----------|-----------|
| KINKEAD, S.B.    | 104    | 47    | 87 | 04751     | Injection | Active    | NEED WR-37-                                                 | attached                                                               |           |           |
| FISHER, IVY      | 111    | 47    | 87 | 04765     | Injection | Active    | NEED WR-37-                                                 | attached                                                               |           |           |
| MCGRAW, C.H.     | 116    | 47    | 87 | 04766     | Injection | Active    | NEED WR-37-                                                 | attached                                                               |           |           |
| LONG, JACKSON    | 106    | 47    | 87 | 04767     | Injection | Active    | NEED WR-37-                                                 | attached                                                               |           |           |
| EPLING, A.J.     | 214    | 47    | 87 | 04773     | Producer  | Active    | need copy of WR-35's-                                       | attached                                                               |           |           |
| BAYS, P.A.       | 208    | 47    | 87 | 04778     | Producer  | Active    | need copy of WR-35's-                                       | attached                                                               |           |           |
| BRANNON, J.S.    | 9      | 47    | 87 | 30004     | Producer  | Plugged   | casing pulled? - not clear                                  | 1250' from unit line- no records found                                 |           |           |
| BAYS, J.S.       | 2      | 47    | 87 | 30007     | Producer  | Plugged   | casing pulled?                                              | well record shows 660' of 8" pulled- left 230'                         |           |           |
| WEBB, L.D.       | 2      | 47    | 87 | 30019     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| SMITH, JONATHAN  | 2      | 47    | 87 | 30039     | Producer  | Plugged   | check duplicate locations on map                            | 30039 is Jonathan Smith No.2. (See 30801 Below)                        |           |           |
| BRANNON, J.S.    | 17     | 47    | 87 | 30112     | Producer  | Abandoned | Need Records                                                | WV Database = 47-0870-01098 record attached                            |           |           |
| BRANNON, J.S.    | 16     | 47    | 87 | 30115     | Producer  | Plugged   | casing pulled?                                              | Outside AOR                                                            |           |           |
| BRANNON, J.S.    | 10     | 47    | 87 | 30119     | Producer  | Plugged   | casing pulled?                                              | 8" & 10" pulled                                                        |           |           |
| BRANNON, J.S.    | 8      | 47    | 87 | 30120     | Producer  | Plugged   | casing pulled?                                              | 8" & 10" pulled                                                        |           |           |
| BRANNON, J.S.    | 6      | 47    | 87 | 30125     | Producer  | Plugged   | casing pulled?                                              | 8" & 10" pulled                                                        |           |           |
| FISHER, J.O.     | 3      | 47    | 87 | 30262     | Producer  | Plugged   | 5' cement in hole above 401', no other plugs outside casing | 2 cement plugs below 6 5/8' casing                                     |           |           |
| LONG, JACKSON    | 4      | 47    | 87 | 30306     | Producer  | Plugged   | no plugging affidavit, check status                         | Monument located.                                                      |           |           |
| SMITH, ELKANAH   | 4      | 47    | 87 | 30309     | Producer  | Plugged   | Wood Plugs                                                  | what is issue several cement plugs in place                            |           |           |
| HOFF, J.A.       | 1      | 47    | 87 | 30402     | Producer  | Plugged   | check plugging method, plugs used                           | Should not be in the Clover AOR                                        |           |           |
| NICHOLS, E.M.    | 2      | 47    | 87 | 30409     | Producer  | ?         | update well status, if plugged need WR-38                   | no records found                                                       |           |           |
| SMITH, MARY M.   | 2      | 47    | 87 | 30484     | Producer  | Plugged   | all bridge/plugs but 1 are inside 6 5/8" casing             | 10' cement plug below 6 5/8" csng                                      |           |           |
| SMITH, MARY M.   | 4      | 47    | 87 | 30485     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| SMITH, MARY M.   | 6      | 47    | 87 | 30486     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| SMITH, MARY M.   | 7      | 47    | 87 | 30487     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| SMITH, MARY M.   | 1      | 47    | 87 | 30488     | Producer  | Plugged   | casing pulled?                                              | 8" & 10" casing pulled - Record attached                               |           |           |
| KINKEAD, WILLIAM | 3      | 47    | 87 | 30489     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" casing pulled when drilled                |           |           |
| BAYS, P.A.       | 1      | 47    | 87 | 30505     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| BAYS, P.A.       | 2      | 47    | 87 | 30506     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| EPLING, A.J.     | 2      | 47    | 87 | 30514     | Producer  | Plugged   | casing pulled?                                              | drillers record indicates the 8" was pulled                            |           |           |
| EPLING, A.J.     | 4      | 47    | 87 | 30515     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| SMITH, G.W.      | 2      | 47    | 87 | 30516     | Producer  | Plugged   | Need Records                                                | SHOULD BE 47-087-04075                                                 |           |           |
| SMITH, G.W.      | 3      | 47    | 87 | 30517     | Producer  | Plugged   | casing pulled?                                              | no additional records found                                            |           |           |
| SMITH, ELKANAH   | 3      | 47    | 87 | 30518     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| SMITH, ELKANAH   | 5      | 47    | 87 | 30519     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" casing pulled when drilled                |           |           |
| SMITH, ELKANAH   | 2      | 47    | 87 | 30520     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| FISHER, E.S.     | 7      | 47    | 87 | 30525     | Producer  | Plugged   | casing pulled?                                              | 10" & 8" pulled when drilled                                           |           |           |
| FISHER, E.S.     | 11     | 47    | 87 | 30526     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| STARR, J.H.      | 2      | 47    | 87 | 30533     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" casing pulled when drilled                |           |           |
| CARR-NICHOLS     | 2      | 47    | 87 | 30534     | Producer  | Plugged   | casing pulled?                                              | no additional records found                                            |           |           |
| FERRELL, C.B.    | 4      | 47    | 87 | 30535     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| MCGRAW, C.H.     | 8      | 47    | 87 | 30548     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| CHAMBERS HEIRS   | 4      | 47    | 87 | 30566     | Producer  | Plugged   | location /coords need updated, check plugging method        | Field Located 9/27/16                                                  | 4,287,358 | 475,757   |
| EDGELL, A.W.     | 4      | 47    | 87 | 30576     | Producer  | Plugged   | Need Records                                                | Wr 35 attached                                                         |           |           |
| LONG, JACKSON    | 5      | 47    | 87 | 30577     | Producer  | ?         | Need Records                                                | not definate if 8" & 10" pulled                                        |           |           |
| Edgell, AW       | 5      | 47    | 87 | 30578     | Producer  | Plugged   | Need Records                                                | WR 35 & Wr 38 attached                                                 |           |           |
| STARR, J.H.      | 1      | 47    | 87 | 30656     | Producer  | ?         | Need Records                                                | Shown no 8" or 10" csng                                                |           |           |
| LEWIS, G.L.      | 2      | 47    | 87 | 30674     | Producer  | Plugged   | casing pulled?                                              | Drillers record indicates 8" & 10" casing pulled when drilled          |           |           |
| FISHER, E.S.     | 13     | 47    | 87 | 30681     | Producer  | ?         | Need Records                                                | Drillers Record shows 10" & 8" pulled                                  |           |           |
| SMITH, A.B.      | 1      | 47    | 87 | 30721     | Producer  | Plugged   | what is preventing migration of fluid                       | 10' cement plug below 5 3/16' casing                                   |           |           |
| SMITH, A.B.      | 2      | 47    | 87 | 30780     | Producer  | Plugged   | not enough plugs/bridge                                     | 2 cement plugs below 6 5/8" csng                                       |           |           |
| SMITH, JONATHAN  | 4      | 47    | 87 | 30801     | Producer  | Plugged   |                                                             | Jonathan Smith #4 should be API 30801. Map has been changed            |           |           |
| SMITH, G.W.      | 1      | 47    | 87 | 30808     | Producer  | Plugged   | no bridge or cement in open hole to prevent migration       | Bridge @ 2080', stone 2080'-2075'- cement 2075'-2065' ( below casing ) |           |           |

| Well Name | Well # | API # | Well Type | Status | Notes | RESPONSE | NORTH | EAST | ELEVATION |
|-----------|--------|-------|-----------|--------|-------|----------|-------|------|-----------|
|-----------|--------|-------|-----------|--------|-------|----------|-------|------|-----------|

|                      |
|----------------------|
| Total Wells          |
| Injection Wells      |
| Active Producers     |
| Plugged Wells        |
| Inactive/Aband       |
| Never Drilled/Cancel |
| Observation Wells    |
| Unknown              |

| APPENDIX C                      |          |              |             |             |             |             |           |           |          |           |
|---------------------------------|----------|--------------|-------------|-------------|-------------|-------------|-----------|-----------|----------|-----------|
| Wells within the Area of Review |          |              |             |             |             |             |           |           |          |           |
|                                 |          |              |             | Well Status |             |             |           |           | Total    |           |
|                                 |          |              |             | (Active,    | Northing    | Easting     | Penetrate | Penetrate |          |           |
|                                 |          |              |             | Abandoned,  | (UTM NAD 83 | (UTM NAD 83 | Injection | Confining | Vertical | Surface   |
|                                 |          |              |             | Shut-in,    | Meters)     | Meters)     | Zone      | Zone      | Depth    | Elevation |
| WELL NAME                       | WELL NO. | API #        | Well Type   | Plugged)    |             |             | (Y or N)  | (Y or N)  |          |           |
| BAYS, P. A.                     | 4        | 47-087-03016 | Producer    | Plugged     | 4,285,046   | 475,225     | Y         | Y         | 2191     | 1,134     |
| BAYS, P. A.                     | 6        | 47-087-03077 | Producer    | Plugged     | 4,284,867   | 475,163     | Y         | Y         | 2110     | 1,083     |
| BAYS, P. A.                     | 204      | 47-087-04783 | Producer    | Active      | 4,285,045   | 474,997     | Y         | Y         | 2370     | 1,097     |
| BAYS, P. A.                     | 208      | 47-087-04778 | Producer    | Active      | 4,284,852   | 474,980     | Y         | Y         | 2300     | 1,064     |
| BAYS, P. A.                     | 209      | 47-087-04770 | Producer    | Active      | 4,284,797   | 475,301     | Y         | Y         | 2322     | 1,162     |
| BAYS, P. A.                     | 101      | 47-087-04724 | Injection   | Inactive    | 4,284,733   | 475,517     | Y         | Y         | 2360     | 1,173     |
| BAYS, P. A.                     | 113      | 47-087-04724 | Injection   | Active      | 4,284,944   | 475,167     | Y         | Y         | 2289     | 1,064     |
| BAYS, P. A.                     | 5        | 47-087-02397 | Producer    | Plugged     | 4,284,773   | 475,276     | Y         | Y         | 2095     | 1,047     |
| CARR-NICHOLS                    | 102      | 47-087-04747 | Injection   | Active      | 4,285,555   | 474,860     | Y         | Y         | 2268     | 1,114     |
| CHAMBERS, C. B.                 | 3        | 47-087-02434 | Producer    | Plugged     | 4,285,744   | 475,242     | Y         | Y         | 2095     | 1,027     |
| CHAMBERS, C. B.                 | 5        | 47-087-03060 | Producer    | Inactive    | 4,285,930   | 475,287     | Y         | Y         | 2141     | 1,070     |
| CHAMBERS, C. B.                 | 10       | 47-087-04089 | Injection   | Inactive    | 4,286,027   | 475,400     | Y         | Y         | 2210     | 1,074     |
| CHAMBERS, C. B.                 | 6        | 47-087-02083 | Observation | Active      | 4,285,951   | 475,790     | Y         | Y         | 2180     | 1,096     |
| CHAMBERS, C. B.                 | 8        | 47-087-02973 | Observation | Active      | 4,286,080   | 475,773     | Y         | Y         | 2147     | 1,021     |
| CHAMBERS, S. J.                 | 1        | 47-087-02440 | Producer    | Active      | 4,286,557   | 475,128     | Y         | Y         | 2141     | 1,042     |
| CHAMBERS, S. J.                 | 3        | 47-087-00965 | Producer    | Active      | 4,287,260   | 475,101     | Y         | Y         | 2183     | 1,062     |
| CHAMBERS, S. J.                 | 4        | 47-087-01094 | Producer    | Active      | 4,286,998   | 475,030     | Y         | Y         | 2160     | 995       |
| CHAMBERS, S. J.                 | 5        | 47-087-01120 | Producer    | Active      | 4,287,167   | 474,803     | Y         | Y         | 2217     | 1,058     |
| EDGEELL, A. W.                  | 3        | 47-087-03046 | Producer    | Active      | 4,285,613   | 475,953     | Y         | Y         | 2025     | 981       |
| EDGEELL, A. W.                  | 6        | 47-087-02509 | Producer    | Active      | 4,285,905   | 475,890     | Y         | Y         | 2052     | 996       |
| EDGEELL, A. W.                  | 100      | 47-087-04481 | Injection   | Active      | 4,286,116   | 475,865     | Y         | Y         | 3891     | 1,018     |
| EPLING, ALICE                   | 1        | 47-087-02519 | Producer    | Active      | 4,284,573   | 476,008     | Y         | Y         | 1995     | 978       |
| EPLING, ALICE                   | 5        | 47-087-03037 | Producer    | Active      | 4,284,705   | 475,826     | Y         | Y         | 2133     | 1,105     |
| EPLING, ALICE                   | 211      | 47-087-04771 | Producer    | Active      | 4,284,766   | 475,914     | Y         | Y         | 2396     | 1,189     |
| EPLING, ALICE                   | 214      | 47-087-04773 | Producer    | Active      | 4,284,448   | 475,612     | Y         | Y         | 2333     | 1,178     |
| EPLING, ALICE                   | 215      | 47-087-04772 | Producer    | Active      | 4,284,480   | 475,928     | Y         | Y         | 2385     | 1,189     |
| EPLING, ALICE                   | 119      | 47-087-04763 | Injection   | Active      | 4,284,611   | 475,788     | Y         | Y         | 2390     | 1,189     |
| EPLING, ALICE                   | 120      | 47-087-04764 | Injection   | Active      | 4,284,667   | 476,077     | Y         | Y         | 2373     | 1,189     |
| FERRELL, C. B.                  | 2        | 47-087-03089 | Producer    | Active      | 4,285,493   | 475,842     | Y         | Y         | 2062     | 982       |
| FERRELL, C. B.                  | 202      | 47-087-04752 | Producer    | Active      | 4,285,441   | 475,629     | Y         | Y         | 2330     | 1,110     |
| FERRELL, C. B.                  | 105      | 47-087-04755 | Injection   | Active      | 4,285,522   | 475,789     | Y         | Y         | 2348     | 1,110     |
| FERRELL, C. B.                  | 110      | 47-087-04754 | Injection   | Active      | 4,285,234   | 475,776     | Y         | Y         | 2333     | 1,110     |
| FERRELL, C. B.                  | 3        | 47-087-02525 | Producer    | Plugged     | 4,285,336   | 475,878     | Y         | Y         | 2005     | 965       |
| FERRELL, C. B.                  | 5        | 47-087-02526 | Producer    | Plugged     | 4,285,612   | 475,603     | Y         | Y         | 2039     | 985       |

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| Wells within the Area of Review |          |              |           |             |             |             |           |           |          |           |
|                                 |          |              |           | Well Status |             |             |           |           | Total    |           |
|                                 |          |              |           | (Active,    | Northing    | Easting     | Penetrate | Penetrate |          |           |
|                                 |          |              |           | Abandoned,  | (UTM NAD 83 | (UTM NAD 83 | Injection | Confining | Vertical | Surface   |
|                                 |          |              |           | Shut-in,    | Meters)     | Meters)     | Zone      | Zone      | Depth    | Elevation |
| WELL NAME                       | WELL NO. | API #        | Well Type | Plugged)    |             |             | (Y or N)  | (Y or N)  |          |           |
| FISCHER, IVY                    | 203      | 47-087-04779 | Producer  | Active      | 4,285,378   | 475,951     | Y         | Y         | 2226     | 1,038     |
| FISCHER, IVY                    | 111      | 47-087-04765 | Injection | Active      | 4,285,298   | 476,298     | Y         | Y         | 2300     | 1,038     |
| FISHER, E. S.                   | 1        | 47-087-02533 | Producer  | Active      | 4,286,700   | 475,677     | Y         | Y         | 2145     | 1,040     |
| FISHER, E. S.                   | 3        | 47-087-03081 | Producer  | Active      | 4,286,211   | 475,816     | Y         | Y         | 2059     | 945       |
| FISHER, E. S.                   | 4        | 47-087-02534 | Producer  | Active      | 4,286,474   | 475,962     | Y         | Y         | 2010     | 907       |
| FISHER, E. S.                   | 8        | 47-087-02998 | Producer  | Active      | 4,286,218   | 476,120     | Y         | Y         | 1990     | 925       |
| FISHER, E. S.                   | 15       | 47-087-03172 | Producer  | Active      | 4,286,672   | 476,228     | Y         | Y         | 2139     | 1,058     |
| FISHER, E. S.                   | 2        | 47-087-03165 | Producer  | Plugged     | 4,286,367   | 475,783     | Y         | Y         | 2050     | 927       |
| FISHER, E. S.                   | 14       | 47-087-02537 | Producer  | Plugged     | 4,286,137   | 476,345     | Y         | Y         | 1942     | 873       |
| FISHER, E. S.                   | 16       | 47-087-02976 | Injection | Plugged     | 4,286,249   | 475,750     | Y         | Y         |          | 897       |
| HOLT, LEWIS                     | 1        | 47-087-02552 | Producer  | Active      | 4,286,694   | 475,203     | Y         | Y         | 2105     | 1,036     |
| KINCAID, S. B.(TR.1)            | 1        | 47-087-03017 | Producer  | Plugged     | 4,285,604   | 475,479     | Y         | Y         | 2057     | 1,370     |
| KINCAID, S. B.(TR.2)            | 6        | 47-087-03079 | Producer  | Active      | 4,285,493   | 475,176     | Y         | Y         | 2180     | 1,101     |
| KINKEAD, S. B.                  | 200      | 47-087-04746 | Producer  | Active      | 4,285,385   | 475,009     | Y         | Y         | 2324     | 1,114     |
| KINKEAD, S. B.                  | 201      | 47-087-04750 | Producer  | Active      | 4,285,360   | 475,286     | Y         | Y         | 2363     | 1,110     |
| KINKEAD, S. B.                  | 103      | 47-087-04745 | Injection | Active      | 4,285,549   | 475,173     | Y         | Y         | 2326     | 1,114     |
| KINKEAD, S. B.                  | 104      | 47-087-04751 | Injection | Active      | 4,285,543   | 475,446     | Y         | Y         | 2290     | 1,110     |
| KINKEAD, S. B.                  | 108      | 47-087-04749 | Injection | Active      | 4,285,227   | 475,151     | Y         | Y         | 2323     | 1,110     |
| KINKEAD, S. B.                  | 109      | 47-087-04753 | Injection | Active      | 4,285,245   | 475,464     | Y         | Y         | 2312     | 1,110     |
| LEWIS, G. L.                    | 3        | 47-087-02615 | Producer  | Active      | 4,286,848   | 476,077     | Y         | Y         | 2094     | 1,126     |
| LONG, JACKSON B.                | 2        | 47-087-03085 | Producer  | Active      | 4,285,728   | 476,237     | Y         | Y         | 2005     | 960       |
| LONG, JACKSON B.                | 106      | 47-087-04767 | Injection | Active      | 4,285,512   | 476,167     | Y         | Y         | 2233     | 1,038     |
| McGRAW, C. H.                   | 2        | 47-087-02765 | Producer  | Active      | 4,284,822   | 475,700     | Y         | Y         | 2115     | 1,085     |
| McGRAW, C. H.                   | 3        | 47-087-03039 | Producer  | Plugged     | 4,285,156   | 475,743     | Y         | Y         | 1988     | 946       |
| McGRAW, C. H.                   | 205      | 47-087-04748 | Producer  | Active      | 4,285,120   | 475,300     | Y         | Y         | 2305     | 1,110     |
| McGRAW, C. H.                   | 206      | 47-087-04775 | Producer  | Active      | 4,285,138   | 475,569     | Y         | Y         | 2330     | 1,111     |
| McGRAW, C. H.                   | 207      | 47-087-04777 | Producer  | Active      | 4,285,108   | 466,809     | Y         | Y         | 2245     | 1,057     |
| McGRAW, C. H.                   | 114      | 47-087-04759 | Injection | Active      | 4,284,937   | 475,484     | Y         | Y         | 2298     | 1,111     |
| McGRAW, C. H.                   | 115      | 47-087-04758 | Injection | Active      | 4,284,991   | 475,725     | Y         | Y         | 2294     | 1,111     |
| McGRAW, C. H.                   | 116      | 47-087-04766 | Injection | Active      | 4,284,965   | 476,013     | Y         | Y         | 2234     | 1,057     |
| NICHOLS, CARR                   | 1        | 47-087-03021 | Producer  | Plugged     | 4,285,674   | 475,180     | Y         | Y         | 2104     | 1,034     |
| SINNETT, A. P.                  | 1        | 47-087-03080 | Producer  | Active      | 4,286,854   | 475,717     | Y         | Y         | 2087     | 955       |
| SINNETT, A. P.                  | 2        | 47-087-03065 | Producer  | Active      | 4,287,068   | 475,514     | Y         | Y         | 2097     | 990       |
| SINNETT, A. P.                  | 3        | 47-087-03186 | Producer  | Active      | 4,287,186   | 475,753     | Y         | Y         | 2055     | 943       |

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| Wells within the Area of Review |          |              |             |             |             |             |           |           |          |           |
|                                 |          |              |             | Well Status |             |             |           |           |          |           |
|                                 |          |              |             | (Active,    | Northing    | Easting     | Penetrate | Penetrate | Total    |           |
|                                 |          |              |             | Abandoned,  | (UTM NAD 83 | (UTM NAD 83 | Injection | Confining | Vertical | Surface   |
|                                 |          |              |             | Shut-in,    | Meters)     | Meters)     | Zone      | Zone      | Depth    | Elevation |
|                                 |          |              |             | Plugged)    |             |             | (Y or N)  | (Y or N)  |          |           |
| WELL NAME                       | WELL NO. | API #        | Well Type   |             |             |             |           |           |          |           |
| SINNETT, A. P.                  | 4        | 47-087-02706 | Producer    | Active      | 4,286,981   | 475,356     | Y         | Y         | 2051     | 942       |
| SINNETT, A. P.                  | 6        | 47-087-03073 | Producer    | Active      | 4,286,792   | 475,176     | Y         | Y         | 2118     | 1,012     |
| SINNETT, A. P.                  | 5        | 47-087-03012 | Producer    | Plugged     | 4,287,330   | 475,458     | Y         | Y         | 2076     | 953       |
| SMITH, A. B.                    | 122      | 47-087-04760 | Injection   | Active      | 4,284,321   | 475,184     | Y         | Y         | 2320     | 1,148     |
| SMITH, ELKANAH                  | 212      | 47-087-04769 | Producer    | Active      | 4,284,477   | 475,012     | Y         | Y         | 2367     | 1,148     |
| SMITH, ELKANAH                  | 213      | 47-087-04774 | Producer    | Active      | 4,284,484   | 475,354     | Y         | Y         | 2282     | 1,162     |
| SMITH, ELKANAH                  | 118      | 47-087-04762 | Injection   | Active      | 4,284,660   | 475,137     | Y         | Y         | 2264     | 1,064     |
| SMITH, ELKANAH                  | 121      | 47-087-04761 | Injection   | Active      | 4,284,292   | 474,946     | Y         | Y         | 2360     | 1,148     |
| SMITH, G. W.                    | 2        | 47-087-04075 | Producer    | Plugged     | 4,284,228   | 475,505     | Y         | Y         | 2148     | 1,133     |
| SMITH, G. W.                    | 5        | 47-087-04208 | Producer    | Active      | 4,283,803   | 475,788     | Y         | Y         | 2189     | 1,171     |
| SMITH, G. W.                    | 123      | 47-087-04768 | Injection   | Active      | 4,284,248   | 475,487     | Y         | Y         | 2390     | 1,178     |
| SMITH, JONATHAN                 | 124      | 47-087-04780 | Injection   | Active      | 4,284,323   | 475,780     | Y         | Y         | 2273     | 1,178     |
| SMITH-CHAMBERS                  | 1        | 47-087-03064 | Producer    | Active      | 4,285,813   | 475,759     | Y         | Y         | 2127     | 1,074     |
| SMITH-CHAMBERS                  | 2        | 47-087-02712 | Producer    | Plugged     | 4,285,736   | 475,512     | Y         | Y         | 2137     | 1,075     |
| STARR, J. H.                    | 5        | 47-087-03028 | Producer    | Active      | 4,285,088   | 474,778     | Y         | Y         | 2095     | 1,029     |
| STARR, J. H.                    | 6        | 47-087-01956 | Producer    | Active      | 4,284,855   | 474,827     | Y         | Y         | 2083     | 986       |
| STARR, J. H.                    | 107      | 47-087-04782 | Injection   | Active      | 4,285,239   | 474,862     | Y         | Y         | 2277     | 1,097     |
| STARR, J. H.                    | 112      | 47-087-04781 | Injection   | Active      | 4,284,921   | 474,794     | Y         | Y         | 2302     | 1,097     |
| STARR, J. H.                    | 117      | 47-087-04757 | Injection   | Active      | 4,284,632   | 474,820     | Y         | Y         | 2257     | 1,064     |
| WEBB, LUCY J.                   | 1        | 47-087-02866 | Producer    | Active      | 4,286,513   | 475,631     | Y         | Y         | 2037     | 954       |
| WEBB, LUCY J.                   | 3        | 47-087-02868 | Producer    | Active      | 4,286,161   | 475,699     | Y         | Y         | 2058     | 983       |
| WEBB, LUCY J.                   | 5        | 47-087-03066 | Producer    | Active      | 4,286,449   | 475,459     | Y         | Y         | 2129     | 1,041     |
| WEBB, LUCY J.                   | 6        | 47-087-02870 | Producer    | Active      | 4,286,150   | 475,488     | Y         | Y         | 2106     | 1,024     |
| WEBB, LUCY J.                   | 7        | 47-087-02871 | Producer    | Active      | 4,286,087   | 475,284     | Y         | Y         | 2112     | 1,028     |
| WEBB, LUCY J.                   | 8        | 47-087-03015 | Producer    | Active      | 4,286,079   | 475,045     | Y         | Y         | 2151     | 1,063     |
| WEBB, LUCY J.                   | 9        | 47-087-02979 | Producer    | Active      | 4,286,346   | 474,939     | Y         | Y         | 2164     | 1,062     |
| WEBB, LUCY J.                   | 10       | 47-087-01744 | Producer    | Active      | 4,286,287   | 475,395     | Y         | Y         | 2072     | 984       |
| WEBB, LUCY J.                   | 11       | 47-087-02975 | Injection   | Active      | 4,286,202   | 475,604     | Y         | Y         | 2084     | 954       |
| WEBB, R. A.                     | 1        | 47-087-03062 | Producer    | Active      | 4,286,638   | 475,545     | Y         | Y         | 2136     | 1,138     |
| WEBB, R. A.                     | 3        | 47-087-02873 | Producer    | Active      | 4,286,461   | 475,731     | Y         | Y         | 2104     | 1,015     |
| WEBB, R. A.                     | 2        | 47-087-02872 | Observation | Active      | 4,286,872   | 475,504     | Y         | Y         | 2133     | 1,032     |
| LEWIS, ASBURY                   | 2        | 47-087-0027  | Producer    | Abandoned   |             |             | Y         | Y         | 2111     | 992       |
| LEWIS, ASBURY                   | 5        | 47-087-01026 | Producer    | Abandoned   | 4,287,513   | 474,776     | Y         | Y         | 2127     | 952       |
| ELLIS-LEWIS                     | 2        | 47-087-02017 | Producer    | Abandoned   | 4,286,841   | 476,536     | Y         | Y         |          | 1,051     |

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| Wells within the Area of Review |          |              |           |                                       |                     |                     |                         |                         |                |                   |
|                                 |          |              |           | Well Status                           | Northing            | Easting             | Penetrate               | Penetrate               | Total          |                   |
|                                 |          |              |           | (Active, Abandoned, Shut-in, Plugged) |                     |                     |                         |                         |                |                   |
| WELL NAME                       | WELL NO. | API #        | Well Type |                                       | (UTM NAD 83 Meters) | (UTM NAD 83 Meters) | Injection Zone (Y or N) | Confining Zone (Y or N) | Vertical Depth | Surface Elevation |
| ELLIS, MAUD                     | 3        | 47-087-02019 | Producer  | Abandoned                             | 4,287,053           | 476,421             | Y                       | Y                       |                | 908               |
| NICHOLS, FELIX                  | 1        | 47-087-02021 | Producer  | Active                                | 4,287,521           | 476,492             | Y                       | Y                       |                | 906               |
| COX, J.M.                       | 1        | 47-087-02400 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| CHAMBERS HEIRS                  | 15       | 47-087-02993 | Producer  | Active                                | 4,287,816           | 475,850             | Y                       | Y                       | 2133           | 1,000             |
| CHAMBERS HEIRS                  | 1        | 47-087-03050 | Producer  | Active                                | 4,287,627           | 476,238             | Y                       | Y                       | 2001           | 883               |
| WEBB, L.D.                      | 1        | 47-087-00752 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| WEBB, L.D.                      | 3        | 47-087-00755 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| FISHER, IVY M.                  | 1        | 47-087-04072 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| CHAMBERS, C. B.                 | 4        | 47-087-02435 | Producer  | Active                                |                     |                     | Y                       | Y                       | 5039           | 1,052             |
| BRANNON, J.S.                   | 9        | 47-087-30004 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| BAYS, J.S.                      | 2        | 47-087-30007 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| WEBB, L.D.                      | 1        | 47-087-00752 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| WEBB, L.D.                      | 2        | 47-087-30019 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| WEBB, L.D.                      | 3        | 47-087-00755 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| SMITH, JONATHAN                 | 2        | 47-087-30039 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| BRANNON, J.S.                   | 17       | 47-087-30112 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| BRANNON, J.S.                   | 16       | 47-087-30115 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| BRANNON, J.S.                   | 10       | 47-087-30119 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| BRANNON, J.S.                   | 8        | 47-087-30120 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| BRANNON, J.S.                   | 6        | 47-087-30125 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| FISHER, J.O.                    | 3        | 47-087-30262 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| LONG, JACKSON                   | 4        | 47-087-30306 | Producer  | ?                                     |                     |                     | Y                       | Y                       |                |                   |
| SMITH, ELKANAH                  | 4        | 47-087-30309 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| HOFF, J.A.                      | 1        | 47-087-30402 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| NICHOLS, E.M.                   | 2        | 47-087-30409 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| SMITH, MARY. M                  | 2        | 47-087-30804 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| SMITH, MARY. M                  | 4        | 47-087-30485 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| SMITH, MARY. M                  | 6        | 47-087-30486 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| SMITH, MARY. M                  | 7        | 47-087-30487 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| SMITH, MARY. M                  | 1        | 47-087-30488 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| KINKEAD, WILLIAM                | 3        | 47-087-30489 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| BAYS, P. A.                     | 1        | 47-087-30505 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| BAYS, P. A.                     | 2        | 47-087-30506 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |
| EPLING, A.J.                    | 2        | 47-087-30514 | Producer  | Plugged                               |                     |                     | Y                       | Y                       |                |                   |

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| Wells within the Area of Review |          |              |           |             |             |             |           |           |          |           |
|                                 |          |              |           | Well Status |             |             |           |           |          |           |
|                                 |          |              |           | (Active,    | Northing    | Easting     | Penetrate | Penetrate | Total    |           |
|                                 |          |              |           | Abandoned,  | (UTM NAD 83 | (UTM NAD 83 | Injection | Confining | Vertical | Surface   |
|                                 |          |              |           | Shut-in,    | Meters)     | Meters)     | Zone      | Zone      | Depth    | Elevation |
| WELL NAME                       | WELL NO. | API #        | Well Type | Plugged)    |             |             | (Y or N)  | (Y or N)  |          |           |
| EPLING, A.J.                    | 4        | 47-087-30515 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| SMITH, G. W.                    | 2        | 47-087-30516 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| SMITH, G. W.                    | 3        | 47-087-30517 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| SMITH, ELKANAH                  | 3        | 47-087-30518 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| SMITH, ELKANAH                  | 5        | 47-087-30519 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| SMITH, ELKANAH                  | 2        | 47-087-30520 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| FISHER, E. S.                   | 7        | 47-087-30525 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| FISHER, E. S.                   | 11       | 47-087-30526 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| STARR, J. H.                    | 2        | 47-087-30533 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| CARR-NICHOLS                    | 2        | 47-087-30534 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| FERRELL, C. B.                  | 4        | 47-087-30535 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| McGRAW, C. H.                   | 8        | 47-087-30548 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| CHAMBERS HEIRS                  | 4        | 47-087-30566 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| EDGEELL, A. W.                  | 4        | 47-087-30576 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| LONG, JACKSON                   | 5        | 47-087-30577 | Producer  | ?           |             |             | Y         | Y         |          |           |
| EDGEELL, A. W.                  | 5        | 47-087-30578 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| STARR, J. H.                    | 1        | 47-087-30656 | Producer  | ?           |             |             | Y         | Y         |          |           |
| LEWIS, G. L.                    | 2        | 47-087-30674 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| FISHER, E. S.                   | 13       | 47-087-30681 | Producer  | ?           |             |             | Y         | Y         |          |           |
| SMITH, A. B.                    | 1        | 47-087-30721 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| SMITH, A. B.                    | 2        | 47-087-30780 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| SMITH, JONATHAN                 | 4        | 47-087-30801 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| SMITH, G. W.                    | 1        | 47-087-30808 | Producer  | Plugged     |             |             | Y         | Y         |          |           |
| FERRELL, C. B.                  | 1        | 47-087-02524 | Producer  | Plugged     | 4,285,627   | 475,803     | Y         | Y         | ?        | 972       |
| WEBB, C.A.                      | 1        | 47-087-00789 | Producer  | Active      | 4,258,550   | 476,703     | Y         | Y         |          | 1,073     |
| HIMES                           | 1        | 47-087-01082 | Producer  | Plugged     |             |             | Y         | Y         |          |           |

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(4/25)

**APPENDIX D****Public Service District Affidavit**

Underground Injection Control Permit applicants must identify all publically recorded drinking water sources within a one (1) mile radius of the proposed injection well facility. If no drinking water sources are present within this radius a written affidavit shall be supplied by the local Public Service District (PSD) as ample verification.

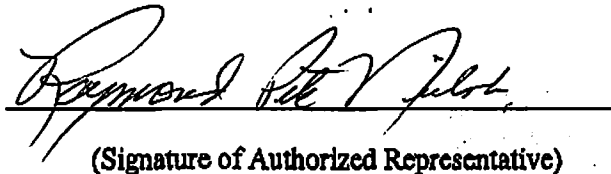
"I certify under penalty of law that (state name of business)

H6 Energy LLC

has verified with the public service district (state name of PSD)

Clower PSD

that there are no such publically recorded sources.

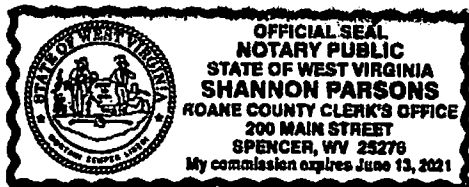
  
(Signature of Authorized Representative)

Sworn and subscribed to before me this 10<sup>th</sup> day of Feb., 20 17.

Shannon Parsons, my commission expires June 13, 2021

(Notary Signature)

Shannon Parsons



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| Clover Tanks - Submitted to DEP on 9-25-14 |                                      |                      |            |            |        |            |            |           |                                                     |                 |                 |                   |                   |                   |             |           |                                           |                                                                                                |                                                                 |                                                                  |                                                 |
|--------------------------------------------|--------------------------------------|----------------------|------------|------------|--------|------------|------------|-----------|-----------------------------------------------------|-----------------|-----------------|-------------------|-------------------|-------------------|-------------|-----------|-------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------|
| Tank ID#                                   | Facility                             | Stored Material Name | CAS #      | Well(s)    | County | District   | Long.      | Lat       | Dike Dimensions                                     | Dike Volume BBL | Dike Volume GAL | Tank Capacity BBL | Tank Capacity GAL | Tank Construction | NFPA Rating | SPCC Regs | Reg Requirements                          | Status: Currently in Use / Temp. Out of Service / Non-Operational / Permanently Out of Service | Date of Installation (if Unknown, put Est. and provide a guess) | Year Tank Constructed (if Unknown, put Est. and provide a guess) | Piping Protection and Corrosion Protection Date |
| 304                                        | Chambers, C.B.                       | Crude Oil            | 8002-05-11 | # 4        | Roane  | Smithfield | -81.282242 | 38.722200 | 24' x 33' x 2.5' D                                  | 353             | 14826           | 100               | 4200              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2006                                                            | 2006                                                             | 2006                                            |
| 310                                        | Clover Main Facility                 | Crude Oil            | 8002-05-17 |            | Roane  | Smithfield | -81.281526 | 38.727950 | 52' x 36' x 49' x 31' x 1.5' D (Ditch 3'x42.5'x3'D) | 521             | 21882           | 210               | 8820              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2008                                                            | 2008                                                             | 2008                                            |
| 311                                        | Clover Main Facility                 | Crude Oil            | 8002-05-18 |            | Roane  | Smithfield | -81.281479 | 38.727952 | 52' x 36' x 49' x 31' x 1.5' D (Ditch 3'x42.5'x3'D) | 521             | 21882           | 210               | 8820              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2008                                                            | 2008                                                             | 2008                                            |
| 313                                        | Clover Main Facility- Produced Water | Produced Water       | 7732-18-5  |            | Roane  | Smithfield | -81.281478 | 38.727876 | 25'x23'x3.5' D                                      | 358             | 15036           | 210               | 8820              | Fiberglass        | 0           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2008                                                            | 2008                                                             | 2008                                            |
| 318                                        | Ferrel, C.B.                         | Crude Oil            | 8002-05-26 | #2         | Roane  | Smithfield | -81.278159 | 38.717832 | 33'x33'x1.5' D                                      | 291             | 12222           | 100               | 4200              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2008                                                            | 2008                                                             | 2008                                            |
| 340                                        | Sinnett, A.P.                        | Crude Oil            | 8002-05-48 | #2, #4 & 6 | Roane  | Smithfield | -81.285699 | 38.729478 | 121' P x 2' D                                       | 278             | 11676           | 100               | 4200              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2013                                                            | 2000                                                             | 2000                                            |
| 341                                        | Sinnett, A.P.                        | Crude Oil            | 8002-05-49 | # 3        | Roane  | Smithfield | -81.278743 | 38.732373 | 24'x30'x2' D                                        | 256             | 10752           | 100               | 4200              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 1985                                                            | 1985                                                             | 1985                                            |
| 342                                        | Chambers, SJ                         | Crude Oil            | 8002-05-50 | #1         | Roane  | Smithfield | -81.286554 | 38.727475 | 30'x20'x2.5'                                        | 267             | 11214           | 100               | 4200              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2013                                                            | 2013                                                             | 2013                                            |
| 343                                        | Chambers, SJ                         | Crude Oil            | 8002-05-51 | #5         | Roane  | Smithfield | -81.289885 | 38.732899 | 21'x18'x3' D                                        | 202             | 8484            | 100               | 4200              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2012                                                            | 2004                                                             | 2004                                            |
| 344                                        | Starr, JH                            | Crude Oil            | 8002-05-52 | #6         | Roane  | Smithfield | -81.289569 | 38.711844 | 25'x18'x1.5'                                        | 120             | 5040            | 100               | 4200              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | 2013                                                            | 2013                                                             | 2013                                            |
| 345                                        | Starr, JH                            | Crude Oil            | 8002-05-53 | #5         | Roane  | Smithfield | -81.289933 | 38.719949 | 24'x12'x3'                                          | 154             | 6468            | 100               | 4200              | Steel             | 1           | 40CFR112  | Annual Inspections, Annual Training, Etc. | Temp. Out of Service                                                                           | 1985                                                            | 1985                                                             | 1985                                            |
| 381                                        | Clover Main Facility- Freshwater     | Freshwater           | 7732-18-5  |            | Roane  | Smithfield | -81.281494 | 38.728552 | 30x50x3                                             | 801             | 33642           | 500               | 21000             | Fiberglass        | 0           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | Jul-15                                                          | 2015                                                             | 2015                                            |
| 382                                        | Clover Main Facility- Freshwater     | Freshwater           | 7732-18-5  |            | Roane  | Smithfield | -81.281494 | 38.728552 | 30x50x3                                             | 801             | 33642           | 500               | 21000             | Fiberglass        | 0           | 40CFR112  | Annual Inspections, Annual Training, Etc. | In use                                                                                         | Jul-15                                                          | 2015                                                             | 2015                                            |
| Tank No 304 is non unit shale well         |                                      |                      |            |            |        |            |            |           |                                                     |                 |                 |                   |                   |                   |             |           |                                           |                                                                                                |                                                                 |                                                                  |                                                 |

Fig No 2a

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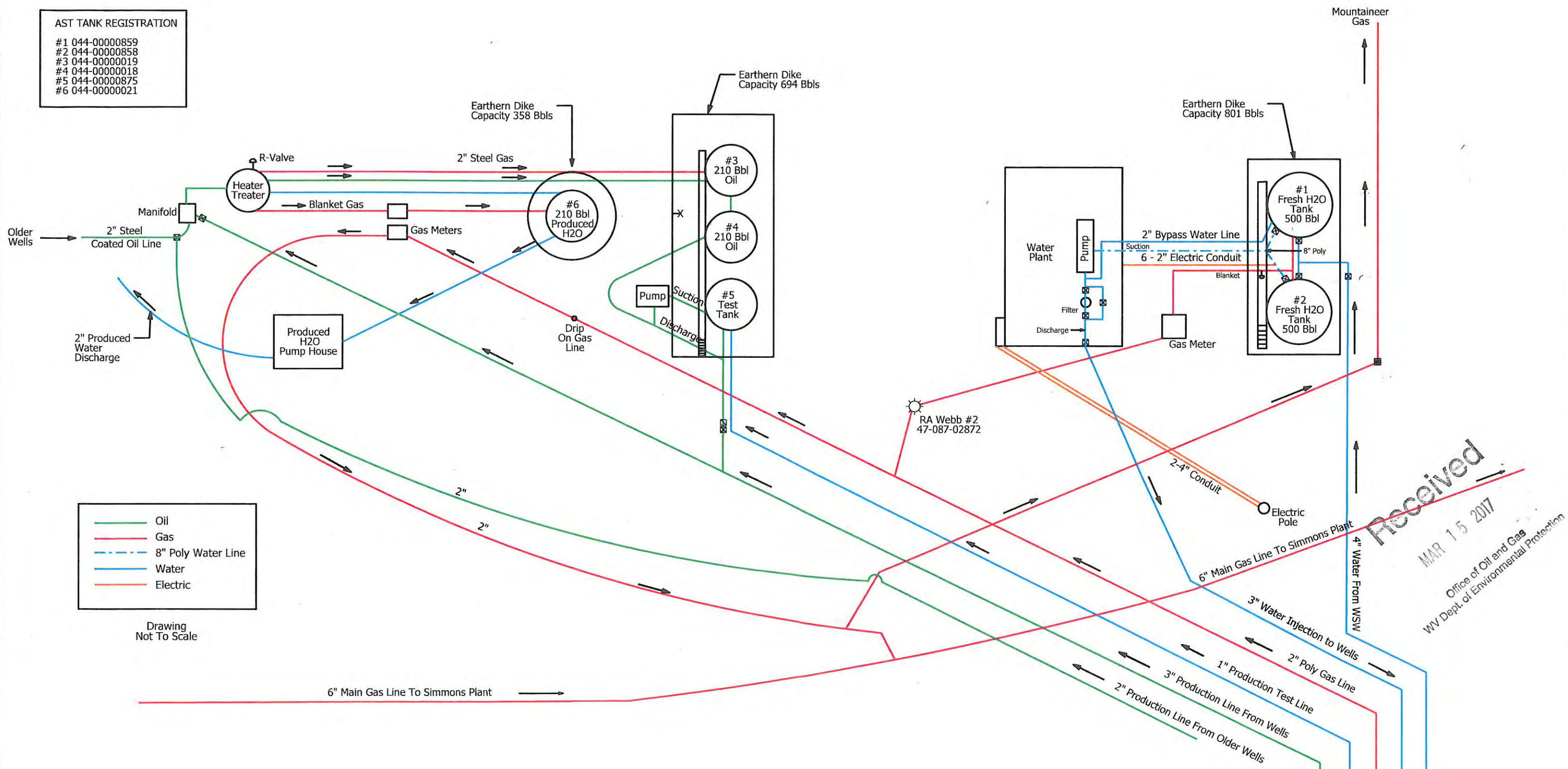
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WV Dept. of Environmental Protection

# CLOVER UIC SCHEMATIC MAIN FACILITY

## AST TANK REGISTRATION

#1 044-00000859  
#2 044-00000858  
#3 044-00000019  
#4 044-00000018  
#5 044-00000875  
#6 044-00000021



Drawing  
Not To Scale

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WV Dept. of Environmental Protection

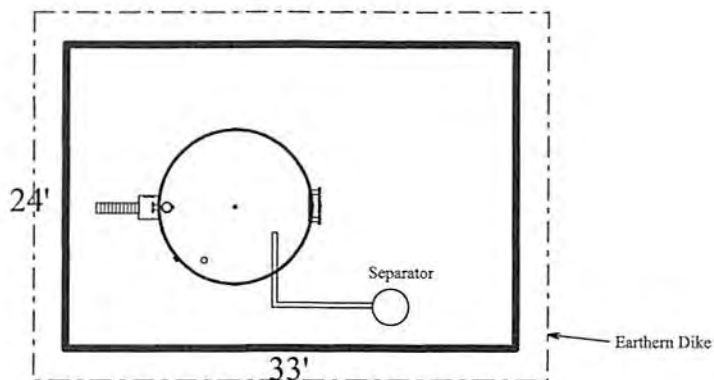
| FARM            | WELL NUM | API NUM      | UIC NUM      | STATUS | LAST MIT DATE      | LAST MIT TYPE                | MAILED TO STATE    | APPROVED           | DUE DATE           | CONSTRUCTION TYPE |
|-----------------|----------|--------------|--------------|--------|--------------------|------------------------------|--------------------|--------------------|--------------------|-------------------|
| CLOVER          |          |              |              |        |                    |                              |                    |                    |                    |                   |
| Figure No 1     |          |              |              |        |                    |                              |                    |                    |                    |                   |
| 2R08704AP       |          |              |              |        |                    |                              | October 30, 2014   |                    |                    |                   |
|                 |          |              |              |        |                    |                              | October 15, 2012   | October 18, 2012   | October 12, 2017   |                   |
| CHAMBERS, C. B. | 10       | 47-08704089  | 2R08704AP    | I      |                    |                              |                    |                    |                    | 1                 |
| CLOVER WF       |          | AREA PERMIT  | UIC2R08704AP | A      |                    | UIC RENEWAL                  | October 30, 2014   |                    |                    |                   |
| EDGEHILL, A. W. | 100      | 47-087-04481 | 2R08704AP    | A      | October 12, 2012   | POS PRESS ON CSG             | October 15, 2012   | October 18, 2012   | October 12, 2017   | 2                 |
| WEBB, LUCY J.   | 11       | 47-087-02975 | 2R08704AP    | A      | October 3, 2014    | POS PRESS ON TBG             |                    | October 14, 2014   | October 3, 2019    | 3                 |
| CARR-NICHOLS    | 102      | 47-087-04747 | 2R08704AP    | A      | March 17, 2015     | POS PRESS ON TBG/CSG/ANNULUS | March 19, 2015     | July 6, 2015       | March 17, 2020     | 3                 |
| KINKEAD, S. B.  | 103      | 47-087-04745 | 2D0871056    | A      | March 17, 2015     | POS PRESS ON TBG/CSG/ANNULUS | March 19, 2015     | July 6, 2015       | March 17, 2020     | 3                 |
| FERRELL, C. B.  | 105      | 47-087-04755 | 2R08704AP    | A      | May 21, 2015       | POS PRESS ON TBG/CSG/ANNULUS | June 1, 2015       | June 5, 2015       | May 21, 2020       | 3                 |
| FERRELL, C. B.  | 110      | 47-087-04754 | 2R08704AP    | A      | May 21, 2015       | POS PRESS ON TBG/CSG/ANNULUS | June 1, 2015       | June 5, 2015       | May 21, 2020       | 3                 |
| KINKEAD, S. B.  | 108      | 47-087-04749 | 2R08704AP    | A      | May 21, 2015       | POS PRESS ON TBG/CSG/ANNULUS | June 1, 2015       | July 6, 2015       | May 21, 2020       | 3                 |
| KINKEAD, S. B.  | 109      | 47-087-04753 | 2R08704AP    | A      | May 21, 2015       | POS PRESS ON TBG/CSG/ANNULUS | June 1, 2015       | June 5, 2015       | May 21, 2020       | 3                 |
| KINKEAD, S. B.  | 104      | 47-087-04751 | 2D0871056    | A      | June 2, 2015       | POS PRESS ON TBG/CSG/ANNULUS | June 8, 2015       | July 6, 2015       | June 2, 2020       | 3                 |
| BAYS, P. A.     | 101      | 47-087-04724 | 2R08704AP    | A      | July 13, 2015      | POS PRESS ON TBG/CSG/ANNULUS | July 15, 2015      | August 4, 2015     | July 13, 2020      | 3                 |
| EPLING, A. J.   | 119      | 47-087-04763 | 2R08704AP    | A      | July 13, 2015      | POS PRESS ON TBG/CSG/ANNULUS | July 15, 2015      | September 23, 2015 | July 13, 2020      | 3                 |
| EPLING, A. J.   | 120      | 47-087-04764 | 2R08704AP    | A      | July 13, 2015      | POS PRESS ON TBG/CSG/ANNULUS | August 28, 2015    | October 16, 2015   | July 13, 2020      | 3                 |
| FISCHER, IVY    | 111      | 47-087-04765 | 2R08704AP    | A      | July 21, 2015      | POS PRESS ON TBG/CSG/ANNULUS | July 28, 2015      | October 16, 2015   | July 21, 2020      | 3                 |
| LONG, JACKSON   | 106      | 47-087-04767 | 2R08704AP    | A      | July 21, 2015      | POS PRESS ON TBG/CSG/ANNULUS | July 29, 2015      | September 23, 2015 | July 21, 2020      | 3                 |
| McGRAW, CHARLES | 115      | 47-087-04758 | 2R08704AP    | A      | July 28, 2015      | POS PRESS ON TBG/CSG/ANNULUS | July 29, 2015      | September 23, 2015 | July 21, 2020      | 3                 |
| McGRAW, CHARLES | 116      | 47-087-04766 | 2R08704AP    | A      | August 11, 2015    | POS PRESS ON TBG/CSG/ANNULUS | August 27, 2015    | September 23, 2015 | August 11, 2020    | 3                 |
| SMITH, A. B.    | 122      | 47-087-04760 | 2R08704AP    | A      | August 24, 2015    | POS PRESS ON TBG/CSG/ANNULUS | August 27, 2015    | October 16, 2015   | August 11, 2020    | 3                 |
| STARR, J. H.    | 107      | 47-087-04782 | 2R08704AP    | A      | August 11, 2015    | POS PRESS ON TBG/CSG/ANNULUS | October 7, 2015    | October 16, 2015   | August 11, 2020    | 3                 |
| STARR, J. H.    | 112      | 47-087-04781 | 2R08704AP    | A      | August 11, 2015    | POS PRESS ON TBG/CSG/ANNULUS | October 7, 2015    | October 16, 2015   | August 11, 2020    | 3                 |
| SMITH, ELKANAH  | 118      | 47-087-04762 | 2R08704AP    | A      | September 21, 2015 | POS PRESS ON TBG/CSG/ANNULUS | September 28, 2015 | October 16, 2015   | September 21, 2020 | 3                 |
| STARR, J. H.    | 117      | 47-087-04757 | 2R08704AP    | A      | September 21, 2015 | POS PRESS ON TBG/CSG/ANNULUS | September 28, 2015 | October 16, 2015   | September 21, 2020 | 3                 |
| BAYS, P. A.     | 113      | 47-087-04756 | 2R08704AP    | A      | October 14, 2015   | POS PRESS ON TBG/CSG/ANNULUS | October 19, 2015   | October 20, 2015   | October 19, 2020   | 3                 |
| McGRAW, CHARLES | 114      | 47-087-04759 | 2R08704AP    | A      | July 30, 2015      | POS PRESS ON TBG/CSG/ANNULUS | August 3, 2015     | October 16, 2015   | August 3, 2020     | 3                 |
| SMITH, ELKANAH  | 121      | 47-087-04761 | 2R08704AP    | A      | August 24, 2015    | POS PRESS ON TBG/CSG/ANNULUS | August 27, 2015    |                    | August 27, 2020    | 3                 |
| SMITH, G. W.    | 123      | 47-087-04768 | 2R08704AP    | A      | October 14, 2015   | POS PRESS ON TBG/CSG/ANNULUS | October 19, 2015   | October 20, 2015   | October 19, 2020   | 3                 |
| SMITH, JONATHAN | 124      | 47-087-04780 | 2R08704AP    | A      | October 16, 2015   | POS PRESS ON TBG/CSG/ANNULUS | October 19, 2015   | October 20, 2015   | October 19, 2020   | 3                 |

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# FACILITY SITE PLAN

frs No 26

# 304  
# 044-00000012  
Non Unit - Shale Well



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Facility Name: Chambers Heirs No.4

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream:  
Tributary Rush Run

Direction & Distance from  
Facility: 0° @ 770'

~CRUDE OIL STORAGE TANKS~

No. 1

Volume bbl: 100

Tank #'s: 304

Dike Dimensions: 24' L x 33' W x 2.5' depth

Calculated Capacity: 353 bbl



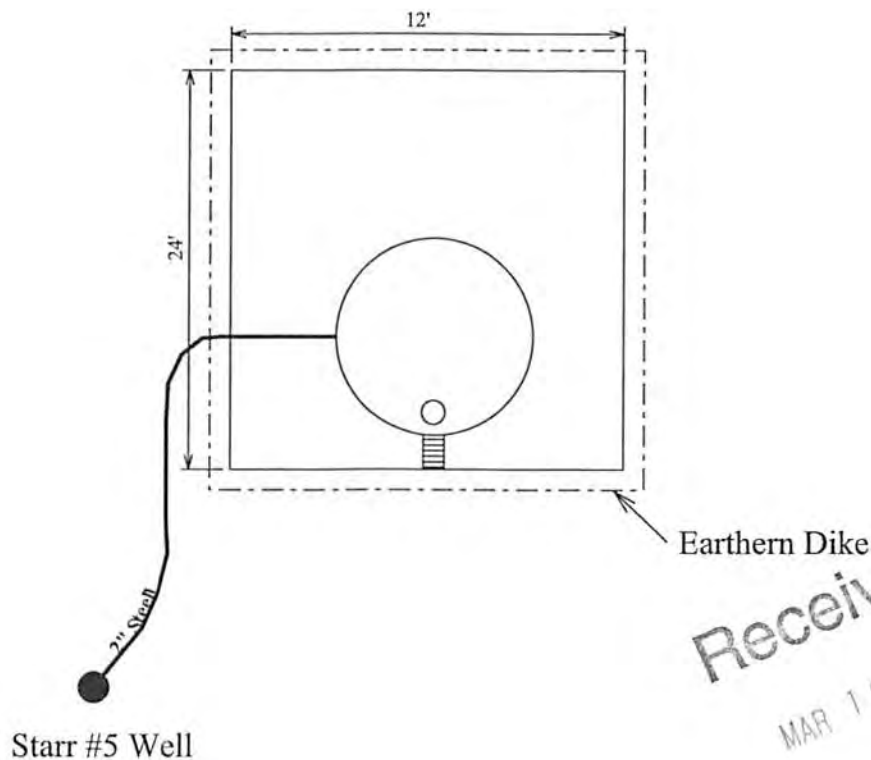
HG ENERGY, LLC  
SPCC PLAN

Drawn by: KAB  
File Name: Clover Area  
Date: 2-17-17  
Point No:

# FACILITY SITE PLAN

Fig No 2d

# 345  
# 044-00000053



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Facility Name: J.H. Starr #5

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream:  
Laurel Fork 1800', North

Direction & Distance from Facility:  
8 Miles on Rt 36, R onto Vandale Frk  
Rd. 1/2 Mi. at Bays Church, turn L thru gate.  
3/4 Mi. on Lease Rd, R thru gate and down hill.

~CRUDE OIL STORAGE TANKS~

No. 1

Volume bbl: 100

Tank #'s: 345

Dike Dimensions: 24' L x 12' W x 3' depth

Calculated Capacity: 154 bbl



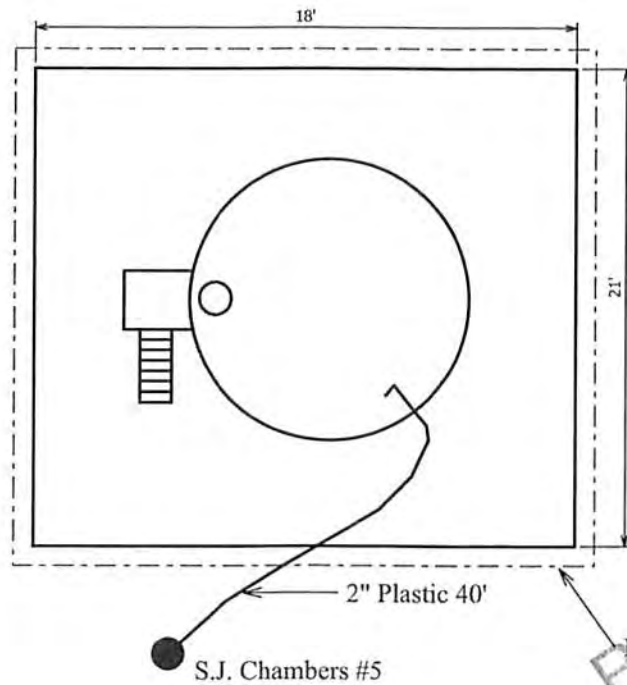
HG ENERGY, LLC  
SPCC PLAN

Drawn by: TAB  
File Name: Clover Area  
Date: 2-17-17

# FACILITY SITE PLAN

Prs No 2e

# 343  
# 044-00000051



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WV Dept. of Environmental Protection



HG ENERGY, LLC  
SPCC PLAN

File Name: Clover Area  
Date: 2-17-17  
Point No:

Facility Name: SJ Chambers No.5

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream:  
Tributary of Vandale Fork, 1500' South

Direction & Distance from  
Facility: App. 1/2 mi. SW from the  
Intersection of Banner Hill Rd &  
SR36 & W 0.3 Mi. along lease Rd.

~CRUDE OIL STORAGE TANKS~

No. 1

Volume bbl: 100

Tank #'s: 343

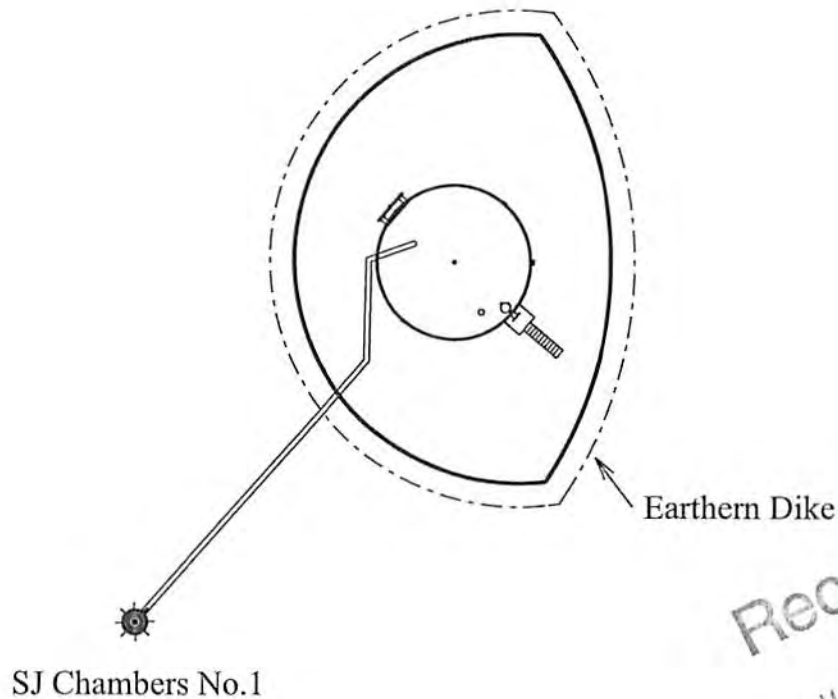
Dike Dimensions: 21' x 18' x 3'

Calculated Capacity: 202 bbl

# FACILITY SITE PLAN

173 No 2f

# 342  
# 044-00000050



Received

MAR 15 2017

Office of Oil and Gas  
WV Dept. of Environmental Protection



HG ENERGY, LLC  
SPCC PLAN

Drawn by: KAB  
File Name: Clover Area  
Date: 2-17-17

Facility Name: SJ Chambers #1

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream:  
Tributary of Left Fork Spring Creek

Direction & Distance from  
Facility: 180° @ 350'

~CRUDE OIL STORAGE TANKS~

No. 1

Volume bbl: 100

Tank #'s: 342

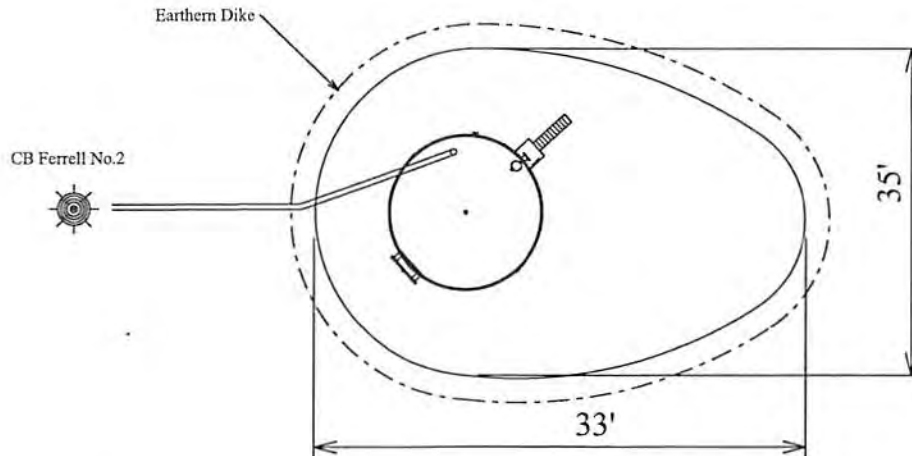
Dike Dimensions: 30' L x 20' W x 2.5' depth

Calculated Capacity: 267 bbl

# FACILITY SITE PLAN

Fig No 29

# 318  
# 044-00000026



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WV Dept. of Environmental Protection



Facility Name: CB Ferrel No.2

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream:  
Tributary Rush Run

Direction & Distance from  
Facility: 40° @ 160'

~CRUDE OIL STORAGE TANKS~

No. 1

Volume bbl: 100

Tank #'s: 318

Dike Dimensions: 33' L x 33' W x 1.5' depth

Calculated Capacity: 291 bbl



HG ENERGY, LLC  
SPCC PLAN

Drawn by: KAB  
File Name: Clover Area  
Date: 2-17-17  
Point No:

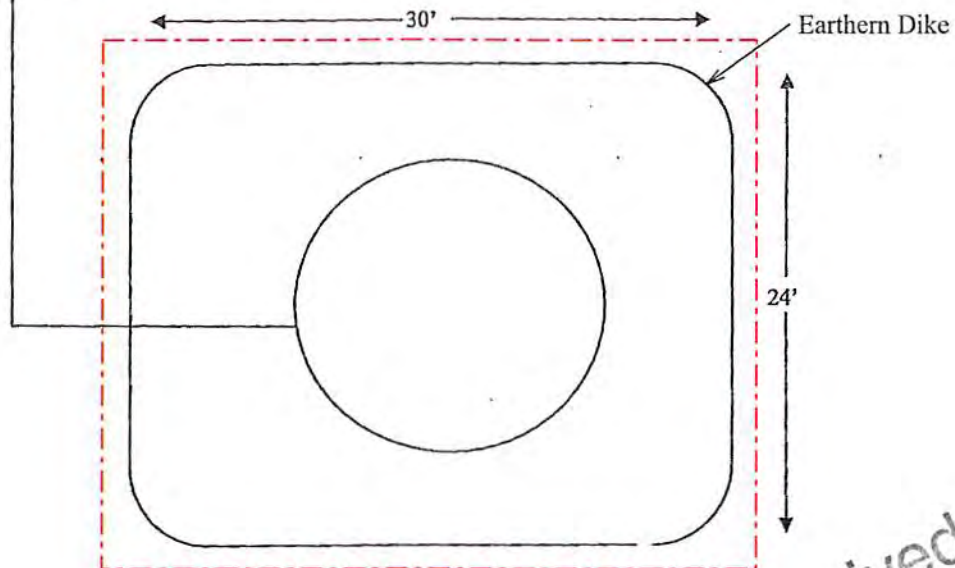
# FACILITY SITE PLAN

Bp No. 24

# 340  
# 044-00000048



A.P.  
SINNETT # 3



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MAR 15 2017

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WV Dept. of Environmental Protection



HG ENERGY, LLC  
SPCC PLAN

Drawn By: KAB  
File Name: Clover Area  
Scale: \_\_\_\_\_  
Date: 2-17-17  
Point No.: \_\_\_\_\_

Facility Name: Sinnett, A.P.

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream:  
Tributary of Chambers Fork

Direction & Distance from  
Facility: 1320' W of R 36

~CRUDE OIL STORAGE TANKS~

No. 1

Volume bbl: 100

Tank #'s: 341

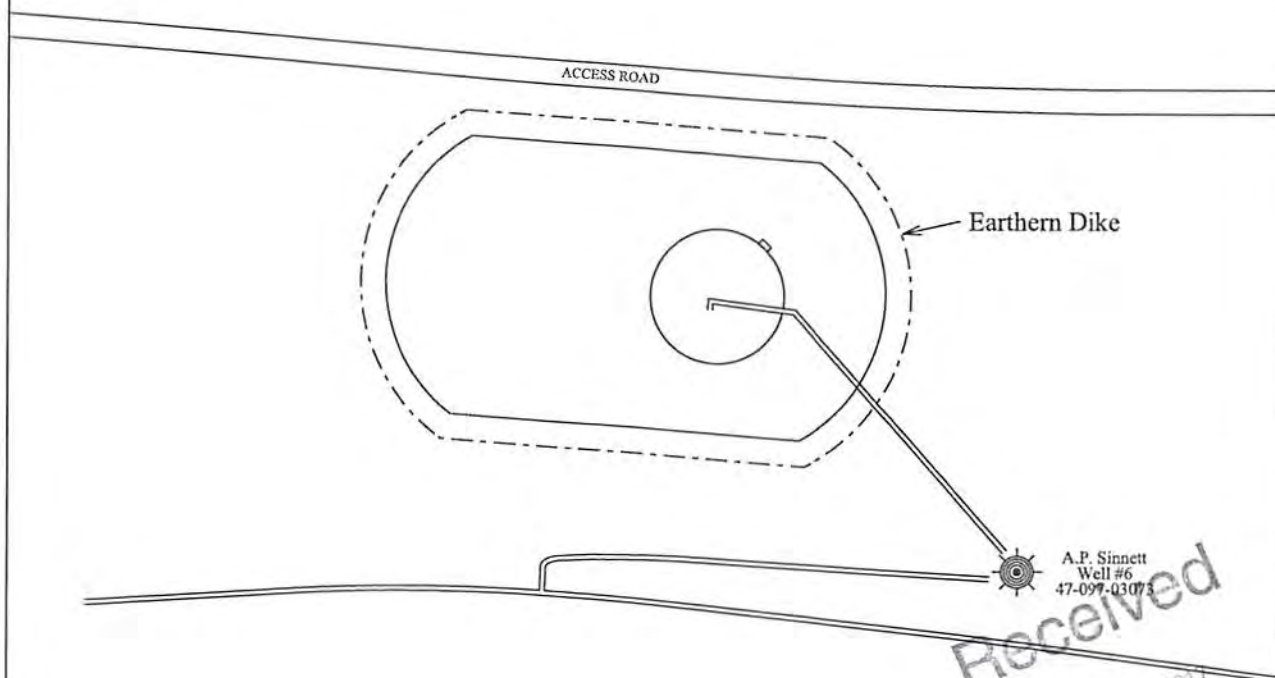
Dike Dimensions: 124' x 30' x 2'

Calculated Capacity: 256 bbl

# FACILITY SITE PLAN

fs no 2 i

# 341  
# 044-00000049



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Dept. of Environmental Protection



Facility Name: A.P. Sinnett #6

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream:  
Tributary of Chambers Fork

Direction & Distance from  
Facility: 185° @ 100'

~CRUDE OIL STORAGE TANKS~

No. 1

Volume bbl: 100

Tank #'s: 340

Dike Dimensions: 121' peri. X 2.0' depth

Calculated Capacity: 278 bbl



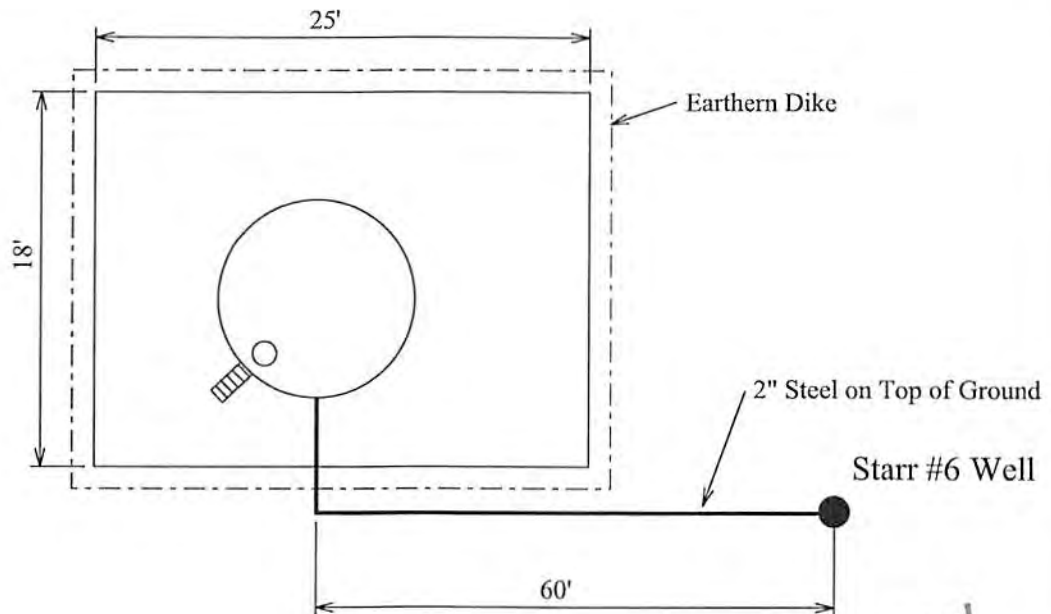
HG ENERGY, LLC  
SPCC PLAN

Drawn By KAB  
File Name Clover Area  
Scale \_\_\_\_\_  
Date 2-17-17  
Point No. \_\_\_\_\_

# FACILITY SITE PLAN

Fig No 2

#344  
#044-00000052



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Facility Name: J.H. Starr #6

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream:  
Laurel Fork 1800'

Direction & Distance from Facility:  
8 Miles on Rt 36, R onto Vandale Frk  
Rd. 1/2 Mi. at Bays Church, turn L thru gate.  
3/4 Mi. on Lease Rd, R thru gate and down hill.

~CRUDE OIL STORAGE TANKS~

No. 1

Volume bbl: 100

Tank #'s: 344

Dike Dimensions: 25' L x 18' W x 1.5' depth

Calculated Capacity: 120 bbl



HG ENERGY, LLC  
SPCC PLAN

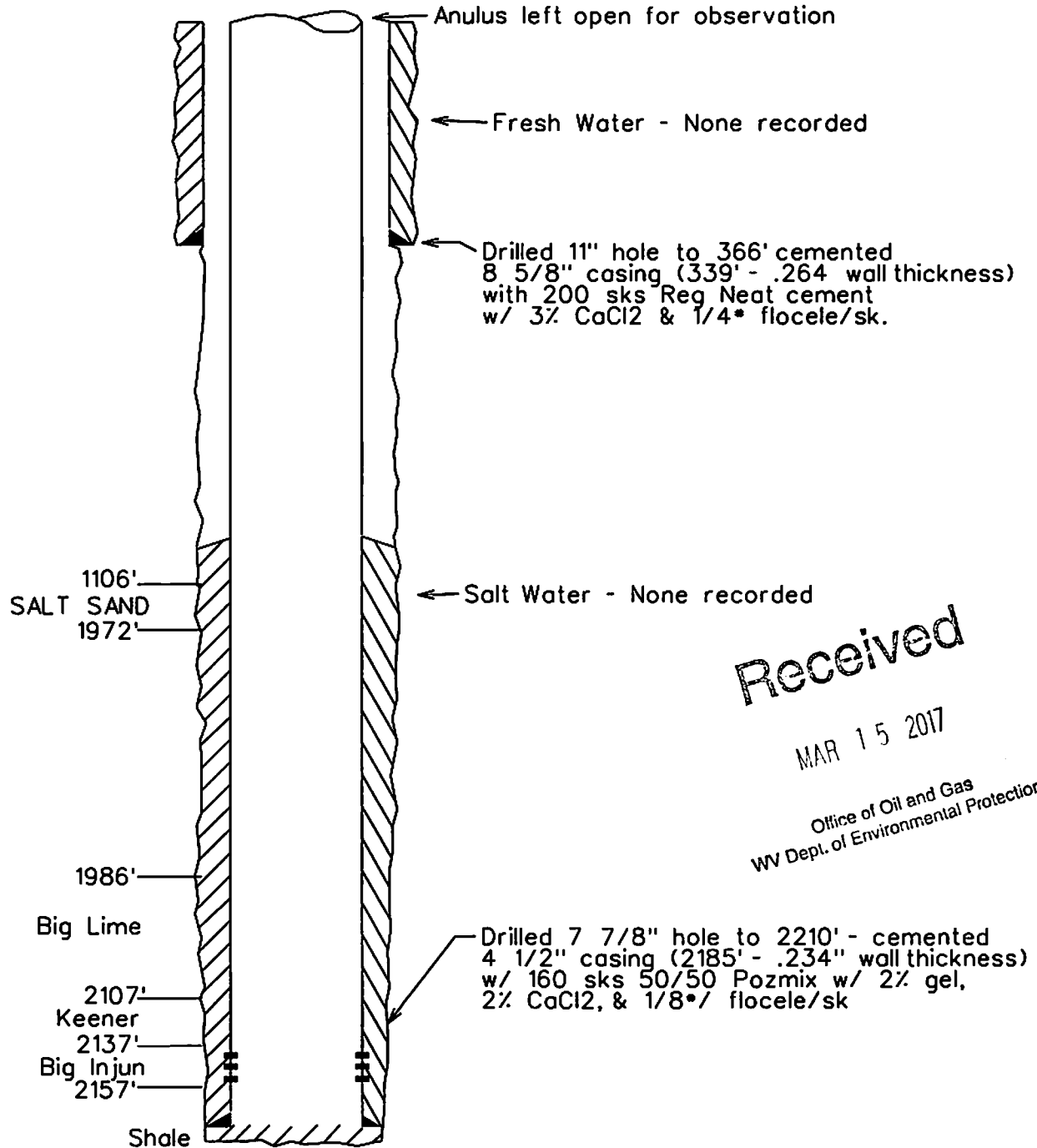
Drawn by: TAB  
File Name: Clover Area  
Date: 2-17-17

# TYPE 1

## CB Chambers #10 - CLOVER

### Injector Completion

(May be directionally drilled)

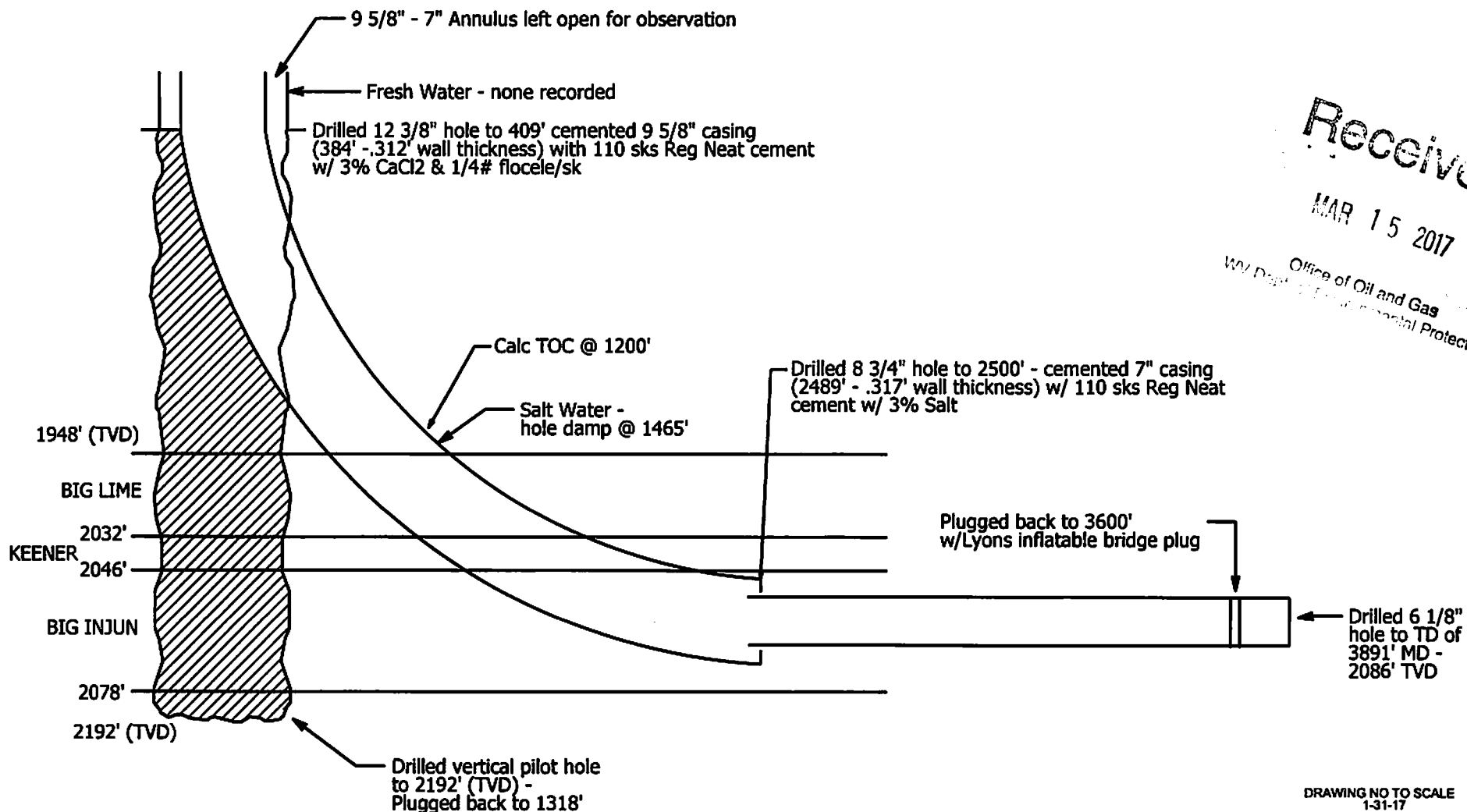


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# CLOVER FIELD AW Edgell #100 Wellbore Schematic (Type 2) API 47-087-04481

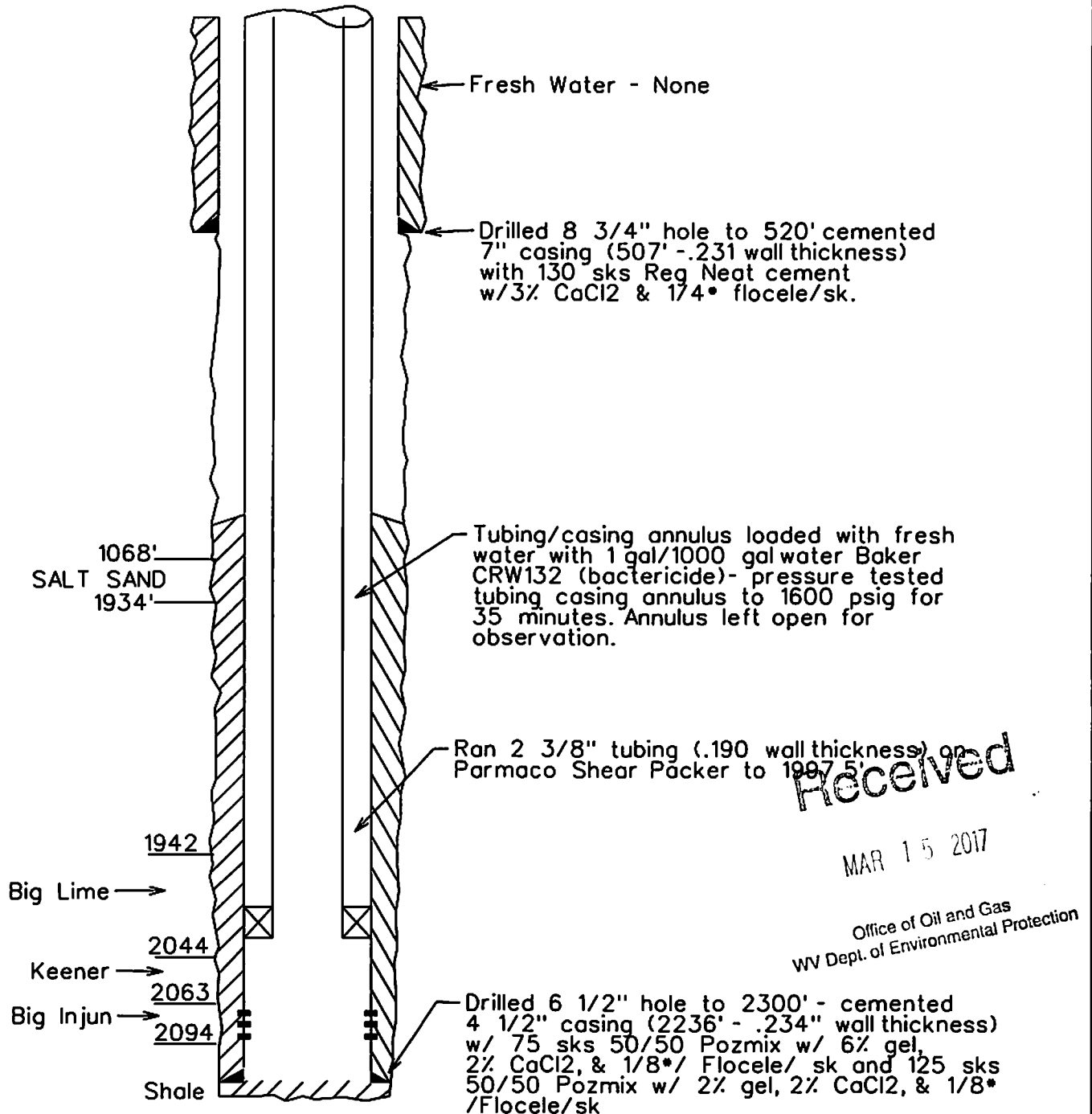


# TYPE 3

## Ivy Fisher #111 - CLOVER

### Injector Completion

(May be directionally drilled)



Rig No 4

# DRILLING HISTORY

Cottrill WSW No. 2

March 23, 1979

Driller: Steven Raines, Owner-Operator  
Rig Type: Cyclone-Rotary-Air

1. 1:30 PM - Moved onto location and rigged up. Contractor dug pit.
2. 2:00 PM - Drilled 7" hole to 16.5'. Water @ 10' - Rate 5 GPM.
3. 3:00 PM - Shut down. Raining and no 9-5/8" casing on location.
4. 3-24,25,26 - Shut down.

March 27, 1979

5. 8:30 AM - Drove 9' of 9-5/8" casing on solid shoulder.
6. 9:00 AM - Drilling @ 18'. Water rate 8 GPM.
7. 9:25 AM - Water rate 10 GPM @ 25'.
8. 10:00 AM - Water rate 50 GPM @ 34'.
9. 10:10 AM - Water rate 60 GPM @ 38'.
10. 10:15 AM - Water rate 150 GPM @ 40'.
11. 11:00 AM - Additional increase in water volume - est. 200 GPM  
Total @ 60'.
12. Drilled to T.D. (150') @ 3:30 PM.

Comments: James Summers inquired about effect on his dug well (3-27-79).

Submitted By: Marvin B. Rollins

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# Basin Surveys, Inc.

## COMPENSATED DENSITY LOG

FILING NO.

PENNZOIL CO.  
 PETROLEUM ENGR. DEPT.  
 PERMIT N/A  
 FILE COPY #

COMPANY PENNZOIL COMPANY

WELL COTTRIL WATER SUPPLY # 2

FIELD CLOVER DISTRICT

COUNTY ROANE STATE WV

LOCATION:

OTHER SERVICES:

SEC. \_\_\_\_\_ TWP. \_\_\_\_\_ RGE. \_\_\_\_\_

Permanent Datum: GROUND LEVEL; Elev.: N/A  
 Log Measured From GROUND LEVEL Ft. Above Perm. Datum  
 Drilling Measured From GROUND LEVEL

Elev.: K.B. \_\_\_\_\_  
 D.F. \_\_\_\_\_  
 G.L. N/A

|                         |                     |  |  |  |  |
|-------------------------|---------------------|--|--|--|--|
| Date                    | <u>3-28-79</u>      |  |  |  |  |
| Run No.                 | <u>ONE</u>          |  |  |  |  |
| Type Log                | <u>GR/C DEN/CAL</u> |  |  |  |  |
| Depth—Driller           | <u>150'</u>         |  |  |  |  |
| Depth—Logger            | <u>145'</u>         |  |  |  |  |
| Bottom logged interval  | <u>144'</u>         |  |  |  |  |
| Top logged interval     | <u>0'</u>           |  |  |  |  |
| Type fluid in hole      | <u>WATER</u>        |  |  |  |  |
| Salinity, PPM Cl.       |                     |  |  |  |  |
| Density                 |                     |  |  |  |  |
| Level                   | <u>6'</u>           |  |  |  |  |
| Max rec. temp., deg. F. |                     |  |  |  |  |
| Operating rig time      | <u>1 HR.</u>        |  |  |  |  |
| Recorded by             | <u>YOUNG</u>        |  |  |  |  |
| Witnessed by            | <u>MR. ROLLINS</u>  |  |  |  |  |

| Run No. | Bore-Hole Record |  | Casing Record |    |               |      |           |           |
|---------|------------------|--|---------------|----|---------------|------|-----------|-----------|
|         | Bit              |  | From          | To | Size          | Wgt. | From      | To        |
|         |                  |  |               |    | <u>9 5/8"</u> |      | <u>0'</u> | <u>6'</u> |
|         |                  |  |               |    |               |      |           |           |
|         |                  |  |               |    |               |      |           |           |
|         |                  |  |               |    |               |      |           |           |
|         |                  |  |               |    |               |      |           |           |

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Caliper

Gamma Ray

50

100

GAMMA RAY

CALIPER

FIRST READING 142'

TOTAL DEPTH 145'

Correction

POROSITY

Density

Received

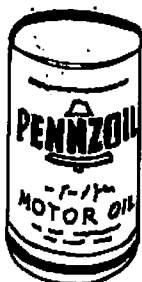
CORRECTION

MAR 17 2017

DENSITY

POROSITY

Office of Oil and Gas  
MW Dept of Environmental Protection



# WELL HISTORY LOG

PERMIT NO. NONE

OPERATOR: PENNZOIL COMPANY FARM: COTTRELL WSW. NO.  
LOCATION: CLOVER FIELD STATE: WEST VIRGINIA  
COUNTY: ROANE QUAD: \_\_\_\_\_  
TWP/DIST.: SMITHFIELD SEC: \_\_\_\_\_

| ELEVATION            |                   |
|----------------------|-------------------|
| K.B.                 |                   |
| GRD.                 |                   |
| STATUS and POTENTIAL |                   |
| TYPE                 | <u>WATER WELL</u> |
| INITIAL POTENTIAL    |                   |
| PRODUCING ZONE/S     |                   |
| NET PAY              |                   |

| CASING                            |               |                  |                        |
|-----------------------------------|---------------|------------------|------------------------|
|                                   | SIZE          | SET AT           | CEMENT                 |
| SURFACE                           | <u>9 5/8"</u> | <u>9'</u>        | <u>SET ON SHOULDER</u> |
| PRODUCTION                        | <u>7"</u>     | <u>150'</u>      | <u>SET ON SHOULDER</u> |
| INTERMED                          |               |                  |                        |
| LINER                             |               |                  |                        |
| MECHANICAL LOGS                   |               |                  |                        |
| GAMMA-RAY / COMP. DENSITY - BASIN |               |                  |                        |
| DEPTH                             |               | FORMATION        |                        |
| DRILLER                           | <u>150'</u>   | <u>SILTSTONE</u> |                        |
| LOGGER                            |               |                  |                        |

| CO-ORDS   |                |
|-----------|----------------|
|           |                |
|           |                |
|           |                |
|           |                |
|           |                |
| DATES     |                |
| SPUD      | <u>3-27-79</u> |
| COMPLETED |                |
| SUSPENDED |                |

## REMARKS:

ROTARY RIG  
AIR DRILLED

200 GPM = 285.7 BWH = 6856.8 BWP

FLOW TESTS AT  
MARVIN ROLLINS

DRILLED 7" PILOT HOLE TO -16'  
DROVE 7 5/8" CSG TO 9'  
DRILLED AHEAD  $\approx$  8 3/4" BIT  
SHOW H<sub>2</sub>O @ 125' ADDITIONAL  
8 GPM = 114 BWH = 273.6 BWP  
10 GPM = 143 BWH = 343.2 BWP  
50 GPM = 71.4 BWH = 1713.6 BWP  
60 GPM = 35.7 BWH = 856.8 BWP  
150 GPM = 214.3 BWH = 5143.2 BWP  
200 GPM = 285.7 BWH = 6856.8 BWP  
DATE: MARCH 30, 1979

COMPILED BY: STEVEN S. HOLSCLOW

## ROCK TYPES AND ACCESSORIES

| SYMBOL | DESCRIPTION   | SYMBOL | DESCRIPTION               | SYMBOL | DESCRIPTION                   |
|--------|---------------|--------|---------------------------|--------|-------------------------------|
|        | SILTSTONE     |        | VOLCANIC                  |        | FRACTURES FILLED              |
|        | SANDSTONE     |        | SILTY                     |        | FRACTURES OPEN                |
|        | CONGLOMERATE  |        | SANDY                     |        | GLAUCONITE                    |
|        | GRANITE WASH  |        | ARGILLACEOUS              |        | MICA                          |
|        | ARKOSE        |        | ANHYDRITIC OR GYPSIFEROUS |        | PYRITE                        |
|        | SHALE         |        | SALT-CRYSTAL CASTS        |        | BENTONITE                     |
|        | LIMESTONE     |        | CALCAREOUS                |        | IRONSTONE, HEMATITE, SIDERITE |
|        | DOLOMITE      |        | DOLOMITIC                 |        | DOLOMITE RHOMB                |
|        | ANHYDRITE     |        | OOLITE                    |        | CARBONATE NODULE              |
|        | GYPSUM        |        | PELLETS                   |        | PHOSPHATE NODULE              |
|        | SALT          |        | FOSSIL FRAMEWORK          |        | QUARTZ CRYSTAL                |
|        | COAL, LIGNITE |        | STYLOLITE                 |        | CHERT                         |

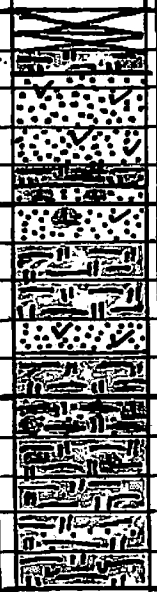
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WV Dept. of Environmental Protection

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17'-18' = 2786.8 BWP  
 28' = 349.2 BWP  
 34' = 1773.6 BWP  
 38' = 2056.8 BWP  
 40' = 5143.2 BWP  
 60' = 6866.8 BWP

100'

125' ADDITIONAL WATER



NO SAMPLES

a SLTSTN + SLTSH, LT-MED GAY ARGILL, TR SS, FREE GMS  
 a SS, LT GAY-WHT, FN-MED SA, MUD SAT, TR CALC, FAIRLY  
 a P SS, ACORNE MUD-VAT FRING, SA/IR, MUD-WELL SAT, FAIR RS  
 a D SLTSTN, VAT ARGILL, DTAITE, TITE ARSAK, SS AA, MUD-VAT  
 a P SS, WHT-LT GAY, SA/IR, MUD-ARSAK, TITE CEMENT  
 SLTSTN, LT-MED GAT, CSE TO VVFN SS, ARGILL  
 SLTSTN AA = SH, LT GAT  
 a M SS, LGAT-WHT, SA/IR, VFTI MUD, TITE CSE, TITE  
 SLTSTN & SH, LT GAT, SOME MICA  
 a W SLTSTN + SH AA = 15% SS, VFTI-M, TITE  
 SH + SLTSH, LT GAT, SOME CALC  
 AA  
 a W AA, = 15% SS, VFTI ESE, LIMON. STAIN, SA, MUD. FRING  
 SLTSTN, LT GAT-MED GAT, ARGILL, MICA

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68°

2000

Fig 006

SB Kin Keys 201  
47-087-0475

69°

2050

Blair

70°

2100

70°

2150

Keener

Bryon

71°

2200

71°

2250

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WV Dept. of Environmental Protection

Clover UIC Permit NO 2R08704AP  
Injection water Analysis

BS No 7

| Parameter                                     | units    | produced water<br>Webb No 11 | make up water<br>Clover PSD | Make up water<br>Cottell WSW 2 |
|-----------------------------------------------|----------|------------------------------|-----------------------------|--------------------------------|
| Total Petroleum Hydrocarbons ( Diesel Range ) | mg/l     | 3.19                         | ND                          |                                |
| Total Petroleum Hydrocarbons ( oil Range )    | mg/l     | 1.95                         | ND                          |                                |
| BTEX                                          | ug/l     |                              |                             |                                |
| Benzene                                       | ug/l     | 1470                         | ND                          |                                |
| Toluene                                       | ug/l     | 1390                         | ND                          |                                |
| Ethylbenzene                                  | ug/l     | ND                           | ND                          |                                |
| m,p, -Xylene                                  | ug/l     | 333                          | ND                          |                                |
| o-Xylene                                      | ug/l     | 141                          | ND                          |                                |
| Surr:1,1,1-Trifluorotoluene                   | %REC     | 105                          | 96.8                        |                                |
| pH                                            | mg/l     | 6.2                          | 6.8                         |                                |
| Aluminum                                      | mg/l     | <.02                         | 0.09                        |                                |
| Arsenic                                       | mg/l     | 0.0046                       | <.0005                      |                                |
| Barium                                        | mg/l     | 585                          | 0.039                       |                                |
| Calcium                                       | mg/l     | 8913                         | 12.2                        |                                |
| Chloride                                      | mg/l     | 69400                        | 4.81                        |                                |
| Iron                                          | mg/l     | 62                           | 8.71                        |                                |
| Manganese                                     | mg/l     | 1.56                         | 0.054                       |                                |
| Sodium                                        | mg/l     | 33980                        | 33.2                        |                                |
| Total Dissolved Solids (TDS)                  | mg/l     | 113970                       | 158                         |                                |
| Total Suspended Solids ( TSS )                | mg/l     | 190                          | 52                          |                                |
| Sulfate                                       | mg/l     | 15.3                         | 31.7                        |                                |
| Detergents ( MBAS )                           | mg/l     | 0.22                         | 0.03                        |                                |
| Dissolved Methane                             | mg/l     | 1220                         | ND                          |                                |
| Dissolved Ethane                              | mg/l     | 3280                         | ND                          |                                |
| Dissolved Propane                             | mg/l     | 4030                         | ND                          |                                |
| Dissolved Butane                              | mg/l     | 1900                         | ND                          |                                |
| Bacteria ( total coliform )                   | c/100 ml | present                      | absent                      |                                |
| Radiation ( NORM ) - see attached sheets      |          |                              |                             |                                |
| Specific Gravity                              |          | 1.08097                      | 0.998269                    |                                |

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## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

Sample: P14012 Lab ID: 30134257001 Collected: 11/10/14 10:42 Received: 11/12/14 15:10 Matrix: Water  
PWS: WEBB INJECTION Site ID: Sample Type:

| Parameters  | Method    | Act ± Unc (MDC) Carr Trac        | Units | Analyzed       | CAS No.    | Qual |
|-------------|-----------|----------------------------------|-------|----------------|------------|------|
| Gross Alpha | EPA 900.0 | 3,205 ± 728 (423)<br>C:NA T:NA   | pCi/L | 11/24/14 18:55 | 12587-46-1 |      |
| Gross Beta  | EPA 900.0 | 1,114 ± 267 (230)<br>C:NA T:NA   | pCi/L | 11/24/14 18:55 | 12587-47-2 |      |
| Radium-226  | EPA 903.1 | 544 ± 66.2 (0.540)<br>C:NA T:69% | pCi/L | 11/25/14 12:41 | 13982-63-3 |      |
| Radium-228  | EPA 904.0 | 521 ± 93.3 (1.40)<br>C:80% T:37% | pCi/L | 11/19/14 11:48 | 15262-20-1 |      |

Sample: P14013 Lab ID: 30134257002 Collected: 11/10/14 11:16 Received: 11/12/14 15:10 Matrix: Water  
PWS: EDGEL INJECTION Site ID: Sample Type:

| Parameters  | Method    | Act ± Unc (MDC) Carr Trac           | Units | Analyzed       | CAS No.    | Qual |
|-------------|-----------|-------------------------------------|-------|----------------|------------|------|
| Gross Alpha | EPA 900.0 | 1.12 ± 1.43 (2.96)<br>C:NA T:NA     | pCi/L | 11/25/14 17:48 | 12587-46-1 |      |
| Gross Beta  | EPA 900.0 | 0.862 ± 1.28 (2.74)<br>C:NA T:NA    | pCi/L | 11/25/14 17:48 | 12587-47-2 |      |
| Radium-226  | EPA 903.1 | 0.317 ± 0.723 (0.429)<br>C:NA T:87% | pCi/L | 11/25/14 12:35 | 13982-63-3 |      |
| Radium-228  | EPA 904.0 | 1.05 ± 0.457 (0.744)<br>C:85% T:79% | pCi/L | 11/19/14 11:19 | 15262-20-1 |      |

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## QUALITY CONTROL - RADIOCHEMISTRY

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

QC Batch: RADC/22263 Analysis Method: EPA 900.0  
QC Batch Method: EPA 900.0 Analysis Description: 900.0 Gross Alpha/Beta  
Associated Lab Samples: 30134257001, 30134257002

METHOD BLANK: 819650 Matrix: Water

Associated Lab Samples: 30134257001, 30134257002

| Parameter   | Act ± Unc (MDC) Carr Trac       | Units | Analyzed       | Qualifiers |
|-------------|---------------------------------|-------|----------------|------------|
| Gross Alpha | -0.212 ± 0.624 (1.86) C:NA T:NA | pCi/L | 11/21/14 07:43 |            |
| Gross Beta  | -0.006 ± 0.751 (1.88) C:NA T:NA | pCi/L | 11/21/14 07:43 |            |

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Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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## QUALIFIERS

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

## DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1  
170230

|                                                  |  |                                                   |  |                                                                                                                                                                                                                            |  |
|--------------------------------------------------|--|---------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Section A</b><br>Required Client Information: |  | <b>Section B</b><br>Required Project Information: |  | <b>Section C</b><br>Invoice Information:                                                                                                                                                                                   |  |
| Company: <u>STURM &amp; SUTHERLAND SERVICES</u>  |  | Report To:                                        |  | Attention: <u>VICKI HOOPS</u>                                                                                                                                                                                              |  |
| Address:                                         |  | Copy To:                                          |  | Company Name: <u>EMAIL</u>                                                                                                                                                                                                 |  |
| Email To: <u>PHOENIX@STURM-SUTHERLAND.COM</u>    |  | Purchase Order No.: <u>6774</u>                   |  | Address:                                                                                                                                                                                                                   |  |
| Phone: <u>304 623 6549</u> Fax: <u>COM</u>       |  | Project Name:                                     |  | Pace Quote Reference:                                                                                                                                                                                                      |  |
| Requested Due Date/TAT:                          |  | Project Number:                                   |  | Pace Project Manager: <u>KIRK EASTHAM</u>                                                                                                                                                                                  |  |
|                                                  |  |                                                   |  | Pace Profile #:                                                                                                                                                                                                            |  |
|                                                  |  |                                                   |  | <b>REGULATORY AGENCY</b>                                                                                                                                                                                                   |  |
|                                                  |  |                                                   |  | <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER<br><input type="checkbox"/> UST <input type="checkbox"/> RCRA <input checked="" type="checkbox"/> OTHER _____ |  |
|                                                  |  |                                                   |  | Site Location: <u>WV</u>                                                                                                                                                                                                   |  |
|                                                  |  |                                                   |  | STATE: <u>WV</u>                                                                                                                                                                                                           |  |

| ITEM # | Section D<br>Required Client Information | Matrix Codes<br>MATRIX / CODE | Drinking Water<br>WT<br>Waste Water<br>WW<br>Product<br>Solid<br>Oil<br>Wipe<br>Air<br>Tissue<br>Other | DW<br>WT<br>WW<br>P<br>SL<br>CL<br>WP<br>AR<br>TS<br>OT | (see valid codes to left) | MATRIX CODE | SAMPLE TYPE (G=GRAB C=COMP) | COLLECTED          |      |                       |      | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Preservatives |                                |                  |     |      |                                               |          |       | Analysis Test ↓ | VIN ↓ | Requested Analysis Filtered (Y/N) | Residual Chlorine (Y/N) | Pace Project No./ Lab I.D. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|        |                                          |                               |                                                                                                        |                                                         |                           |             |                             | COMPOSITE<br>START |      | COMPOSITE<br>END/GRAB |      |                           |                 | Unpreserved   | H <sub>2</sub> SO <sub>4</sub> | HNO <sub>3</sub> | HCl | NaOH | Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> | Methanol | Other |                 |       |                                   |                         |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|        |                                          |                               |                                                                                                        |                                                         |                           |             |                             | DATE               | TIME | DATE                  | TIME |                           |                 |               |                                |                  |     |      |                                               |          |       |                 |       |                                   |                         |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1      | P14012                                   |                               |                                                                                                        |                                                         |                           |             |                             |                    |      |                       |      | 3                         |                 |               |                                |                  |     |      |                                               |          |       |                 |       |                                   |                         |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE            | TIME         | ACCEPTED BY / AFFILIATION | DATE            | TIME         | SAMPLE CONDITIONS |          |          |          |
|---------------------|-------------------------------|-----------------|--------------|---------------------------|-----------------|--------------|-------------------|----------|----------|----------|
|                     | <u>L. H. SCS</u>              | <u>11-12-14</u> |              | <u>R. J. PACE</u>         | <u>11-12-14</u> | <u>11:52</u> |                   |          |          |          |
|                     | <u>Env. Dept.</u>             | <u>11-12-14</u> | <u>15:00</u> | <u>Walt K. PACE</u>       | <u>11-12-14</u> | <u>1610</u>  | <u>1A</u>         | <u>Y</u> | <u>N</u> | <u>N</u> |

|          |                                   |                         |            |                       |                                |                      |
|----------|-----------------------------------|-------------------------|------------|-----------------------|--------------------------------|----------------------|
| ORIGINAL | <b>SAMPLER NAME AND SIGNATURE</b> |                         | Temp in °C | Received on Ice (Y/N) | Custody Sealed Container (Y/N) | Samples Intact (Y/N) |
|          | PRINT Name of SAMPLER:            |                         |            |                       |                                |                      |
|          | SIGNATURE of SAMPLER:             |                         |            |                       |                                |                      |
|          |                                   | DATE Signed (MM/DD/YY): |            |                       |                                |                      |

**Sample Condition Upon Receipt**Client Name: Stem Environmental

Project #

30134257Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☒ Pace Other \_\_\_\_\_

Tracking #: \_\_\_\_\_

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no Biological Tissue is Frozen: Yes NoPacking Material: Bubble Wrap \_\_\_\_\_ Bubble Bags ☒ None \_\_\_\_\_ Other \_\_\_\_\_Thermometer Used #6 Type of Ice: ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begunCooler Temp.: Observed Temp.: NA °C Correction Factor: 0 °C Final Temp: NA °C

Date and Initials of person

examining contents: SRA 11-12-1

Temp should be above freezing to 6°C

Comments:

|                                                                                            |                                                                                                  |                                                               |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Chain of Custody Present:                                                                  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 1.                                                            |
| Chain of Custody Filled Out:                                                               | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 2.                                                            |
| Chain of Custody Relinquished:                                                             | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 3.                                                            |
| Sampler Name & Signature on COC:                                                           | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 4.                                                            |
| Samples Arrived within Hold Time:                                                          | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 5.                                                            |
| Short Hold Time Analysis (<72hr):                                                          | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 6.                                                            |
| Rush Turn Around Time Requested:                                                           | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 7.                                                            |
| Sufficient Volume:                                                                         | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 8.                                                            |
| Correct Containers Used:                                                                   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 9.                                                            |
| -Pace Containers Used:                                                                     | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A |                                                               |
| Containers Intact:                                                                         | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 10.                                                           |
| Filtered volume received for Dissolved tests                                               | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | 11.                                                           |
| Sample Labels match COC:                                                                   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 12. no date or time on samples                                |
| -Includes date/time/ID/Analysis Matrix:                                                    | <u>wt</u>                                                                                        |                                                               |
| All containers needing preservation have been checked.                                     | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 13. PHLZ                                                      |
| All containers needing preservation are found to be in compliance with EPA recommendation. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |                                                               |
| exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)                                        | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                              | Initial when completed <u>SRA</u> Lot # of added preservative |
| Samples checked for dechlorination:                                                        | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | 14.                                                           |
| Headspace in VOA Vials (>6mm):                                                             | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | 15.                                                           |
| Trip Blank Present:                                                                        | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 16.                                                           |
| Trip Blank Custody Seals Present                                                           | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A |                                                               |
| Pace Trip Blank Lot # (if purchased):                                                      |                                                                                                  |                                                               |

Client Notification/ Resolution:

Field Data Required?

Y / N

Person Contacted: Vicki Hump Date/Time: 11/13/14Comments/ Resolution: Number of items #4Project Manager Review: Samantha D. B...Date: 11/13/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

**Client Name:**

Stress Evidently

| Item No. | Matrix Code |                                        |
|----------|-------------|----------------------------------------|
| 001      | WT          | Glass Jar (120 / 250 / 500 / 1L)       |
| 002      | I           | Soil kit (2 SB, 1M, soil jar)          |
|          |             | Chemistry (250 / 500 / 1L)             |
|          |             | Organics (1L)                          |
|          |             | Nutrient (250 / 500 )                  |
|          |             | Phenolics (250 ml)                     |
|          |             | TOC (40 ml / 250 ml)                   |
|          |             | TOX (250 ml)                           |
|          |             | Total Metals                           |
|          |             | Dissolved Metals preserved Y           |
|          |             | N                                      |
|          |             | O & G (1L)                             |
|          |             | TPH (1L)                               |
|          |             | VOA (40 ml 30 ml)                      |
|          |             | Cyanide (250 ml)                       |
|          |             | Sulfide (500 ml)                       |
|          |             | Bacteria (120 ml)                      |
|          |             | Wipes / swipe/ smear/ filter           |
|          |             | Radchem Nalgene (125 / 250 / 500 / 1L) |
|          |             | Radchem Nalgene (1/2 gal. / (gal.))    |
|          |             | Cubittainer (500 ml / 4L)              |
|          |             | Ziploc                                 |
|          |             | Other                                  |
|          |             | Other                                  |

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CHARLESTON BRANCH—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

## QUALITY CONTROL - RADIOCHEMISTRY

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

QC Batch: RADC/22195 Analysis Method: EPA 903.1  
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226  
Associated Lab Samples: 30134257001, 30134257002

METHOD BLANK: 817077 Matrix: Water  
Associated Lab Samples: 30134257001, 30134257002

| Parameter  | Act ± Unc (MDC) Carr Trac        | Units | Analyzed       | Qualifiers |
|------------|----------------------------------|-------|----------------|------------|
| Radium-226 | 0.250 ± 0.459 (0.819) C:NA T:86% | pCi/L | 11/25/14 12:16 |            |

Received  
11/25/14  
Office of Oil and Gas  
WV Dept. of Environmental Protection

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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# QUALITY CONTROL - RADIOCHEMISTRY

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

QC Batch: RADC/22194 Analysis Method: EPA 904.0  
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228  
Associated Lab Samples: 30134257001, 30134257002

METHOD BLANK: 817076 Matrix: Water  
Associated Lab Samples: 30134257001, 30134257002

| Parameter  | Act ± Unc (MDC) Carr Trac          | Units | Analyzed       | Qualifiers |
|------------|------------------------------------|-------|----------------|------------|
| Radium-228 | -0.165 ± 0.263 (0.651) C:87% T:81% | pCi/L | 11/19/14 11:18 |            |

Received  
MAR 14 2017  
Office of Oil and Gas  
WV Dept. of Environmental Protection

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**CHARLESTON BRANCH—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864**

Clover Water Sampling UIC 2014

Residence

Name Edgar Leal

Address \_\_\_\_\_

Phone \_\_\_\_\_

Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 43 24.22

Long 81 16 39.53

Provide sketch below of approximate location of dwelling(s ) and water wells(s)

# Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|---------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11-10-14      | KH               | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 - 10.0 | .1    |
| Hot Acid                     |               |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | 1     |
| Mineral Acid                 |               |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | 1     |
| Alkalinity                   |               |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | 1     |
| NH <sub>3</sub> N            |               |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |               |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |               |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |               |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | 1     |
| TKN                          |               |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS - Total Suspended Solids |               |                  | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | 4     |
| TDS - Total Dissolved Solids | 11-11-14      | DC               | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | 4     |
| Sulfate                      | 11-12-14      | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-12-14      | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |               |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |               |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |               |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |               |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |               |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/14/14      | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |               |                  | EPA 200.7 Rev.4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/19/14      | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |               |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |               |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |               |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Hardness (calc)              |               |                  | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | 1     |
| Iron                         | 11/19/14      | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Iron               |               |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |               |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |               |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/19/14      | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |               |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       | 11/24/14      | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |               |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11-11-14      | LW               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |               |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |               |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |               |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |               |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |               |                  | SM22 <sup>nd</sup> 3500 - Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |               |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |               |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |               |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |               |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          |               |                  | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |               |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |               |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |               |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |               |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |               |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |               |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |               |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |               |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

# Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11.11.14      | PC               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/19/14      | TW               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Molybdenum                 |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-Cl-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           | 1.019-14      | SW               | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

**STURM ENVIRONMENTAL SERVICES**  
610 D STREET  
SO. CHARLESTON, WV 25303  
PHONE: 304-744-9864  
FAX: 304-744-7866

1

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## CHAIN OF CUSTODY RECORD



Research Environmental &amp; Industrial Consultants, Inc.

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Service Center  
3029-C Parkway Creek Rd  
Roanoke, VA 24019  
540-777-1276MORGANTOWN  
Service Center  
16 Commerce Drive  
Westover, WV 26501  
304-241-5861Client: Shenandoah Environmental ServicesContact Person: Lucy Lee

Quote #

Fax

PO # 6771Phone 304-665-6543

Email:

Address 1111 1st St

City

State

Zip

Site ID &amp; State

City

State

Zip

Project ID

Sampler 1111 1st St

## SAMPLE LOG &amp; ANALYSIS REQUEST

TURNAROUND TIME

RUSH TURNAROUND

1. NORMAL

5 DAY

3 DAY

2 DAY

1 DAY

\*Rush work needs prior laboratory approval and will incur additional charges.

| SAMPLE ID | No. & Type of Containers | Sampling Date/Time | Matrix | Sample Comp/Grab | ANALYSIS & METHOD REQUESTED |   |   |  |  |  |  |  |  |  |
|-----------|--------------------------|--------------------|--------|------------------|-----------------------------|---|---|--|--|--|--|--|--|--|
| 14711     | 3 bottles<br>4 vials     | 11/14/11           |        | 4                | X                           | X | X |  |  |  |  |  |  |  |
| 14712     | 3 bottles<br>4 vials     | 11/14/11           |        | 6                | X                           | X | X |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |
|           |                          |                    |        |                  |                             |   |   |  |  |  |  |  |  |  |

ENTER  
PRESERVATIVE  
CODE

## Preservative Codes:

- 0 None
- 1 Hydrochloric Acid
- 2 Nitric Acid
- 3 Sulfuric Acid
- 4 Sodium Thiosulfate
- 5 Sodium Hydroxide / Sodium Arsenite
- 6 Sodium Hydroxide
- 7 Ascorbic Acid
- 8 Sodium Borohydride / Methanol
- 9 Ammonium Citrate
- 10
- 11

\*Use blanks for preservatives not used.

COMMENTS:

All analytical requests are subject to REIC's Standard Terms and Conditions.

Temperature at arrival: 1 °CICED? Y X NContainers provided by: REIC 1 Client

|                                                                     |            |                 |   |                                                                     |                 |                                      |                                        |
|---------------------------------------------------------------------|------------|-----------------|---|---------------------------------------------------------------------|-----------------|--------------------------------------|----------------------------------------|
| 1                                                                   | <u>212</u> | <u>11/14/11</u> | 2 | <u>11/12/11</u>                                                     | <u>11/12/11</u> | FAX RESULTS <input type="checkbox"/> | EMAIL RESULTS <input type="checkbox"/> |
| <u>[Signature]</u><br>Date: <u>11/12/11</u><br>Initials: <u>123</u> |            |                 |   | <u>[Signature]</u><br>Date: <u>11/12/11</u><br>Initials: <u>123</u> |                 |                                      |                                        |



**MAIN OFFICE—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549**  
**CHARLESTON BRANCH—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864**

# REI Consultants, Inc. - Analytical Report

WO#: 1411E71

Date Reported: 11/24/2014

Client: STURM ENVIRONMENTAL SERVICES  
Project: H.G. ENERGY, LLC.  
Lab ID: 1411E71-01A  
Client Sample ID: 14211 WEBB INJECTION

Collection Date: 11/10/2014 10:42:00 AM  
Date Received: 11/12/2014  
Matrix: Liquid  
Site ID:

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |       |
| TPH (Diesel Range)                  | 3.19   | NA  | 0.13                          | NA       | mg/L  | 11/14/14 9:58AM    | 11/14/14 11:27PM | PAVA  |
| TPH (Oil Range)                     | 1.95   | NA  | 0.32                          | NA       | mg/L  | 11/14/14 9:58AM    | 11/14/14 11:27PM |       |
| Surr: o-Terphenyl                   | 67.6   | NA  | 28.3-152                      | NA       | %REC  | 11/14/14 9:58AM    | 11/14/14 11:27PM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |       |
| Methane                             | 1,220  | NA  | 500                           | NA       | µg/L  |                    | 11/18/14 6:37PM  |       |
| Ethane                              | 3,280  | NA  | 300                           | NA       | µg/L  |                    | 11/18/14 5:06PM  |       |
| Propane                             | 4,030  | NA  | 400                           | NA       | µg/L  |                    | 11/18/14 5:06PM  |       |
| Butane                              | 1,900  | NA  | 500                           | NA       | µg/L  |                    | 11/18/14 5:06PM  |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 50.0                          | NA       | mg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PAVA  |
| Surr: 2,5-Dibromotoluene            | 87.9   | NA  | 37.2-152                      | NA       | %REC  | 11/13/14 1:35PM    | 11/20/14 5:33PM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| Benzene                             | 1,470  | NA  | 100                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PAVA  |
| Toluene                             | 1,390  | NA  | 100                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PAVA  |
| Ethylbenzene                        | ND     | NA  | 100                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PAVA  |
| m,p-Xylene                          | 333    | NA  | 200                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PAVA  |
| o-Xylene                            | 141    | NA  | 100                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PAVA  |
| Surr: 1,1,1-Trifluorotoluene        | 105    | NA  | 61.2-135                      | NA       | %REC  | 11/13/14 1:35PM    | 11/20/14 5:33PM  |       |

Office of Oil and Gas  
Environmental Protection  
11/24/14  
Received

Client: STURM ENVIRONMENTAL SERVICES  
 Project: H.G. ENERGY, LLC.  
 Lab ID: 1411E71-02A  
 Client Sample ID: 14212 EDGEL INJECTION

Collection Date: 11/10/2014 11:16:00 AM  
 Date Received: 11/12/2014  
 Matrix: Liquid  
 Site ID:

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.12                          | NA       | mg/L  | 11/14/14 9:58AM    | 11/14/14 11:59PM | PAVA  |
| TPH (Oil Range)                     | ND     | NA  | 0.29                          | NA       | mg/L  | 11/14/14 9:58AM    | 11/14/14 11:59PM |       |
| Surr: o-Terphenyl                   | 101    | NA  | 28.3-152                      | NA       | %REC  | 11/14/14 9:58AM    | 11/14/14 11:59PM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |       |
| Methane                             | ND     | NA  | 10.0                          | NA       | µg/L  |                    | 11/18/14 3:09PM  |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/18/14 3:09PM  |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/18/14 3:09PM  |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/18/14 3:09PM  |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PAVA  |
| Surr: 2,5-Dibromotoluene            | 86.7   | NA  | 37.2-152                      | NA       | %REC  | 11/13/14 1:35PM    | 11/20/14 5:01PM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PAVA  |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PAVA  |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PAVA  |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PAVA  |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PAVA  |
| Surr: 1,1,1-Trifluorotoluene        | 96.8   | NA  | 61.2-135                      | NA       | %REC  | 11/13/14 1:35PM    | 11/20/14 5:01PM  |       |

Received  
 11/24/2014  
 WV Dept. of Environmental Protection  
 Office of Oil and Gas

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-10-14 1116

SAMPLED BY: K. WILLIAMS

DATE & TIME RECEIVED: 11-10-14 1340

ANALYST: MW

DATE & TIME ANALYZED: 11-10-14 1350

METHOD: 3

| SAMPLE ID       | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|-----------------|--------------------|------------|-------------------|--------------|
| EDGEJ INJECTION | ABSENT             | ABSENT     | 11-10-14 1116     | HGE 141110-2 |
|                 |                    |            |                   |              |
|                 |                    |            |                   |              |
|                 |                    |            |                   |              |
|                 |                    |            |                   |              |
|                 |                    |            |                   |              |
|                 |                    |            |                   |              |
|                 |                    |            |                   |              |
|                 |                    |            |                   |              |
|                 |                    |            |                   |              |

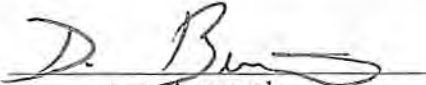
Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 - Coliform, Fecal (MF)            | 9222 D      |
| 2 - Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 - Coliform, Total (MPN)           | COLILERT    |
| 4 - Coliform, Total (P/A)           | 9223 B      |
| 5 - Heterotrophic Plate Count (HPC) | 9215 B      |

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

  
Approved



## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-10-14 1042

SAMPLED BY: K. WILLIAMS

DATE & TIME RECEIVED: 11-10-14 1340

ANALYST: MW

DATE & TIME ANALYZED: 11-10-14 1350

METHOD: 3

| SAMPLE ID      | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|----------------|--------------------|------------|-------------------|--------------|
| WEBB INJECTION | PRESENT            | ABSENT     | 11-10-14 1042     | HGE 141110-1 |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |

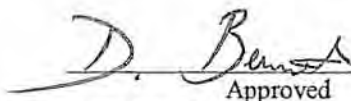
Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- 1 - Coliform, Fecal (MF) 9222 D
- 2 - Coliform, Fecal (MPN) COLILERT 18
- 3 - Coliform, Total (MPN) COLILERT
- 4 - Coliform, Total (P/A) 9223 B
- 5 - Heterotrophic Plate Count (HPC) 9215 B

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

  
Approved

Clover Water Sampling UIC 2014

Residence

Name Webb Injection

Address \_\_\_\_\_

Phone \_\_\_\_\_

Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 43 39.9

Long 81 16 52.51

Provide sketch below of approximate location of dwelling(s ) and water wells(s)

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MAY 1 2014  
Office of Oil and Gas  
WV Dept. of Environmental Protection

## Section 1. Identification

**Product name** : X-CIDE™ 207 INDUSTRIAL MICROBIOCIDES  
™ a trademark of Baker Hughes Incorporated.

**Product code** : XC207

### Relevant identified uses of the substance or mixture and uses advised against

**Identified uses** : Microbiocide

**Print date** : 3/11/2015.

**Validation date** : 3/11/2015.

**Version** : 1

**Supplier's details** : Baker Petrolite  
A Baker Hughes Company  
12645 W. Airport Blvd.  
Sugar Land, TX 77478  
For Product Information/SDSs Call: 800-231-3606  
(8:00 a.m. - 5:00 p.m. cst, Monday - Friday) 281-276-5400

**Emergency telephone number (with hours of operation)** : CHEMTREC: 800-424-9300 (U.S. 24 hour)  
Baker Petrolite: 800-231-3606  
(001)281-276-5400  
CANUTEC: 613-996-6666 (Canada 24 hours)  
CHEMTREC Int'l 01-703-527-3887 (International 24 hour)

## Section 2. Hazards identification

**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Classification of the substance or mixture** : ACUTE TOXICITY: ORAL - Category 4  
SKIN CORROSION/IRRITATION - Category 1B  
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1  
SKIN SENSITIZATION - Category 1  
CARCINOGENICITY - Category 1  
AQUATIC HAZARD (ACUTE) - Category 1

### GHS label elements

**Hazard pictograms** :



**Signal word** : Danger

**Hazard statements** : Harmful if swallowed.  
Causes severe skin burns and eye damage.  
May cause an allergic skin reaction.  
May cause cancer.  
Very toxic to aquatic life.

### Precautionary statements

Received

MAR 15 2017

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WV Dept. of Environmental Protection

## Section 2. Hazards identification

- Prevention** : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves: > 8 hours (breakthrough time): Nitrile gloves. Butyl rubber gloves.. Wear eye or face protection. Wear protective clothing. Avoid release to the environment. Avoid breathing dust. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace.
- Response** : Collect spillage. IF exposed or concerned: Get medical attention. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
- Storage** : Store locked up.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Hazards not otherwise classified** : None known.

## Section 3. Composition/information on ingredients

**Substance/mixture** : Mixture

| Ingredient name                                | %       | CAS number |
|------------------------------------------------|---------|------------|
| Diatomaceous earth, calcined                   | 30 - 60 | 91053-39-3 |
| Sodium nitrate                                 | 5 - 10  | 7631-99-4  |
| 5-chloro-2-methyl-4-isothiazolin-3-one         | 3 - 7   | 26172-55-4 |
| 2-Methyl-4-isothiazolin-3-one                  | 1 - 5   | 2682-20-4  |
| Crystalline silica: cristobalite               | 0.1 - 1 | 14464-46-1 |
| Crystalline silica: Quartz (SiO <sub>2</sub> ) | 0.1 - 1 | 14808-60-7 |

## Section 4. First aid measures

### Description of necessary first aid measures

- Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush the eye(s) continuously with lukewarm, gently flowing water for at least 20-60 minutes while holding the eyelid(s) open. Check for and remove any contact lenses. Chemical burns must be treated promptly by a physician.
- Inhalation** : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

MAR 15 2017

Office of Oil and Gas

## Section 4. First aid measures

- Skin contact** : Get medical attention immediately. Call a poison center or physician. Wash affected area with soap and mild detergent for at least 20 - 60 minutes. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Skin contact** : Causes severe burns. May cause an allergic skin reaction.
- Ingestion** : Harmful if swallowed. May cause burns to mouth, throat and stomach.

#### Over-exposure signs/symptoms

- Eye contact** : pain, watering, redness
- Inhalation** : No specific data.
- Skin contact** : pain or irritation, redness, blistering may occur
- Ingestion** : stomach pains

### Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

Received

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WV Dept. of Environmental Protection

## Section 5. Fire-fighting measures

- Specific hazards arising from the chemical** : This material is very toxic to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
- Hazardous thermal decomposition products** : carbon dioxide, carbon monoxide, nitrogen oxides, sulfur oxides, halogenated compounds, metal oxide/oxides
- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Remark** : Avoid temperature extremes. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Hazardous combustion products may include hydrogen chloride, carbon monoxide, carbon dioxide and oxides of nitrogen and sulfur.

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

### Methods and materials for containment and cleaning up

- Small spill** : Move containers from spill area. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Move containers from spill area. Approach release from upwind. Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.) Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

### Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid release to the environment. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved

## Section 7. Handling and storage

alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

### Advice on general occupational hygiene

- : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

### Conditions for safe storage, including any incompatibilities

- : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## Section 8. Exposure controls/personal protection

### Control parameters

| Occupational exposure limits                                            |               | TWA (8 hours) |                   |                       | STEL (15 mins) |                   |       | Ceiling |                   |       | Notations |
|-------------------------------------------------------------------------|---------------|---------------|-------------------|-----------------------|----------------|-------------------|-------|---------|-------------------|-------|-----------|
| Ingredients:                                                            | List name     | ppm           | mg/m <sup>3</sup> | Other                 | ppm            | mg/m <sup>3</sup> | Other | ppm     | mg/m <sup>3</sup> | Other |           |
| Diatomaceous earth, calcined                                            | US ACGIH      | -             | 10                | -                     | -              | -                 | -     | -       | -                 | -     | [a]       |
|                                                                         | US ACGIH      | -             | 3                 | -                     | -              | -                 | -     | -       | -                 | -     | [b]       |
|                                                                         | OSHA PEL      | -             | 5                 | -                     | -              | -                 | -     | -       | -                 | -     | [c]       |
|                                                                         | OSHA PEL      | -             | 15                | -                     | -              | -                 | -     | -       | -                 | -     | [d]       |
| 5-chloro-2-methyl-4-isothiazolin-3-one<br>2-Methyl-4-isothiazolin-3-one | Supplier      | -             | 0.076             | -                     | -              | 0.23              | -     | -       | -                 | -     |           |
|                                                                         | Supplier      | -             | -                 | 1.5 µg/m <sup>3</sup> | -              | 4.5               | -     | -       | -                 | -     |           |
| Crystalline silica: cristobalite                                        | US ACGIH      | -             | 0.025             | -                     | -              | -                 | -     | -       | -                 | -     | [b]       |
| Crystalline silica: cristobalite, as quartz                             | OSHA PEL 1989 | -             | 0.05              | -                     | -              | -                 | -     | -       | -                 | -     | [c][A]    |
| Crystalline silica: Quartz (SiO <sub>2</sub> )                          | US ACGIH      | -             | 0.025             | -                     | -              | -                 | -     | -       | -                 | -     | [b]       |
| Crystalline silica: Quartz (SiO <sub>2</sub> ), as quartz               | OSHA PEL 1989 | -             | 0.1               | -                     | -              | -                 | -     | -       | -                 | -     | [c][A]    |

Form: [a]Inhalable fraction. [b]Respirable fraction [c]Respirable dust [d]Total dust

Notes: [A]as quartz

Consult local authorities for acceptable exposure limits.

Only components of this product with established exposure limits appear in the box above.

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

### Appropriate engineering controls

- : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

### Individual protection measures

#### Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

#### Eyeface protection

- : Wear chemical safety goggles. When transferring material wear face shield in addition to chemical safety goggles. If inhalation hazards exist, a full-face respirator may be required instead.

#### Hand protection

- : Chemical-resistant gloves: Nitrile gloves. Butyl rubber gloves.

## Section 8. Exposure controls/personal protection

- Skin protection** : Wear long sleeves and chemical resistant apron to prevent repeated or prolonged skin contact.
- Respiratory protection** : Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

### Additional information

Substance may be harmful if swallowed. In extreme cases (ingestion) may cause liver and/or kidney damage.

## Section 9. Physical and chemical properties

### Appearance

- Physical state** : Solid. [Granular.]
- Color** : Tan. Red.
- Odor** : Mild.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting/freezing point** : Not available.
- Boiling point** : Not available.
- Initial Boiling Point** : Not available.
- Flash point** : Closed cup: >93.4°C (>200.1°F) [SFCC]
- Burning time** : Not available.
- Burning rate** : Not available.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Slightly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.  
Avoid temperature extremes. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Hazardous combustion products may include hydrogen chloride, carbon monoxide, carbon dioxide and oxides of nitrogen and sulfur.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : 2.1 kPa (15.8 mm Hg) @ 21°C (Calculated Value for all Components.)
- Vapor density** : >1 [Air = 1]
- Relative density** : Not available.
- Density** : 6 (lbs/gal)
- Solubility in water** : Dispersible
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.
- Viscosity** : Not available.
- VOC** : Not available.
- Pour Point** : -29°C (-20.2°F)

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## Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : No specific data.
- Incompatible materials** : Reactive or incompatible with the following materials: oxidizing materials, reducing materials, combustible materials and acids.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

| Product/ingredient name                                  | Result                | Species | Dose        | Exposure |
|----------------------------------------------------------|-----------------------|---------|-------------|----------|
| Sodium nitrate<br>5-chloro-2-methyl-4-isothiazolin-3-one | LD50 Oral             | Rat     | 1267 mg/kg  | -        |
|                                                          | LC50 Inhalation Vapor | Rat     | 0.33 mg/l   | 4 hours  |
|                                                          | LD50 Dermal           | Rabbit  | 660 mg/kg   | -        |
|                                                          | LD50 Oral             | Rat     | 457 mg/kg   | -        |
| X-CIDE™ 207 INDUSTRIAL<br>MICROBIOCIDE                   | LD50 Dermal           | Rabbit  | >5000 mg/kg | -        |

#### Irritation/Corrosion

No applicable toxicity data

#### Conclusion/Summary

**Skin** : Skin Irritation Score = 4 (Extreme Irritant/Corrosive).

**Eyes** : Eye Irritation Score = 4 (Extreme Irritant/Corrosive).

#### Sensitization

No applicable toxicity data

#### Mutagenicity

No applicable toxicity data

#### Carcinogenicity

| Product/ingredient name                        | OSHA  | IARC | NTP                             |
|------------------------------------------------|-------|------|---------------------------------|
| Sodium nitrate                                 | -     | 2A   | -                               |
| Crystalline silica: cristobalite               | None. | 1    | Known to be a human carcinogen. |
| Crystalline silica: Quartz (SiO <sub>2</sub> ) | +     | 1    | Known to be a human carcinogen. |

#### Reproductive toxicity

No applicable toxicity data

#### Teratogenicity

No applicable toxicity data

#### Specific target organ toxicity (single exposure)

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## Section 11. Toxicological information

| Name                                           | Category   | Route of exposure | Target organs                |
|------------------------------------------------|------------|-------------------|------------------------------|
| 5-chloro-2-methyl-4-isothiazolin-3-one         | Category 3 | Not applicable.   | Respiratory tract irritation |
| 2-Methyl-4-isothiazolin-3-one                  | Category 3 | Not applicable.   | Respiratory tract irritation |
| Crystalline silica: Quartz (SiO <sub>2</sub> ) | Category 3 | Not applicable.   | Respiratory tract irritation |

### Specific target organ toxicity (repeated exposure)

| Name                                           | Category   | Route of exposure | Target organs     |
|------------------------------------------------|------------|-------------------|-------------------|
| Crystalline silica: Quartz (SiO <sub>2</sub> ) | Category 1 | Not determined    | respiratory tract |

### Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

#### Potential chronic health effects

**General** : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

**Carcinogenicity** : May cause cancer. Risk of cancer depends on duration and level of exposure.

**Mutagenicity** : No known significant effects or critical hazards.

**Teratogenicity** : No known significant effects or critical hazards.

**Developmental effects** : No known significant effects or critical hazards.

**Fertility effects** : No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

| Route | ATE value    |
|-------|--------------|
| Oral  | 1242.9 mg/kg |

## Section 12. Ecological information

### Toxicity

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## Section 12. Ecological information

| Product/ingredient name                | Result                            | Species                                 | Exposure |
|----------------------------------------|-----------------------------------|-----------------------------------------|----------|
| Sodium nitrate                         | Acute EC50 522 mg/l Fresh water   | Fish - Pimephales promelas              | 96 hours |
|                                        | Acute LC50 161 mg/l Fresh water   | Crustaceans - Hyalella azteca - Adult   | 48 hours |
|                                        | Acute LC50 323 mg/l Fresh water   | Daphnia - Daphnia magna - Neonate       | 48 hours |
|                                        | Chronic NOEC 1.6 mg/l Fresh water | Fish - Coregonus clupeaformis - Embryo  | 120 days |
| 5-chloro-2-methyl-4-isothiazolin-3-one | Acute EC50 0.021 ppm Marine water | Algae - Skeletonema costatum            | 72 hours |
|                                        | Acute EC50 0.062 ppm Fresh water  | Algae - Pseudokirchneriella subcapitata | 4 days   |
|                                        | Acute EC50 13 ppm Fresh water     | Crustaceans - Ceriodaphnia dubia        | 48 hours |
|                                        | Acute EC50 0.18 ppm Fresh water   | Daphnia - Daphnia magna                 | 48 hours |
| 2-Methyl-4-isothiazolin-3-one          | Acute LC50 0.19 ppm Fresh water   | Fish - Oncorhynchus mykiss              | 96 hours |
|                                        | Chronic NOEC 0.1 ppm Marine water | Daphnia - Daphnia magna                 | 21 days  |
|                                        | Chronic NOEC 0.02 ppm             | Fish - Pimephales promelas              | 36 days  |
|                                        | Acute EC50 0.18 ppm Fresh water   | Daphnia - Daphnia magna                 | 48 hours |
| X-CIDE™ 207 INDUSTRIAL MICROBIOCIDE    | Acute LC50 0.07 ppm Fresh water   | Fish - Oncorhynchus mykiss              | 96 hours |
|                                        | Acute LC50 9.2 mg/l               | Fish                                    | 96 hours |

### Persistence and degradability

Not available.

Other adverse effects : No known significant effects or critical hazards.

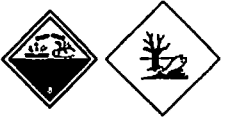
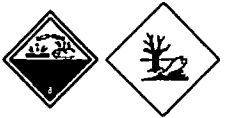
## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 14. Transport information

|                         | DOT Classification                                                                                                          | TDG Classification                                                                                                          | IMDG                                                                                                                        | IATA                                                                                                                        |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| UN number               | UN3261                                                                                                                      | UN3261                                                                                                                      | UN3261                                                                                                                      | UN3261                                                                                                                      |
| UN proper shipping name | CORROSIVE SOLID, ACIDIC, ORGANIC, N. O.S. (Contains: 5-chloro-2-methyl-4-isothiazolin-3-one, 2-Methyl-4-isothiazolin-3-one) | CORROSIVE SOLID, ACIDIC, ORGANIC, N. O.S. (Contains: 5-chloro-2-methyl-4-isothiazolin-3-one, 2-Methyl-4-isothiazolin-3-one) | CORROSIVE SOLID, ACIDIC, ORGANIC, N. O.S. (Contains: 5-chloro-2-methyl-4-isothiazolin-3-one, 2-Methyl-4-isothiazolin-3-one) | CORROSIVE SOLID, ACIDIC, ORGANIC, N. O.S. (Contains: 5-chloro-2-methyl-4-isothiazolin-3-one, 2-Methyl-4-isothiazolin-3-one) |
|                         |                                                                                                                             |                                                                                                                             |                                                                                                                             |                                                                                                                             |

## Section 14. Transport information

|                            |                                                                                        |                                                                                        |                                                                                         |                                                                                          |
|----------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Transport hazard class(es) | 8<br> | 8<br> | 8<br> | 8<br> |
| Packing group              | II                                                                                     | II                                                                                     | II                                                                                      | II                                                                                       |
| Environmental hazards      | Yes.                                                                                   | Yes.                                                                                   | Yes.                                                                                    | No.                                                                                      |
| Additional information     | -                                                                                      | -                                                                                      | <b>Emergency schedules (EmS)</b><br>F-A S-B                                             | -                                                                                        |

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** : Not available.

**DOT Reportable Quantity** : Not applicable.

**Marine pollutant** : 5-chloro-2-methyl-4-isothiazolin-3-one  
2-Methyl-4-isothiazolin-3-one

**North-America NAERG** : 154

## Section 15. Regulatory information

**U.S. Federal regulations** : **TSCA 12(b) one-time export:** 2-methyl-2H-isothiazol-3-one; 5-chloro-2-methyl-2H-isothiazol-3-one  
**TSCA 12(b) annual export notification:** No products were found.  
**United States inventory (TSCA 8b):** All components are listed or exempted.  
**Clean Water Act (CWA) 307:** No products were found.  
**Clean Water Act (CWA) 311:** No products were found.

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**SARA 302/304** : No products were found.

**SARA 311/312**

**Classification** : Immediate (acute) health hazard  
Delayed (chronic) health hazard

**SARA 313**

|                       | Product name   | CAS number | % Protection |
|-----------------------|----------------|------------|--------------|
| Supplier notification | Sodium nitrate | 7631-99-4  | 5 - 10       |

**Canada**

**Canada (CEPA DSL):** : All components are listed or exempted.

**Additional information**

## Section 15. Regulatory information

This product is subject to regulation under the US Federal Insecticide, Fungicide and Rodenticide ACT (FIFRA) and is therefore exempt from US Toxic Substance Control Act (TSCA) Inventory listing requirements.

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals.

Following is the hazard information as required on the pesticide label:

### DANGER

Corrosive. Causes irreversible eye damage and skin burns. May be fatal if absorbed through the skin. Harmful if inhaled or swallowed. This product may cause skin sensitization reactions in some people. Do not get in eyes, on skin or on clothing. Mixers, loaders, applicators and all other handlers must wear: coveralls over long-sleeved shirt and long pants; socks and chemical resistant footwear; goggles or face shield; chemical-resistant gloves made of any waterproof material; and a chemical resistant apron when mixing and loading. Discard clothing or other materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separate from other laundry. Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly.

This chemical is toxic to terrestrial and aquatic plants, fish and aquatic invertebrates.

## Section 16. Other information

### National Fire Protection Association (U.S.A.)



### History

Date of printing : 3/11/2015.

☒ Indicates information that has changed from previously issued version.

### Notice to reader

**NOTE:** The information on this SDS is based on data which is considered to be accurate. Baker Hughes, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This SDS was prepared and is to be used for this product. If the product is used as a component in another product, this SDS information may not be applicable.

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## Section 1. Identification

**Product name** : WCW219 COMBINATION INHIBITOR  
**Product code** : WCW219

### Relevant identified uses of the substance or mixture and uses advised against

**Identified uses** : Scale & Corrosion Inhibitor

**Print date** : 11/20/2014.

**Validation date** : 11/20/2014.

**Version** : 1

**Supplier's details** : Baker Petrolite  
A Baker Hughes Company  
12645 W. Airport Blvd.  
Sugar Land, TX 77478  
For Product Information/MSDSs Call: 800-231-3606  
(8:00 a.m. - 5:00 p.m. cst, Monday - Friday) 281-276-5400

**Emergency telephone number (with hours of operation)** : CHEMTREC: 800-424-9300 (U.S. 24 hour)  
Baker Petrolite: 800-231-3606  
(001)281-276-5400  
CANUTEC: 613-996-6666 (Canada 24 hours)  
CHEMTREC Int'l 01-703-527-3887 (International 24 hour)

## Section 2. Hazards identification

**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Classification of the substance or mixture** : FLAMMABLE LIQUIDS - Category 3  
ACUTE TOXICITY: ORAL - Category 4  
ACUTE TOXICITY: SKIN - Category 4  
ACUTE TOXICITY: INHALATION - Category 4  
SKIN CORROSION/IRRITATION - Category 2  
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2  
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE): ORAL [optic nerve] - Category 1

### GHS label elements

**Hazard pictograms** :   

**Signal word** : Danger

**Hazard statements** : Flammable liquid and vapor.  
Harmful if swallowed, in contact with skin or if inhaled.  
Causes serious eye irritation.  
Causes skin irritation.  
Causes damage to organs if swallowed. (optic nerve)

### Precautionary statements

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## Section 2. Hazards identification

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Prevention</b>                       | : Wear protective gloves: > 8 hours (breakthrough time): Nitrile or Neoprene gloves.. Wear eye or face protection. Wear protective clothing. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.                                                                                                                                                                          |
| <b>Response</b>                         | : IF exposed: Call a POISON CENTER or physician. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. Take off contaminated clothing. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention. |
| <b>Storage</b>                          | : Store locked up. Store in a well-ventilated place. Keep cool.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Disposal</b>                         | : Dispose of contents and container in accordance with all local, regional, national and international regulations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Supplemental label elements</b>      | : Avoid contact with skin and clothing. Wash thoroughly after handling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hazards not otherwise classified</b> | : Prolonged or repeated contact may dry skin and cause irritation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Section 3. Composition/information on ingredients

Substance/mixture : Mixture

| <b>Ingredient name</b>                        | <b>%</b> | <b>CAS number</b> |
|-----------------------------------------------|----------|-------------------|
| Salt of fatty acid/polyamine reaction product | 20 - 30  | Trade secret.     |
| Methanol                                      | 10 - 20  | 67-56-1           |
| Isopropanol                                   | 5 - 10   | 67-63-0           |
| Oxyalkylated alkylphenol                      | 1 - 5    | Trade secret.     |
| Polyamine phosphonate salt                    | 1 - 5    | Trade secret.     |

## Section 4. First aid measures

### Description of necessary first aid measures

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Eye contact</b>  | : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Continue to rinse for at least 10 minutes. Check for and remove any contact lenses. Get medical attention. If necessary, call a poison center or physician.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Inhalation</b>   | : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. |
| <b>Skin contact</b> | : Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. If necessary, call a poison center or physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Section 4. First aid measures

- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : Harmful if inhaled. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Skin contact** : Harmful in contact with skin. Causes skin irritation. Defatting to the skin.
- Ingestion** : Harmful if swallowed. Causes damage to organs following a single exposure if swallowed. Irritating to mouth, throat and stomach.

#### Over-exposure signs/symptoms

- Eye contact** : pain or irritation, watering, redness
- Inhalation** : No specific data.
- Skin contact** : irritation, redness, dryness, cracking
- Ingestion** : No specific data.

### Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### Extinguishing media

- Suitable extinguishing media** : Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.
- Unsuitable extinguishing media** : Do not use water jet.

- Specific hazards arising from the chemical** : Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.
- Hazardous thermal decomposition products** : carbon dioxide, carbon monoxide, nitrogen oxides, phosphorus oxides, halogenated compounds, metal oxide/oxides

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## Section 5. Fire-fighting measures

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

### Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.) Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

If RQ (Reportable Quantity) is exceeded, report to National Spill Response Office at 1-800-424-8802.

## Section 7. Handling and storage

### Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

## Section 7. Handling and storage

**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## Section 8. Exposure controls/personal protection

### Control parameters

| Occupational exposure limits |               | TWA (8 hours) |                   |       | STEL (15 mins) |                   |       | Ceiling |                   |       | Notations |
|------------------------------|---------------|---------------|-------------------|-------|----------------|-------------------|-------|---------|-------------------|-------|-----------|
| Ingredients:                 | List name     | ppm           | mg/m <sup>3</sup> | Other | ppm            | mg/m <sup>3</sup> | Other | ppm     | mg/m <sup>3</sup> | Other |           |
| Methanol                     | US ACGIH      | 200           | 262               | -     | 250            | 328               | -     | -       | -                 | -     | [1]       |
|                              | OSHA PEL      | 200           | 260               | -     | -              | -                 | -     | -       | -                 | -     |           |
|                              | OSHA PEL 1989 | 200           | 260               | -     | 250            | 325               | -     | -       | -                 | -     | [1]       |
| Isopropanol                  | US ACGIH      | 200           | -                 | -     | 400            | -                 | -     | -       | -                 | -     |           |
|                              | OSHA PEL      | 400           | 980               | -     | -              | -                 | -     | -       | -                 | -     |           |
|                              | OSHA PEL 1989 | 400           | 980               | -     | 500            | 1225              | -     | -       | -                 | -     |           |

[1] Absorbed through skin.

**Consult local authorities for acceptable exposure limits.**

Only components of this product with established exposure limits appear in the box above.

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

**Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

### Individual protection measures

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : Wear chemical safety goggles. When transferring material wear face-shield in addition to chemical safety goggles.

**Hand protection** : Chemical-resistant gloves: Nitrile or Neoprene gloves.

**Skin protection** : Wear long sleeves to prevent repeated or prolonged skin contact.

**Respiratory protection** : If a risk assessment indicates it is necessary, use a properly fitted supplied air respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## Section 9. Physical and chemical properties

### Appearance

|                                              |                                                                                                                                 |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Physical state                               | : Liquid.                                                                                                                       |
| Color                                        | : Amber to brown.                                                                                                               |
| Odor                                         | : Acrid. [Slight]                                                                                                               |
| Odor threshold                               | : Not available.                                                                                                                |
| pH                                           | : 5 to 6                                                                                                                        |
|                                              | : Neat - without dilution                                                                                                       |
| Melting/freezing point                       | : Not available.                                                                                                                |
| Boiling point                                | : Not available.                                                                                                                |
| Initial Boiling Point                        | : Not available.                                                                                                                |
| Flash point                                  | : Closed cup: 26.1°C (79°F) [SFCC]                                                                                              |
| Burning time                                 | : Not applicable.                                                                                                               |
| Burning rate                                 | : Not applicable.                                                                                                               |
| Evaporation rate                             | : Not available.                                                                                                                |
| Flammability (solid, gas)                    | : Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat. |
| Lower and upper explosive (flammable) limits | : Lower: 6%<br>Upper: 36.5%                                                                                                     |
| Vapor pressure                               | : Not available.                                                                                                                |
| Vapor density                                | : >1 [Air = 1]                                                                                                                  |
| Relative density                             | : 1.002 (15.6°C)                                                                                                                |
| Density                                      | : 8.35 (lbs/gal)                                                                                                                |
| Solubility in water                          | : Soluble                                                                                                                       |
| Partition coefficient: n-octanol/water       | : Not available.                                                                                                                |
| Auto-ignition temperature                    | : Not available.                                                                                                                |
| Decomposition temperature                    | : Not available.                                                                                                                |
| Viscosity                                    | : Dynamic (16°C): 41.96 cP                                                                                                      |
| VOC                                          | : Not available.                                                                                                                |
| Pour Point                                   | : <-40°C (<-40°F)                                                                                                               |

## Section 10. Stability and reactivity

|                                    |                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reactivity                         | : No specific test data related to reactivity available for this product or its ingredients.                                                                                                                                         |
| Chemical stability                 | : The product is stable.                                                                                                                                                                                                             |
| Possibility of hazardous reactions | : Under normal conditions of storage and use, hazardous reactions will not occur.                                                                                                                                                    |
| Conditions to avoid                | : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. |

## Section 10. Stability and reactivity

**Incompatible materials** : Reactive or incompatible with the following materials: oxidizing materials, reducing materials and acids.  
Methanol and isopropanol are incompatible and may react with acetyl bromide, alkyl aluminum solutions, beryllium hydride, boron trichloride, nitric acid, cyanuric chloride, dichloromethane, diethylzinc, metals (granulated forms of aluminum and magnesium – including aluminum and zinc salts), phosphorus III oxide, and potassium tert-butoxide.

**Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

| Product/ingredient name | Result                | Species | Dose        | Exposure |
|-------------------------|-----------------------|---------|-------------|----------|
| Methanol                | LC50 Inhalation Gas.  | Rat     | 145000 ppm  | 1 hours  |
|                         | LC50 Inhalation Gas.  | Rat     | 64000 ppm   | 4 hours  |
|                         | LD50 Dermal           | Rabbit  | 15800 mg/kg | -        |
|                         | LD50 Oral             | Rat     | 5600 mg/kg  | -        |
| Isopropanol             | LC50 Inhalation Vapor | Rat     | >10000 ppm  | 6 hours  |
|                         | LD50 Dermal           | Rabbit  | 6.29 g/kg   | -        |
|                         | LD50 Oral             | Rat     | 5000 mg/kg  | -        |

#### Irritation/Corrosion

No applicable toxicity data

#### Sensitization

No applicable toxicity data

#### Mutagenicity

No applicable toxicity data

#### Carcinogenicity

| Product/ingredient name | OSHA | IARC | NTP |
|-------------------------|------|------|-----|
| Isopropanol             | -    | 3    | -   |

#### Reproductive toxicity

No applicable toxicity data

#### Teratogenicity

No applicable toxicity data

#### Specific target organ toxicity (single exposure)

| Name        | Category   | Route of exposure | Target organs    |
|-------------|------------|-------------------|------------------|
| Methanol    | Category 1 | Oral              | optic nerve      |
| Isopropanol | Category 3 | Not applicable.   | Narcotic effects |

#### Specific target organ toxicity (repeated exposure)

Not applicable.

#### Aspiration hazard

Not available.

**Information on the likely routes of exposure** : Routes of entry anticipated: Dermal, Inhalation.

## Section 11. Toxicological information

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

#### Potential chronic health effects

**General** : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

**Carcinogenicity** : No known significant effects or critical hazards.

**Mutagenicity** : No known significant effects or critical hazards.

**Teratogenicity** : No known significant effects or critical hazards.

**Developmental effects** : No known significant effects or critical hazards.

**Fertility effects** : No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

| Route               | ATE value    |
|---------------------|--------------|
| Oral                | 566.6 mg/kg  |
| Dermal              | 1842.6 mg/kg |
| Inhalation (vapors) | 18.43 mg/l   |

## Section 12. Ecological information

### Toxicity

| Product/ingredient name | Result                               | Species                       | Exposure |
|-------------------------|--------------------------------------|-------------------------------|----------|
| Methanol                | Acute EC50 16.912 mg/l Marine water  | Algae - Ulva pertusa          | 96 hours |
|                         | Acute EC50 10000000 µg/l Fresh water | Daphnia - Daphnia magna       | 48 hours |
|                         | Acute LC50 2500000 µg/l Marine water | Crustaceans - Crangon crangon | 48 hours |
|                         | Acute LC50 100 mg/l Fresh water      | Fish - Pimephales promelas    | 96 hours |
|                         | Chronic NOEC 9.96 mg/l Marine water  | Algae - Ulva pertusa          | 96 hours |
| Isopropanol             | Acute LC50 1400000 µg/l Marine water | Crustaceans - Crangon crangon | 48 hours |
|                         | Acute LC50 1400000 µg/l              | Fish - Gambusia affinis       | 96 hours |

### Persistence and degradability

Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered

## Section 13. Disposal considerations

when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 14. Transport information

|                            | DOT Classification                                                                     | TDG Classification                                                                     | IMDG                                                                                    | IATA                                                                                     |
|----------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| UN number                  | UN1993                                                                                 | UN1993                                                                                 | UN1993                                                                                  | UN1993                                                                                   |
| UN proper shipping name    | FLAMMABLE LIQUID, N.O.S. (Contains: Methanol, Isopropanol)                             | FLAMMABLE LIQUID, N.O.S. (Contains: Methanol, Isopropanol)                             | FLAMMABLE LIQUID, N.O.S. (Contains: Methanol, Isopropanol)                              | FLAMMABLE LIQUID, N.O.S. (Contains: Methanol, Isopropanol)                               |
| Transport hazard class(es) | 3<br> | 3<br> | 3<br> | 3<br> |
| Packing group              | III                                                                                    | III                                                                                    | III                                                                                     | II                                                                                       |
| Environmental hazards      | No.                                                                                    | No.                                                                                    | No.                                                                                     | No.                                                                                      |
| Additional information     | -                                                                                      | -                                                                                      | <u>Emergency schedules (EmS)</u><br>F-E S-D                                             | -                                                                                        |

**Special precautions for user :** **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code :** Not available.

**DOT Reportable Quantity** Methanol, 3678 gal of this product.

**Marine pollutant** Not available.

**North-America NAERG :** 128

## Section 15. Regulatory information

**U.S. Federal regulations :** **TSCA 12(b) one-time export:** No products were found.  
**TSCA 12(b) annual export notification:** No products were found.  
**United States inventory (TSCA 8b):** All components are listed or exempted.  
**Clean Water Act (CWA) 307:** No products were found.  
**Clean Water Act (CWA) 311:** No products were found.

## Section 15. Regulatory information

Clean Air Act Section 112 : Listed

(b) Hazardous Air  
Pollutants (HAPs)

SARA 302/304 : No products were found.

SARA 311/312

Classification : Fire hazard  
Immediate (acute) health hazard

SARA 313

|                       | Product name | CAS number | %       |
|-----------------------|--------------|------------|---------|
| Supplier notification | Methanol     | 67-56-1    | 10 - 20 |

### Canada

Canada (CEPA DSL): : All components are listed or exempted.

## Section 16. Other information

### National Fire Protection Association (U.S.A.)



### History

Date of printing : 11/20/2014.

☑ Indicates information that has changed from previously issued version.

### Notice to reader

NOTE: The information on this MSDS is based on data which is considered to be accurate. Baker Hughes, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This MSDS was prepared and is to be used for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

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## Section 1. Identification

Product name : CRW132 CORROSION INHIBITOR  
Product code : CRW132

### Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Corrosion Inhibitor.

Print date : 4/8/2015.

Validation date : 4/8/2015.

Version : 1.01

Supplier's details : Baker Petrolite  
A Baker Hughes Company  
12645 W. Airport Blvd.  
Sugar Land, TX 77478  
For Product Information/SDSs Call: 800-231-3606  
(8:00 a.m. - 5:00 p.m. cst, Monday - Friday) 281-276-5400

Emergency telephone number (with hours of operation) : CHEMTREC: 800-424-9300 (U.S. 24 hour)  
Baker Petrolite: 800-231-3606  
(001)281-276-5400  
CANUTEC: 613-996-6666 (Canada 24 hours)  
CHEMTREC Int'l 01-703-527-3887 (International 24 hour)

## Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3  
ACUTE TOXICITY: ORAL - Category 4  
ACUTE TOXICITY: SKIN - Category 4  
ACUTE TOXICITY: INHALATION - Category 4  
SKIN CORROSION/IRRITATION - Category 2  
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1  
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) [optic nerve] - Category 1  
AQUATIC HAZARD (ACUTE) - Category 2  
AQUATIC HAZARD (LONG-TERM) - Category 3

### GHS label elements

Hazard pictograms :



Signal word : Danger

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WV Dept. of Environmental Protection

## Section 2. Hazards identification

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hazard statements</b>                | : Flammable liquid and vapor.<br>Harmful if swallowed, in contact with skin or if inhaled.<br>Causes serious eye damage.<br>Causes skin irritation.<br>Causes damage to organs. (optic nerve)<br>Toxic to aquatic life.<br>Harmful to aquatic life with long lasting effects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b><u>Precautionary statements</u></b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Prevention</b>                       | : Wear protective gloves: > 8 hours (breakthrough time): Nitrile or Neoprene gloves. 4H gloves.. Wear eye or face protection. Wear protective clothing. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.                                                                                                                         |
| <b>Response</b>                         | : IF exposed: Call a POISON CENTER or physician. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. Take off contaminated clothing. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician. |
| <b>Storage</b>                          | : Store locked up. Store in a well-ventilated place. Keep cool.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Disposal</b>                         | : Dispose of contents and container in accordance with all local, regional, national and international regulations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Supplemental label elements</b>      | : Avoid contact with skin and clothing. Wash thoroughly after handling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hazards not otherwise classified</b> | : Prolonged or repeated contact may dry skin and cause irritation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Section 3. Composition/information on ingredients

**Substance/mixture** : Mixture

| Ingredient name               | %       | CAS number    |
|-------------------------------|---------|---------------|
| Methanol                      | 20 - 30 | 67-56-1       |
| Quaternary ammonium compounds | 5 - 10  | Trade secret. |
| Alkylpyridine salts           | 5 - 10  | Trade secret. |
| Ammonium bisulfite            | 1 - 5   | 10192-30-0    |

## Section 4. First aid measures

### Description of necessary first aid measures

**Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush the eye(s) continuously with lukewarm, gently flowing water for at least 20-60 minutes while holding the eyelid(s) open. Check for and remove any contact lenses. Chemical burns must be treated promptly by a physician.

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## Section 4. First aid measures

- Inhalation** : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Skin contact** : Get medical attention immediately. Call a poison center or physician. Wash affected area with soap and mild detergent for at least 20 - 60 minutes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : Harmful if inhaled. May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Skin contact** : Harmful in contact with skin. Causes skin irritation. Defatting to the skin.
- Ingestion** : Harmful if swallowed. May cause burns to mouth, throat and stomach.

#### Over-exposure signs/symptoms

- Eye contact** : pain, watering, redness
- Inhalation** : No specific data.
- Skin contact** : pain or irritation, redness, dryness, cracking, blistering may occur
- Ingestion** : stomach pains

### Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

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Office of Environmental Protection  
1000 Pennsylvania Avenue, N.W.  
Washington, D.C. 20460  
Tel: 202-554-6888  
Fax: 202-554-6889

## Section 5. Fire-fighting measures

### Extinguishing media

**Suitable extinguishing media** : Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.

**Unsuitable extinguishing media** : Do not use water jet.

**Specific hazards arising from the chemical** : Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. This material is toxic to aquatic life. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

**Hazardous thermal decomposition products** : carbon dioxide, carbon monoxide, nitrogen oxides, sulfur oxides, halogenated compounds

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

### Methods and materials for containment and cleaning up

**Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

**Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.) Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor.

## Section 6. Accidental release measures

Contaminated absorbent material may pose the same hazard as the spilled product.  
Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

If RQ (Reportable Quantity) is exceeded, report to National Spill Response Office at 1-800-424-8802.

## Section 7. Handling and storage

### Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## Section 8. Exposure controls/personal protection

### Control parameters

| Occupational exposure limits |               | TWA (8 hours) |                   |       | STEL (15 mins) |                   |       | Ceiling |                   |       | Notations |
|------------------------------|---------------|---------------|-------------------|-------|----------------|-------------------|-------|---------|-------------------|-------|-----------|
| Ingredients:                 | List name     | ppm           | mg/m <sup>3</sup> | Other | ppm            | mg/m <sup>3</sup> | Other | ppm     | mg/m <sup>3</sup> | Other |           |
| Methanol                     | US ACGIH      | 200           | 262               | -     | 250            | 328               | -     | -       | -                 | -     | [1]       |
|                              | OSHA PEL      | 200           | 260               | -     | -              | -                 | -     | -       | -                 | -     | [1]       |
|                              | OSHA PEL 1989 | 200           | 260               | -     | 250            | 325               | -     | -       | -                 | -     | [1]       |

[1] Absorbed through skin.

Consult local authorities for acceptable exposure limits.

Only components of this product with established exposure limits appear in the box above.

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels, or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

- Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

## Section 8. Exposure controls/personal protection

### Individual protection measures

- |                               |                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hygiene measures</b>       | : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location. |
| <b>Eye/face protection</b>    | : Wear chemical safety goggles. When transferring material wear face-shield in addition to chemical safety goggles. If inhalation hazards exist, a full-face respirator may be required instead.                                                                                                                                                                                      |
| <b>Hand protection</b>        | : Chemical-resistant gloves: Nitrile or Neoprene gloves. 4H gloves.                                                                                                                                                                                                                                                                                                                   |
| <b>Skin protection</b>        | : Wear long sleeves and chemical resistant apron to prevent repeated or prolonged skin contact.                                                                                                                                                                                                                                                                                       |
| <b>Respiratory protection</b> | : If a risk assessment indicates it is necessary, use a properly fitted supplied air respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.                                                                                   |

## Section 9. Physical and chemical properties

### Appearance

- |                                                     |                                                                                                                                 |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Physical state</b>                               | : Liquid.                                                                                                                       |
| <b>Color</b>                                        | : Amber. [Dark]                                                                                                                 |
| <b>Odor</b>                                         | : Pungent. Amine-like.                                                                                                          |
| <b>Odor threshold</b>                               | : Not available.                                                                                                                |
| <b>pH</b>                                           | : 4 to 5                                                                                                                        |
|                                                     | : Neat - without dilution.                                                                                                      |
| <b>Melting/freezing point</b>                       | : Not available.                                                                                                                |
| <b>Boiling point</b>                                | : Not available.                                                                                                                |
| <b>Initial Boiling Point</b>                        | : Not available.                                                                                                                |
| <b>Flash point</b>                                  | : Closed cup: 31.1°C (88°F) [PMCC]                                                                                              |
| <b>Burning time</b>                                 | : Not applicable.                                                                                                               |
| <b>Burning rate</b>                                 | : Not applicable.                                                                                                               |
| <b>Evaporation rate</b>                             | : Not available.                                                                                                                |
| <b>Flammability (solid, gas)</b>                    | : Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat. |
| <b>Lower and upper explosive (flammable) limits</b> | : Not available.                                                                                                                |
| <b>Vapor pressure</b>                               | : 45.5 kPa (341.3 mm Hg, 6.6 psig) @ 54.4°C, 130 F (Reid)                                                                       |
| <b>Vapor density</b>                                | : >1 [Air = 1]                                                                                                                  |
| <b>Relative density</b>                             | : 0.97 (15.6°C)                                                                                                                 |
| <b>Density</b>                                      | : 8.08 (lbs/gal)                                                                                                                |
| <b>Solubility in water</b>                          | : Soluble                                                                                                                       |
| <b>Partition coefficient: n-octanol/water</b>       | : Not available.                                                                                                                |
| <b>Auto-ignition temperature</b>                    | : Not available.                                                                                                                |
| <b>Decomposition temperature</b>                    | : Not available.                                                                                                                |
| <b>Viscosity</b>                                    | : Dynamic (15.6°C): 8 cP                                                                                                        |
| <b>VOC</b>                                          | : Not available.                                                                                                                |
| <b>Pour Point</b>                                   | : -40°C (-40°F)                                                                                                                 |

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## Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
- Incompatible materials** : Reactive or incompatible with the following materials: oxidizing materials and reducing materials.  
Methanol is incompatible and may react with acetyl bromide, alkyl aluminum solutions, beryllium hydride, boron trichloride, nitric acid, cyanuric chloride, dichloromethane, diethylzinc, metals (granulated forms of aluminum and magnesium – including aluminum and zinc salts), phosphorus III oxide, and potassium tert-butoxide.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

| Product/ingredient name | Result               | Species | Dose        | Exposure |
|-------------------------|----------------------|---------|-------------|----------|
| Methanol                | LC50 Inhalation Gas. | Rat     | 145000 ppm  | 1 hours  |
|                         | LC50 Inhalation Gas. | Rat     | 64000 ppm   | 4 hours  |
|                         | LD50 Dermal          | Rabbit  | 15800 mg/kg | -        |
|                         | LD50 Oral            | Rat     | 5600 mg/kg  | -        |

#### Irritation/Corrosion

No applicable toxicity data

#### Sensitization

No applicable toxicity data

#### Mutagenicity

No applicable toxicity data

#### Carcinogenicity

No applicable toxicity data

#### Reproductive toxicity

No applicable toxicity data

#### Teratogenicity

No applicable toxicity data

#### Specific target organ toxicity (single exposure)

| Name     | Category   | Route of exposure | Target organs |
|----------|------------|-------------------|---------------|
| Methanol | Category 1 | Not determined    | optic nerve   |

#### Specific target organ toxicity (repeated exposure)

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## Section 11. Toxicological information

Not applicable.

### Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

#### Potential chronic health effects

**General** : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

**Carcinogenicity** : No known significant effects or critical hazards.

**Mutagenicity** : No known significant effects or critical hazards.

**Teratogenicity** : No known significant effects or critical hazards.

**Developmental effects** : No known significant effects or critical hazards.

**Fertility effects** : No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

| Route               | ATE value    |
|---------------------|--------------|
| Oral                | 319.9 mg/kg  |
| Dermal              | 1003.3 mg/kg |
| Inhalation (vapors) | 10.03 mg/l   |

## Section 12. Ecological information

### Toxicity

| Product/ingredient name                                                    | Result                               | Species                       | Exposure |
|----------------------------------------------------------------------------|--------------------------------------|-------------------------------|----------|
| Methanol<br><br><br><br><br><br><br><br><br><br>CRW132 CORROSION INHIBITOR | Acute EC50 16.912 mg/l Marine water  | Algae - Ulva pertusa          | 96 hours |
|                                                                            | Acute EC50 10000000 µg/l Fresh water | Daphnia - Daphnia magna       | 48 hours |
|                                                                            | Acute LC50 2500000 µg/l Marine water | Crustaceans - Crangon crangon | 48 hours |
|                                                                            | Acute LC50 100 mg/l Fresh water      | Fish - Pimephales promelas    | 96 hours |
|                                                                            | Chronic NOEC 9.96 mg/l Marine water  | Algae - Ulva pertusa          | 96 hours |
|                                                                            | Acute LC50 2.61 mg/l                 | Daphnia                       | 48 hours |
|                                                                            | Acute LC50 3 ppm                     | Daphnia                       | 48 hours |
|                                                                            | Acute LC50 2.3 mg/l                  | Fish - Fathead minnow         | 96 hours |
|                                                                            | Acute LC50 2.3 mg/l                  | Fish - Sheepshead minnow      | 96 hours |
|                                                                            |                                      |                               |          |

### Persistence and degradability

Not available.

## Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 14. Transport information

|                            | DOT Classification                                                                       | TDG Classification                                                                       | IMDG                                                                                      | IATA                                                                                       |
|----------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| UN number                  | UN1993                                                                                   | UN1993                                                                                   | UN1993                                                                                    | UN1993                                                                                     |
| UN proper shipping name    | FLAMMABLE LIQUID, N.O.S. (Contains: Methanol)                                            | FLAMMABLE LIQUID, N.O.S. (Contains: Methanol)                                            | FLAMMABLE LIQUID, N.O.S. (Contains: Methanol)                                             | FLAMMABLE LIQUID, N.O.S. (Contains: Methanol)                                              |
| Transport hazard class(es) | 3<br> | 3<br> | 3<br> | 3<br> |
| Packing group              | III                                                                                      | III                                                                                      | III                                                                                       | III                                                                                        |
| Environmental hazards      | No.                                                                                      | No.                                                                                      | No.                                                                                       | No.                                                                                        |
| Additional information     | -                                                                                        | -                                                                                        | <b>Emergency schedules (EmS)</b><br>F-E S-D                                               | -                                                                                          |

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** : Not available.

**DOT Reportable Quantity** Methanol, 2070 gal of this product.  
Ammonium bisulfite, 24752 gal of this product.

**Marine pollutant** Not available.

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## Section 15. Regulatory information

U.S. Federal regulations : TSCA 12(b) one-time export: No products were found.  
 TSCA 12(b) annual export notification: No products were found.  
 United States inventory (TSCA 8b): All components are listed or exempted.  
 Clean Water Act (CWA) 307: No products were found.  
 Clean Water Act (CWA) 311: ammonium hydrogensulphite

Clean Air Act Section 112 : Listed  
 (b) Hazardous Air  
 Pollutants (HAPs)

SARA 302/304 : No products were found.

SARA 311/312

Classification : Fire hazard  
 Immediate (acute) health hazard

SARA 313

|                       | Product name       | CAS number | %       |
|-----------------------|--------------------|------------|---------|
| Supplier notification | Methanol           | 67-56-1    | 20 - 30 |
|                       | Ammonium bisulfite | 10192-30-0 | 1 - 5   |

### Canada

Canada (CEPA DSL): : All components are listed or exempted.

## Section 16. Other information

### National Fire Protection Association (U.S.A.)



### History

Date of printing : 4/8/2015.

☒ Indicates information that has changed from previously issued version.

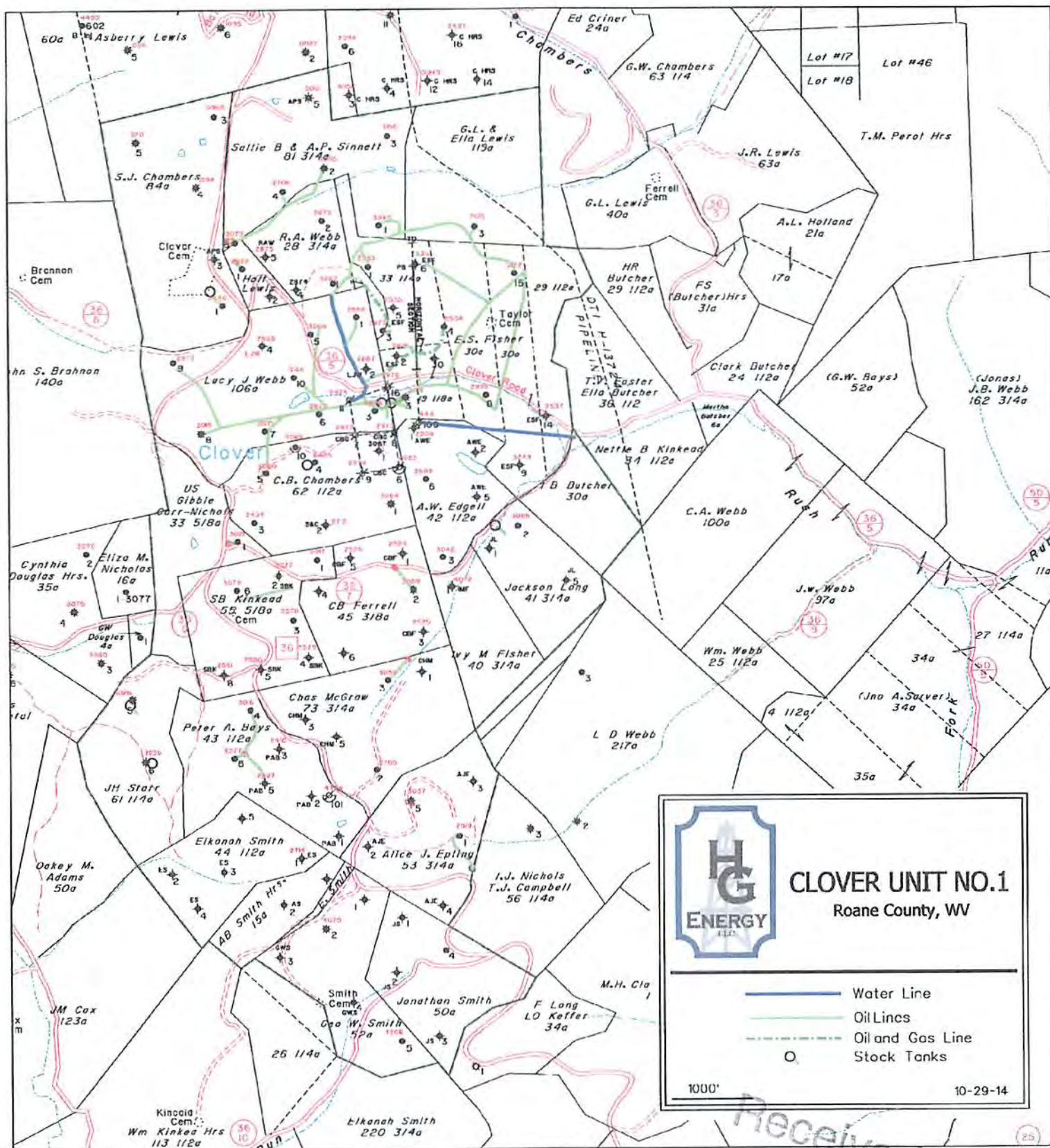
### Notice to reader

NOTE: The information on this SDS is based on data which is considered to be accurate. Baker Hughes, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This SDS was prepared and is to be used for this product. If the product is used as a component in another product, this SDS information may not be applicable.

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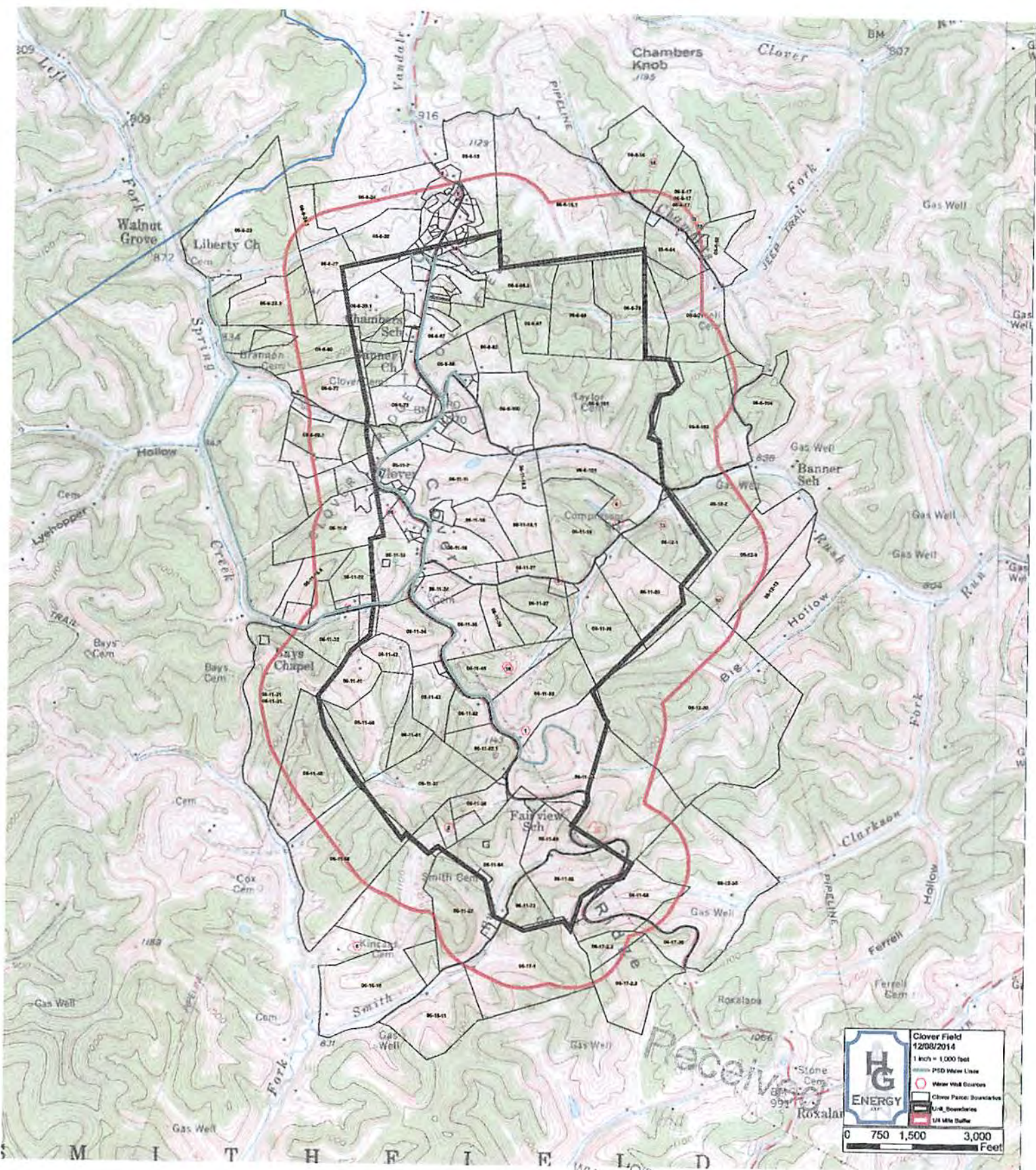
**HG ENERGY**

**CLOVER UNIT NO.1**  
Roane County, WV

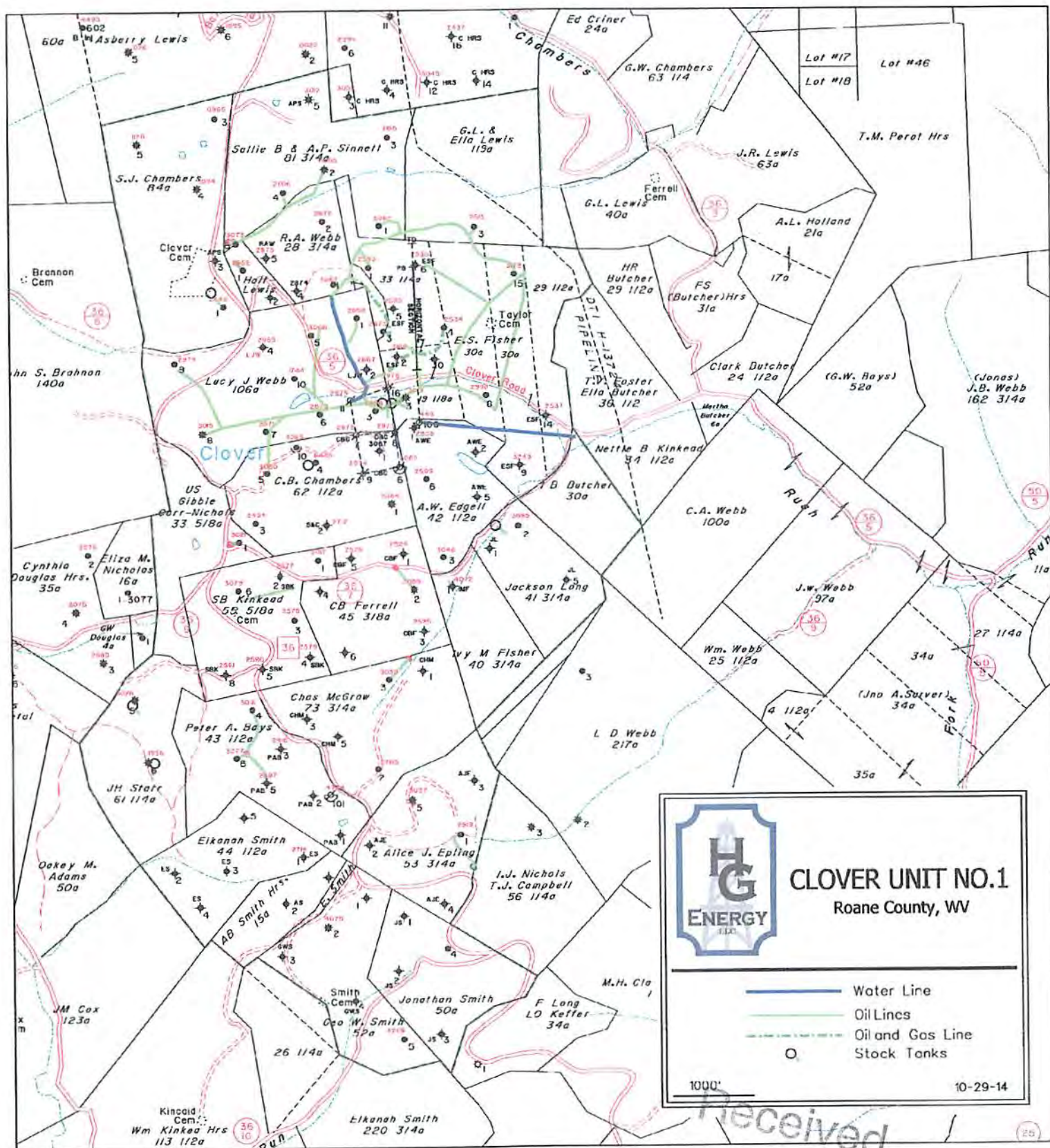
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 — Oil Lines  
 - - - Oil and Gas Line  
 O Stock Tanks

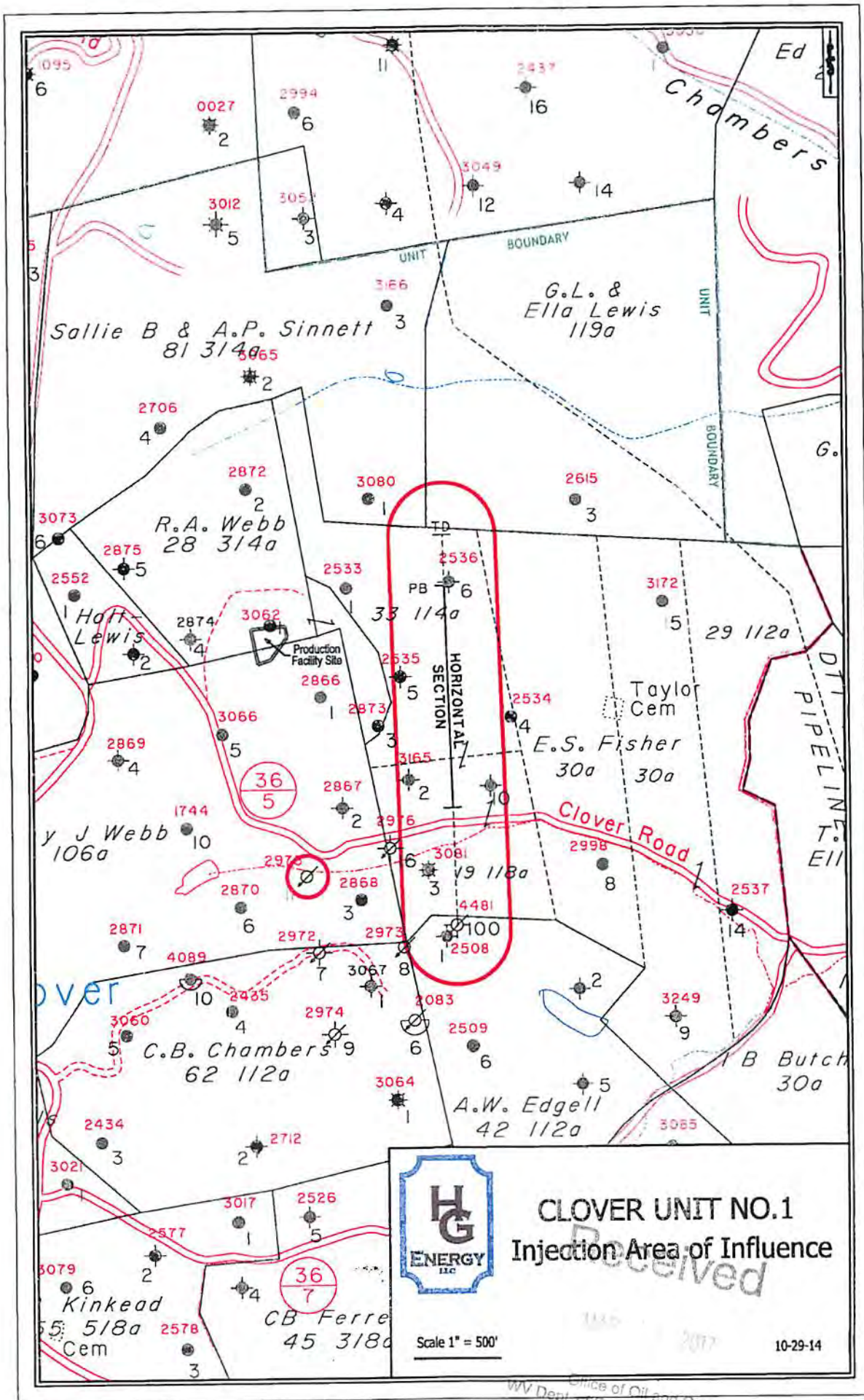
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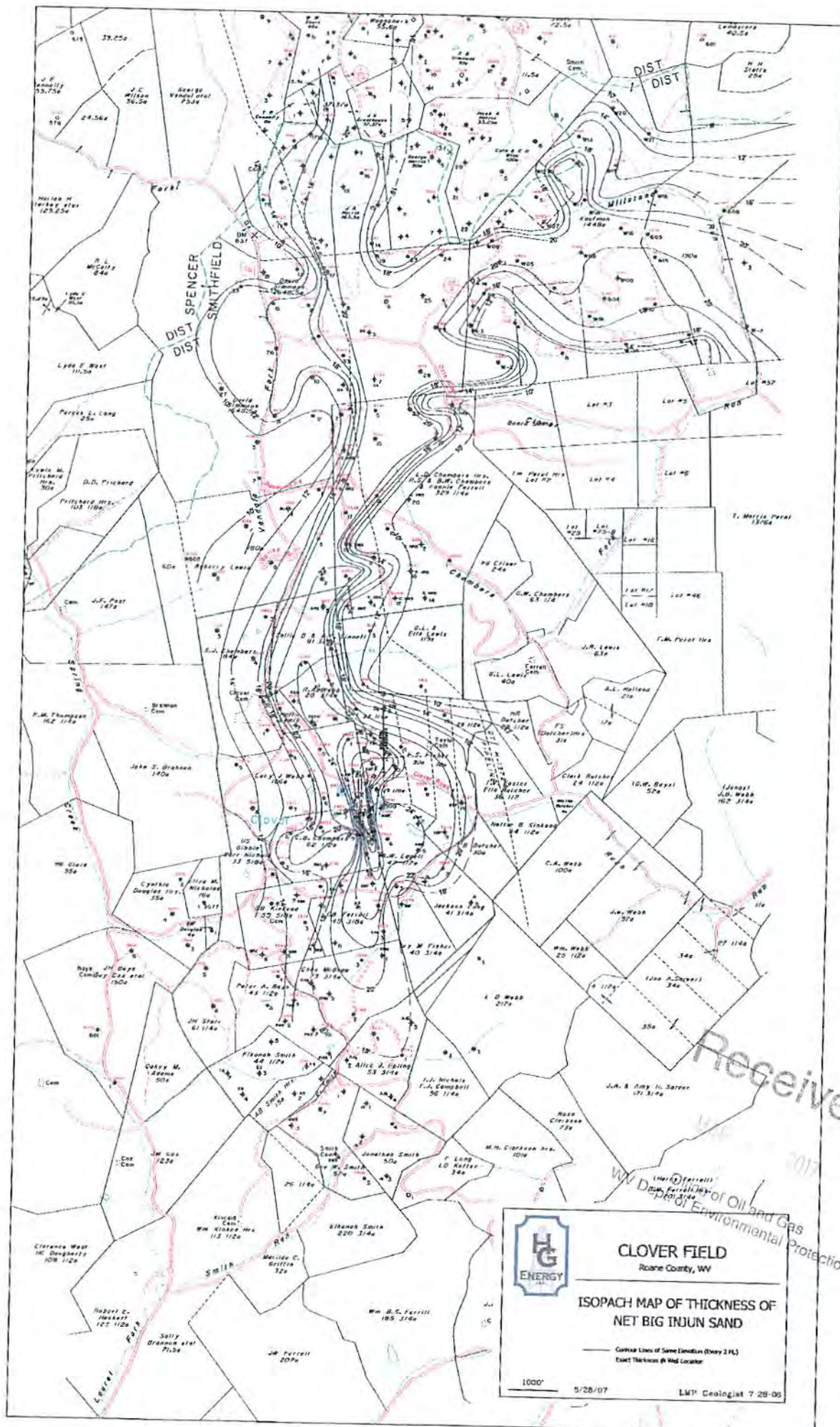
10-29-14



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Not applicable – see Appendix E

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| Source # | Source Name            | Address                                  | Phone        | Lat            | Long           | Degrees Y | Minutes Y | Seconds Y | Degrees X | Minutes X |
|----------|------------------------|------------------------------------------|--------------|----------------|----------------|-----------|-----------|-----------|-----------|-----------|
| 1        | Richard Fisher         | 4513 Clay Road, Spencer, WV 25276        | 304-927-3199 | 38° 42' 39.61" | 81° 16' 46.42" | 38        | 42        | 39.61     | -81       |           |
| 2        | Mrs. James R. Cale     | 4582 Clay Road, Spencer, WV 25276        | 304-927-4941 | 38° 42' 22.56" | 81° 17' 3.53"  | 38        | 42        | 22.56     | -81       |           |
| 3        | Willie King Barn       | 387 Edgell Fork, Spencer, WV 25276       |              | 38° 43' 16.53" | 81° 16' 25.92" | 38        | 43        | 16.53     | -81       |           |
| 4        | Judy Zigler            | 887 Edgell Fork, Spencer, WV 25276       |              | 30° 43' 19.64" | 81° 16' 26.55" | 38        | 43        | 19.64     | -81       |           |
| 5        | Timothy May            | 242 Edgell Fork Road, Spencer, WV 25276  |              | 38° 43' 6.03"  | 81° 16' 39.39" | 38        | 43        | 6.03      | -81       |           |
| 6        | Anthony Plasecki       | 2169 Vandale Fork, Spencer, WV 25276     | 304-927-3464 | 38° 42' 1.47"  | 81° 17' 23.91" | 38        | 42        | 1.47      | -81       |           |
| 7        | James O'Brien          | 88 High Street, Vincent, OH 45784        | 304-377-8262 | 38° 43' 0.65"  | 81° 17' 27.19" | 38        | 43        | 0.65      | -81       |           |
| 8        | Dave Bailey            | 3306 Clay Road, Spencer, WV 25276        | 304-927-5511 | 38° 44' 17.21" | 81° 17' 7.14"  | 38        | 44        | 17.21     | -81       |           |
| 9        | Michael S. Nutter      | 3350 Clay Road, Spencer, WV 25276        | 304-927-1368 | 33° 44' 13.62" | 81° 17' 3.59"  | 38        | 44        | 13.62     | -81       |           |
| 10       | Ray Elliott            | 573 Clover Road, Spencer, WV 25276       | 304-927-5889 | 38° 43' 29.78" | 81° 16' 3.04"  | 38        | 43        | 3.04      | -81       |           |
| 11       | Lacey Smith            | 558 Banner Hill, Spencer, WV 25276       |              | 38° 44' 6.22"  | 81° 16' 9.86"  | 38        | 44        | 9.86      | -81       |           |
| 12       | Jimmie Smith           | 573 Banner Hill, Spencer, WV 25276       | 304-927-1135 | 38° 44' 5.50"  | 81° 16' 8.60"  | 38        | 44        | 8.6       | -81       |           |
| 13       | Patrick Cottrill       | 434 Edgell Fork, Spencer, WV 25276       | 304-927-3517 | 38° 43' 20.65" | 81° 16' 16.00" | 38        | 43        | 16        | -81       |           |
| 14       | Charles Morton         | 3934 Clay Road, Spencer, WV 25276        |              | 38° 43' 20.43" | 81° 17' 17.72" | 38        | 43        | 17.72     | -81       |           |
| 15       | Lonnie A. Smith        | 474 Banner Hill, Spencer, WV 25276       |              | 38° 44' 10.86" | 81° 16' 19.54" | 38        | 44        | 19.54     | -81       |           |
| 16       | Jareld Gibson          | 33 ?                                     |              | 38° 44' 62"    | 81° 17' 4.08"  | 38        | 44        | 4.08      | -81       |           |
| 17       | Chuck Wyrostak Well #1 | 230 Griffith Run Road, Spencer, WV 25276 | 304-927-2978 | 38° 42' 08.4"  | 81° 16' 50.9"  | 38        | 42        | 50.9      | -81       |           |
| 18       | Chuck Wyrostak Well #2 | 230 Griffith Run Road, Spencer, WV 25276 | 304-927-2978 | 38° 42' 08.1"  | 81° 16' 50.5"  | 38        | 42        | 50.5      | -81       |           |
| 19       | Glenda Cottrill        | 546 Banner Hill Road, Spencer, WV 25276  | 304-927-1668 | 38° 44' 08.0"  | 81° 16' 13.1"  | 38        | 44        | 8         | -81       |           |

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# APPENDIX E

## Water Sources

Operator: HG Energy, LLC Year 2014 UIC Permit # 2R08704AP

| Water Source Name            | Source # 1     | Source # 2         | Source # 3       | Source # 4  |
|------------------------------|----------------|--------------------|------------------|-------------|
| Nothing Easting              | Richard Fisher | Mrs. James R. Cale | Willie King Barn | Judy Zigler |
| Parameter                    | Units          |                    |                  |             |
| TPH - GRO                    | mg/L           | NA                 | NA               | NA          |
| TPH - DRO                    | mg/L           | NA                 | NA               | NA          |
| TPH - ORO                    | mg/L           | NA                 | NA               | NA          |
| BTEX                         | mg/L           | NA                 | NA               | NA          |
| Chloride                     | mg/L           | 2.38               | 500              | 75.2        |
| Sodium                       | mg/L           |                    |                  |             |
| Total Dissolved Solids (TDS) | mg/L           | 71                 | 1345             | 301         |
| Aluminum                     | mg/L           | 0.61               | <0.2             | 0.03        |
| Arsenic                      | mg/L           | 0.0022             | 0.0026           | <0.0005     |
| Barium                       | mg/L           | 0.122              | 0.889            | 0.057       |
| Iron                         | mg/L           | 2.49               | 0.88             | 0.19        |
| Manganese                    | mg/L           | 0.784              | 1.11             | 0.002       |
| pH                           | SU             | 7.0                | 7.2              | 7.6         |
| Calcium                      | mg/L           | 6.95               | 194              | 15.2        |
| Sulfate                      | mg/L           | 5.63               | 6.9              | 15.4        |
| MBAS                         | mg/L           | 0.18               | <0.1             | <0.1        |
| Dissolved Methane            | mg/L           | NA                 | NA               | NA          |
| Dissolved Ethane             | mg/L           | NA                 | NA               | NA          |
| Dissolved Butane             | mg/L           | NA                 | NA               | NA          |
| Dissolved Propane            | mg/L           | NA                 | NA               | NA          |
| Bacteria (Total Coliform)    | c/100m L       | Present            | Absent           | Absent      |

# APPENDIX E Water Sources

Operator: HG Energy, LLC Year: 2014 UIC Permit #: 2R08704AP

| Water Source Name            | Source # 5  | Source # 6       | Source # 7    | Source # 8  |
|------------------------------|-------------|------------------|---------------|-------------|
| Northing Easting             | Timothy May | Anthony Piasecki | James O'Brien | Dave Bailey |
| Parameter                    | Units       |                  |               |             |
| TPH - GRO                    | mg/L        | NA               | NA            | NA          |
| TPH - DRO                    | mg/L        | NA               | NA            | NA          |
| TPH - ORO                    | mg/L        | NA               | NA            | NA          |
| BTEX                         | mg/L        | NA               | NA            | NA          |
| Chloride                     | mg/L        | 49.9             | 62.7          | 154         |
| Sodium                       | mg/L        |                  |               |             |
| Total Dissolved Solids (TDS) | mg/L        | 250              | 257           | 385         |
| Aluminum                     | mg/L        | <.02             | <.02          | 0.05        |
| Arsenic                      | mg/L        | 0.0015           | 0.0006        | <.0005      |
| Barium                       | mg/L        | 0.191            | 0.455         | 1.17        |
| Iron                         | mg/L        | 0.5              | 5.53          | 0.15        |
| Manganese                    | mg/L        | 0.097            | 0.975         | 0.007       |
| pH                           | SU          | 7.5              | 7.0           | 7.8         |
| Calcium                      | mg/L        | 73.1             | 46.1          | 45.4        |
| Sulfate                      | mg/L        | 6.0              | 3.43          | 4.89        |
| MBAS                         | mg/L        | <.01             | <.01          | 0.01        |
| Dissolved Methane            | mg/L        | NA               | NA            | NA          |
| Dissolved Ethane             | mg/L        | NA               | NA            | NA          |
| Dissolved Butane             | mg/L        | NA               | NA            | NA          |
| Dissolved Propane            | mg/L        | NA               | NA            | NA          |
| Bacteria (Total Coliform)    | c/100m L    | Absent           | Present       | Present     |

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# APPENDIX E

Water Sources

Operator: HG Energy, LLC Year: 2014 UIC Permit #: 2R08704AP

| Water Source Name            |          | Source # 9        | Source # 10 | Source # 11 | Source # 12  |
|------------------------------|----------|-------------------|-------------|-------------|--------------|
| Northing Easting             |          | Michael S. Nutter | Ray Elliott | Lacey Smith | Jimmie Smith |
| Parameter                    | Units    |                   |             |             |              |
| TPH - GRO                    | mg/L     | NA                | NA          | NA          | NA           |
| TPH - DRO                    | mg/L     | NA                | NA          | NA          | NA           |
| TPH - ORO                    | mg/L     | NA                | NA          | NA          | NA           |
| BTEX                         | mg/L     | NA                | NA          | NA          | NA           |
| Chloride                     | mg/L     | 126               | 2.9         | 101         | 45.1         |
| Sodium                       | mg/L     |                   |             |             |              |
| Total Dissolved Solids (TDS) | mg/L     | 263               | 301         | 360         | 231          |
| Aluminum                     | mg/L     | 0.03              | 0.02        | <0.02       | 0.02         |
| Arsenic                      | mg/L     | <0.0005           | <0.0005     | 0.0032      | 0.0020       |
| Barium                       | mg/L     | 0.607             | 0.222       | 0.665       | 0.334        |
| Iron                         | mg/L     | 0.45              | 0.04        | 2.21        | 1.02         |
| Manganese                    | mg/L     | 0.008             | <0.002      | 0.411       | 0.603        |
| pH                           | SU       | 7.2               | 7.5         | 7.7         | 7.6          |
| Calcium                      | mg/L     | 20.8              | 55.6        | 53.9        | 40.2         |
| Sulfate                      | mg/L     | 4.09              | 11.4        | 1.64        | 10.2         |
| MBAS                         | mg/L     | 0.01              | <0.01       | 0.05        | 0.01         |
| Dissolved Methane            | mg/L     | NA                | NA          | NA          | NA           |
| Dissolved Ethane             | mg/L     | NA                | NA          | NA          | NA           |
| Dissolved Butane             | mg/L     | NA                | NA          | NA          | NA           |
| Dissolved Propane            | mg/L     | NA                | NA          | NA          | NA           |
| Bacteria (Total Coliform)    | c/100m L | Present           | Present     | Present     | Present      |

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## Water Sources

Operator: HG Energy, LLC Year: 2014 UIC Permit #: 2R08704AP

| Water Source Name            |          | Source # 13      | Source # 14    | Source # 15     | Source # 16   |
|------------------------------|----------|------------------|----------------|-----------------|---------------|
| Northing Easting             |          | Patrick Cottrill | Charles Morton | Lonnie A. Smith | Jareld Gibson |
| Parameter                    | Units    |                  |                |                 |               |
| TPH - GRO                    | mg/L     | NA               | NA             | NA              | NA            |
| TPH - DRO                    | mg/L     | NA               | NA             | NA              | NA            |
| TPH - ORO                    | mg/L     | NA               | NA             | NA              | NA            |
| BTEX                         | mg/L     | NA               | NA             | NA              | NA            |
| Chloride                     | mg/L     | 28.7             | 61.3           | 50.6            | 21.8          |
| Sodium                       | mg/L     |                  |                |                 |               |
| Total Dissolved Solids (TDS) | mg/L     | 283              | 490            | 359             | 205           |
| Aluminum                     | mg/L     | <.02             | 0.02           | <.02            | .             |
| Arsenic                      | mg/L     | 0.0019           | <.0005         | 0.0046          | 0.07          |
| Barium                       | mg/L     | 0.325            | 0.354          | 24.6            | <.0005        |
| Iron                         | mg/L     | 0.10             | 0.02           | 0.03            | 36.3          |
| Manganese                    | mg/L     | 0.075            | <.002          | 0.055           | 0.022         |
| pH                           | SU       | 7.8              | 7.2            | 7.8             | 7.2           |
| Calcium                      | mg/L     | 30.3             | 99.3           | 0.395           | 0.141         |
| Sulfate                      | mg/L     | 1.49             | 16.9           | 2.4             | 23.1          |
| MBAS                         | mg/L     | <.01             | <.01           | 0.03            | <.01          |
| Dissolved Methane            | mg/L     | NA               | NA             | NA              | NA            |
| Dissolved Ethane             | mg/L     | NA               | NA             | NA              | NA            |
| Dissolved Butane             | mg/L     | NA               | NA             | NA              | NA            |
| Dissolved Propane            | mg/L     | NA               | NA             | NA              | NA            |
| Bacteria (Total Coliform)    | c/100m L | Absent           | Present        | Absent          | Present       |

# APPENDIX E

## Water Sources

Operator: HG Energy, LLC Year: 2014 UIC Permit #: 2R08704AP

| Water Source Name            |          | Source # 17      | Source # 18      | Source # 19    | Source # 20 |
|------------------------------|----------|------------------|------------------|----------------|-------------|
| Northing Easting             |          | Chuck Wyrstak #1 | Chuck Wyrstak #2 | Glenda Cotrill |             |
| Parameter                    | Units    |                  |                  |                |             |
| TPH - GRO                    | mg/L     | NA               | NA               | NA             |             |
| TPH - DRO                    | mg/L     | NA               | NA               | NA             |             |
| TPH - ORO                    | mg/L     | NA               | NA               | NA             |             |
| BTEX                         | mg/L     | NA               | NA               | NA             |             |
| Chloride                     | mg/L     | 31.4             | 2.98             | 27.9           |             |
| Sodium                       | mg/L     |                  |                  |                |             |
| Total Dissolved Solids (TDS) | mg/L     | 266              | 53               | 207            |             |
| Aluminum                     | mg/L     | 0.02             | 0.18             | 0.02           |             |
| Arsenic                      | mg/L     | 0.0037           | <.0005           | 1.3            |             |
| Barium                       | mg/L     | 0.87             | 0.089            | 0.027          |             |
| Iron                         | mg/L     | 0.97             | 0.13             | 0.45           |             |
| Manganese                    | mg/L     | 0.144            | 0.003            | <.002          |             |
| pH                           | SU       | 7.2              | 6.3              | 6.7            |             |
| Calcium                      | mg/L     | 60.9             | 7.52             | 0.02           |             |
| Sulfate                      | mg/L     | 6.88             |                  | 9.04           |             |
| MBAS                         | mg/L     | <.01             | <.01             | 0.02           |             |
| Dissolved Methane            | mg/L     | NA               | NA               | NA             |             |
| Dissolved Ethane             | mg/L     | NA               | NA               | NA             |             |
| Dissolved Butane             | mg/L     | NA               | NA               | NA             |             |
| Dissolved Propane            | mg/L     | NA               | NA               | NA             |             |
| Bacteria (Total Coliform)    | c/100m L | Absent           | Present          | Present        |             |



DATE/TIME SAMPLED: 11-05-14 1028

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-05-14 1345

**SAMPLED BY: K. WILLIAMS / C. ROSS**

LABORATORY ID: HGE 141105-1

**\*Client Provided**

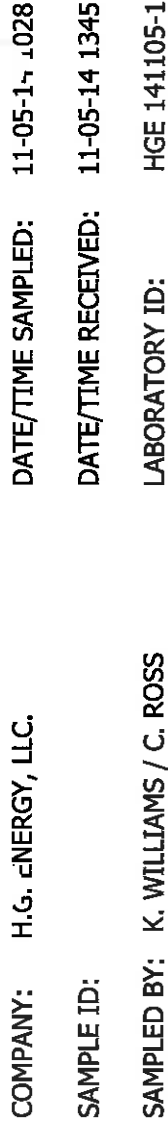
**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

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DEC 12 2014

APPROVED

**MAIN OFFICE**—POST OFFICE BOX 550 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864



**\*Client Provided**

**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

APPROVED D. B. A.

DEC 12 2014

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-05-14 1028

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-05-14 1345

ANALYST: MW

DATE & TIME ANALYZED: 11-05-14 1408

METHOD: 3

| SAMPLE ID      | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|----------------|--------------------|------------|-------------------|--------------|
| RICHARD FISHER | PRESENT            | PRESENT    | 11-05-14 1028     | HGE 141105-1 |
|                |                    |            |                   |              |
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|                |                    |            |                   |              |

Received  
Office of Oil & Gas

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

DEC 12 2014

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

  
Approved

Clover Water Sampling UIC 2014

Residence

Name Richard Fisher City Water

Address 4513 Clay Rd

Phone 304 927 3199

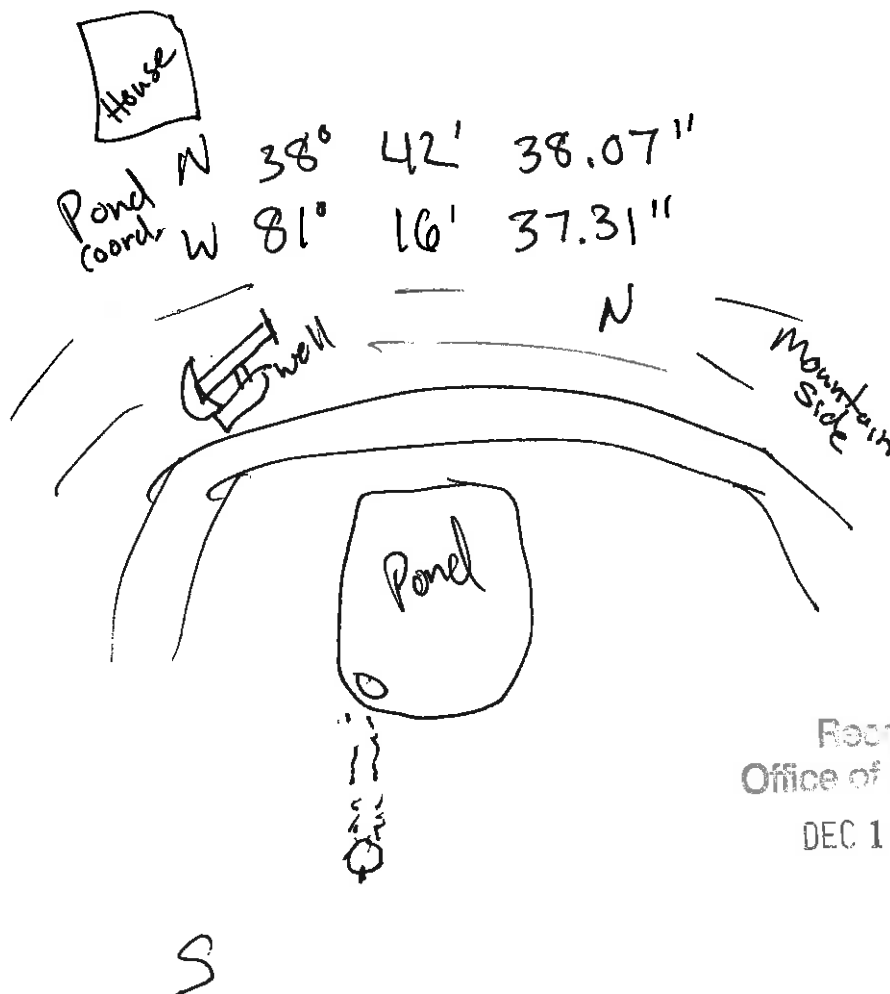
Depth of well (if known- estimate if not) \_\_\_\_\_

GPS Coordinates House Coord.

Lat 38° 42' 39.61"

Long 81° 16' 46.42"

Provide sketch below of approximate location of dwelling(s) and water wells(s)  
Resident has a Pond Below a well he would like Sampled



Received  
Office of Oil & Gas  
DEC 12 2014

# REI Consultants, Inc. - Analytical Report

WO#: 1411929

Date Reported: 11/19/2014

|                          |                              |                         |                       |
|--------------------------|------------------------------|-------------------------|-----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/5/2014 10:38:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014             |
| <b>Lab ID:</b>           | 1411929-01A                  | <b>Matrix:</b>          | Liquid                |
| <b>Client Sample ID:</b> | 14192 RICHARD FISHER         | <b>Site ID:</b>         |                       |

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.14                          | NA       | mg/L  | 11/12/14 9:47AM    | 11/13/14 4:58AM  | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.34                          | NA       | mg/L  | 11/12/14 9:47AM    | 11/13/14 4:58AM  |       |
| Surr: o-Terphenyl                   | 102    | NA  | 28.3-152                      | NA       | %REC  | 11/12/14 9:47AM    | 11/13/14 4:58AM  |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |       |
| Methane                             | ND     | NA  | 10.0                          | NA       | µg/L  |                    | 11/18/14 10:57AM |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/18/14 10:57AM |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/18/14 10:57AM |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/18/14 10:57AM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/10/14 2:04PM    | 11/11/14 5:41AM  | PA/VA |
| Surr: 2,5-Dibromotoluene            | 89.1   | NA  | 37.2-152                      | NA       | %REC  | 11/10/14 2:04PM    | 11/11/14 5:41AM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1986)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/11/14 5:41AM  | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/11/14 5:41AM  | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/11/14 5:41AM  | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/11/14 5:41AM  | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/11/14 5:41AM  | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 97.5   | NA  | 61.2-135                      | NA       | %REC  | 11/10/14 2:04PM    | 11/11/14 5:41AM  |       |

Received  
Office of Oil & Gas  
DEC 12 2014

DATE/TIME SAMPLED: 11-05-14 1:00

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-05-14 1345

**SAMPLED BY: K. WILLIAMS / C. ROSS**

LABORATORY ID: HGE 141105-2

[illegible]

**\*Client Provided**

**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

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Office of Civil & Gas

DEC 12 2014

**APPROVED**

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

LABORATORY ID: HGE 141105-2

[illegible]

**Client Provided**

DEC 12 2014



**METHOD:** 3

| SAMPLE ID          | TOTAL<br>COLIFORM<br>P/A | E. COLI<br>PA | DATE/TIME<br>SAMPLED | LOG<br>NO.   |
|--------------------|--------------------------|---------------|----------------------|--------------|
| MRS. JAMES R. CALE | PRESENT                  | ABSENT        | 11-05-14 1000        | HGE 141105-2 |
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Office of Oil & Gas  
DEC 19 2014

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

|                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

\* Client provided

**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

D. Buma  
Approved

Clover Water Sampling UIC 2014

Residence

Name Mrs James R. Cule

Address 4562 Clay Rd,

Phone 304-927-4941

Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

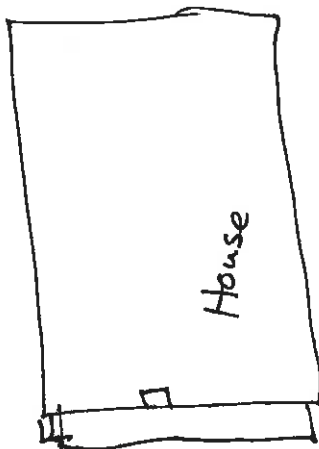
Lat N 38° 42' 22.58"

Long W 81° 17' 3.53"

Provide sketch below of approximate location of dwelling(s) and water wells(s)

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□ Cistern



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Received  
Office of Oil & Gas

DEC 12 2014

1000 8.4 18.8 77

# REI Consultants, Inc. - Analytical Report

WO#: 1411929

Date Reported: 11/19/2014

|                          |                              |                         |                       |
|--------------------------|------------------------------|-------------------------|-----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/5/2014 10:00:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014             |
| <b>Lab ID:</b>           | 1411929-02A                  | <b>Matrix:</b>          | Liquid                |
| <b>Client Sample ID:</b> | 14193 MRS. JAMES R. CALE     | <b>Site ID:</b>         |                       |

| Analysis                            | Result | MDL | PQL      | MCL | Qual | Units       | Prep Date       | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|----------|-----|------|-------------|-----------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     |          |     |      |             |                 |                  |       |
| Method: SW8015C (2000)              |        |     |          |     |      | Analyst: CL |                 |                  |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.11     | NA  |      | mg/L        | 11/10/14 1:14PM | 11/11/14 9:33PM  | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.27     | NA  |      | mg/L        | 11/10/14 1:14PM | 11/11/14 9:33PM  |       |
| Surr: o-Terphenyl                   | 109    | NA  | 28.3-152 | NA  |      | %REC        | 11/10/14 1:14PM | 11/11/14 9:33PM  |       |
| <b>DISSOLVED GASES</b>              |        |     |          |     |      |             |                 |                  |       |
| Method: GC-FID                      |        |     |          |     |      | Analyst: JC |                 |                  |       |
| Methane                             | ND     | NA  | 10.0     | NA  |      | µg/L        |                 | 11/18/14 11:03AM |       |
| Ethane                              | ND     | NA  | 15.0     | NA  |      | µg/L        |                 | 11/18/14 11:03AM |       |
| Propane                             | ND     | NA  | 20.0     | NA  |      | µg/L        |                 | 11/18/14 11:03AM |       |
| Butane                              | ND     | NA  | 25.0     | NA  |      | µg/L        |                 | 11/18/14 11:03AM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     |          |     |      |             |                 |                  |       |
| Method: SW8015C (2000)              |        |     |          |     |      | Analyst: CB |                 |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500    | NA  |      | mg/L        | 11/10/14 2:04PM | 11/11/14 6:13AM  | PA/VA |
| Surr: 2,5-Dibromotoluene            | 89.2   | NA  | 37.2-152 | NA  |      | %REC        | 11/10/14 2:04PM | 11/11/14 6:13AM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     |          |     |      |             |                 |                  |       |
| Method: SW8021B (1996)              |        |     |          |     |      | Analyst: CB |                 |                  |       |
| Benzene                             | ND     | NA  | 1.00     | NA  |      | µg/L        | 11/10/14 2:04PM | 11/11/14 6:13AM  | PA/VA |
| Toluene                             | ND     | NA  | 1.00     | NA  |      | µg/L        | 11/10/14 2:04PM | 11/11/14 6:13AM  | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00     | NA  |      | µg/L        | 11/10/14 2:04PM | 11/11/14 6:13AM  | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00     | NA  |      | µg/L        | 11/10/14 2:04PM | 11/11/14 6:13AM  | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00     | NA  |      | µg/L        | 11/10/14 2:04PM | 11/11/14 6:13AM  | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 95.2   | NA  | 61.2-135 | NA  |      | %REC        | 11/10/14 2:04PM | 11/11/14 6:13AM  |       |

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| PARAMETER                    | DATE ANALYZED  | ANALYST INITIALS | METHOD                                                                    | UNITS | MRL        | MDL   |
|------------------------------|----------------|------------------|---------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11-6-14        | KH               | SM22 <sup>nd</sup> 4500 HB                                                | S.U   | 2.0 - 10.0 | .1    |
| Hot Acid                     |                |                  | SM22 <sup>nd</sup> 2310 B (4a)                                            | mg/L  | 20.        | 1     |
| Mineral Acid                 |                |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                      | mg/L  |            | 1     |
| Alkalinity                   |                |                  | SM22 <sup>nd</sup> 2320 B                                                 | mg/L  | 20.        | 1     |
| NH <sub>3</sub> N            |                |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22th 4500 NH <sub>3</sub> C  | mg/L  | 10.        | .10   |
| Settleable Solids            |                |                  | SM 22 <sup>nd</sup> 2540 F                                                | ml/L  |            | .1    |
| Turbidity                    |                |                  | SM22 <sup>nd</sup> 2130 B                                                 | NTU   | 1.         | .05   |
| Conductivity                 |                |                  | EPA 120.1 Rev-1982                                                        | µmhos | 20.        | 1     |
| TKN                          |                |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| TSS - Total Suspended Solids | 11-6-14        | DB               | SM22 <sup>nd</sup> 2540 D                                                 | mg/L  | 50.        | 4     |
| TDS - Total Dissolved Solids | 11-6-14        | PC               | SM22 <sup>nd</sup> 2540 C                                                 | mg/L  | 450.       | 4     |
| Sulfate                      | 11-6-14        | PC               | EPA 300.0 Rev 2.1-1993                                                    | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-6-14        | PC               | EPA 300.0 Rev 2.1-1993                                                    | mg/L  | .50        | .50   |
| Nitrate                      |                |                  | EPA 300.0 Rev 2.1-1993                                                    | mg/L  | .05        | .01   |
| Nitrite                      |                |                  | EPA 300.0 Rev 2.1-1993                                                    | mg/L  | .05        | .01   |
| Fluoride                     |                |                  | EPA 300.0 Rev 2.1-1993                                                    | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                |                  | EPA 300.0 Rev 2.1-1993+Calc                                               | mg/L  |            | .01   |
| Ortho-Phosphate              |                |                  | EPA 300.0 Rev 2.1-1993                                                    | mg/L  | .05        | .05   |
| Aluminum                     | 11/07/14       | TW               | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .25        | .02   |
| Calcium                      | 11/07/14       | TW               | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .50        | .10   |
| Dissolved Calcium            |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .50        | .10   |
| Chromium                     |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .05        | .003  |
| Dissolved Chromium           |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .05        | .003  |
| Iron                         | 11/07/14       | TW               | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                           | mg/L  |            | 1     |
| Dissolved Iron               |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .25        | .02   |
| Magnesium                    |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .25        | .02   |
| Dissolved Magnesium          |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .50        | .01   |
| Manganese                    | 11/07/14       | TW               | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .50        | .01   |
| Dissolved Manganese          |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .25        | .002  |
| Sodium                       |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .25        | .002  |
| Zinc (ICP)                   |                |                  | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .50        | .03   |
| MBAS                         | 11-5-14        | SW               | EPA 200.7 Rev 4.4-1994                                                    | mg/L  | .05        | .004  |
| Cyanide                      |                |                  | SM22 <sup>nd</sup> 5540C                                                  | mg/L  | .01        | .01   |
| Ortho-Phosphate              |                |                  | EPA 335.4 Rev 1.0-1993                                                    | mg/L  | .005       | .002  |
| Phenol                       |                |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                     | mg/L  | .02        | .01   |
| Sulfide                      |                |                  | EPA 420.4 1983                                                            | mg/L  | .010       | .004  |
| Hexavalent Chromium          |                |                  | SM22 <sup>nd</sup> 4500 S2 F                                              | mg/L  | 5.0        | .50   |
| TPO <sub>4</sub>             |                |                  | SM22 <sup>nd</sup> 3500 - Cr-B                                            | mg/L  | .02        | .007  |
| Oil & Grease                 |                |                  | SM22 <sup>nd</sup> 4500 P E + SM22th 4500 P B.5                           | mg/L  | .02        | .010  |
| BOD                          |                |                  | EPA 1664A Gravimetric Extraction                                          | mg/L  | 5.0        | 3.0   |
| COD                          |                |                  | SM22 <sup>nd</sup> 5210B                                                  | mg/L  | 3.0        | 2.0   |
| TOC                          | 11-7-14 (11-7) | ML               | SM22 <sup>nd</sup> 5220D                                                  | mg/L  | 20         | 6.0   |
| Dissolved Selenium           |                |                  | SM22 <sup>nd</sup> 5310B                                                  | mg/L  | 5.0        | 1.0   |
| Total Selenium               |                |                  | SM22 <sup>nd</sup> 3113 B                                                 | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                |                  | SM22 <sup>nd</sup> 3113 B                                                 | mg/L  | .005       | .0006 |
| Chromium                     |                |                  | SM22 <sup>nd</sup> 3113 B                                                 | mg/L  | .005       | .0006 |
| Dissolved Chromium           |                |                  | SM22 <sup>nd</sup> 3113 B                                                 | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                |                  | SM22 <sup>nd</sup> 3113 B                                                 | mg/L  | .001       | .0002 |
| Total Recoverable Selenium   |                |                  | SM22 <sup>nd</sup> 3114B                                                  | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                |                  | SM22 <sup>nd</sup> 3114B                                                  | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11-10-14      | Re               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11-10-14      | Re               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Chromium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-Cl-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           |               |                  | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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# Sturm Environmental Services

STURM ENVIRONMENTAL  
BRUSHY FORK ROAD  
BRIDGEPORT, WV 26330  
PHONE: 304-623-6549  
FAX: 304-623-6552

STURM ENVIRONMENTAL SERVICES  
610 D STREET  
SO. CHARLESTON, WV 25303  
PHONE: 304-744-9864  
FAX: 304-744-7866

MAILING ADDRESSES ARE LISTED BELOW

REPORT TO: Client Name:

Address:

City/State/Zip:

Contact Person:

Telephone Number:

Email Address:

Sampler Name: (Print)

Sampler Signature:

Project Name:

Special Reporting:

BILL TO: Client Name:

Address:

City/State/Zip:

Contact Person:

Telephone Number:

Email Address:

Purchase Order #:

TURN AROUND TIME:

Standard

RUSH (pre-scheduled; surcharges may apply) Please Check One

1 DAY 2 DAY 3 DAY

Fax Results

Email Results

Date Needed

| START DATE | START TIME | END DATE | END TIME | GRAB SAMPLE |      | PRESERVATIVE |     | MATRIX |                                        |                                      |      |                  |             | ANALYZE FOR: |                |        |      |                  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|            |            |          |          | DATE        | TIME | OTHER        | HCl | NaOH   | H <sub>2</sub> SO <sub>4</sub> Plastic | H <sub>2</sub> SO <sub>4</sub> Glass | None | HNO <sub>3</sub> | Groundwater | Wastewater   | Drinking Water | Sludge | Soil | Other (specify): |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Field Temp (F° or C°) circle one  
Field Chlorine (mg/L or ug/L) circle one  
Field DO  
Field Conductivity  
Flow (gpm, cfs, mgd) circle one  
Field pH  
# of Bottles

9.7  
8.4  
7.7  
8.0  
8.4

Comments: Collected 915 14 2779 14

Records retained for 5 years

|                  |         |      |                |         |      |                    |                    |                           |                      |
|------------------|---------|------|----------------|---------|------|--------------------|--------------------|---------------------------|----------------------|
| Relinquished by: | Date    | Time | Received by:   | Date    | Time | Temp upon Receipt: | Bottles Preserved? | Temperature Upon Receipt: | Laboratory Comments: |
| James Cable      | 11-5-14 | 1127 | Richard Fisher | 11/5/14 | 1127 | 2.7                | Y                  | 0.3                       |                      |
| James Cable      | 11/5/14 | 1345 | K. Cable       | 11/5/14 | 1345 |                    |                    |                           |                      |

[illegible]

Office of Oil &amp; Gas

DEC 12 2014

**COMPANY:** H.G. ENERGY, LLC.

DATE/TIME SAMPLED: 11-05-11 1525

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-05-14 1810

SAMPLED BY: K. WILLIAMS / C. ROSS

LABORATORY ID: HGE 141105-A1

[illegible]

**\*Client Provided**

**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

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**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

DATE/TIME SAMPLED: 11-05-11, 1525

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-05-14 1810

SAMPLED BY: K. WILLIAMS / C. ROSS

LABORATORY ID: HGE 141105-A1

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

Received  
Office of Oil & Gas

DEC 12 2014

APPROVED

/ED Brenda

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-05-14 1525

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-05-14 1810

ANALYST: SB/MC

DATE & TIME ANALYZED: 11-05-14 1818

METHOD: 3

| SAMPLE ID        | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.       |
|------------------|--------------------|------------|-------------------|---------------|
| WILLIE KING BARN | ABSENT             | ABSENT     | 11-05-14 1525     | HGE 141105-A1 |
|                  |                    |            |                   |               |
|                  |                    |            |                   |               |
|                  |                    |            |                   |               |
|                  |                    |            |                   |               |
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|                  |                    |            |                   |               |
|                  |                    |            |                   |               |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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DEC 12 2014

\* Client provided

  
Approved

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Clover

Wolf Summit Water Sampling UIC 2014

Residence

Name Willie King Bana

Address 387 Edgall Fl

Phone \_\_\_\_\_

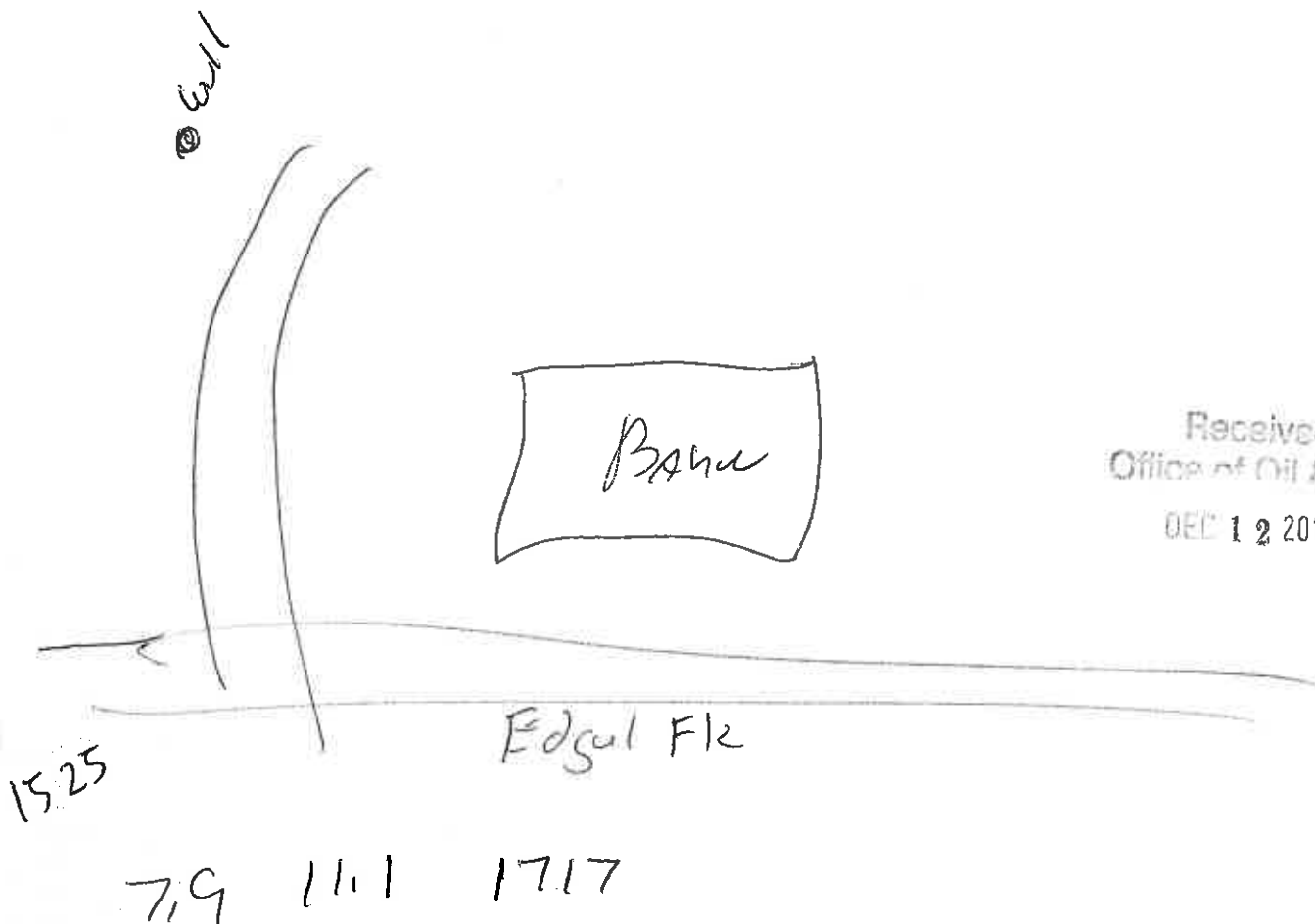
Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 43 16.53

Long 81 16 25.92

Provide sketch below of approximate location of dwelling(s ) and water wells(s)



Received  
Office of Oil & Gas  
DEC 12 2014

# REI Consultants, Inc. - Analytical Report

WO#: 1411929

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/5/2014 3:25:00 PM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014            |
| <b>Lab ID:</b>           | 1411929-03A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14194 WILLIE KING BARN       | <b>Site ID:</b>         |                      |

| Analysis | Result | MDL | PQL | MCL Qual | Units | Prep Date | Date Analyzed | NELAC |
|----------|--------|-----|-----|----------|-------|-----------|---------------|-------|
|----------|--------|-----|-----|----------|-------|-----------|---------------|-------|

## SEMI-VOLATILE RANGE ORGANICS

Method: SW8015C (2000)

Analyst: CL

|                    |      |    |          |    |      |                 |                 |       |
|--------------------|------|----|----------|----|------|-----------------|-----------------|-------|
| TPH (Diesel Range) | ND   | NA | 0.12     | NA | mg/L | 11/12/14 9:47AM | 11/13/14 7:08AM | PA/VA |
| TPH (Oil Range)    | ND   | NA | 0.31     | NA | mg/L | 11/12/14 9:47AM | 11/13/14 7:08AM |       |
| Surr: o-Terphenyl  | 98.6 | NA | 28.3-152 | NA | %REC | 11/12/14 9:47AM | 11/13/14 7:08AM |       |

## DISSOLVED GASES

Method: GC-FID

Analyst: JC

|         |       |    |      |    |      |  |                  |  |
|---------|-------|----|------|----|------|--|------------------|--|
| Methane | 1,540 | NA | 200  | NA | µg/L |  | 11/18/14 3:33PM  |  |
| Ethane  | ND    | NA | 15.0 | NA | µg/L |  | 11/18/14 11:08AM |  |
| Propane | ND    | NA | 20.0 | NA | µg/L |  | 11/18/14 11:08AM |  |
| Butane  | ND    | NA | 25.0 | NA | µg/L |  | 11/18/14 11:08AM |  |

## VOLATILE RANGE ORGANICS

Method: SW8015C (2000)

Analyst: CB

|                          |      |    |          |    |      |                 |                 |       |
|--------------------------|------|----|----------|----|------|-----------------|-----------------|-------|
| TPH (Gasoline Range)     | ND   | NA | 0.500    | NA | mg/L | 11/10/14 2:04PM | 11/11/14 6:44AM | PA/VA |
| Surr: 2,5-Dibromotoluene | 92.9 | NA | 37.2-152 | NA | %REC | 11/10/14 2:04PM | 11/11/14 6:44AM |       |

## VOLATILE ORGANIC COMPOUNDS

Method: SW8021B (1996)

Analyst: CB

|                              |      |    |          |    |      |                 |                 |       |
|------------------------------|------|----|----------|----|------|-----------------|-----------------|-------|
| Benzene                      | ND   | NA | 1.00     | NA | µg/L | 11/10/14 2:04PM | 11/11/14 6:44AM | PA/VA |
| Toluene                      | ND   | NA | 1.00     | NA | µg/L | 11/10/14 2:04PM | 11/11/14 6:44AM | PA/VA |
| Ethylbenzene                 | ND   | NA | 1.00     | NA | µg/L | 11/10/14 2:04PM | 11/11/14 6:44AM | PA/VA |
| m,p-Xylene                   | ND   | NA | 2.00     | NA | µg/L | 11/10/14 2:04PM | 11/11/14 6:44AM | PA/VA |
| o-Xylene                     | ND   | NA | 1.00     | NA | µg/L | 11/10/14 2:04PM | 11/11/14 6:44AM | PA/VA |
| Surr: 1,1,1-Trifluorotoluene | 98.0 | NA | 61.2-135 | NA | %REC | 11/10/14 2:04PM | 11/11/14 6:44AM |       |

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DEC 12 2014



DATE/TIME SAMPLED: 11-05-17 1540

11-05-14 1540

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-05-14 1810

**SAMPLED BY: K. WILLIAMS / C. ROSS**

LABORATORY ID: HGE 141105-A2

**\*Client Provided**

**\*\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

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**CHARLESTON BRANCH—**POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25309-0337 • (304) 744-9864

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

2010

SPRING 2000

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2 Bunt

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-05-14 1540

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-05-14 1810

ANALYST: SB/MC

DATE & TIME ANALYZED: 11-05-14 1818

METHOD: 3

| SAMPLE ID   | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.       |
|-------------|--------------------|------------|-------------------|---------------|
| JUDY ZIGLER | ABSENT             | ABSENT     | 11-05-14 1540     | HGE 141105-A2 |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
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|             |                    |            | Received          |               |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- 1 – Coliform, Fecal (MF) 9222 D
- 2 – Coliform, Fecal (MPN) COLILERT 18
- 3 – Coliform, Total (MPN) COLILERT
- 4 – Coliform, Total (P/A) 9223 B
- 5 – Heterotrophic Plate Count (HPC) 9215 B

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

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Clower

~~Wolf Summit~~ Water Sampling UIC 2014

Residence

Name Dodge Ziegler

Address 887 Edgel Fl

Phone \_\_\_\_\_

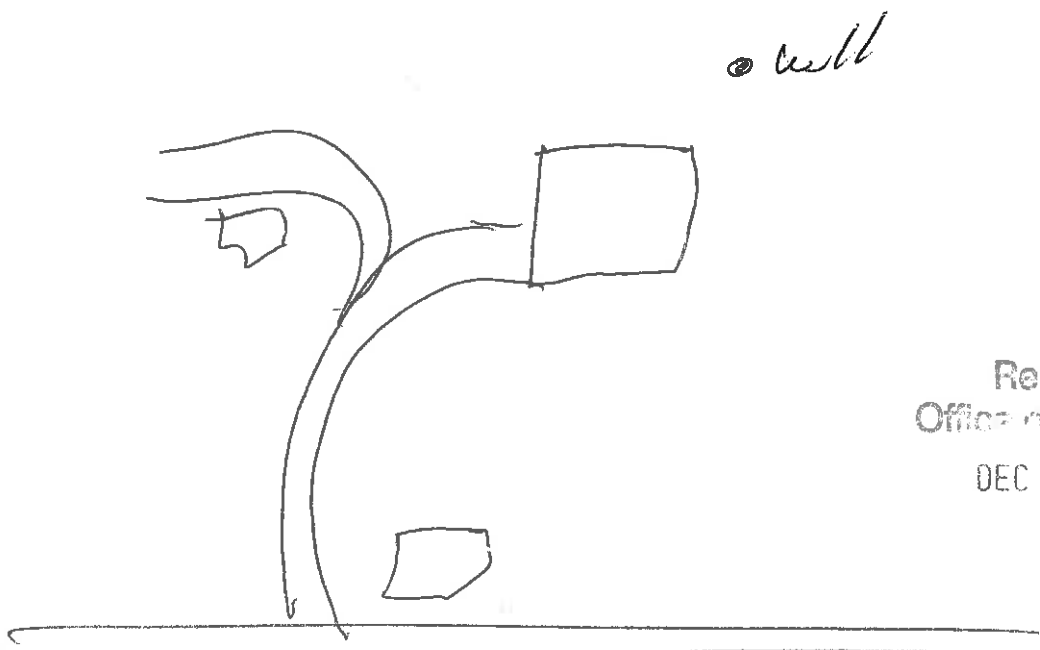
Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 30 43 19.64

Long 81 16 26.55

Provide sketch below of approximate location of dwelling(s) and water wells(s)



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1340

Edgel Fl

8.2 14.9 581

# REI Consultants, Inc. - Analytical Report

WO#: 1411929

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/5/2014 3:40:00 PM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014            |
| <b>Lab ID:</b>           | 1411929-04A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14195 JUDY ZIGLER            | <b>Site ID:</b>         |                      |

| Analysis                     | Result | MDL | PQL                    | MCL Qual | Units | Prep Date       | Date Analyzed    | NELAC |
|------------------------------|--------|-----|------------------------|----------|-------|-----------------|------------------|-------|
| SEMI-VOLATILE RANGE ORGANICS |        |     | Method: SW8015C (2000) |          |       | Analyst: CL     |                  |       |
| TPH (Diesel Range)           | ND     | NA  | 0.12                   | NA       | mg/L  | 11/12/14 9:47AM | 11/13/14 7:41AM  | PAVA  |
| TPH (Oil Range)              | ND     | NA  | 0.30                   | NA       | mg/L  | 11/12/14 9:47AM | 11/13/14 7:41AM  |       |
| Surr: o-Terphenyl            | 93.0   | NA  | 28.3-152               | NA       | %REC  | 11/12/14 9:47AM | 11/13/14 7:41AM  |       |
| DISSOLVED GASES              |        |     | Method: GC-FID         |          |       | Analyst: JC     |                  |       |
| Methane                      | ND     | NA  | 10.0                   | NA       | µg/L  |                 | 11/18/14 11:17AM |       |
| Ethane                       | ND     | NA  | 15.0                   | NA       | µg/L  |                 | 11/18/14 11:17AM |       |
| Propane                      | ND     | NA  | 20.0                   | NA       | µg/L  |                 | 11/18/14 11:17AM |       |
| Butane                       | ND     | NA  | 25.0                   | NA       | µg/L  |                 | 11/18/14 11:17AM |       |
| VOLATILE RANGE ORGANICS      |        |     | Method: SW8015C (2000) |          |       | Analyst: CB     |                  |       |
| TPH (Gasoline Range)         | ND     | NA  | 0.500                  | NA       | mg/L  | 11/10/14 2:04PM | 11/11/14 7:16AM  | PAVA  |
| Surr: 2,5-Dibromotoluene     | 95.1   | NA  | 37.2-152               | NA       | %REC  | 11/10/14 2:04PM | 11/11/14 7:16AM  |       |
| VOLATILE ORGANIC COMPOUNDS   |        |     | Method: SW8021B (1996) |          |       | Analyst: CB     |                  |       |
| Benzene                      | ND     | NA  | 1.00                   | NA       | µg/L  | 11/10/14 2:04PM | 11/11/14 7:16AM  | PAVA  |
| Toluene                      | ND     | NA  | 1.00                   | NA       | µg/L  | 11/10/14 2:04PM | 11/11/14 7:16AM  | PAVA  |
| Ethylbenzene                 | ND     | NA  | 1.00                   | NA       | µg/L  | 11/10/14 2:04PM | 11/11/14 7:16AM  | PAVA  |
| m,p-Xylene                   | ND     | NA  | 2.00                   | NA       | µg/L  | 11/10/14 2:04PM | 11/11/14 7:16AM  | PAVA  |
| o-Xylene                     | ND     | NA  | 1.00                   | NA       | µg/L  | 11/10/14 2:04PM | 11/11/14 7:16AM  | PAVA  |
| Surr: 1,1,1-Trifluorotoluene | 96.2   | NA  | 61.2-135               | NA       | %REC  | 11/10/14 2:04PM | 11/11/14 7:16AM  |       |

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**\*Client Provided**

**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

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LABORATORY ID: HGE 141105-A3

[illegible]

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-05-14 1504

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-05-14 1810

ANALYST: SB/MC

DATE & TIME ANALYZED: 11-05-14 1818

METHOD: 3

| SAMPLE ID   | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.       |
|-------------|--------------------|------------|-------------------|---------------|
| TIMOTHY MAY | ABSENT             | ABSENT     | 11-05-14 1504     | HGE 141105-A3 |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
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|             |                    |            |                   |               |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- 1 – Coliform, Fecal (MF) 9222 D
- 2 – Coliform, Fecal (MPN) COLILERT 18
- 3 – Coliform, Total (MPN) COLILERT
- 4 – Coliform, Total (P/A) 9223 B
- 5 – Heterotrophic Plate Count (HPC) 9215 B

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DEC 12 2014

*D. Bunn*  
Approved

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

*Claven*  
Wolf Summit Water Sampling UIC 2014

Residence

Name Timothy D May

Address 242 Edgely Fork Road

Phone \_\_\_\_\_

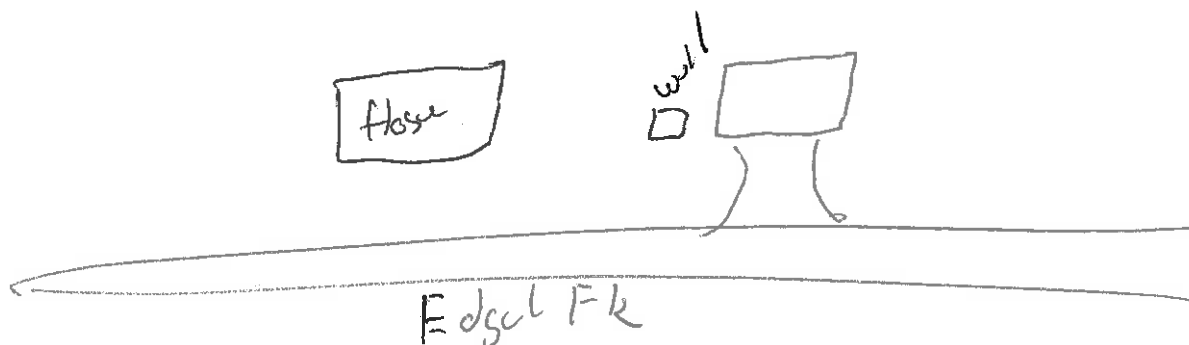
Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 43 6103

Long 81 16 39.39

Provide sketch below of approximate location of dwelling(s ) and water wells(s)



1,04  
7.9  
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524

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# REI Consultants, Inc. - Analytical Report

WO#: 1411929

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/5/2014 3:04:00 PM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014            |
| <b>Lab ID:</b>           | 1411929-05A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14196 TIMOTHY MAY            | <b>Site ID:</b>         |                      |

| Analysis | Result | MDL | PQL | MCL | Qual | Units | Prep Date | Date Analyzed | NELAC |
|----------|--------|-----|-----|-----|------|-------|-----------|---------------|-------|
|----------|--------|-----|-----|-----|------|-------|-----------|---------------|-------|

## SEMI-VOLATILE RANGE ORGANICS

Method: SW8015C (2000)

Analyst: CL

|                    |      |    |          |    |  |      |                 |                 |       |
|--------------------|------|----|----------|----|--|------|-----------------|-----------------|-------|
| TPH (Diesel Range) | ND   | NA | 0.14     | NA |  | mg/L | 11/12/14 9:47AM | 11/13/14 8:14AM | PA/VA |
| TPH (Oil Range)    | ND   | NA | 0.34     | NA |  | mg/L | 11/12/14 9:47AM | 11/13/14 8:14AM |       |
| Surr: o-Terphenyl  | 98.8 | NA | 28.3-162 | NA |  | %REC | 11/12/14 9:47AM | 11/13/14 8:14AM |       |

## DISSOLVED GASES

Method: GC-FID

Analyst: JC

|         |     |    |      |    |  |      |  |                  |  |
|---------|-----|----|------|----|--|------|--|------------------|--|
| Methane | 363 | NA | 100  | NA |  | µg/L |  | 11/18/14 3:41PM  |  |
| Ethane  | ND  | NA | 15.0 | NA |  | µg/L |  | 11/18/14 11:23AM |  |
| Propane | ND  | NA | 20.0 | NA |  | µg/L |  | 11/18/14 11:23AM |  |
| Butane  | ND  | NA | 25.0 | NA |  | µg/L |  | 11/18/14 11:23AM |  |

## VOLATILE RANGE ORGANICS

Method: SW8015C (2000)

Analyst: CB

|                          |      |    |          |    |  |      |                 |                 |       |
|--------------------------|------|----|----------|----|--|------|-----------------|-----------------|-------|
| TPH (Gasoline Range)     | ND   | NA | 0.500    | NA |  | mg/L | 11/10/14 2:04PM | 11/11/14 7:48AM | PA/VA |
| Surr: 2,5-Dibromotoluene | 98.2 | NA | 37.2-152 | NA |  | %REC | 11/10/14 2:04PM | 11/11/14 7:48AM |       |

## VOLATILE ORGANIC COMPOUNDS

Method: SW8021B (1996)

Analyst: CB

|                              |      |    |          |    |  |      |                 |                 |       |
|------------------------------|------|----|----------|----|--|------|-----------------|-----------------|-------|
| Benzene                      | ND   | NA | 1.00     | NA |  | µg/L | 11/10/14 2:04PM | 11/11/14 7:48AM | PA/VA |
| Toluene                      | ND   | NA | 1.00     | NA |  | µg/L | 11/10/14 2:04PM | 11/11/14 7:48AM | PA/VA |
| Ethylbenzene                 | ND   | NA | 1.00     | NA |  | µg/L | 11/10/14 2:04PM | 11/11/14 7:48AM | PA/VA |
| m,p-Xylene                   | ND   | NA | 2.00     | NA |  | µg/L | 11/10/14 2:04PM | 11/11/14 7:48AM | PA/VA |
| o-Xylene                     | ND   | NA | 1.00     | NA |  | µg/L | 11/10/14 2:04PM | 11/11/14 7:48AM | PA/VA |
| Surr: 1,1,1-Trifluorotoluene | 95.3 | NA | 61.2-135 | NA |  | %REC | 11/10/14 2:04PM | 11/11/14 7:48AM |       |

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DEC 12 2014

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**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

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**APPROVED**

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864



**COMPANY:**

**SAMPLE ID:**

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE/TIME SAMPLED: 11-05-14 1349

**DATE/TIME RECEIVED:** 11-05-14 1810

LABORATORY ID: HGE 141105-A4

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

**Revised**  
**Oil & Gas**

DEC 12 2014

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**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-05-14 1349

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-05-14 1810

ANALYST: SB/MC

DATE & TIME ANALYZED: 11-05-14 1818

METHOD: 3

| SAMPLE ID        | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.       |
|------------------|--------------------|------------|-------------------|---------------|
| ANTHONY PIASECKI | PRESENT            | PRESENT    | 11-05-14 1349     | HGE 141105-A4 |
|                  |                    |            |                   |               |
|                  |                    |            |                   |               |
|                  |                    |            |                   |               |
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Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

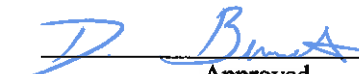
- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

  
Approved

Clover Water Sampling UIC 2014

Residence

Name Anthony PIASECKI

Address 2169 VANDALE FORK

Phone 304-927-3464

Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 42 11.47

Long 81 17 23.91

Provide sketch below of approximate location of dwelling(s ) and water wells(s)

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Dec 12 2014

72 11.9 447

1349

# REI Consultants, Inc. - Analytical Report

WO#: 1411929

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/5/2014 1:49:00 PM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014            |
| <b>Lab ID:</b>           | 1411929-06A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14197 ANTHONY PIASECKI       | <b>Site ID:</b>         |                      |

| Analysis                            | Result | MDL | PQL      | MCL | Qual | Units | Prep Date                     | Date Analyzed    | NELAC              |
|-------------------------------------|--------|-----|----------|-----|------|-------|-------------------------------|------------------|--------------------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     |          |     |      |       |                               |                  |                    |
|                                     |        |     |          |     |      |       | <b>Method: SW8015C (2000)</b> |                  | <b>Analyst: CL</b> |
| TPH (Diesel Range)                  | ND     | NA  | 0.12     | NA  |      | mg/L  | 11/12/14 9:47AM               | 11/13/14 7:41AM  | PA/VA              |
| TPH (Oil Range)                     | ND     | NA  | 0.31     | NA  |      | mg/L  | 11/12/14 9:47AM               | 11/13/14 7:41AM  |                    |
| Surr: o-Terphenyl                   | 94.8   | NA  | 28.3-152 | NA  |      | %REC  | 11/12/14 9:47AM               | 11/13/14 7:41AM  |                    |
| <b>DISSOLVED GASES</b>              |        |     |          |     |      |       |                               |                  |                    |
|                                     |        |     |          |     |      |       | <b>Method: GC-FID</b>         |                  | <b>Analyst: JC</b> |
| Methane                             | 159    | NA  | 100      | NA  |      | µg/L  |                               | 11/18/14 5:48PM  |                    |
| Ethane                              | ND     | NA  | 15.0     | NA  |      | µg/L  |                               | 11/18/14 11:29AM |                    |
| Propane                             | ND     | NA  | 20.0     | NA  |      | µg/L  |                               | 11/18/14 11:29AM |                    |
| Butane                              | ND     | NA  | 25.0     | NA  |      | µg/L  |                               | 11/18/14 11:29AM |                    |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     |          |     |      |       |                               |                  |                    |
|                                     |        |     |          |     |      |       | <b>Method: SW8015C (2000)</b> |                  | <b>Analyst: CB</b> |
| TPH (Gasoline Range)                | ND     | NA  | 0.500    | NA  |      | mg/L  | 11/10/14 2:04PM               | 11/11/14 8:20AM  | PA/VA              |
| Surr: 2,5-Dibromotoluene            | 93.9   | NA  | 37.2-152 | NA  |      | %REC  | 11/10/14 2:04PM               | 11/11/14 8:20AM  |                    |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     |          |     |      |       |                               |                  |                    |
|                                     |        |     |          |     |      |       | <b>Method: SW8021B (1996)</b> |                  | <b>Analyst: CB</b> |
| Benzene                             | ND     | NA  | 1.00     | NA  |      | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:20AM  | PA/VA              |
| Toluene                             | ND     | NA  | 1.00     | NA  |      | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:20AM  | PA/VA              |
| Ethylbenzene                        | ND     | NA  | 1.00     | NA  |      | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:20AM  | PA/VA              |
| m,p-Xylene                          | ND     | NA  | 2.00     | NA  |      | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:20AM  | PA/VA              |
| o-Xylene                            | ND     | NA  | 1.00     | NA  |      | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:20AM  | PA/VA              |
| Surr: 1,1,1-Trifluorotoluene        | 98.5   | NA  | 61.2-135 | NA  |      | %REC  | 11/10/14 2:04PM               | 11/11/14 8:20AM  |                    |

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LABORATORY ID: HGE 141105-A5

[illegible]

DATE/TIME SAMPLED: 11-05-17 1504

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-05-14 1810

SAMPLED BY: K. WILLIAMS / C. ROSS

LABORATORY ID: HGE 141105-A5

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

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Office of Oil &amp; Gas

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APPROVED

VED Burt

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-05-14 1328

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-05-14 1810

ANALYST: SB/MC

DATE & TIME ANALYZED: 11-05-14 1818

METHOD: 3

| SAMPLE ID     | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.       |
|---------------|--------------------|------------|-------------------|---------------|
| JAMES O'BRIEN | PRESENT            | ABSENT     | 11-05-14 1328     | HGE 141105-A5 |
|               |                    |            |                   |               |
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Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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Office of Oil & Gas

DEC 12 2014

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

  
Approved

Clover Water Sampling UIC 2014

Residence

Name James O'Brien

Address 88 high st. Vincent OH 43784

Phone 304-377-8262

Depth of well ( if known- estimate if not ) 80 Ft.

GPS Coordinates

Lat 38 43 0.65

Long 81 17 27.19

Provide sketch below of approximate location of dwelling(s ) and water wells(s)

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Office of Oil & Gas

DEC 12 2014

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# REI Consultants, Inc. - Analytical Report

WO#: 1411929

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/5/2014 1:28:00 PM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014            |
| <b>Lab ID:</b>           | 1411929-07A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14198 JAMES O'BRIEN          | <b>Site ID:</b>         |                      |

| Analysis                            | Result | MDL | PQL      | MCL Qual | Units | Prep Date                     | Date Analyzed    | NELAC              |
|-------------------------------------|--------|-----|----------|----------|-------|-------------------------------|------------------|--------------------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     |          |          |       |                               |                  |                    |
|                                     |        |     |          |          |       | <b>Method: SW8015C (2000)</b> |                  | <b>Analyst: CL</b> |
| TPH (Diesel Range)                  | ND     | NA  | 0.12     | NA       | mg/L  | 11/12/14 9:47AM               | 11/13/14 8:14AM  | PA/VA              |
| TPH (Oil Range)                     | ND     | NA  | 0.30     | NA       | mg/L  | 11/12/14 9:47AM               | 11/13/14 8:14AM  |                    |
| Surr: o-Terphenyl                   | 73.5   | NA  | 28.3-152 | NA       | %REC  | 11/12/14 9:47AM               | 11/13/14 8:14AM  |                    |
| <b>DISSOLVED GASES</b>              |        |     |          |          |       |                               |                  |                    |
|                                     |        |     |          |          |       | <b>Method: GC-FID</b>         |                  | <b>Analyst: JC</b> |
| Methane                             | 777    | NA  | 100      | NA       | µg/L  |                               | 11/18/14 3:57PM  |                    |
| Ethane                              | ND     | NA  | 15.0     | NA       | µg/L  |                               | 11/18/14 11:36AM |                    |
| Propane                             | ND     | NA  | 20.0     | NA       | µg/L  |                               | 11/18/14 11:36AM |                    |
| Butane                              | ND     | NA  | 25.0     | NA       | µg/L  |                               | 11/18/14 11:36AM |                    |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     |          |          |       |                               |                  |                    |
|                                     |        |     |          |          |       | <b>Method: SW8015C (2000)</b> |                  | <b>Analyst: CB</b> |
| TPH (Gasoline Range)                | ND     | NA  | 0.500    | NA       | mg/L  | 11/10/14 2:04PM               | 11/11/14 8:51AM  | PA/VA              |
| Surr: 2,5-Dibromotoluene            | 96.2   | NA  | 37.2-152 | NA       | %REC  | 11/10/14 2:04PM               | 11/11/14 8:51AM  |                    |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     |          |          |       |                               |                  |                    |
|                                     |        |     |          |          |       | <b>Method: SW8021B (1936)</b> |                  | <b>Analyst: CB</b> |
| Benzene                             | ND     | NA  | 1.00     | NA       | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:51AM  | PA/VA              |
| Toluene                             | ND     | NA  | 1.00     | NA       | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:51AM  | PA/VA              |
| Ethylbenzene                        | ND     | NA  | 1.00     | NA       | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:51AM  | PA/VA              |
| m,p-Xylene                          | ND     | NA  | 2.00     | NA       | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:51AM  | PA/VA              |
| o-Xylene                            | ND     | NA  | 1.00     | NA       | µg/L  | 11/10/14 2:04PM               | 11/11/14 8:51AM  | PA/VA              |
| Surr: 1,1,1-Trifluorotoluene        | 97.0   | NA  | 61.2-135 | NA       | %REC  | 11/10/14 2:04PM               | 11/11/14 8:51AM  |                    |

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COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED  | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|----------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11.6.14        | KH               | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 – 10.0 | .1    |
| Hot Acid                     |                |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | 1     |
| Mineral Acid                 |                |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | 1     |
| Alkalinity                   |                |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | 1     |
| NH <sub>3</sub> N            |                |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |                |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |                |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |                |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | 1     |
| TKN                          |                |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS – Total Suspended Solids | 11.6.14        | AD/OK            | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | 4     |
| TDS – Total Dissolved Solids |                |                  | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | 4     |
| Sulfate                      | 11-7-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-7-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |                |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |                |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |                |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |                |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/12/14       | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/12/14       | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Chlorine (calc)              |                |                  | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | 1     |
| Iron                         | 11/12/14       | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Iron               |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/12/14       | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11-5-14        | SW               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |                |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |                |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |                |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |                |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |                |                  | SM22 <sup>nd</sup> 3500 – Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |                |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |                |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |                |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |                |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          | 11-7-14 (12+5) | new              | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |                |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

Office of Oil & Gas

DEC 12 2014

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11-10-14      | Re               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/12/14      | TW               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Chromium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-Cl-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           |               |                  | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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# CHAIN OF CUSTODY RECORD



**Research Environmental & Industrial Consultants, Inc.**  
**MAIN LABORATORY & CORPORATE HEADQUARTERS:**  
 P.O. Box 286 • 225 Industrial Park Rd. Beaver, WV 25813  
 800-999-0105 • 304-255-2503 • www.reiclabs.com

**MID-OHIO VALLEY**  
 Service Center  
 101 17th Street  
 Ashland, KY 41101  
 606-393-5027

**SHENANDOAH**  
 Service Center  
 1557 Commerce Rd., Ste 201  
 Verona, VA 24482  
 540-248-0183

**ROANOKE**  
 Service Center  
 3029-C Peters Creek Rd  
 Roanoke, VA 24019  
 540-771-1276

**MORGANTOWN**  
 Service Center  
 16 Commerce Drive  
 Westover, WV 26001  
 304-281-5861

## SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME

☒ NORMAL

☐ 5 DAY

☐ 3 DAY

☐ 2 DAY

☐ 1 DAY

\*Run work needs prior laboratory approval and will incur additional charges

| SAMPLE ID | DATE & TIME OF COLLECTION | ANALYSIS REQUESTED | ANALYSIS & METHOD REQUESTED | SAMPLE COMMENTS |
|-----------|---------------------------|--------------------|-----------------------------|-----------------|
| 14192     | 11/17/14                  | 11:54 / 11:58      |                             |                 |
| 14193     | 11/17/14                  | 11:54 / 11:58      |                             |                 |
| 14194     | 11/17/14                  | 11:54 / 11:58      |                             |                 |
| 14195     | 11/17/14                  | 11:54 / 11:58      |                             |                 |
| 14196     | 11/17/14                  | 11:54 / 11:58      |                             |                 |
| 14197     | 11/17/14                  | 11:54 / 11:58      |                             |                 |
| 14198     | 11/17/14                  | 11:54 / 11:58      |                             |                 |

ENTER PRESERVATIVE CODE

- Preservative Codes:**
- 0 None
  - 1 Hydrochloric Acid
  - 2 Nitric Acid
  - 3 Sulfuric Acid
  - 4 Sodium Thiosulfate
  - 5 Sodium Hydroxide
  - 6 Sodium Arsenite
  - 7 Acetic Acid
  - 8 Sodium Bisulfate/Methanol
  - 9 Ammonium Chloride
  - 10
  - 11

(Use biphenyls for preservatives not listed)

COMMENTS:

All analytical requests are subject to REIC's Standard Terms and Conditions

Temperature at arrival

°C

°F

Y

N

Containers provided by: ☒ REIC ☐ Client

RECEIVED BY

DATE

TIME

INITIALS

FAX RESULTS

EMAIL RESULTS

LABORATORY ID: HGE 141106-A1

[illegible]

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**



D. Boud

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-06-14 1347

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-06-14 1810

ANALYST: ML/SB

DATE & TIME ANALYZED: 11-06-14 1815

METHOD: 3

| SAMPLE ID   | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.       |
|-------------|--------------------|------------|-------------------|---------------|
| DAVE BAILEY | PRESENT            | PRESENT    | 11-06-14 1347     | HGE 141106-A1 |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |
|             |                    |            |                   |               |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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*D. B...*  
Approved

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Clover

Wolf Summit Water Sampling UIC 2014

Residence

Name Dave Bailey

Address 3306 Clay Rd 7

Phone 304 927 5511

Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 44 17.21

Long 81 17 7.14

Provide sketch below of approximate location of dwelling(s ) and water wells(s)

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well

Clay Rd

1347 72 1818 719

# REI Consultants, Inc. - Analytical Report

WO#: 1411935

Date Reported: 11/19/2014

Client: STURM ENVIRONMENTAL SERVICES  
Project: H.G. ENERGY, LLC.  
Lab ID: 1411935-05A  
Client Sample ID: 14203 DAVE BAILEY

Collection Date: 11/6/2014 1:47:00 PM  
Date Received: 11/7/2014  
Matrix: Liquid  
Site ID:

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed   | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|-----------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                 |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.10                          | NA       | mg/L  | 11/12/14 5:47PM    | 11/13/14 9:06PM | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.25                          | NA       | mg/L  | 11/12/14 5:47PM    | 11/13/14 9:06PM |       |
| Surr: o-Terphenyl                   | 91.5   | NA  | 28.3-152                      | NA       | %REC  | 11/12/14 5:47PM    | 11/13/14 9:06PM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                 |       |
| Methane                             | ND     | NA  | 10.0                          | NA       | µg/L  |                    | 11/18/14 1:35PM |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/18/14 1:35PM |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/18/14 1:35PM |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/18/14 1:35PM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                 |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/10/14 2:04PM    | 11/12/14 6:42PM | PA/VA |
| Surr: 2,5-Dibromotoluene            | 90.0   | NA  | 37.2-152                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 6:42PM |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                 |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:42PM | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:42PM | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:42PM | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:42PM | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:42PM | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 92.3   | NA  | 61.2-135                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 6:42PM |       |

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DEC 12 2014



**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

DEC 12 2014



**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-06-14 1440

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-06-14 1810

ANALYST: ML/SB

DATE & TIME ANALYZED: 11-06-14 1815

METHOD: 3

| SAMPLE ID         | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.       |
|-------------------|--------------------|------------|-------------------|---------------|
| MICHAEL S. NUTTER | PRESENT            | PRESENT    | 11-06-14 1440     | HGE 141106-A2 |
|                   |                    |            |                   |               |
|                   |                    |            |                   |               |
|                   |                    |            |                   |               |
|                   |                    |            |                   |               |
|                   |                    |            |                   |               |
|                   |                    |            |                   |               |
|                   |                    |            |                   |               |
|                   |                    |            |                   |               |
|                   |                    |            |                   |               |

Microbiological analysis results will be discarded after 5 years

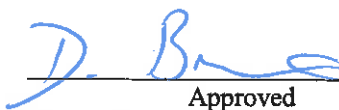
Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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DEC 12 2014

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

  
Approved

Clover

~~Wolf Summit~~ Water Sampling UIC 2014

Residence

Name

Michael S Winter

Address

3350 Spencer Wk Clay Rd

Phone

304 927 1368

Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat

33 44' 13.92

Long

81 17 3.59

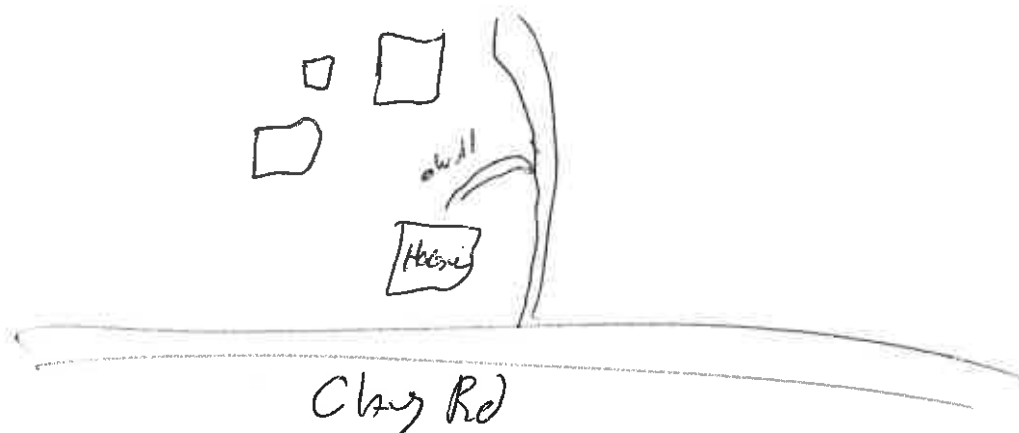
Provide sketch below of approximate location of dwelling(s) and water wells(s)

1440

7.7

12.4

471



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Oct 12 2014

# REI Consultants, Inc. - Analytical Report

WO#: 1411935

Date Reported: 11/19/2014

Client: STURM ENVIRONMENTAL SERVICES  
Project: H.G. ENERGY, LLC.  
Lab ID: 1411935-06A  
Client Sample ID: 14204 MICHAEL S. NUTTER

Collection Date: 11/6/2014 2:40:00 PM  
Date Received: 11/7/2014  
Matrix: Liquid  
Site ID:

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed   | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|-----------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                 |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.10                          | NA       | mg/L  | 11/12/14 5:47PM    | 11/13/14 9:39PM | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.25                          | NA       | mg/L  | 11/12/14 5:47PM    | 11/13/14 9:39PM |       |
| Surr: o-Terphenyl                   | 71.5   | NA  | 28.3-152                      | NA       | %REC  | 11/12/14 5:47PM    | 11/13/14 9:39PM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                 |       |
| Methane                             | ND     | NA  | 10.0                          | NA       | µg/L  |                    | 11/18/14 1:40PM |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/18/14 1:40PM |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/18/14 1:40PM |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/18/14 1:40PM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                 |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/10/14 2:04PM    | 11/12/14 7:14PM | PA/VA |
| Surr: 2,5-Dibromotoluene            | 91.3   | NA  | 37.2-152                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 7:14PM |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                 |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 7:14PM | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 7:14PM | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 7:14PM | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 7:14PM | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 7:14PM | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 95.3   | NA  | 61.2-135                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 7:14PM |       |

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COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED   | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|-----------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | (1/26) 11-10-14 | KH               | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 – 10.0 | .1    |
| Hot Acid                     |                 |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | 1     |
| Mineral Acid                 |                 |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | 1     |
| Alkalinity                   |                 |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | 1     |
| NH <sub>3</sub> N            |                 |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |                 |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |                 |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |                 |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | 1     |
| TKN                          |                 |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS – Total Suspended Solids | 11-7-14         | ANBL             | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | 4     |
| TDS – Total Dissolved Solids | ↓               | ↓                | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | 4     |
| Sulfate                      | 11-10-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-11-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                 |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Hardness (calc)              |                 |                  | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | 1     |
| Iron                         | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Iron               |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11-7-14         | SW               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |                 |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |                 |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |                 |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |                 |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |                 |                  | SM22 <sup>nd</sup> 3500 – Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |                 |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |                 |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |                 |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |                 |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          | 11-10-14 (1108) | SW               | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11-11-14      | RC               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/12/14      | TW               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Molybdenum                 |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  | H             |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-CL-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           |               |                  | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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LABORATORY ID: HGE 141106-3

[illegible]

DATE/TIME SAMPLED: 11-06-14 J857

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-06-14 1335

SAMPLED BY: K. WILLIAMS / C. ROSS

LABORATORY ID: HGE 141106-3

[illegible]

**\*Client Provided**

**\*\*See Attached:** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Office of  
the  
Attorney General  
of the State of New York

DEC 12 2014

APPROVED

D. Burnett

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-06-14 0857

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-06-14 1335

ANALYST: MW

DATE & TIME ANALYZED: 11-06-14 1345

METHOD: 3

| SAMPLE ID   | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|-------------|--------------------|------------|-------------------|--------------|
| RAY ELLIOTT | PRESENT            | ABSENT     | 11-06-14 0857     | HGE 141106-3 |
|             |                    |            |                   |              |
|             |                    |            |                   |              |
|             |                    |            |                   |              |
|             |                    |            |                   |              |
|             |                    |            |                   |              |
|             |                    |            |                   |              |
|             |                    |            |                   |              |
|             |                    |            |                   |              |
|             |                    |            |                   |              |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

1 – Coliform, Fecal (MF) 9222 D  
 2 – Coliform, Fecal (MPN) COLILERT 18  
 3 – Coliform, Total (MPN) COLILERT  
 4 – Coliform, Total (P/A) 9223 B  
 5 – Heterotrophic Plate Count (HPC) 9215 B

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DEC 12 2014



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\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Clawson

Wolf Summit Water Sampling UIC 2014

Residence

Name Ray Elliott

Address 543 Clover Rd

Phone 304-927-5889

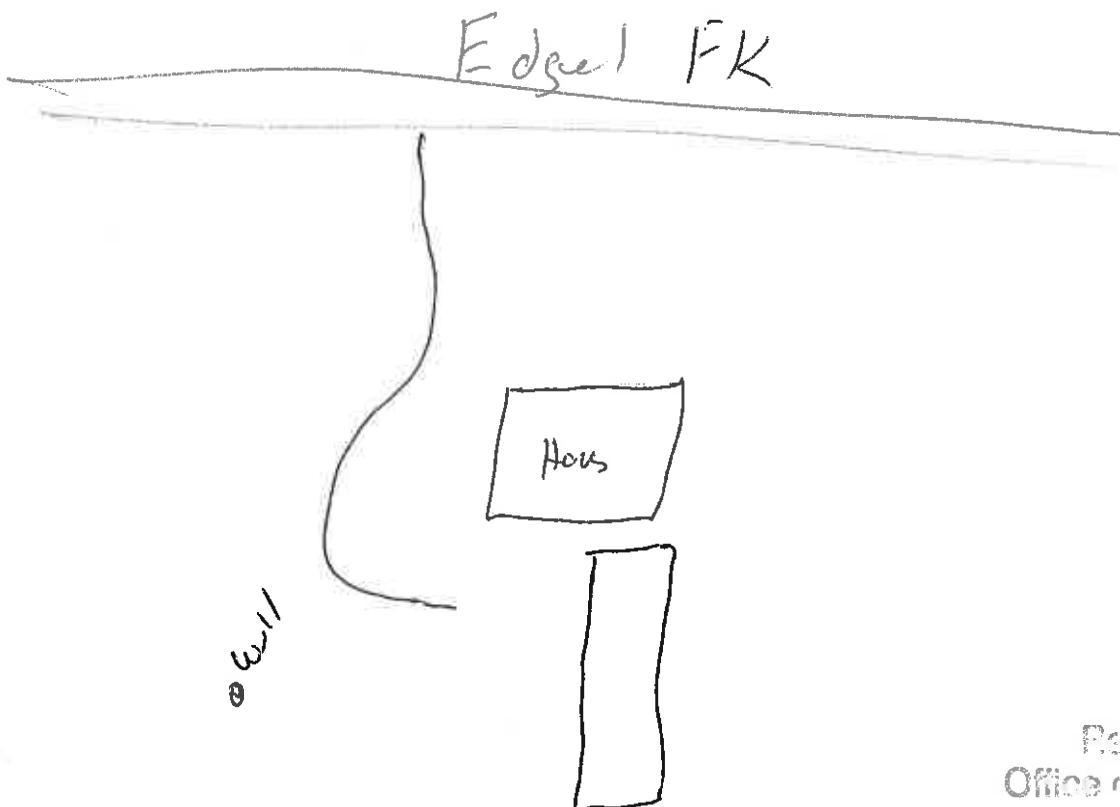
Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 43 29.78

Long 81 16 3.04

Provide sketch below of approximate location of dwelling(s) and water wells(s)



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DEC 1 2 2014

857 7.6 18.6 529

**REI Consultants, Inc. - Analytical Report**

WO#: 1411935

Date Reported: 11/19/2014

**Client:** STURM ENVIRONMENTAL SERVICES  
**Project:** H.G. ENERGY, LLC.  
**Lab ID:** 1411935-03A  
**Client Sample ID:** 14201 RAY ELLIOTT

**Collection Date:** 11/6/2014 8:53:00 AM  
**Date Received:** 11/7/2014  
**Matrix:** Liquid  
**Site ID:**

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.13                          | NA       | mg/L  | 11/12/14 9:47AM    | 11/13/14 5:30AM  | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.31                          | NA       | mg/L  | 11/12/14 9:47AM    | 11/13/14 5:30AM  |       |
| Surr: o-Terphenyl                   | 98.4   | NA  | 28.3-152                      | NA       | %REC  | 11/12/14 9:47AM    | 11/13/14 5:30AM  |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |       |
| Methane                             | ND     | NA  | 10.0                          | NA       | µg/L  |                    | 11/18/14 11:58AM |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/18/14 11:58AM |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/18/14 11:58AM |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/18/14 11:58AM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/10/14 2:04PM    | 11/12/14 5:39PM  | PA/VA |
| Surr: 2,5-Dibromotoluene            | 88.7   | NA  | 37.2-152                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 5:39PM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:39PM  | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:39PM  | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:39PM  | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:39PM  | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:39PM  | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 92.8   | NA  | 61.2-135                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 5:39PM  |       |

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**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864



**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE &amp; TIME SAMPLED: 11-06-14 1002

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE &amp; TIME RECEIVED: 11-06-14 1335

ANALYST: MW

DATE &amp; TIME ANALYZED: 11-06-14 1345

METHOD: 3

| SAMPLE ID   | TOTAL<br>COLIFORM<br>P/A | E. COLI<br>PA | DATE/TIME<br>SAMPLED | LOG<br>NO.   |
|-------------|--------------------------|---------------|----------------------|--------------|
| LACEY SMITH | PRESENT                  | PRESENT       | 11-06-14 1002        | HGE 141106-1 |
|             |                          |               |                      |              |
|             |                          |               |                      |              |
|             |                          |               |                      |              |
|             |                          |               |                      |              |
|             |                          |               |                      |              |
|             |                          |               |                      |              |
|             |                          |               |                      |              |
|             |                          |               |                      |              |

Microbiological analysis results will be discarded after 5 years

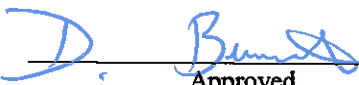
Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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DEC 12 2014

\* Client provided

  
Approved

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Clown

Wolf Summit Water Sampling UIC 2014

Residence

Name

Larry Smith

Address

558 ~~Beach Hill Rd~~ Bremen Hill

Phone

Depth of well ( if known- estimate if not )

GPS Coordinates

Lat

38 44 0.22

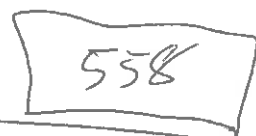
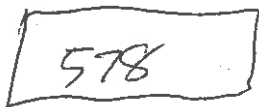
Long

81 16 9.86

Provide sketch below of approximate location of dwelling(s) and water wells(s)

James Neal

Same Well



well

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1002

717 M.4 056

# REI Consultants, Inc. - Analytical Report

WO#: 1411935

Date Reported: 11/19/2014

|                          |                              |                         |                       |
|--------------------------|------------------------------|-------------------------|-----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/6/2014 10:02:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014             |
| <b>Lab ID:</b>           | 1411935-01A                  | <b>Matrix:</b>          | Liquid                |
| <b>Client Sample ID:</b> | 14199 LACEY SMITH            | <b>Site ID:</b>         |                       |

| Analysis                            | Result | MDL | PQL                           | MCL | Qual | Units              | Prep Date       | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|-----|------|--------------------|-----------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |     |      | <b>Analyst: CL</b> |                 |                  |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.10                          | NA  |      | mg/L               | 11/12/14 5:47PM | 11/13/14 8:01PM  | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.25                          | NA  |      | mg/L               | 11/12/14 5:47PM | 11/13/14 8:01PM  |       |
| Surr: o-Terphenyl                   | 91.8   | NA  | 28.3-152                      | NA  |      | %REC               | 11/12/14 5:47PM | 11/13/14 8:01PM  |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |     |      | <b>Analyst: JC</b> |                 |                  |       |
| Methane                             | 1,270  | NA  | 200                           | NA  |      | µg/L               |                 | 11/18/14 4:03PM  |       |
| Ethane                              | ND     | NA  | 15.0                          | NA  |      | µg/L               |                 | 11/18/14 11:43AM |       |
| Propane                             | ND     | NA  | 20.0                          | NA  |      | µg/L               |                 | 11/18/14 11:43AM |       |
| Butane                              | ND     | NA  | 25.0                          | NA  |      | µg/L               |                 | 11/18/14 11:43AM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |     |      | <b>Analyst: CB</b> |                 |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA  |      | mg/L               | 11/10/14 2:04PM | 11/12/14 4:36PM  | PA/VA |
| Surr: 2,5-Dibromotoluene            | 95.0   | NA  | 37.2-152                      | NA  |      | %REC               | 11/10/14 2:04PM | 11/12/14 4:36PM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |     |      | <b>Analyst: CB</b> |                 |                  |       |
| Benzene                             | ND     | NA  | 1.00                          | NA  |      | µg/L               | 11/10/14 2:04PM | 11/12/14 4:36PM  | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA  |      | µg/L               | 11/10/14 2:04PM | 11/12/14 4:36PM  | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA  |      | µg/L               | 11/10/14 2:04PM | 11/12/14 4:36PM  | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA  |      | µg/L               | 11/10/14 2:04PM | 11/12/14 4:36PM  | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA  |      | µg/L               | 11/10/14 2:04PM | 11/12/14 4:36PM  | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 91.0   | NA  | 81.2-135                      | NA  |      | %REC               | 11/10/14 2:04PM | 11/12/14 4:36PM  |       |

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**COMPANY:** H.G. ENERGY, LLC.

DATE/TIME SAMPLED: 11-06-14 J921

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-06-14 1335

**SAMPLED BY: K. WILLIAMS / C. ROSS**

LABORATORY ID: HGE 141106-2

[illegible]

**\*Client Provided**

\*\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

**APPROVED**

ED Broad

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**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

DATE/TIME SAMPLED: 11-06-17 0921

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-06-14 1335

SAMPLED BY: K. WILLIAMS / C. ROSS

LABORATORY ID: HGE 141106-2

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

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**APPROVED**

DEC 12 2014



COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-06-14 0921

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-06-14 1335

ANALYST: MW

DATE & TIME ANALYZED: 11-06-14 1345

**METHOD:** 3

Received

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

|                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

Office of Oil &amp; Gas

DEC 12 2014

\* Client provided

**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

D. Bennett  
Approved

Clover

Well Summit Water Sampling UIC 2014

Residence

Name Jimmie Smith

Address 573 Banner Hill 579 same well

Phone 264-927-1135

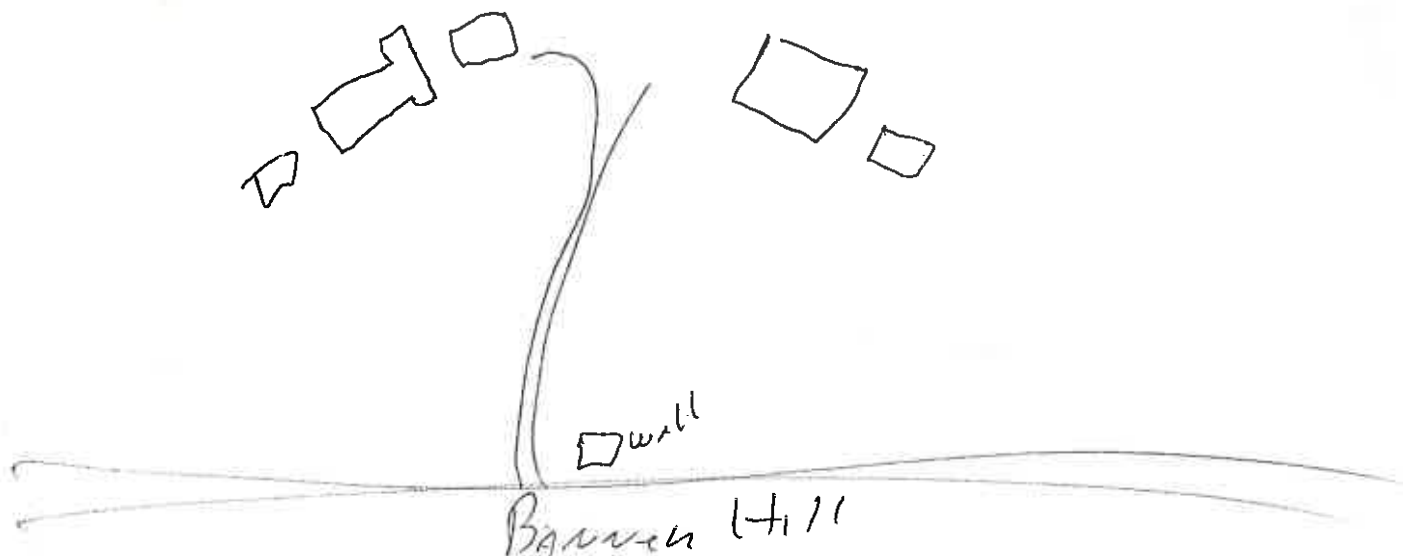
Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 44 5.50

Long 81 01 6 8.60

Provide sketch below of approximate location of dwelling(s) and water wells(s)



Received  
Office of Oil & Gas  
DEC 12 2014

921 7.9 13.4

# REI Consultants, Inc. - Analytical Report

WO#: 1411935

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/6/2014 9:21:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/7/2014            |
| <b>Lab ID:</b>           | 1411935-02A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14200 JIMMIE SMITH           | <b>Site ID:</b>         |                      |

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.10                          | NA       | mg/L  | 11/12/14 5:47PM    | 11/13/14 8:34PM  | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.25                          | NA       | mg/L  | 11/12/14 5:47PM    | 11/13/14 8:34PM  |       |
| Surr: o-Terphenyl                   | 91.2   | NA  | 28.3-152                      | NA       | %REC  | 11/12/14 5:47PM    | 11/13/14 8:34PM  |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |       |
| Methane                             | 306    | NA  | 100                           | NA       | µg/L  |                    | 11/18/14 4:08PM  |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/18/14 11:47AM |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/18/14 11:47AM |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/18/14 11:47AM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/10/14 2:04PM    | 11/12/14 5:08PM  | PA/VA |
| Surr: 2,5-Dibromotoluene            | 90.2   | NA  | 37.2-152                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 5:08PM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:08PM  | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:08PM  | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:08PM  | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:08PM  | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 5:08PM  | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 90.1   | NA  | 61.2-135                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 5:08PM  |       |

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LABORATORY ID: HGE 141106-4

[illegible]

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-06-14 0833

SAMPLED BY: K. WILLIAMS / C. ROSS

DATE & TIME RECEIVED: 11-06-14 1335

ANALYST: MW

DATE & TIME ANALYZED: 11-06-14 1345

METHOD: 3

| SAMPLE ID        | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|------------------|--------------------|------------|-------------------|--------------|
| PATRICK COTTRILL | ABSENT             | ABSENT     | 11-06-14 0833     | HGE 141106-4 |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 - Coliform, Fecal (MF)            | 9222 D      |
| 2 - Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 - Coliform, Total (MPN)           | COLILERT    |
| 4 - Coliform, Total (P/A)           | 9223 B      |
| 5 - Heterotrophic Plate Count (HPC) | 9215 B      |

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\* Client provided

  
Approved

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Clower  
~~Wolf Summit~~ Water Sampling UIC 2014

Residence

Name Patrick Cottrill

Address 474 Edgell Fork Spencer

Phone 304-927-3517

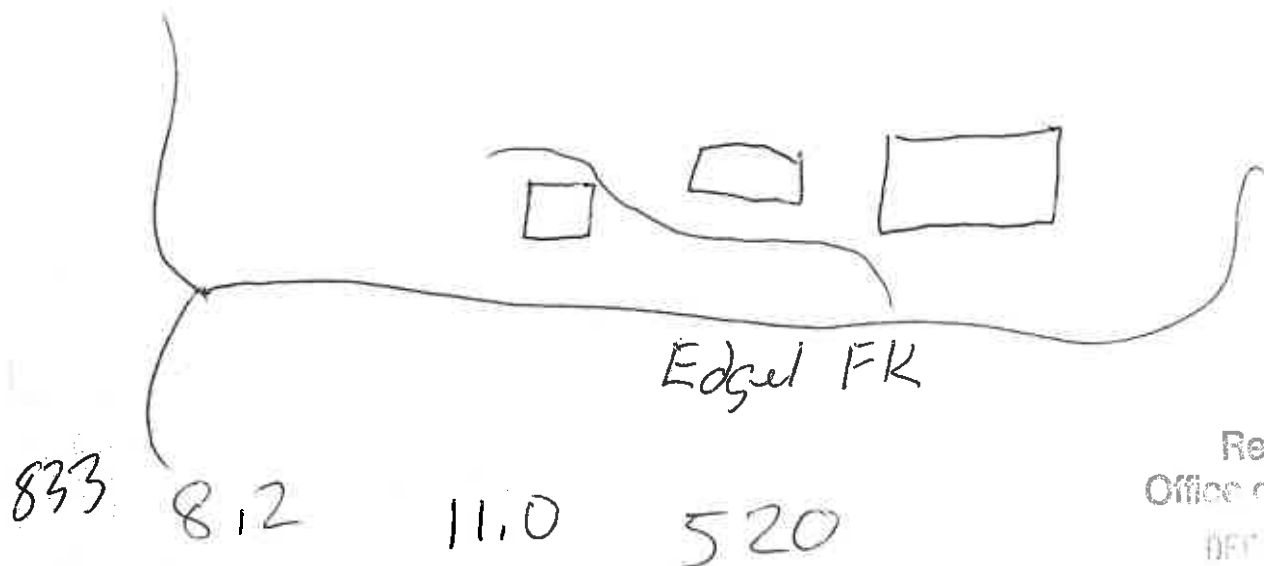
Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 43 20.65

Long 81 16 16.00

Provide sketch below of approximate location of dwelling(s) and water wells(s)



Received  
Office of Oil & Gas  
DEC 12 2014

# REI Consultants, Inc. - Analytical Report

WO#: 1411935

Date Reported: 11/19/2014

Client: STURM ENVIRONMENTAL SERVICES  
 Project: H.G. ENERGY, LLC.  
 Lab ID: 1411935-04A  
 Client Sample ID: 14202 PATRICK COTTRILL

Collection Date: 11/6/2014 8:33:00 AM  
 Date Received: 11/7/2014  
 Matrix: Liquid  
 Site ID:

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed   | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|-----------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                 |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.14                          | NA       | mg/L  | 11/12/14 9:47AM    | 11/13/14 6:03AM | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.35                          | NA       | mg/L  | 11/12/14 9:47AM    | 11/13/14 6:03AM |       |
| Sum: o-Terphenyl                    | 95.6   | NA  | 28.3-152                      | NA       | %REC  | 11/12/14 9:47AM    | 11/13/14 6:03AM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                 |       |
| Methane                             | 1,350  | NA  | 200                           | NA       | µg/L  |                    | 11/18/14 4:45PM |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/18/14 1:19PM |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/18/14 1:19PM |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/18/14 1:19PM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                 |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/10/14 2:04PM    | 11/12/14 6:11PM | PA/VA |
| Sum: 2,5-Dibromotoluene             | 91.3   | NA  | 37.2-152                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 6:11PM |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                 |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:11PM | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:11PM | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:11PM | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:11PM | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/10/14 2:04PM    | 11/12/14 6:11PM | PA/VA |
| Sum: 1,1,1-Trifluorotoluene         | 93.0   | NA  | 61.2-135                      | NA       | %REC  | 11/10/14 2:04PM    | 11/12/14 6:11PM |       |

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# Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED   | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|-----------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11-07-14        | JK               | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 – 10.0 | .1    |
| Hot Acid                     | 11-7-14         |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | 1     |
| Mineral Acid                 | 11-7-14         |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | 1     |
| Alkalinity                   | 11-7-14         |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | 1     |
| NH <sub>3</sub> N            |                 |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |                 |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |                 |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |                 |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | 1     |
| TKN                          |                 |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS – Total Suspended Solids | 11-7-14         | MB/BL            | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | 4     |
| TDS – Total Dissolved Solids | ↓               | ↓                | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | 4     |
| Sulfate                      | 11-10-14        | DL               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-11-14        | DL               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                 |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Hardness (calc)              |                 |                  | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | 1     |
| Iron                         | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Iron               |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11-7-14         | SW               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |                 |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |                 |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |                 |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |                 |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |                 |                  | SM22 <sup>nd</sup> 3500 – Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |                 |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |                 |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |                 |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |                 |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          | 11-12-14 (1232) | msj              | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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Office of Oil & Gas

DEC 12 2014

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11-11-14      | RL               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/12/14      | TRV              | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Molybdenum                 |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-Cl-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           |               |                  | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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**STURM ENVIRONMENTAL SERVICES**  
610 D STREET  
SO. CHARLESTON, WV 25303  
PHONE: 304-744-9864  
FAX: 304-744-7866  
LISTED BELOW

### Fax Results

## Fax Results

DEC 12 2014

[illegible]

# CHAIN OF CUSTODY RECORD



Research Environmental & Industrial Consultants, Inc.

MAIN LABORATORY & CORPORATE HEADQUARTERS:

P.O. Box 286 • 225 Industrial Park Rd, Beaver, WV 25813  
800-999-0105 • 304-255-2500 • www.reiclabs.com

MID-OHIO VALLEY

Service Center

101 17th Street

Ashland, KY 41101

606-393-5027

SHENANDOAH

Service Center

1557 Commerce Rd., Ste 201

Verona, VA 24482

540-248-0183

ROANOKE

Service Center

3029-C Peters Creek Rd

Roanoke, VA 24019

540-777-1276

MORGANTOWN

Service Center

16 Commerce Drive

Westover, WV 26501

304-241-5861

## SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME

☒ NORMAL

☐ 5 DAY

☐ 3 DAY

☐ 2 DAY

☐ 1 DAY

RUSH TURNAROUND\*

\*Rush work needs prior laboratory approval and will incur additional charges

| SAMPLE ID                       | No. & Type of Containers | Sampling Date/Time | Matrix | Sample Comp/Grab | ANALYSIS & METHOD REQUESTED | ENTER PRESERVATIVE CODE | COMMENTS: |
|---------------------------------|--------------------------|--------------------|--------|------------------|-----------------------------|-------------------------|-----------|
| 14199                           | 1-LITR<br>4-WIMS         | 11-14 / 1002       |        | 6                |                             |                         |           |
| 14200                           |                          | 1 / 0921           |        |                  |                             |                         |           |
| 14201                           |                          | 1 / 0933           |        |                  |                             |                         |           |
| 14202                           | 3-LITR<br>4-WIMS         | 1 / 0933           |        |                  |                             |                         |           |
| 14203                           | 1-LITR<br>4-WIMS         | 1 / 1347           |        |                  |                             |                         |           |
| 14204                           | 1                        | 1 / 1440           |        |                  |                             |                         |           |
| Received<br>Office of Oil & Gas |                          |                    |        |                  |                             |                         |           |

### Preservative Codes:

- 0 None
- 1 Hydrochloric Acid
- 2 Nitric Acid
- 3 Sulfuric Acid
- 4 Sodium Thiosulfate
- 5 Sodium Hydroxide/Sodium Arsenite
- 6 Sodium Hydroxide
- 7 Ascorbic Acid
- 8 Sodium Bisulfate/Methanol
- 9 Ammonium Chloride
- 10
- 11

\* (Use blanks for preservatives not listed.)

All analytical requests are subject to REIC's Standard Terms and Conditions.

Containers provided by: ☒ REIC ☐ Client

Relinquished by (signature)

Date/Time

Relinquished by (signature)

Date/Time

Date/Time

FAX RESULTS ☐

EMAIL RESULTS ☐

SHIPMENT ☒ Hand Delivered ☒ Courier ☐ UPS ☐ FEDEX ☐ USPS ☐ OTHER

COC-NCR-011414

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

DATE/TIME SAMPLED: 11-07-14 1333

**SAMPLE ID:**

**DATE/TIME RECEIVED:** 11-07-14 1710

**SAMPLED BY: K. WILLIAMS**

LABORATORY ID: HGE 141107-1

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

100  
 90  
 80  
 70  
 60  
 50  
 40  
 30  
 20  
 10  
 0

**APPROVED**

DEC 12 2014

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-07-14 1333

SAMPLED BY: K. WILLIAMS

DATE & TIME RECEIVED: 11-07-14 1710

ANALYST: SB/MW

DATE & TIME ANALYZED: 11-07-14 1711

METHOD: 3

| SAMPLE ID      | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|----------------|--------------------|------------|-------------------|--------------|
| CHARLES MORTON | PRESENT            | PRESENT    | 11-07-14 1333     | HGE 141107-1 |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |

Received

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

  
Approved

Clover Water Sampling UIC 2014

Residence

Name Charles W. Mott

Address 3934 Clay Rd. Spencer

Phone \_\_\_\_\_

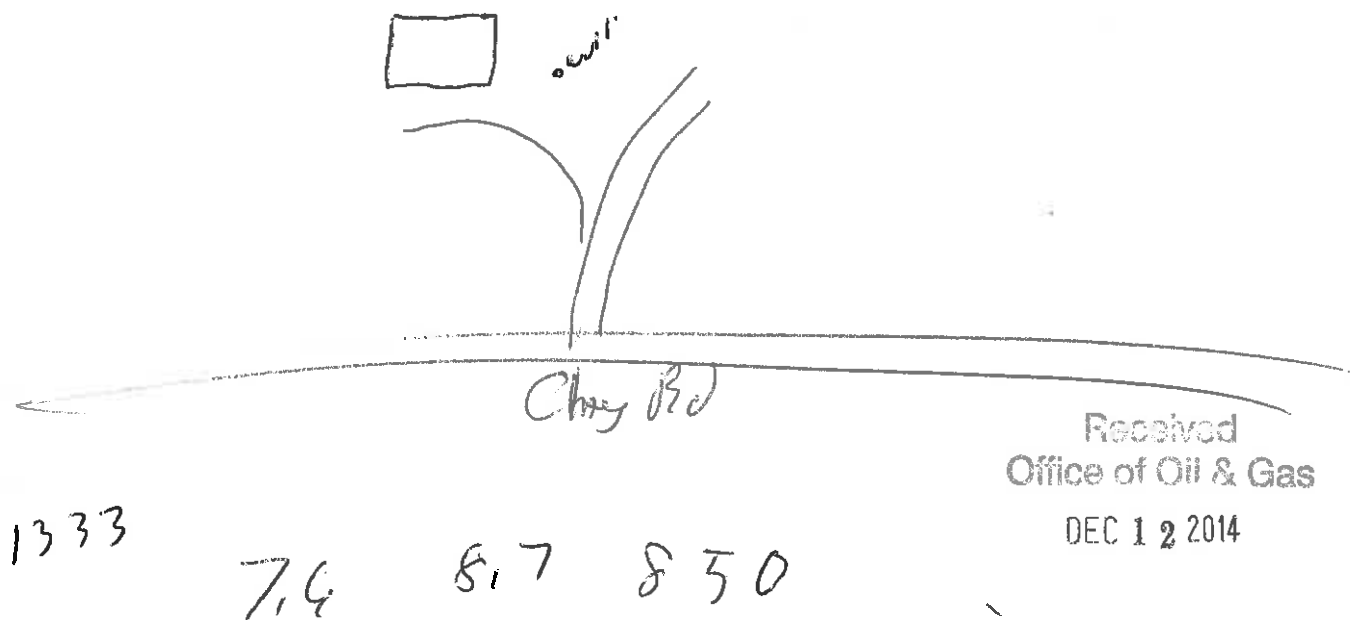
Depth of well ( if known- estimate if not ) 90. ft.

GPS Coordinates

Lat 38 43 20.43

Long 81 17 17.72

Provide sketch below of approximate location of dwelling(s ) and water wells(s)



# REI Consultants, Inc. - Analytical Report

WO#: 1411A60

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/7/2014 1:33:00 PM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/10/2014           |
| <b>Lab ID:</b>           | 1411A60-03A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14210 CHARLES MORTON         | <b>Site ID:</b>         |                      |

| Analysis                            | Result | MDL | PQL      | MCL Qual | Units | Prep Date                     | Date Analyzed   | NELAC              |
|-------------------------------------|--------|-----|----------|----------|-------|-------------------------------|-----------------|--------------------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     |          |          |       |                               |                 |                    |
|                                     |        |     |          |          |       | <b>Method: SW8015C (2000)</b> |                 | <b>Analyst: CL</b> |
| TPH (Diesel Range)                  | ND     | NA  | 0.10     | NA       | mg/L  | 11/12/14 5:47PM               | 11/13/14 9:39PM | PAVA               |
| TPH (Oil Range)                     | ND     | NA  | 0.25     | NA       | mg/L  | 11/12/14 5:47PM               | 11/13/14 9:39PM |                    |
| Surr: o-Terphenyl                   | 104    | NA  | 28.3-152 | NA       | %REC  | 11/12/14 5:47PM               | 11/13/14 9:39PM |                    |
| <b>DISSOLVED GASES</b>              |        |     |          |          |       |                               |                 |                    |
|                                     |        |     |          |          |       | <b>Method: GC-FID</b>         |                 | <b>Analyst: JC</b> |
| Methane                             | ND     | NA  | 10.0     | NA       | µg/L  |                               | 11/18/14 2:07PM |                    |
| Ethane                              | ND     | NA  | 15.0     | NA       | µg/L  |                               | 11/18/14 2:07PM |                    |
| Propane                             | ND     | NA  | 20.0     | NA       | µg/L  |                               | 11/18/14 2:07PM |                    |
| Butane                              | ND     | NA  | 25.0     | NA       | µg/L  |                               | 11/18/14 2:07PM |                    |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     |          |          |       |                               |                 |                    |
|                                     |        |     |          |          |       | <b>Method: SW8015C (2000)</b> |                 | <b>Analyst: CB</b> |
| TPH (Gasoline Range)                | ND     | NA  | 0.500    | NA       | mg/L  | 11/12/14 7:27AM               | 11/12/14 8:49PM | PAVA               |
| Surr: 2,5-Dibromotoluene            | 88.6   | NA  | 37.2-152 | NA       | %REC  | 11/12/14 7:27AM               | 11/12/14 8:49PM |                    |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     |          |          |       |                               |                 |                    |
|                                     |        |     |          |          |       | <b>Method: SW8021B (1996)</b> |                 | <b>Analyst: CB</b> |
| Benzene                             | ND     | NA  | 1.00     | NA       | µg/L  | 11/12/14 7:27AM               | 11/12/14 8:49PM | PAVA               |
| Toluene                             | ND     | NA  | 1.00     | NA       | µg/L  | 11/12/14 7:27AM               | 11/12/14 8:49PM | PAVA               |
| Ethylbenzene                        | ND     | NA  | 1.00     | NA       | µg/L  | 11/12/14 7:27AM               | 11/12/14 8:49PM | PAVA               |
| m,p-Xylene                          | ND     | NA  | 2.00     | NA       | µg/L  | 11/12/14 7:27AM               | 11/12/14 8:49PM | PAVA               |
| o-Xylene                            | ND     | NA  | 1.00     | NA       | µg/L  | 11/12/14 7:27AM               | 11/12/14 8:49PM | PAVA               |
| Surr: 1,1,1-Trifluorotoluene        | 92.4   | NA  | 61.2-135 | NA       | %REC  | 11/12/14 7:27AM               | 11/12/14 8:49PM |                    |

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COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED   | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|-----------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11-10-14        | KH               | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 - 10.0 | .1    |
| Hot Acid                     |                 |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | .1    |
| Mineral Acid                 |                 |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | .1    |
| Alkalinity                   |                 |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | .1    |
| NH <sub>3</sub> N            |                 |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |                 |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |                 |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |                 |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | .1    |
| TKN                          |                 |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS - Total Suspended Solids | 11-11-14        | BB/ea            | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | .4    |
| TDS - Total Dissolved Solids | 11-11-14        | BB/ea            | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | .4    |
| Sulfate                      | 11-12-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-12-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                 |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/17/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/17/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Iron                         | 11/17/14        | TW               | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | .1    |
| Dissolved Iron               |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/17/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11-7-14         | SW               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |                 |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |                 |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |                 |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |                 |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |                 |                  | SM22 <sup>nd</sup> 3500 - Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |                 |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |                 |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |                 |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |                 |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          | 11-10-14 (1494) | ms               | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11-11-14      | RL               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/17/14      | TL               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Molybdenum                 |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-Cl-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           |               |                  | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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# CHAIN OF CUSTODY RECORD



**Research Environmental & Industrial Consultants, Inc.**  
**MAIN LABORATORY & CORPORATE HEADQUARTERS:**  
 P.O. Box 286 • 225 Industrial Park Rd, Beaver, WV 25813  
 800-999-0105 • 304-255-2500 • www.reiclabs.com

**MID-OHIO VALLEY Service Center**  
 101 17th Street  
 Ashland, KY 41101  
 606-393-5027

**SHENANDOAH Service Center**  
 1557 Commerce Rd., Ste 201  
 Verona, VA 24482  
 540-248-0183

**ROANOKE Service Center**  
 3029 C Peters Creek Rd  
 Roanoke, VA 24019  
 540-777-1776

**MORGANTOWN Service Center**  
 16 Commerce Drive  
 Westover, WV 26051  
 304-241-5861

## SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME

☒ NORMAL

☐ 5 DAY

☐ 3 DAY

☐ 2 DAY

☐ 1 DAY

\*Rush work needs prior laboratory approval and will incur additional charges

Received  
 Office of Oil & Gas  
 DEC 12 2014

Client: Summit Environmental Services  
 Contact Person: Lucinda  
 Phone: 304 623 6349

Quote #  
 Address: one job  
 Billing Address (if different):

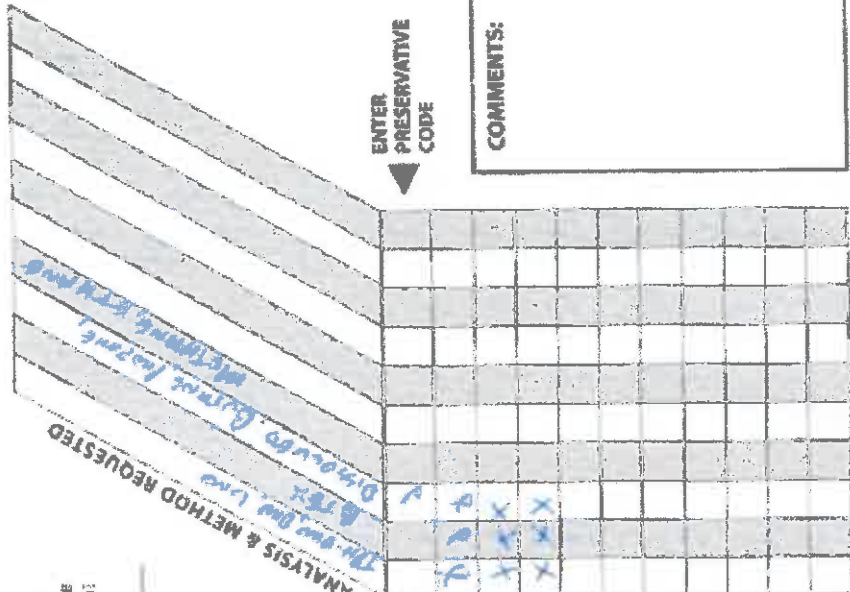
Fax: \_\_\_\_\_  
 City: \_\_\_\_\_  
 State: \_\_\_\_\_ Zip: \_\_\_\_\_

Site ID & State: \_\_\_\_\_  
 Project ID: \_\_\_\_\_  
 Sample: WV1111111111

- Preservative Codes**
- 1 None
  - 2 Hydrochloric Acid
  - 3 Nitric Acid
  - 4 Sulfuric Acid
  - 5 Sodium Hydroxide
  - 6 Sodium Hydroxide / Sodium Arsenite
  - 7 Ascorbic Acid
  - 8 Sodium Bisulfate/Methanol
  - 9 Ammonium Chloride
  - 10
  - 11
- \*Use blanks for preservatives not listed

ENTER PRESERVATIVE CODE

COMMENTS:



All analytical requests are subject to REIC's Standard Terms and Conditions.

Containers provided by: ☒ REIC ☐ Client

|                                                                                          |                                                                        |                                        |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------|
| Temperature at arrival: <input type="checkbox"/> C <input checked="" type="checkbox"/> F | ICED? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N | EMAIL RESULTS <input type="checkbox"/> |
| FAX RESULTS <input type="checkbox"/>                                                     | DATE: _____                                                            | TIME: _____                            |
| LAB: _____                                                                               | ANALYST: _____                                                         | CLIENT: _____                          |



**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9884

DATE/TIME SAMPLED: 11-07-14 0929

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-07-14 1350

**SAMPLED BY: K. WILLIAMS**

LABORATORY ID: HGE 141107-A1

[illegible]

**\*Client Provided**

**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

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**APPROVED**

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-07-14 0929

SAMPLED BY: K. WILLIAMS

DATE & TIME RECEIVED: 11-07-14 1350

ANALYST: MW

DATE & TIME ANALYZED: 11-07-14 1359

METHOD: 3

| SAMPLE ID       | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.       |
|-----------------|--------------------|------------|-------------------|---------------|
| LONNIE A. SMITH | ABSENT             | ABSENT     | 11-07-14 0929     | HGE 141107-A1 |
|                 |                    |            |                   |               |
|                 |                    |            |                   |               |
|                 |                    |            |                   |               |
|                 |                    |            |                   |               |
|                 |                    |            |                   |               |
|                 |                    |            |                   |               |
|                 |                    |            |                   |               |
|                 |                    |            |                   |               |
|                 |                    |            |                   |               |

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Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- 1 – Coliform, Fecal (MF) 9222 D
- 2 – Coliform, Fecal (MPN) COLILERT 18
- 3 – Coliform, Total (MPN) COLILERT
- 4 – Coliform, Total (P/A) 9223 B
- 5 – Heterotrophic Plate Count (HPC) 9215 B

Office of Oil & Gas

DEC 12 2014

\* Client provided

   
Approved

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Clover Water Sampling UIC 2014

Residence

Name Louise A Smith

Address 474 Banner Hill

Phone \_\_\_\_\_

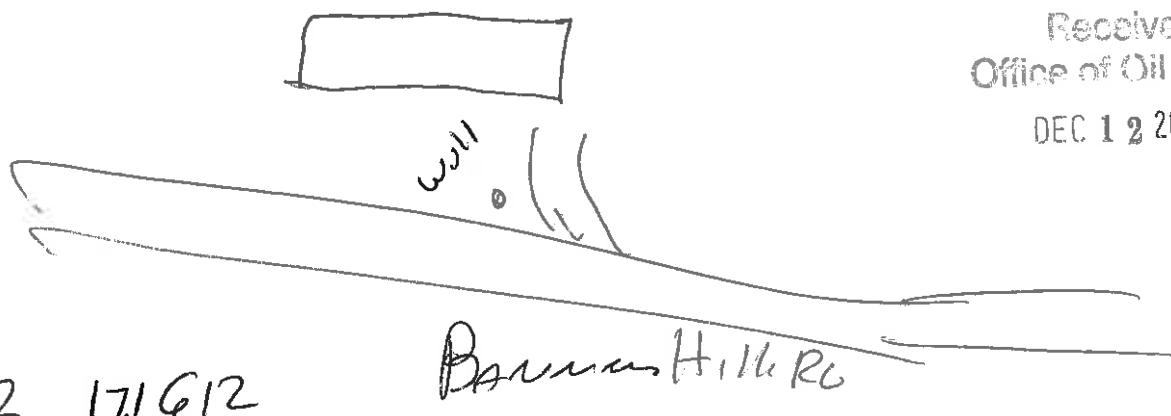
Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 44 10.86

Long 81 16 19.54

Provide sketch below of approximate location of dwelling(s ) and water wells(s)



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DEC 12 2014

Q29

8.2 171612

Banner Hill Rd

# REI Consultants, Inc. - Analytical Report

WO#: 1411A60

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/7/2014 9:29:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/10/2014           |
| <b>Lab ID:</b>           | 1411A60-01A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14208 LONNIE A. SMITH        | <b>Site ID:</b>         |                      |

| Analysis                            | Result | MDL | PQL      | MCL Qual | Units                  | Prep Date       | Date Analyzed   | NELAC |
|-------------------------------------|--------|-----|----------|----------|------------------------|-----------------|-----------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     |          |          |                        |                 |                 |       |
|                                     |        |     |          |          | Method: SW8015C (2000) |                 | Analyst: CL     |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.10     | NA       | mg/L                   | 11/12/14 5:47PM | 11/13/14 8:01PM | PAVA  |
| TPH (Oil Range)                     | ND     | NA  | 0.25     | NA       | mg/L                   | 11/12/14 5:47PM | 11/13/14 8:01PM |       |
| Surr: o-Terphenyl                   | 101    | NA  | 28.3-152 | NA       | %REC                   | 11/12/14 5:47PM | 11/13/14 8:01PM |       |
| <b>DISSOLVED GASES</b>              |        |     |          |          |                        |                 |                 |       |
|                                     |        |     |          |          | Method: GC-FID         |                 | Analyst: JC     |       |
| Methane                             | 473    | NA  | 100      | NA       | µg/L                   |                 | 11/18/14 4:51PM |       |
| Ethane                              | ND     | NA  | 15.0     | NA       | µg/L                   |                 | 11/18/14 1:52PM |       |
| Propane                             | ND     | NA  | 20.0     | NA       | µg/L                   |                 | 11/18/14 1:52PM |       |
| Butane                              | ND     | NA  | 25.0     | NA       | µg/L                   |                 | 11/18/14 1:52PM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     |          |          |                        |                 |                 |       |
|                                     |        |     |          |          | Method: SW8015C (2000) |                 | Analyst: CB     |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500    | NA       | mg/L                   | 11/12/14 7:27AM | 11/12/14 7:46PM | PAVA  |
| Surr: 2,5-Dibromotoluene            | 90.3   | NA  | 37.2-152 | NA       | %REC                   | 11/12/14 7:27AM | 11/12/14 7:46PM |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     |          |          |                        |                 |                 |       |
|                                     |        |     |          |          | Method: SW8021B (1996) |                 | Analyst: CB     |       |
| Benzene                             | ND     | NA  | 1.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 7:46PM | PAVA  |
| Toluene                             | ND     | NA  | 1.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 7:46PM | PAVA  |
| Ethylbenzene                        | ND     | NA  | 1.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 7:46PM | PAVA  |
| m,p-Xylene                          | ND     | NA  | 2.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 7:46PM | PAVA  |
| o-Xylene                            | ND     | NA  | 1.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 7:46PM | PAVA  |
| Surr: 1,1,1-Trifluorotoluene        | 93.1   | NA  | 61.2-135 | NA       | %REC                   | 11/12/14 7:27AM | 11/12/14 7:46PM |       |

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DEC 1 2 2014

DATE/TIME SAMPLED: 11-07-14 U831

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-07-14 1350

**SAMPLED BY: K. WILLIAMS**

LABORATORY ID: HGE 141107-A2

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

100

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**MAIN OFFICE—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549**  
**CHARLESTON BRANCH—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864**

DATE/TIME SAMPLED: 11-07-14 0831

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-07-14 1350

SAMPLED BY: K. WILLIAMS

LABORATORY ID: HGE 141107-A2

[illegible]

**\*Client Provided**

**\*\*See Attached.** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Regional  
Office of OIA Affairs

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**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE &amp; TIME SAMPLED: 11-07-14 0831

SAMPLED BY: K. WILLIAMS

DATE &amp; TIME RECEIVED: 11-07-14 1350

ANALYST: MW

DATE &amp; TIME ANALYZED: 11-07-14 1359

METHOD: 3

| SAMPLE ID     | TOTAL<br>COLIFORM<br>P/A | E. COLI<br>PA | DATE/TIME<br>SAMPLED | LOG<br>NO.    |
|---------------|--------------------------|---------------|----------------------|---------------|
| JARELD GIBSON | PRESENT                  | PRESENT       | 11-07-14 0831        | HGE 141107-A2 |
|               |                          |               |                      |               |
|               |                          |               |                      |               |
|               |                          |               |                      |               |
|               |                          |               |                      |               |
|               |                          |               |                      |               |
|               |                          |               |                      |               |
|               |                          |               |                      |               |
|               |                          |               |                      |               |
|               |                          |               |                      |               |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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DEC 12 2014

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

  
Approved

Clover Water Sampling UIC 2014

Residence

Name Janelle Gibson

Address 33 Bakers Rd

Phone \_\_\_\_\_

Depth of well ( if known- estimate if not ) 100

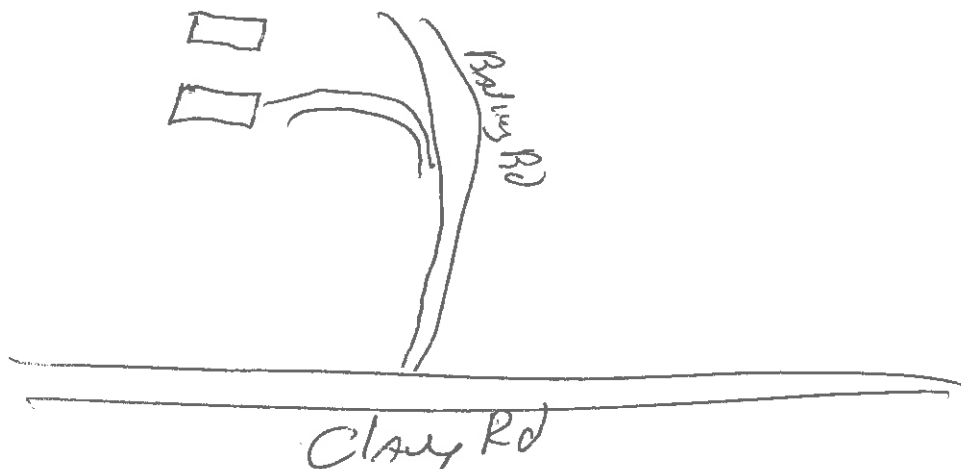
GPS Coordinates

Lat 38 44 10 62

Long 81 17 4.08

Provide sketch below of approximate location of dwelling(s ) and water wells(s)

~~21~~



831

7.3

12.3

393

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# REI Consultants, Inc. - Analytical Report

WO#: 1411A60

Date Reported: 11/19/2014

|                          |                              |                         |                      |
|--------------------------|------------------------------|-------------------------|----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/7/2014 8:31:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/10/2014           |
| <b>Lab ID:</b>           | 1411A60-02A                  | <b>Matrix:</b>          | Liquid               |
| <b>Client Sample ID:</b> | 14209 JARELD GIBSON          | <b>Site ID:</b>         |                      |

| Analysis                            | Result | MDL | PQL      | MCL Qual | Units                  | Prep Date       | Date Analyzed   | NELAC |
|-------------------------------------|--------|-----|----------|----------|------------------------|-----------------|-----------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     |          |          |                        |                 |                 |       |
|                                     |        |     |          |          | Method: SW8015C (2000) |                 | Analyst: CL     |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.10     | NA       | mg/L                   | 11/12/14 5:47PM | 11/13/14 8:34PM | PAVA  |
| TPH (Oil Range)                     | ND     | NA  | 0.25     | NA       | mg/L                   | 11/12/14 5:47PM | 11/13/14 8:34PM |       |
| Surr: o-Terphenyl                   | 94.2   | NA  | 28.3-152 | NA       | %REC                   | 11/12/14 5:47PM | 11/13/14 8:34PM |       |
| <b>DISSOLVED GASES</b>              |        |     |          |          |                        |                 |                 |       |
|                                     |        |     |          |          | Method: GC-FID         |                 | Analyst: JC     |       |
| Methane                             | ND     | NA  | 10.0     | NA       | µg/L                   |                 | 11/18/14 2:02PM |       |
| Ethane                              | ND     | NA  | 15.0     | NA       | µg/L                   |                 | 11/18/14 2:02PM |       |
| Propane                             | ND     | NA  | 20.0     | NA       | µg/L                   |                 | 11/18/14 2:02PM |       |
| Butane                              | ND     | NA  | 25.0     | NA       | µg/L                   |                 | 11/18/14 2:02PM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     |          |          |                        |                 |                 |       |
|                                     |        |     |          |          | Method: SW8015C (2000) |                 | Analyst: CB     |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500    | NA       | mg/L                   | 11/12/14 7:27AM | 11/12/14 8:17PM | PAVA  |
| Surr: 2,5-Dibromotoluene            | 86.3   | NA  | 37.2-152 | NA       | %REC                   | 11/12/14 7:27AM | 11/12/14 8:17PM |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     |          |          |                        |                 |                 |       |
|                                     |        |     |          |          | Method: SW8021B (1996) |                 | Analyst: CB     |       |
| Benzene                             | ND     | NA  | 1.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 8:17PM | PAVA  |
| Toluene                             | ND     | NA  | 1.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 8:17PM | PAVA  |
| Ethylbenzene                        | ND     | NA  | 1.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 8:17PM | PAVA  |
| m,p-Xylene                          | ND     | NA  | 2.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 8:17PM | PAVA  |
| o-Xylene                            | ND     | NA  | 1.00     | NA       | µg/L                   | 11/12/14 7:27AM | 11/12/14 8:17PM | PAVA  |
| Surr: 1,1,1-Trifluorotoluene        | 94.0   | NA  | 61.2-135 | NA       | %REC                   | 11/12/14 7:27AM | 11/12/14 8:17PM |       |

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# Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED   | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|-----------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11.10.14        | JCH              | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 – 10.0 | .1    |
| Hot Acid                     |                 |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | 1     |
| Mineral Acid                 |                 |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | 1     |
| Alkalinity                   |                 |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | 1     |
| NH <sub>3</sub> N            |                 |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |                 |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |                 |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |                 |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | 1     |
| TKN                          |                 |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS – Total Suspended Solids | 11-11-14        | JCH              | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | 4     |
| TDS – Total Dissolved Solids |                 |                  | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | 4     |
| Sulfate                      | DL 11-13-14     | DL               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     |                 | DL               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                 |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Hardness (calc)              |                 |                  | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | 1     |
| Iron                         | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Iron               |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/12/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11-7-14         | SW               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |                 |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |                 |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |                 |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |                 |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |                 |                  | SM22 <sup>nd</sup> 3500 – Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |                 |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |                 |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |                 |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |                 |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          | 11-10-14 (1341) | ML               | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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Office of Air & Gas

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# Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11-11-14      | ke               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/12/14      | tw               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Molybdenum                 |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-Cl-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           |               |                  | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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**COMPANY:** H.G. ENERGY, LLC.

DATE/TIME SAMPLED: 11-14-17 0900

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-14-14 1330

**SAMPLED BY: C. ROSS**

LABORATORY ID: HGE 141114-1

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

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APPROVED

LABORATORY ID: HGE 141114-1

[illegible]

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

**MAIN OFFICE**—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549  
**CHARLESTON BRANCH**—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE &amp; TIME SAMPLED: 11-14-14 0900

SAMPLED BY: C. ROSS

DATE &amp; TIME RECEIVED: 11-14-14 1330

ANALYST: MW

DATE &amp; TIME ANALYZED: 11-14-14 1400

METHOD: 3

| SAMPLE ID             | TOTAL<br>COLIFORM<br>P/A | E. COLI<br>PA | DATE/TIME<br>SAMPLED | LOG<br>NO.   |
|-----------------------|--------------------------|---------------|----------------------|--------------|
| CHUCK WYROSTOK WELL 1 | ABSENT                   | ABSENT        | 11-14-14 0900        | HGE 141114-1 |
|                       |                          |               |                      |              |
|                       |                          |               |                      |              |
|                       |                          |               |                      |              |
|                       |                          |               |                      |              |
|                       |                          |               |                      |              |
|                       |                          |               |                      |              |
|                       |                          |               |                      |              |
|                       |                          |               |                      |              |
|                       |                          |               |                      |              |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

|                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

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DEC 12 2014

\* Client provided

  
Approved

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Clover Water Sampling UIC 2014

Well 1

Residence

Name

Chuck Wyrstok

Address

230 Griffith Run Rd Spencer WV

Phone

304 927 2978

Depth of well ( if known- estimate if not )

85 ft Drilled Well

GPS Coordinates

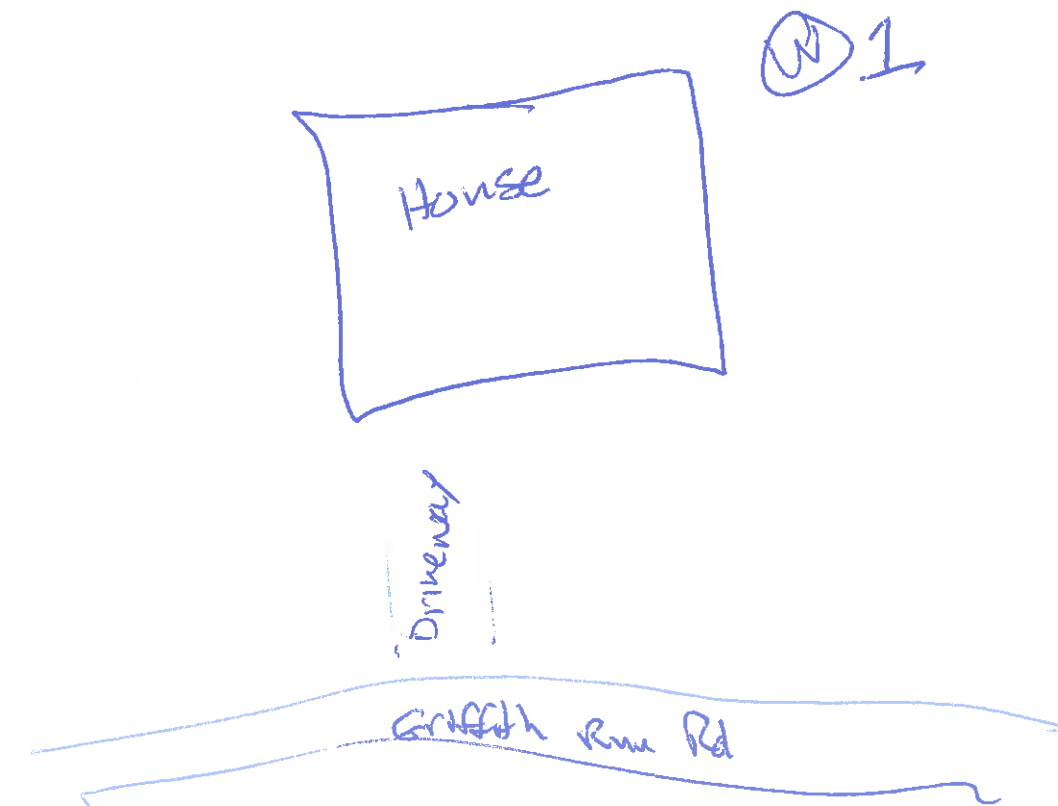
Lat

38° 42' 08.4"

Long

81° 16' 50.9"

Provide sketch below of approximate location of dwelling(s) and water wells(s)



7.50 ph 18° 485 cond

Packed

Received  
Office of Oil & Gas

DEC 12 2014

# REI Consultants, Inc. - Analytical Report

WO#: 1411K30

Date Reported: 12/2/2014

|                          |                              |                         |                       |
|--------------------------|------------------------------|-------------------------|-----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/14/2014 9:00:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/18/2014            |
| <b>Lab ID:</b>           | 1411K30-01A                  | <b>Matrix:</b>          | Liquid                |
| <b>Client Sample ID:</b> | 14219 CHUCK WYROSTAK WELL 1  | <b>Site ID:</b>         |                       |

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed   | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|-----------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                 |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.13                          | NA       | mg/L  | 11/19/14 9:41AM    | 11/19/14 9:15PM | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.34                          | NA       | mg/L  | 11/19/14 9:41AM    | 11/19/14 9:15PM |       |
| Surr: o-Terphenyl                   | 110    | NA  | 28.3-152                      | NA       | %REC  | 11/19/14 9:41AM    | 11/19/14 9:15PM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                 |       |
| Methane                             | 455    | NA  | 100                           | NA       | µg/L  |                    | 11/26/14 2:52PM |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/26/14 2:00PM |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/26/14 2:00PM |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/26/14 2:00PM |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                 |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/20/14 7:46AM    | 11/24/14 2:54PM | PA/VA |
| Surr: 2,5-Dibromotoluene            | 96.0   | NA  | 37.2-152                      | NA       | %REC  | 11/20/14 7:46AM    | 11/24/14 2:54PM |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                 |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 2:54PM | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 2:54PM | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 2:54PM | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 2:54PM | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 2:54PM | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 98.4   | NA  | 61.2-135                      | NA       | %REC  | 11/20/14 7:46AM    | 11/24/14 2:54PM |       |

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**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

**MAIN OFFICE—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549**  
**CHARLESTON BRANCH—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864**

**COMPANY:** H.G. ENERGY, LLC.

DATE/TIME SAMPLED: 11-14-14 0920

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-14-14 1330

**SAMPLED BY: C. ROSS**

LABORATORY ID: HGE 141114-2

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

**Robert  
Orloff & Gas**

DEC 12 2014

**APPROVED**

Dr. B. C. B. C.

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-14-14 0930

SAMPLED BY: C. ROSS

DATE & TIME RECEIVED: 11-14-14 1330

ANALYST: MW

DATE & TIME ANALYZED: 11-14-14 1400

METHOD: 3

| SAMPLE ID             | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|-----------------------|--------------------|------------|-------------------|--------------|
| CHUCK WYROSTOK WELL 2 | PRESENT            | PRESENT    | 11-14-14 0930     | HGE 141114-2 |
|                       |                    |            |                   |              |
|                       |                    |            |                   |              |
|                       |                    |            |                   |              |
|                       |                    |            |                   |              |
|                       |                    |            |                   |              |
|                       |                    |            |                   |              |
|                       |                    |            |                   |              |
|                       |                    |            |                   |              |
|                       |                    |            |                   |              |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- 1 - Coliform, Fecal (MF) 9222 D
- 2 - Coliform, Fecal (MPN) COLILERT 18
- 3 - Coliform, Total (MPN) COLILERT
- 4 - Coliform, Total (P/A) 9223 B
- 5 - Heterotrophic Plate Count (HPC) 9215 B

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\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Approved

Clover Water Sampling UIC 2014

Well 2

Residence

Name Chuck Wyrstok

Address 230 Griffith Run Rd

Phone 304 927 2978

Depth of well ( if known- estimate if not ) 25 ft

8 ft to water  
Hand Dug Well

GPS Coordinates

Lat 38° 42' 08.1"

Long 81° 16' 50.5"

Provide sketch below of approximate location of dwelling(s) and water wells(s)



Co<sub>2</sub> ph 13° 90 cord  
Pooled 8' to water

# REI Consultants, Inc. - Analytical Report

WO#: 1411K30

Date Reported: 12/2/2014

|                          |                              |                         |                       |
|--------------------------|------------------------------|-------------------------|-----------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/14/2014 9:20:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/18/2014            |
| <b>Lab ID:</b>           | 1411K30-02A                  | <b>Matrix:</b>          | Liquid                |
| <b>Client Sample ID:</b> | 14220 CHUCK WYROSTAK WELL 2  | <b>Site ID:</b>         |                       |

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.13                          | NA       | mg/L  | 11/19/14 9:41AM    | 11/19/14 10:20PM | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.33                          | NA       | mg/L  | 11/19/14 9:41AM    | 11/19/14 10:20PM |       |
| Surr: o-Terphenyl                   | 90.3   | NA  | 28.3-152                      | NA       | %REC  | 11/19/14 9:41AM    | 11/19/14 10:20PM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |       |
| Methane                             | ND     | NA  | 10.0                          | NA       | µg/L  |                    | 11/26/14 2:06PM  |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/26/14 2:06PM  |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/26/14 2:06PM  |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/26/14 2:06PM  |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/20/14 7:46AM    | 11/24/14 3:26PM  | PA/VA |
| Surr: 2,5-Dibromotoluene            | 101    | NA  | 37.2-152                      | NA       | %REC  | 11/20/14 7:46AM    | 11/24/14 3:26PM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 3:26PM  | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 3:26PM  | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 3:26PM  | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 3:26PM  | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/20/14 7:46AM    | 11/24/14 3:26PM  | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 99.9   | NA  | 61.2-135                      | NA       | %REC  | 11/20/14 7:46AM    | 11/24/14 3:26PM  |       |

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# Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED   | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|-----------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11.17.14        | KH               | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 - 10.0 | .1    |
| Hot Acid                     |                 |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | .1    |
| Mineral Acid                 |                 |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | .1    |
| Alkalinity                   |                 |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | .1    |
| NH <sub>3</sub> N            |                 |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |                 |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |                 |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |                 |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | 1     |
| TKN                          |                 |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS - Total Suspended Solids | 11.18.14        | DB/OK            | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | 4     |
| TDS - Total Dissolved Solids |                 |                  | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | 4     |
| Sulfate                      | 11-20-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-21-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                 |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/20/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/20/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Iron (calc)                  |                 |                  | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | 1     |
| Iron                         | 11/20/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Iron               |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/20/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11.14.14        | JL               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |                 |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |                 |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |                 |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |                 |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |                 |                  | SM22 <sup>nd</sup> 3500 - Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |                 |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |                 |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |                 |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |                 |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          | 11-19-14 (1227) | mw               | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11-21-14      | SB               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/20/14      | tw               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Indium                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-Cl-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           |               |                  | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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STURM ENVIRONMENTAL SERVICES  
610 D STREET  
SO. CHARLESTON, WV 25303  
PHONE: 304-744-9864  
FAX: 304-744-7866  
LISTED BELOW

Green Environmental Services



...the ... of ...

**ROANOKE**  
**Service Center**  
1019 C. Myers Circle  
Roanoke, VA 24014  
404-373-1779

**NATIONAL SERVICE CENTER**

## TURNAROUND TIME

## MODEL

**● 1987年10月**

3 DAY 3 DAY 3 DAY

! Day

[illegible]

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Received

Preprint Code

1. **Formaldehyde**  
 2. **Formic Acid**  
 3. **Formic Anhydride**  
 4. **Formic Chloride**  
 5. **Formic Oxide**  
 6. **Formic Peroxide**  
 7. **Formic Sulfide**  
 8. **Formic Tetroxide**  
 9. **Formic Trioxide**  
 10. **Formic Tetraoxide**  
 11. **Formic Pentafluoride**  
 12. **Formic Hexafluoride**  
 13. **Formic Heptafluoride**  
 14. **Formic Octafluoride**  
 15. **Formic Nonafluoride**  
 16. **Formic Decafluoride**  
 17. **Formic Undecafluoride**  
 18. **Formic Dodecafluoride**  
 19. **Formic Trifluoromethane**  
 20. **Formic Tetrafluoromethane**  
 21. **Formic Pentafluoromethane**  
 22. **Formic Hexafluoromethane**  
 23. **Formic Heptafluoromethane**  
 24. **Formic Octafluoromethane**  
 25. **Formic Nonafluoromethane**  
 26. **Formic Decafluoromethane**  
 27. **Formic Undecafluoromethane**  
 28. **Formic Dodecafluoromethane**  
 29. **Formic Trifluoromethyl Ether**  
 30. **Formic Tetrafluoromethyl Ether**  
 31. **Formic Pentafluoromethyl Ether**  
 32. **Formic Hexafluoromethyl Ether**  
 33. **Formic Heptafluoromethyl Ether**  
 34. **Formic Octafluoromethyl Ether**  
 35. **Formic Nonafluoromethyl Ether**  
 36. **Formic Decafluoromethyl Ether**  
 37. **Formic Undecafluoromethyl Ether**  
 38. **Formic Dodecafluoromethyl Ether**  
 39. **Formic Trifluoromethyl Sulfide**  
 40. **Formic Tetrafluoromethyl Sulfide**  
 41. **Formic Pentafluoromethyl Sulfide**  
 42. **Formic Hexafluoromethyl Sulfide**  
 43. **Formic Heptafluoromethyl Sulfide**  
 44. **Formic Octafluoromethyl Sulfide**  
 45. **Formic Nonafluoromethyl Sulfide**  
 46. **Formic Decafluoromethyl Sulfide**  
 47. **Formic Undecafluoromethyl Sulfide**  
 48. **Formic Dodecafluoromethyl Sulfide**  
 49. **Formic Trifluoromethyl Nitrate**  
 50. **Formic Tetrafluoromethyl Nitrate**  
 51. **Formic Pentafluoromethyl Nitrate**  
 52. **Formic Hexafluoromethyl Nitrate**  
 53. **Formic Heptafluoromethyl Nitrate**  
 54. **Formic Octafluoromethyl Nitrate**  
 55. **Formic Nonafluoromethyl Nitrate**  
 56. **Formic Decafluoromethyl Nitrate**  
 57. **Formic Undecafluoromethyl Nitrate**  
 58. **Formic Dodecafluoromethyl Nitrate**  
 59. **Formic Trifluoromethyl Perchlorate**  
 60. **Formic Tetrafluoromethyl Perchlorate**  
 61. **Formic Pentafluoromethyl Perchlorate**  
 62. **Formic Hexafluoromethyl Perchlorate**  
 63. **Formic Heptafluoromethyl Perchlorate**  
 64. **Formic Octafluoromethyl Perchlorate**  
 65. **Formic Nonafluoromethyl Perchlorate**  
 66. **Formic Decafluoromethyl Perchlorate**  
 67. **Formic Undecafluoromethyl Perchlorate**  
 68. **Formic Dodecafluoromethyl Perchlorate**  
 69. **Formic Trifluoromethyl Borate**  
 70. **Formic Tetrafluoromethyl Borate**  
 71. **Formic Pentafluoromethyl Borate**  
 72. **Formic Hexafluoromethyl Borate**  
 73. **Formic Heptafluoromethyl Borate**  
 74. **Formic Octafluoromethyl Borate**  
 75. **Formic Nonafluoromethyl Borate**  
 76. **Formic Decafluoromethyl Borate**  
 77. **Formic Undecafluoromethyl Borate**  
 78. **Formic Dodecafluoromethyl Borate**  
 79. **Formic Trifluoromethyl Silicate**  
 80. **Formic Tetrafluoromethyl Silicate**  
 81. **Formic Pentafluoromethyl Silicate**  
 82. **Formic Hexafluoromethyl Silicate**  
 83. **Formic Heptafluoromethyl Silicate**  
 84. **Formic Octafluoromethyl Silicate**  
 85. **Formic Nonafluoromethyl Silicate**  
 86. **Formic Decafluoromethyl Silicate**  
 87. **Formic Undecafluoromethyl Silicate**  
 88. **Formic Dodecafluoromethyl Silicate**  
 89. **Formic Trifluoromethyl Phosphate**  
 90. **Formic Tetrafluoromethyl Phosphate**  
 91. **Formic Pentafluoromethyl Phosphate**  
 92. **Formic Hexafluoromethyl Phosphate**  
 93. **Formic Heptafluoromethyl Phosphate**  
 94. **Formic Octafluoromethyl Phosphate**  
 95. **Formic Nonafluoromethyl Phosphate**  
 96. **Formic Decafluoromethyl Phosphate**  
 97. **Formic Undecafluoromethyl Phosphate**  
 98. **Formic Dodecafluoromethyl Phosphate**  
 99. **Formic Trifluoromethyl Selenate**  
 100. **Formic Tetrafluoromethyl Selenate**  
 101. **Formic Pentafluoromethyl Selenate**  
 102. **Formic Hexafluoromethyl Selenate**  
 103. **Formic Heptafluoromethyl Selenate**  
 104. **Formic Octafluoromethyl Selenate**  
 105. **Formic Nonafluoromethyl Selenate**  
 106. **Formic Decafluoromethyl Selenate**  
 107. **Formic Undecafluoromethyl Selenate**  
 108. **Formic Dodecafluoromethyl Selenate**  
 109. **Formic Trifluoromethyl Tellurate**  
 110. **Formic Tetrafluoromethyl Tellurate**  
 111. **Formic Pentafluoromethyl Tellurate**  
 112. **Formic Hexafluoromethyl Tellurate**  
 113. **Formic Heptafluoromethyl Tellurate**  
 114. **Formic Octafluoromethyl Tellurate**  
 115. **Formic Nonafluoromethyl Tellurate**  
 116. **Formic Decafluoromethyl Tellurate**  
 117. **Formic Undecafluoromethyl Tellurate**  
 118. **Formic Dodecafluoromethyl Tellurate**  
 119. **Formic Trifluoromethyl Molybdate**  
 120. **Formic Tetrafluoromethyl Molybdate**  
 121. **Formic Pentafluoromethyl Molybdate**  
 122. **Formic Hexafluoromethyl Molybdate**  
 123. **Formic Heptafluoromethyl Molybdate**  
 124. **Formic Octafluoromethyl Molybdate**  
 125. **Formic Nonafluoromethyl Molybdate**  
 126. **Formic Decafluoromethyl Molybdate**  
 127. **Formic Undecafluoromethyl Molybdate**  
 128. **Formic Dodecafluoromethyl Molybdate**  
 129. **Formic Trifluoromethyl Tungstate**  
 130. **Formic Tetrafluoromethyl Tungstate**  
 131. **Formic Pentafluoromethyl Tungstate**  
 132. **Formic Hexafluoromethyl Tungstate**  
 133. **Formic Heptafluoromethyl Tungstate**  
 134. **Formic Octafluoromethyl Tungstate**  
 135. **Formic Nonafluoromethyl Tungstate**  
 136. **Formic Decafluoromethyl Tungstate**  
 137. **Formic Undecafluoromethyl Tungstate**  
 138. **Formic Dodecafluoromethyl Tungstate**  
 139. **Formic Trifluoromethyl Vanadate**  
 140. **Formic Tetrafluoromethyl Vanadate**  
 141. **Formic Pentafluoromethyl Vanadate**  
 142. **Formic Hexafluoromethyl Vanadate**  
 143. **Formic Heptafluoromethyl Vanadate**  
 144. **Formic Octafluoromethyl Vanadate**  
 145. **Formic Nonafluoromethyl Vanadate**  
 146. **Formic Decafluoromethyl Vanadate**  
 147. **Formic Undecafluoromethyl Vanadate**  
 148. **Formic Dodecafluoromethyl Vanadate**  
 149. **Formic Trifluoromethyl Arsenate**  
 150. **Formic Tetrafluoromethyl Arsenate**  
 151. **Formic Pentafluoromethyl Arsenate**  
 152. **Formic Hexafluoromethyl Arsenate**  
 153. **Formic Heptafluoromethyl Arsenate**  
 154. **Formic Octafluoromethyl Arsenate**  
 155. **Formic Nonafluoromethyl Arsenate**  
 156. **Formic Decafluoromethyl Arsenate**  
 157. **Formic Undecafluoromethyl Arsenate**  
 158. **Formic Dodecafluoromethyl Arsenate**  
 159. **Formic Trifluoromethyl Antimonate**  
 160. **Formic Tetrafluoromethyl Antimonate**  
 161. **Formic Pentafluoromethyl Antimonate**  
 162. **Formic Hexafluoromethyl Antimonate**  
 163. **Formic Heptafluoromethyl Antimonate**  
 164. **Formic Octafluoromethyl Antimonate**  
 165. **Formic Nonafluoromethyl Antimonate**  
 166. **Formic Decafluoromethyl Antimonate**  
 167. **Formic Undecafluoromethyl Antimonate**  
 168. **Formic Dodecafluoromethyl Antimonate**  
 169

ENTER  
PRESERVATIVE  
CODE

01544163175

| No. & Type of Containers | Sampling Date/Time | Matrix | Sample Comp./Grab |
|--------------------------|--------------------|--------|-------------------|
| 14219                    | 11/9/14 0900       |        | XX                |
| 14219                    | 11/9/14 0924       |        | XX                |

All statistical procedures are subject to the following standard assumptions:

1000

1

100



12

1

1. *Journal of the American Medical Association*, 2000; 283: 2686-2692.

100

10

1998

1

100



100



Figure 1

# THE FIGHTERS

10

DATE/TIME SAMPLED: 11-20-14 1030

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-20-14 1330

**SAMPLED BY: C. ROSS**

LABORATORY ID: HGE 141120-1

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

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**APPROVED**

**COMPANY:** H.G. ENERGY, LLC.

DATE/TIME SAMPLED: 11-20-14 1030

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-20-14 1330

**SAMPLED BY: C. ROSS**

LABORATORY ID: HGE 141120-1

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

OF THE  
CITY OF

DEC 12 2014

APPROVED

VED Red

MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE &amp; TIME SAMPLED: 11-20-14 1030

SAMPLED BY: C. ROSS

DATE &amp; TIME RECEIVED: 11-20-14 1330

ANALYST: MW

DATE &amp; TIME ANALYZED: 11-20-14 1535

METHOD: 3

| SAMPLE ID       | TOTAL<br>COLIFORM<br>P/A | E. COLI<br>PA | DATE/TIME<br>SAMPLED | LOG<br>NO.   |
|-----------------|--------------------------|---------------|----------------------|--------------|
| GLEND A COTRILL | PRESENT                  | PRESENT       | 11-20-14 1030        | HGE 141120-1 |
|                 |                          |               |                      |              |
|                 |                          |               |                      |              |
|                 |                          |               |                      |              |
|                 |                          |               |                      |              |
|                 |                          |               |                      |              |
|                 |                          |               |                      |              |
|                 |                          |               |                      |              |
|                 |                          |               |                      |              |
|                 |                          |               |                      |              |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 - Coliform, Fecal (MF)            | 9222 D      |
| 2 - Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 - Coliform, Total (MPN)           | COLILERT    |
| 4 - Coliform, Total (P/A)           | 9223 B      |
| 5 - Heterotrophic Plate Count (HPC) | 9215 B      |

Office of Oil &amp; Gas

DEC 12 2014

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Approved

Clover Water Sampling UIC 2014

Residence

Name

Glenda Cotrill

Address

546 Banner Hill Rd

Phone

304 927 1668

Depth of well ( if known- estimate if not )

GPS Coordinates

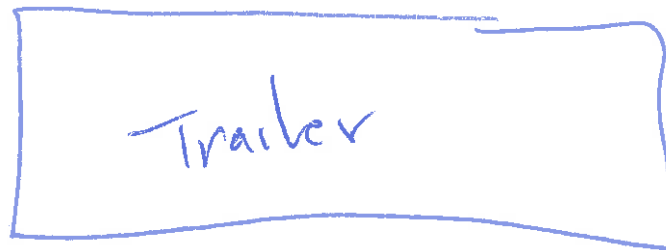
Lat

38° 44' 08.0"

Long

81° 16' 13.1"

Provide sketch below of approximate location of dwelling(s) and water wells(s)



Banner Hill Rd

6.9

15.5  
Pooled

365

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# REI Consultants, Inc. - Analytical Report

WO#: 1411R59

Date Reported: 12/3/2014

|                          |                              |                         |                        |
|--------------------------|------------------------------|-------------------------|------------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/20/2014 10:30:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/24/2014             |
| <b>Lab ID:</b>           | 1411R59-01A                  | <b>Matrix:</b>          | Liquid                 |
| <b>Client Sample ID:</b> | 14221 GLENDA COTRILL         | <b>Site ID:</b>         |                        |

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NE/LAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|--------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |        |
| TPH (Diesel Range)                  | ND     | NA  | 0.13                          | NA       | mg/L  | 11/26/14 1:11PM    | 11/26/14 7:06PM  | PA/VA  |
| TPH (Oil Range)                     | ND     | NA  | 0.33                          | NA       | mg/L  | 11/26/14 1:11PM    | 11/26/14 7:06PM  |        |
| Surr: o-Terphenyl                   | 94.1   | NA  | 28.3-152                      | NA       | %REC  | 11/26/14 1:11PM    | 11/26/14 7:06PM  |        |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |        |
| Methane                             | 165    | NA  | 50.0                          | NA       | µg/L  |                    | 11/26/14 2:57PM  |        |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/26/14 2:20PM  |        |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/26/14 2:20PM  |        |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/26/14 2:20PM  |        |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |        |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/25/14 2:57PM    | 11/26/14 12:36AM | PA/VA  |
| Surr: 2,5-Dibromotoluene            | 76.5   | NA  | 37.2-152                      | NA       | %REC  | 11/25/14 2:57PM    | 11/26/14 12:36AM |        |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                  |        |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/25/14 2:57PM    | 11/26/14 12:36AM | PA/VA  |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/25/14 2:57PM    | 11/26/14 12:36AM | PA/VA  |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/25/14 2:57PM    | 11/26/14 12:36AM | PA/VA  |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/25/14 2:57PM    | 11/26/14 12:36AM | PA/VA  |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/25/14 2:57PM    | 11/26/14 12:36AM | PA/VA  |
| Surr: 1,1,1-Trifluorotoluene        | 94.9   | NA  | 61.2-135                      | NA       | %REC  | 11/25/14 2:57PM    | 11/26/14 12:36AM |        |

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# Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED  | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|----------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11-20-14       | WJ               | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 - 10.0 | .1    |
| Hot Acid                     |                |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | 1     |
| Mineral Acid                 |                |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | 1     |
| Alkalinity                   |                |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | 1     |
| NH <sub>3</sub> N            |                |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |                |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |                |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |                |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | 1     |
| TKN                          |                |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS - Total Suspended Solids | 11-21-14       | BB/EK            | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | 4     |
| TDS - Total Dissolved Solids | ↓              | ↓                | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | 4     |
| Sulfate                      | 11-21-14       | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-21-14       | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |                |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |                |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |                |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |                |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/26/14       | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/26/14       | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Chromium (calc)              |                |                  | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | 1     |
| Iron                         | 11/26/14       | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Iron               |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/26/14       | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |                |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11-20-14       | SW               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |                |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |                |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |                |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |                |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |                |                  | SM22 <sup>nd</sup> 3500 - Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |                |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |                |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |                |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |                |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          | 12-3-14 (1420) | md               | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |                |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |                |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.  
SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

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COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11-21-14      | RC               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/20/14      | TW               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Chromium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-Cl-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           |               |                  | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

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Operator:

HG Energy, LLC

Year

2014

UIC Permit #

2R08704AP

# FIGURE NO. 9

## Water Sources

*Injectate*

| Water Source Name            |          | Source # 21    | Source # 22      | Source # 23 | Source # 24 |
|------------------------------|----------|----------------|------------------|-------------|-------------|
| Nothing Easting              |          | Webb Injection | Edgell Injection |             |             |
| Parameter                    | Units    |                |                  |             |             |
| TPH - GRO                    | mg/L     | NA <i>ND</i>   | NA <i>NP</i>     |             |             |
| TPH - DRO                    | mg/L     | NA <i>3.19</i> | NA <i>ND</i>     |             |             |
| TPH - ORO                    | mg/L     | NA <i>1.95</i> | NA <i>ND</i>     |             |             |
| BTEX                         | mg/L     | NA <i>1.47</i> | NA <i>ND</i>     |             |             |
| Chloride                     | mg/L     | 69400          | 4.81             |             |             |
| Sodium                       | mg/L     |                |                  |             |             |
| Total Dissolved Solids (TDS) | mg/L     | 113970         | 158              |             |             |
| Aluminum                     | mg/L     | <.02           | 0.09             |             |             |
| Arsenic                      | mg/L     | 0.0046         | <.0005           |             |             |
| Barium                       | mg/L     | 585            | 0.039            |             |             |
| Iron                         | mg/L     | 62.0           | 8.71             |             |             |
| Manganese                    | mg/L     | 1.56           | 0.054            |             |             |
| pH                           | SU       | 6.2            | 6.8              |             |             |
| Calcium                      | mg/L     | 8913           | 12.2             |             |             |
| Sulfate                      | mg/L     | 15.3           | 31.7             |             |             |
| MBAS                         | mg/L     | 0.22           | 0.03             |             |             |
| Dissolved Methane            | mg/L     | NA             | NA               |             |             |
| Dissolved Ethane             | mg/L     | NA             | NA               |             |             |
| Dissolved Butane             | mg/L     | NA             | NA               |             |             |
| Dissolved Propane            | mg/L     | NA             | NA               |             |             |
| Bacteria (Total Coliform)    | c/100m L | Preset         | Absent           |             |             |

**DATE/TIME SAMPLED:** 11-10-14 1042

**SAMPLE ID:**

**DATE/TIME RECEIVED: 11-10-14 1340**

**SAMPLED BY: K. WILLIAMS**

LABORATORY ID: HGE 141110-1

[illegible]

**\*Client Provided**

**\*\*See Attached:** The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

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**DATE/TIME SAMPLED:** 11-10-14 1042

**SAMPLE ID:**

**DATE/TIME RECEIVED: 11-10-14 1340**

**SAMPLED BY: K. WILLIAMS**

LABORATORY ID: HGE 141110-1

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**\*Client Provided**

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D. Boud

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JOHN W. STURM, PRESIDENT



MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-10-14 1042

SAMPLED BY: K. WILLIAMS

DATE & TIME RECEIVED: 11-10-14 1340

ANALYST: MW

DATE & TIME ANALYZED: 11-10-14 1350

METHOD: 3

| SAMPLE ID      | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|----------------|--------------------|------------|-------------------|--------------|
| WEBB INJECTION | PRESENT            | ABSENT     | 11-10-14 1042     | HGE 141110-1 |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |
|                |                    |            |                   |              |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- 1 – Coliform, Fecal (MF) 9222 D
- 2 – Coliform, Fecal (MPN) COLILERT 18
- 3 – Coliform, Total (MPN) COLILERT
- 4 – Coliform, Total (P/A) 9223 B
- 5 – Heterotrophic Plate Count (HPC) 9215 B

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Approved

Clover Water Sampling UIC 2014

Residence

Name Webb Injection

Address \_\_\_\_\_

Phone \_\_\_\_\_

Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 43 39.9

Long 81 16 52.51

Provide sketch below of approximate location of dwelling(s ) and water wells(s)

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# REI Consultants, Inc. - Analytical Report

WO#: 1411E71

Date Reported: 11/24/2014

Client: STURM ENVIRONMENTAL SERVICES  
Project: H.G. ENERGY, LLC.  
Lab ID: 1411E71-01A  
Client Sample ID: 14211 WEBB INJECTION

Collection Date: 11/10/2014 10:42:00 AM  
Date Received: 11/12/2014  
Matrix: Liquid  
Site ID:

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |       |
| TPH (Diesel Range)                  | 3.19   | NA  | 0.13                          | NA       | mg/L  | 11/14/14 9:58AM    | 11/14/14 11:27PM | PA/VA |
| TPH (Oil Range)                     | 1.95   | NA  | 0.32                          | NA       | mg/L  | 11/14/14 9:58AM    | 11/14/14 11:27PM |       |
| Surr: o-Terphenyl                   | 67.6   | NA  | 28.3-152                      | NA       | %REC  | 11/14/14 9:58AM    | 11/14/14 11:27PM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |       |
| Methane                             | 1,220  | NA  | 500                           | NA       | µg/L  |                    | 11/18/14 6:37PM  |       |
| Ethane                              | 3,280  | NA  | 300                           | NA       | µg/L  |                    | 11/18/14 5:06PM  |       |
| Propane                             | 4,030  | NA  | 400                           | NA       | µg/L  |                    | 11/18/14 5:06PM  |       |
| Butane                              | 1,900  | NA  | 500                           | NA       | µg/L  |                    | 11/18/14 5:06PM  |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 50.0                          | NA       | mg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PA/VA |
| Surr: 2,5-Dibromotoluene            | 87.9   | NA  | 37.2-152                      | NA       | %REC  | 11/13/14 1:35PM    | 11/20/14 5:33PM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| Benzene                             | 1,470  | NA  | 100                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PA/VA |
| Toluene                             | 1,390  | NA  | 100                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PA/VA |
| Ethylbenzene                        | ND     | NA  | 100                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PA/VA |
| m,p-Xylene                          | 333    | NA  | 200                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PA/VA |
| o-Xylene                            | 141    | NA  | 100                           | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:33PM  | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 105    | NA  | 61.2-135                      | NA       | %REC  | 11/13/14 1:35PM    | 11/20/14 5:33PM  |       |

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## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

Sample: P14012 Lab ID: 30134257001 Collected: 11/10/14 10:42 Received: 11/12/14 15:10 Matrix: Water  
PWS: WEBB INJECTION Site ID: Sample Type:

| Parameters  | Method    | Act ± Unc (MDC) Carr Trac        | Units | Analyzed       | CAS No.    | Qual |
|-------------|-----------|----------------------------------|-------|----------------|------------|------|
| Gross Alpha | EPA 900.0 | 3,205 ± 728 (423)<br>C:NA T:NA   | pCi/L | 11/24/14 18:55 | 12587-46-1 |      |
| Gross Beta  | EPA 900.0 | 1,114 ± 267 (230)<br>C:NA T:NA   | pCi/L | 11/24/14 18:55 | 12587-47-2 |      |
| Radium-226  | EPA 903.1 | 544 ± 66.2 (0.540)<br>C:NA T:69% | pCi/L | 11/25/14 12:41 | 13982-63-3 |      |
| Radium-228  | EPA 904.0 | 521 ± 93.3 (1.40)<br>C:80% T:37% | pCi/L | 11/19/14 11:48 | 15262-20-1 |      |

Sample: P14013 Lab ID: 30134257002 Collected: 11/10/14 11:16 Received: 11/12/14 15:10 Matrix: Water  
PWS: EDGEL INJECTION Site ID: Sample Type:

| Parameters  | Method    | Act ± Unc (MDC) Carr Trac           | Units | Analyzed       | CAS No.    | Qual |
|-------------|-----------|-------------------------------------|-------|----------------|------------|------|
| Gross Alpha | EPA 900.0 | 1.12 ± 1.43 (2.96)<br>C:NA T:NA     | pCi/L | 11/25/14 17:48 | 12587-46-1 |      |
| Gross Beta  | EPA 900.0 | 0.862 ± 1.28 (2.74)<br>C:NA T:NA    | pCi/L | 11/25/14 17:48 | 12587-47-2 |      |
| Radium-226  | EPA 903.1 | 0.317 ± 0.723 (0.429)<br>C:NA T:87% | pCi/L | 11/25/14 12:35 | 13982-63-3 |      |
| Radium-228  | EPA 904.0 | 1.05 ± 0.457 (0.744)<br>C:85% T:79% | pCi/L | 11/19/14 11:19 | 15262-20-1 |      |

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL - RADIOCHEMISTRY

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

QC Batch: RADC/22263 Analysis Method: EPA 900.0  
QC Batch Method: EPA 900.0 Analysis Description: 900.0 Gross Alpha/Beta  
Associated Lab Samples: 30134257001, 30134257002

METHOD BLANK: 819650 Matrix: Water  
Associated Lab Samples: 30134257001, 30134257002

| Parameter   | Act ± Unc (MDC) Carr Trac       | Units | Analyzed       | Qualifiers |
|-------------|---------------------------------|-------|----------------|------------|
| Gross Alpha | -0.212 ± 0.624 (1.86) C:NA T:NA | pCi/L | 11/21/14 07:43 |            |
| Gross Beta  | -0.006 ± 0.751 (1.88) C:NA T:NA | pCi/L | 11/21/14 07:43 |            |

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## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL - RADIOCHEMISTRY

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

---

|                                                  |            |                       |                  |
|--------------------------------------------------|------------|-----------------------|------------------|
| QC Batch:                                        | RADC/22194 | Analysis Method:      | EPA 904.0        |
| QC Batch Method:                                 | EPA 904.0  | Analysis Description: | 904.0 Radium 228 |
| Associated Lab Samples: 30134257001, 30134257002 |            |                       |                  |

---

|                                                  |        |         |       |
|--------------------------------------------------|--------|---------|-------|
| METHOD BLANK:                                    | 817076 | Matrix: | Water |
| Associated Lab Samples: 30134257001, 30134257002 |        |         |       |

---

| Parameter  | Act ± Unc (MDC) Carr Trac          | Units | Analyzed       | Qualifiers |
|------------|------------------------------------|-------|----------------|------------|
| Radium-228 | -0.165 ± 0.263 (0.651) C:87% T:81% | pCi/L | 11/19/14 11:18 |            |

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## QUALITY CONTROL - RADIOCHEMISTRY

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

QC Batch: RADC/22195 Analysis Method: EPA 903.1  
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226  
Associated Lab Samples: 30134257001, 30134257002

METHOD BLANK: 817077 Matrix: Water  
Associated Lab Samples: 30134257001, 30134257002

| Parameter  | Act ± Unc (MDC) Carr Trac        | Units | Analyzed       | Qualifiers |
|------------|----------------------------------|-------|----------------|------------|
| Radium-226 | 0.250 ± 0.459 (0.819) C:NA T:86% | pCi/L | 11/25/14 12:16 |            |

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## QUALIFIERS

Project: 6774  
Pace Project No.: 30134257 H.G. ENERGY, LLC.

## DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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## REPORT OF LABORATORY ANALYSIS





## Sample Condition Upon Receipt

Client Name: Green Environmental

Project #

30134257

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☒ Pace Other \_\_\_\_\_

Tracking #: \_\_\_\_\_

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no Biological Tissue is Frozen: Yes NoPacking Material: Bubble Wrap \_\_\_\_\_ Bubble Bags ☒ None \_\_\_\_\_ Other \_\_\_\_\_Thermometer Used #6 Type of Ice: ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begunCooler Temp.: Observed Temp.: 14 °C Correction Factor: 0 °C Final Temp: 14 °C

Date and Initials of person

examining contents: SRA 11/13/14

Temp should be above freezing to 6°C

Comments:

|                                                                                            |                                                                                                  |                                                               |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Chain of Custody Present:                                                                  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 1.                                                            |
| Chain of Custody Filled Out:                                                               | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 2.                                                            |
| Chain of Custody Relinquished                                                              | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 3.                                                            |
| Sampler Name & Signature on COC:                                                           | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 4.                                                            |
| Samples Arrived within Hold Time:                                                          | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 5.                                                            |
| Short Hold Time Analysis (<72hr):                                                          | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 6.                                                            |
| Rush Turn Around Time Requested:                                                           | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 7.                                                            |
| Sufficient Volume:                                                                         | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 8.                                                            |
| Correct Containers Used:                                                                   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 9.                                                            |
| -Pace Containers Used:                                                                     | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A |                                                               |
| Containers Intact:                                                                         | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 10.                                                           |
| Filtered volume received for Dissolved tests                                               | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | 11.                                                           |
| Sample Labels match COC:                                                                   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 12. no date or time on samples                                |
| -Includes date/time/ID/Analysis Matrix:                                                    | <u>wt</u>                                                                                        |                                                               |
| All containers needing preservation have been checked                                      | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | 13. PHLZ                                                      |
| All containers needing preservation are found to be in compliance with EPA recommendation. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |                                                               |
| exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)                                        | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                              | Initial when completed <u>SRA</u> Lot # of added preservative |
| Samples checked for dechlorination:                                                        | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | 14.                                                           |
| Headspace in VOA Vials (>8mm):                                                             | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | 15.                                                           |
| Trip Blank Present:                                                                        | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | 16.                                                           |
| Trip Blank Custody Seals Present                                                           | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A |                                                               |
| Pace Trip Blank Lot # (if purchased):                                                      |                                                                                                  |                                                               |

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## Client Notification/ Resolution:

Field Data Required?

Y / N

Person Contacted: Vicki Hoops Date/Time: 11/13/14Comments/ Resolution: Notified by email #4Project Manager Review: Samantha B. BayDate: 11/13/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Client Name: Stephen Cardozo

| Item No. | Matrix Code | Glass Jar (120 / 250 / 500 / 1L) | Soil kit (2 SB, 1M, soil jar) | Chemistry (250 / 500 / 1L) | Organics (1L) | Nutrient (250 / 500 ) | Phenolics (250 ml) | TOC (40 ml / 250 ml) | TOX (250 ml) | Total Metals | Dissolved Metals preserved Y | O & G (1L) | TPH (1L) | VOA (40 ml 30 ml) | Cyanide (250 ml) | Sulfide (500 ml) | Bacteria (120 ml) | Wipes / swipe/ smear/ filter | Radchem Nalgene (125 / 250 / 500 / 1L) | Radchem Nalgene (1/2 gal. / gal.L) | Cubitainer (500 ml / 4L) | Ziploc | Other | Other |
|----------|-------------|----------------------------------|-------------------------------|----------------------------|---------------|-----------------------|--------------------|----------------------|--------------|--------------|------------------------------|------------|----------|-------------------|------------------|------------------|-------------------|------------------------------|----------------------------------------|------------------------------------|--------------------------|--------|-------|-------|
| 100      | 1/2         |                                  |                               |                            |               |                       |                    |                      |              |              |                              |            |          |                   |                  |                  |                   |                              |                                        |                                    |                          |        |       |       |
| 200      | 1/2         |                                  |                               |                            |               |                       |                    |                      |              |              |                              |            |          |                   |                  |                  |                   |                              |                                        |                                    |                          |        |       |       |

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STURM ENVIRONMENTAL  
BRUSHY FORK ROAD  
BRIDGEPORT, WV 26330  
PHONE: 304-623-6549  
FAX: 304-623-6552

STURM ENVIRONMENTAL SERVICES  
610 D STREET  
SO. CHARLESTON, WV 25303  
PHONE: 304-744-9864  
FAX: 304-744-7866

## HG Energy

BILL TO: Client Name;

Address:

City/State/Zip:

Contact Person:

Telephone Number:

Email Address:

**Sampler Name: (Print)**

**Sampler Signature:**

**Project Name:**

**Special Reporting:**

|               |  |             |
|---------------|--|-------------|
| Email Results |  | Fax Results |
|---------------|--|-------------|

**SLIDESHOW**

Date Needed

## Supplies

**RUSH (pre-scheduled; surcharges may apply) Please Check One**

1 DAY 2 DAY 3 DAY

|   |  |
|---|--|
|   |  |
| * |  |
|   |  |

[illegible]

Comments

# T-83110V

Relinquished by: 0-11

Records retained for 5 years

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Received by:

| Date | Time |
|------|------|
|------|------|

| Date | Time |
|------|------|
|------|------|

Laboratory Comments:

Temperature Upon Receipt: \_\_\_\_\_

## Bottles Preserved?

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MAIN OFFICE—POST OFFICE BOX 554

MAIN OFFICE—POST OFFICE BOX 650  
CHARLESTON BRANCH—POST OFFICE BOX 600

CHARLESTON BRANCH—POST OFFICE BOX 8337 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549

SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 : (304) 744-9854

DATE/TIME SAMPLED: 11-10-14 1116

**SAMPLE ID:**

DATE/TIME RECEIVED: 11-10-14 1340

**SAMPLED BY: K. WILLIAMS**

LABORATORY ID: HGE 141110-2

[illegible]

**\*Client Provided**

**\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.**

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**APPROVED**



**APPROVED**

## MICROBIOLOGY

COMPANY: H.G. ENERGY, LLC.

DATE & TIME SAMPLED: 11-10-14 1116

SAMPLED BY: K. WILLIAMS

DATE & TIME RECEIVED: 11-10-14 1340

ANALYST: MW

DATE & TIME ANALYZED: 11-10-14 1350

METHOD: 3

| SAMPLE ID        | TOTAL COLIFORM P/A | E. COLI PA | DATE/TIME SAMPLED | LOG NO.      |
|------------------|--------------------|------------|-------------------|--------------|
| EDGE L INJECTION | ABSENT             | ABSENT     | 11-10-14 1116     | HGE 141110-2 |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |
|                  |                    |            |                   |              |

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

- |                                     |             |
|-------------------------------------|-------------|
| 1 – Coliform, Fecal (MF)            | 9222 D      |
| 2 – Coliform, Fecal (MPN)           | COLILERT 18 |
| 3 – Coliform, Total (MPN)           | COLILERT    |
| 4 – Coliform, Total (P/A)           | 9223 B      |
| 5 – Heterotrophic Plate Count (HPC) | 9215 B      |

\* Client provided

\*\*See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

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Approved

# REI Consultants, Inc. - Analytical Report

WO#: 1411E71

Date Reported: 11/24/2014

|                          |                              |                         |                        |
|--------------------------|------------------------------|-------------------------|------------------------|
| <b>Client:</b>           | STURM ENVIRONMENTAL SERVICES | <b>Collection Date:</b> | 11/10/2014 11:16:00 AM |
| <b>Project:</b>          | H.G. ENERGY, LLC.            | <b>Date Received:</b>   | 11/12/2014             |
| <b>Lab ID:</b>           | 1411E71-02A                  | <b>Matrix:</b>          | Liquid                 |
| <b>Client Sample ID:</b> | 14212 EDGEL INJECTION        | <b>Site ID:</b>         |                        |

| Analysis                            | Result | MDL | PQL                           | MCL Qual | Units | Prep Date          | Date Analyzed    | NELAC |
|-------------------------------------|--------|-----|-------------------------------|----------|-------|--------------------|------------------|-------|
| <b>SEMI-VOLATILE RANGE ORGANICS</b> |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CL</b> |                  |       |
| TPH (Diesel Range)                  | ND     | NA  | 0.12                          | NA       | mg/L  | 11/14/14 9:58AM    | 11/14/14 11:59PM | PA/VA |
| TPH (Oil Range)                     | ND     | NA  | 0.29                          | NA       | mg/L  | 11/14/14 9:58AM    | 11/14/14 11:59PM |       |
| Surr: o-Terphenyl                   | 101    | NA  | 28.3-152                      | NA       | %REC  | 11/14/14 9:58AM    | 11/14/14 11:59PM |       |
| <b>DISSOLVED GASES</b>              |        |     | <b>Method: GC-FID</b>         |          |       | <b>Analyst: JC</b> |                  |       |
| Methane                             | ND     | NA  | 10.0                          | NA       | µg/L  |                    | 11/18/14 3:09PM  |       |
| Ethane                              | ND     | NA  | 15.0                          | NA       | µg/L  |                    | 11/18/14 3:09PM  |       |
| Propane                             | ND     | NA  | 20.0                          | NA       | µg/L  |                    | 11/18/14 3:09PM  |       |
| Butane                              | ND     | NA  | 25.0                          | NA       | µg/L  |                    | 11/18/14 3:09PM  |       |
| <b>VOLATILE RANGE ORGANICS</b>      |        |     | <b>Method: SW8015C (2000)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| TPH (Gasoline Range)                | ND     | NA  | 0.500                         | NA       | mg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PA/VA |
| Surr: 2,5-Dibromotoluene            | 86.7   | NA  | 37.2-152                      | NA       | %REC  | 11/13/14 1:35PM    | 11/20/14 5:01PM  |       |
| <b>VOLATILE ORGANIC COMPOUNDS</b>   |        |     | <b>Method: SW8021B (1996)</b> |          |       | <b>Analyst: CB</b> |                  |       |
| Benzene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PA/VA |
| Toluene                             | ND     | NA  | 1.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PA/VA |
| Ethylbenzene                        | ND     | NA  | 1.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PA/VA |
| m,p-Xylene                          | ND     | NA  | 2.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PA/VA |
| o-Xylene                            | ND     | NA  | 1.00                          | NA       | µg/L  | 11/13/14 1:35PM    | 11/20/14 5:01PM  | PA/VA |
| Surr: 1,1,1-Trifluorotoluene        | 96.8   | NA  | 61.2-135                      | NA       | %REC  | 11/13/14 1:35PM    | 11/20/14 5:01PM  |       |

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Clover Water Sampling UIC 2014

Residence

Name Edgar Injacion

Address \_\_\_\_\_

Phone \_\_\_\_\_

Depth of well ( if known- estimate if not ) \_\_\_\_\_

GPS Coordinates

Lat 38 43 24.22

Long 81 16 39.53

Provide sketch below of approximate location of dwelling(s ) and water wells(s)

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COMPANY: H.G. ENERGY, LLC.

| PARAMETER                    | DATE ANALYZED   | ANALYST INITIALS | METHOD                                                                               | UNITS | MRL        | MDL   |
|------------------------------|-----------------|------------------|--------------------------------------------------------------------------------------|-------|------------|-------|
| pH                           | 11-10-14        | KH               | SM22 <sup>nd</sup> 4500 HB                                                           | S.U   | 2.0 - 10.0 | .1    |
| Hot Acid                     |                 |                  | SM22 <sup>nd</sup> 2310 B (4a)                                                       | mg/L  | 20.        | 1     |
| Mineral Acid                 |                 |                  | SM22 <sup>nd</sup> 2310, Titrimetric                                                 | mg/L  |            | 1     |
| Alkalinity                   |                 |                  | SM22 <sup>nd</sup> 2320 B                                                            | mg/L  | 20.        | 1     |
| NH <sub>3</sub> N            |                 |                  | SM22 <sup>nd</sup> 4500NH <sub>3</sub> B + SM22 <sup>th</sup> 4500 NH <sub>3</sub> C | mg/L  | 10.        | .10   |
| Settleable Solids            |                 |                  | SM 22 <sup>nd</sup> 2540 F                                                           | ml/L  |            | .1    |
| Turbidity                    |                 |                  | SM22 <sup>nd</sup> 2130 B                                                            | NTU   | 1.         | .05   |
| Conductivity                 |                 |                  | EPA 120.1 Rev-1982                                                                   | µmhos | 20.        | 1     |
| TKN                          |                 |                  | SM22 <sup>nd</sup> 4500 N org + SM22 <sup>nd</sup> 4500 NH <sub>3</sub> C            | mg/L  | 10.        | .10   |
| TSS - Total Suspended Solids |                 |                  | SM22 <sup>nd</sup> 2540 D                                                            | mg/L  | 50.        | 4     |
| TDS - Total Dissolved Solids | 11-11-14        | BO/DC            | SM22 <sup>nd</sup> 2540 C                                                            | mg/L  | 450.       | 4     |
| Sulfate                      | 11-12-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | 1.0 / 10.  | 1.0   |
| Chloride                     | 11-12-14        | DC               | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .50        | .50   |
| Nitrate                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrite                      |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Fluoride                     |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .01   |
| Nitrate-Nitrite              |                 |                  | EPA 300.0 Rev 2.1-1993+Calc                                                          | mg/L  |            | .01   |
| Ortho-Phosphate              |                 |                  | EPA 300.0 Rev 2.1-1993                                                               | mg/L  | .05        | .05   |
| Aluminum                     | 11/19/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Aluminum           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Calcium                      | 11/19/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Dissolved Calcium            |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .10   |
| Chromium                     |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Dissolved Chromium           |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .003  |
| Chromium (calc)              |                 |                  | SM22 <sup>nd</sup> 2340B+EPA 200.7 Rev 4.4-1994                                      | mg/L  |            | 1     |
| Iron                         | 11/19/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Dissolved Iron               |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .02   |
| Magnesium                    |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Dissolved Magnesium          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .01   |
| Manganese                    | 11/19/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Dissolved Manganese          |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .25        | .002  |
| Sodium                       | 11/24/14        | TW               | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .50        | .03   |
| Zinc (ICP)                   |                 |                  | EPA 200.7 Rev 4.4-1994                                                               | mg/L  | .05        | .004  |
| MBAS                         | 11-11-14        | SW               | SM22 <sup>nd</sup> 5540C                                                             | mg/L  | .01        | .01   |
| Cyanide                      |                 |                  | EPA 335.4 Rev 1.0-1993                                                               | mg/L  | .005       | .002  |
| Ortho-Phosphate              |                 |                  | SM22 <sup>nd</sup> 4500P B.5 + 4500PE                                                | mg/L  | .02        | .01   |
| Phenol                       |                 |                  | EPA 420.4 1983                                                                       | mg/L  | .010       | .004  |
| Sulfide                      |                 |                  | SM22 <sup>nd</sup> 4500 S2 F                                                         | mg/L  | 5.0        | .50   |
| Hexavalent Chromium          |                 |                  | SM22 <sup>nd</sup> 3500 - Cr-B                                                       | mg/L  | .02        | .007  |
| TPO <sub>4</sub>             |                 |                  | SM22 <sup>nd</sup> 4500 P E + SM22 <sup>th</sup> 4500 P B.5                          | mg/L  | .02        | .010  |
| Oil & Grease                 |                 |                  | EPA 1664A Gravimetric Extraction                                                     | mg/L  | 5.0        | 3.0   |
| BOD                          |                 |                  | SM22 <sup>nd</sup> 5210B                                                             | mg/L  | 3.0        | 2.0   |
| COD                          |                 |                  | SM22 <sup>nd</sup> 5220D                                                             | mg/L  | 20         | 6.0   |
| TOC                          | 11-12-14 (1551) | ML               | SM22 <sup>nd</sup> 5310B                                                             | mg/L  | 5.0        | 1.0   |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Selenium               |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .005       | .0006 |
| Chromium                     |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Dissolved Chromium           |                 |                  | SM22 <sup>nd</sup> 3113 B                                                            | mg/L  | .001       | .0002 |
| Total Selenium (AFS)         |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Total Recoverable Selenium   |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |
| Dissolved Selenium           |                 |                  | SM22 <sup>nd</sup> 3114B                                                             | mg/L  | .001       | .0006 |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level.

DEC 12 2014



JOHN W. STURM, PRESIDENT

COMPANY: H.G. ENERGY, LLC.

| PARAMETER                  | DATE ANALYZED | ANALYST INITIALS | METHOD                       | UNITS | MRL   | MDL   |
|----------------------------|---------------|------------------|------------------------------|-------|-------|-------|
| Antimony                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0004 |
| Arsenic                    | 11.11.14      | PC               | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Beryllium                  |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Beryllium        |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Cadmium                    |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Dissolved Cadmium          |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0005 | .0001 |
| Copper                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Dissolved Copper           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .002  | .0006 |
| Lead                       |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Dissolved Lead             |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .005  | .0005 |
| Silver                     |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Dissolved Silver           |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .001  | .0002 |
| Thallium                   |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Dissolved Thallium         |               |                  | SM22 <sup>nd</sup> 3113 B    | mg/L  | .0025 | .0003 |
| Mercury                    |               |                  | EPA 245.1 Rev 3.0-1994       | mg/L  | .001  | .0002 |
| Barium                     | 11/19/14      | LV               | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .002  |
| Beryllium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Beryllium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Boron                      |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .03   |
| Cadmium                    |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Dissolved Cadmium          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .001  |
| Cobalt                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .01   |
| Copper                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Dissolved Copper           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Barium                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Nickel                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Potassium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Dissolved Potassium        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .50   | .01   |
| Silica                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Dissolved Silicon          |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .25   | .02   |
| Silver                     |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Dissolved Silver           |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Strontium                  |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .01   | .001  |
| Tin                        |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .005  |
| Titanium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .02   | .001  |
| Vanadium                   |               |                  | EPA 200.7 Rev 4.4-1994       | mg/L  | .05   | .003  |
| Bromide                    |               |                  | EPA 300.0 Rev 2.1-1993       | mg/L  | .25   | .10   |
| Chlorine Residual (AT LAB) |               |                  | SM22 <sup>nd</sup> 4500CL G  | mg/L  | 1.0   | .01   |
| Dissolved Oxygen           |               |                  | SM22 <sup>nd</sup> 4500 O G  | mg/L  |       | 1     |
| Volatile Suspended Solids  |               |                  | EPA 160.4                    | mg/L  |       | 1     |
| Total Solids               |               |                  | SM22 <sup>nd</sup> 2540 B    | mg/L  |       | .01   |
| % Solids                   |               |                  | EPA 160.3                    | mg/L  |       | 1.0   |
| Ferrous Iron               |               |                  | SM22 3500 Fe-D               | mg/L  | .60   | .02   |
| Ferric Iron                |               |                  | Calculation                  | mg/L  |       | .05   |
| Chloride                   |               |                  | SM22 <sup>nd</sup> 4500-CL-E | mg/L  | 1.0   | .25   |
| Nitrite                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .004  |
| Nitrate                    |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   |       |
| Nitrite-Nitrate            |               |                  | EPA 353.2 Rev 2.0-1993       | mg/L  | .05   | .02   |
| Specific Gravity           | 1.014-14      | JW               | Calculation                  | mg/L  |       |       |
| Total Nitrogen             |               |                  | Calculation                  | mg/L  |       |       |

EPA-United States Environmental Protection Agency, "Method for the Chemical Analysis of Water and Waste," EPA 600/4-79-020, March 1983.

SM-Standard Methods for the Examination of Water and Wastewater, 22<sup>nd</sup> Edition. MRL-Minimum Reporting Level, MDL-Method Detection Level

Received  
Office of Oil & Gas

DEC 12 2014

# Sturm Environmental Services

STURM ENVIRONMENTAL  
BRUSHY FORK ROAD  
BRIDGEPORT, WV 26330  
PHONE: 304-623-6549  
FAX: 304-623-6552

STURM ENVIRONMENTAL SERVICES  
610 D STREET  
SO. CHARLESTON, WV 25303  
PHONE: 304-744-9864  
FAX: 304-744-7866

MAILING ADDRESSES ARE LISTED BELOW

REPORT TO: Client Name:

*HG-Envy*

BILL TO: Client Name:

Address:

City/State/Zip:

Contact Person:

Telephone Number:

Email Address:

Purchase Order #:

TURN AROUND TIME: Standard

RUSH (pre-scheduled; surcharges may apply) Please Check One

1 DAY 2 DAY 3 DAY

Date Needed

ANALYZE FOR:

MATRIX

Other (specify):

Soil

Sludge

Drinking Water

Wastewater

Groundwater

HNO<sub>3</sub>

None

H<sub>2</sub>SO<sub>4</sub> Glass

H<sub>2</sub>SO<sub>4</sub> Plastic

NaOH

HCl

OTHER

Ice

TIME

DATE

11-10-14 1042

1116

# 897 14

# 877 14

Field pH

Field DO

Field Conductivity

Field Chlorine (mg/L or ug/L)

Field Temp (F" or C") circle one

1215

1219

# of Bottles

3.1

Laboratory Comments:

Temperature Upon Receipt:

Bottles Preserved?

Received

Office of Oil & Gas

DEC 12 2014

Records retained for 5 years

Received by:

Date

Time

11-10-14 1340

Received by:

Date

Time

11-10-14 1340

Comments

COLLECT #

Relinquished by:

*Thomas Miller*

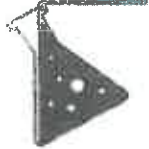
Relinquished by:

*Thomas Miller*

MAIN OFFICE—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549

CHARLESTON BRANCH—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

# CHAIN OF CUSTODY RECORD



**REIC**  
Research Environmental & Industrial Consultants, Inc.  
MAIN LABORATORY & CORPORATE HEADQUARTERS:  
100 Blue Bell • 205 Industrial Park Blvd. • Blue Bell, PA 19001  
610-261-1100 • 261-255-7500 • www.reic.com

**MID OHIO VALLEY Service Center**  
101 17th Street  
Arlington, KY 41001  
606-345-5977

**SHEMANGOH Service Center**  
1037 Commercial Rd. Box 201  
Vernonia, VA 24683  
640-248-1181

**ROANOKE Service Center**  
3075 E. Expressway Blvd.  
Fayetteville, VA 24119  
540-338-1276

**MORGANTOWNS Service Center**  
100 Commercial Drive  
Martinsburg, WV 26150  
800-345-5977

## SAMPLE LOG & ANALYSIS REQUEST

**TURNAROUND TIME**

☒ **NORMAL**    ☐ **5 DAY**    ☐ **3 DAY**    ☐ **2 DAY**    ☐ **1 DAY**

**RUSH TURNAROUND\***

\*Rush requests are subject to laboratory approval and will incur additional charges.

| SAMPLE ID | No. of Type of Containers | Sampling Date/Time | Attn to | Sample Chain of Custody |
|-----------|---------------------------|--------------------|---------|-------------------------|
| 14710     | 3 (Gas)<br>4 (Liquor)     | 11/14 / 11:02      |         | h                       |
| 14712     | 4 (Liquor)                | 11/14 / 11:02      |         | h                       |

Office of Oil & Gas  
DEC 12 2014

All analytical requests are subject to REIC's Standard Terms and Conditions.

Signature: *[Signature]* Date: 11/12/14

Client: *Shenandoah Environmental Services*  
Contact Person: *Joe...*  
Company: *Shenandoah Environmental Services*  
Address: *100 Blue Bell*  
City: *Blue Bell*  
State: *PA*  
Zip: *19001*  
Phone: *610-261-1100*  
Fax: *610-261-1100*  
E-mail: *info@shenandoah.com*

- Preservative Codes:**
- 1. Organic Solvents
  - 2. Organic Acids
  - 3. Organic Bases
  - 4. Organic Salts
  - 5. Organic Metals
  - 6. Organic Gases
  - 7. Organic Liquids
  - 8. Organic Solids
  - 9. Organic Powders
  - 10. Organic Slurries
  - 11. Organic Emulsions
  - 12. Organic Suspensions
  - 13. Organic Solutions
  - 14. Organic Mixtures
  - 15. Organic Residues
  - 16. Organic Wastes
  - 17. Organic By-products
  - 18. Organic Effluents
  - 19. Organic Discharges
  - 20. Organic Leachates
  - 21. Organic Extracts
  - 22. Organic Fractions
  - 23. Organic Components
  - 24. Organic Constituents
  - 25. Organic Impurities
  - 26. Organic Contaminants
  - 27. Organic Pollutants
  - 28. Organic Degradates
  - 29. Organic Transformation Products
  - 30. Organic Metabolites
  - 31. Organic Biomarkers
  - 32. Organic Tracers
  - 33. Organic Indicators
  - 34. Organic Markers
  - 35. Organic Signatures
  - 36. Organic Fingerprints
  - 37. Organic Profiles
  - 38. Organic Patterns
  - 39. Organic Trends
  - 40. Organic Variations
  - 41. Organic Fluctuations
  - 42. Organic Oscillations
  - 43. Organic Cycles
  - 44. Organic Rhythms
  - 45. Organic Periods
  - 46. Organic Intervals
  - 47. Organic Durations
  - 48. Organic Timescales
  - 49. Organic Chronologies
  - 50. Organic Timelines
  - 51. Organic Sequences
  - 52. Organic Series
  - 53. Organic Progressions
  - 54. Organic Regressions
  - 55. Organic Correlations
  - 56. Organic Relationships
  - 57. Organic Interactions
  - 58. Organic Connections
  - 59. Organic Linkages
  - 60. Organic Associations
  - 61. Organic Affiliations
  - 62. Organic Connections
  - 63. Organic Relationships
  - 64. Organic Interactions
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  - 93. Organic Relationships
  - 94. Organic Interactions
  - 95. Organic Connections
  - 96. Organic Relationships
  - 97. Organic Interactions
  - 98. Organic Connections
  - 99. Organic Relationships
  - 100. Organic Interactions

ENTER PRESERVATIVE CODE

COMMENTS:

Container's provided by: *Client*

EMAIL RESULTS ☐

FAX RESULTS ☐

HG Energy is currently locating water source wells within the AOR. These wells will be tested and data reported to WV DEP.

Received

10/1/2014

Office of Oil and Gas  
WV Dept. of Environmental Protection

**APPENDIX F**  
**Area Permit Wells**

| API #        | Well Type<br>(Injection,<br>Production,<br>Observation,<br>Monitoring) | Well Status<br>(Active,<br>Abandoned,<br>Shut-in,<br>Plugged) | Northing (UTM<br>NAD 83 Meters) | Easting (UTM<br>NAD 83 Meters) |
|--------------|------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------|--------------------------------|
| 47-087-03016 | Producer                                                               | Active                                                        | 4,285,046                       | 475,225                        |
| 47-087-03077 | Producer                                                               | Active                                                        | 4,284,867                       | 475,163                        |
| 47-087-02434 | Producer                                                               | Active                                                        | 4,285,744                       | 475,242                        |
| 47-087-03060 | Producer                                                               | Inactive                                                      | 4,285,930                       | 475,287                        |
| 47-087-02440 | Producer                                                               | Active                                                        | 4,286,557                       | 475,128                        |
| 47-087-00965 | Producer                                                               | Active                                                        | 4,287,260                       | 475,101                        |
| 47-087-01094 | Producer                                                               | Active                                                        | 4,286,998                       | 475,030                        |
| 47-087-01120 | Producer                                                               | Active                                                        | 4,287,167                       | 474,803                        |
| 47-087-03046 | Producer                                                               | Active                                                        | 4,285,613                       | 475,953                        |
| 47-087-02509 | Producer                                                               | Active                                                        | 4,285,905                       | 475,890                        |
| 47-087-02519 | Producer                                                               | Active                                                        | 4,284,573                       | 476,008                        |
| 47-087-03037 | Producer                                                               | Active                                                        | 4,284,705                       | 475,826                        |
| 47-087-03089 | Producer                                                               | Active                                                        | 4,285,493                       | 475,842                        |
| 47-087-02533 | Producer                                                               | Active                                                        | 4,286,700                       | 475,677                        |
| 47-087-03081 | Producer                                                               | Active                                                        | 4,286,211                       | 475,816                        |
| 47-087-02534 | Producer                                                               | Active                                                        | 4,286,474                       | 475,962                        |
| 47-087-02998 | Producer                                                               | Active                                                        | 4,286,218                       | 476,120                        |
| 47-087-03172 | Producer                                                               | Active                                                        | 4,286,672                       | 476,228                        |
| 47-087-02552 | Producer                                                               | Active                                                        | 4,286,694                       | 475,203                        |
| 47-087-03017 | Producer                                                               | Active                                                        | 4,285,604                       | 475,479                        |
| 47-087-03079 | Producer                                                               | Active                                                        | 4,285,493                       | 475,176                        |
| 47-087-02615 | Producer                                                               | Active                                                        | 4,286,848                       | 476,077                        |
| 47-087-03085 | Producer                                                               | Active                                                        | 4,285,728                       | 476,237                        |
| 47-087-02765 | Producer                                                               | Active                                                        | 4,284,822                       | 475,700                        |
| 47-087-03039 | Producer                                                               | Active                                                        | 4,285,156                       | 475,743                        |
| 47-087-03021 | Producer                                                               | Active                                                        | 4,285,674                       | 475,180                        |
| 47-087-03080 | Producer                                                               | Active                                                        | 4,286,854                       | 475,717                        |
| 47-087-03065 | Producer                                                               | Active                                                        | 4,287,068                       | 475,514                        |
| 47-087-03166 | Producer                                                               | Active                                                        | 4,287,186                       | 475,753                        |
| 47-087-02706 | Producer                                                               | Active                                                        | 4,286,981                       | 475,356                        |
| 47-087-03073 | Producer                                                               | Active                                                        | 4,286,792                       | 475,176                        |
| 47-087-04075 | Producer                                                               | Active                                                        | 4,284,228                       | 475,505                        |
| 47-087-04208 | Producer                                                               | Active                                                        | 4,283,803                       | 475,788                        |
| 47-087-03064 | Producer                                                               | Active                                                        | 4,285,813                       | 475,759                        |
| 47-087-03028 | Producer                                                               | Active                                                        | 4,285,088                       | 474,778                        |

NOV - 5 2014

Office of Oil and Gas

[illegible]

All producing wells within the Clover Unit No 1 are served by these injection wells.

Received

2014 - 8 - 2014

Office of Oil and Gas  
TWP Division of Environmental Protection

## APPENDIX H

### GROUNDWATER PROTECTION PLAN

Facility Name: Clover Waterflood

County: Roane

Facility Location:

|                         |           |           |
|-------------------------|-----------|-----------|
| Postal Service Address: | NA        |           |
| Latitude and Longitude: | 38.727907 | 81.281486 |

Contact Information:

|                 |                          |
|-----------------|--------------------------|
| Person:         | Roger Heldman            |
| Phone Number:   | 304-420-1107             |
| E-mail Address: | rheldman@hgenergyllc.com |

Date: 10/21/14

1. A list of all operations that may contaminate the groundwater.

|                                               |
|-----------------------------------------------|
| <p>Tank failure/leak</p> <p>Pipeline leak</p> |
|-----------------------------------------------|

2. A description of procedures and facilities used to protect groundwater quality from the list of potential contaminant sources above.

|                                                                                          |
|------------------------------------------------------------------------------------------|
| <p>Secondary containment around tanks</p> <p>Pipelines routinely patrolled for leaks</p> |
|------------------------------------------------------------------------------------------|

3. List procedures to be used when designing and adding new equipment or operations.

|                                                                          |
|--------------------------------------------------------------------------|
| <p>No new equipment or operations are anticipated for this facility.</p> |
|--------------------------------------------------------------------------|

Received  
 NOV - 2 2014  
 Office of Oil and Gas  
 WV Dept. of Environmental Protection

4. Summarize all activities at your facility that are already regulated for groundwater protection.

This facility is covered by existing UIC permit

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

There are no known ground water quality issues in this area. This facility is remotely located with very few USDWs in the area.

6. Provide a statement that no waste material will be used for deicing or fill material on the property unless allowed by another rule.

No waste material is or will be used for deicing or fill material.

7. Describe the groundwater protection instruction and training to be provided to the employees. Job procedures shall provide direction on how to prevent groundwater contamination.

The operators of this facility are instructed to routinely monitor tank conditions, secondary containment condition, and patrol injection lines.

Received

11/7 - 5 2014

Office of Oil and Gas  
WV Dept. of Environmental Protection

8. Include provisions for inspections of all GPP elements and equipment. Inspections must be made quarterly at a minimum.

Dikes, pipelines, and injection equipment will be inspected at a minimum of every 90 days.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

10/21/14

Received

Office of Oil and Gas  
WV Dept. of Environmental Protection

## APPENDIX I

### Requirement for Financial Responsibility to Plug/Abandon an Injection Well

To: WV Department of Environmental Protection  
Office of Oil and Gas  
601 57<sup>th</sup> Street, SE  
Charleston, West Virginia 25304-2345  
ATTN: Underground Injection Control Program

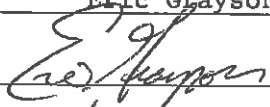
From: HG Energy, LLC  
5260 Dupont Road  
Parkersburg, WV 26101

Date: 10/10/14

Subject: Underground Injection Control (UIC) Permit Application  
# 2R08704AP  
Requirement for Financial Responsibility

I, Eric Grayson, verify in accordance with 47CSR13-13.7.g., that I will maintain financial responsibility and resources to close, plug, and abandon underground injection wells(s) in a manner prescribed by the Chief of the Office of Oil and Gas.

Name: Eric Grayson

Signature: 

Date: 10/30/14

Received

NOV - 11 2014

Office of Oil and Gas  
WV Dept. of Environmental Protection

Promoting a healthy environment



This is not a commercial disposal facility.

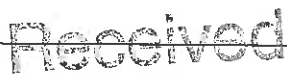
Received

NOV 12 2014

Office of Oil and Gas  
New York State Department of Environmental Protection

## APPENDIX K

**Identify permit or construction approvals received  
or applied for under the following programs:**

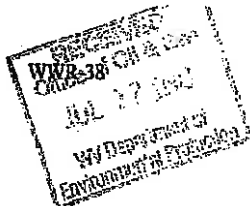
| Permit/approvals                                                | ID Number                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hazardous Waste Management Program under RCRA                   |                                                                                                                                                                                                                                                            |
| NPDES Program                                                   |                                                                                                                                                                                                                                                            |
| Prevention of Significant Deterioration (PSD)                   |                                                                                                                                                                                                                                                            |
| Nonattainment Program                                           |                                                                                                                                                                                                                                                            |
| Dredge or Fill                                                  |                                                                                                                                                                                                                                                            |
| NPDES/NPDES – Stormwater                                        |                                                                                                                                                                                                                                                            |
| WVDEP – Office of Waste Management (OWM) – Solid Waste Facility |                                                                                                                                                                                                                                                            |
| WVDEP – OWM – RCRA (Hazardous Waste TSD or Transporter)         |                                                                                                                                                                                                                                                            |
| WVDEP – OWM – UST                                               |                                                                                                                                                                                                                                                            |
| CERCLA – Superfund                                              |                                                                                                                                                                                                                                                            |
| WV Voluntary Remediation – Brownfields                          |                                                                                                                                                                                                                                                            |
| FIFRA – Federal Insecticide, Fungicide and Rodenticide Act      |                                                                                                                                                                                                                                                            |
| Well Head Protection Program (WHPP)                             |                                                                                                                                                                                                                                                            |
| Underground Injection Control (UIC)                             | 2R08704AP                                                                                                                                                                                                                                                  |
| Toxic Substances Control Act (TSCA)                             |                                                                                                                                                                                                                                                            |
| Best Management Plans                                           |                                                                                                                                                                                                                                                            |
| Management of Used Oil                                          |                                                                                                                                                                                                                                                            |
| Other Relevant Permits (Specify):                               |                                                                                                                                                                                                                                                            |
|                                                                 | <div style="text-align: center;"> <br/>           NOV - 4 2011<br/>           Office of Oil and Gas<br/>           WV Dept. of Environmental Protection         </div> |
|                                                                 |                                                                                                                                                                                                                                                            |
|                                                                 |                                                                                                                                                                                                                                                            |
|                                                                 |                                                                                                                                                                                                                                                            |
|                                                                 |                                                                                                                                                                                                                                                            |

## AFFIDAVIT OF PLUGGING AND FILLING WELL

Operator Well No.: No. 5  
 Quadrangle: Looneyville .5'  
 County: Roane  
 Deg.          Min.          Sec.           
 Deg.          Min.          Sec.         

|                           |    |
|---------------------------|----|
| Coal Operator<br>or Owner | NA |
|---------------------------|----|

Completed on \_\_\_\_\_  
*Richard W. Moore*  
 Office of Oil and Gas  
 Dept. of Environmental Protection  
*July 2009*  
*Sandra Pulone*  
 Notary Public  
 OFFICIAL SEAL  
 NOTARY PUBLIC  
 STATE OF WEST VIRGINIA  
 S. DIANNE DULANEY  
 P. O. Box 5519  
 Vienna, West Virginia 26105  
 My Commission Expires Oct. 4, 2016



STATE OF WEST VIRGINIA  
DEPARTMENT OF ENERGY  
DIVISION OF OIL AND GAS

API# 47-087-2525

AFFIDAVIT OF PLUGGING AND FILLING WELL

AFFIDAVIT SHOULD BE IN TRIPPLICATE, one copy mailed to the Division, one copy to be retained by the Well Operator and the third copy (and extra copies if required) should be mailed to each coal operator at their respective addresses.

Farm name: C.B. Ferrell  
LOCATION: Elevation: 967'  
District: Smithfield  
Latitude:  
Longitude:

Operator Well No.: No. 3  
Quadrangle: Looneyville 7.5'  
County: Roane  
Deg. Min. Sec.  
Deg. Min. Sec.

Well Type: Oil ☒ Gas ☐ WIW ☐

Company: East Resources Inc.  
P.O. Box 5519  
Vienna, WV 26105

Coal Operator or Owner NA

Agent: Philip S. Ondrusek  
Inspector: Ed Gainer  
Permit Issued: 4/4/09

Coal Operator or Owner NA

AFFIDAVIT

STATE OF WEST VIRGINIA,

County of Wood ss:  
Steve Fields and Richard Moore being

first duly sworn according to law depose and say that they are experienced in the work of plugging and filling oil and gas wells and were employed by East Resources Inc., well operator, and participated in the work of plugging and filling the above well, that said work was commenced on the 8th day of July, 2009, and that the well was plugged and filled in the following manner:

| TYPE                        | FROM  | TO    | PIPE REMOVED  | LEFT  |
|-----------------------------|-------|-------|---------------|-------|
| Cement                      | 1950' | 1800' | 6 5/8" 90'    | 1760' |
| Cement                      | 1000' | 900'  | 5 3/16" 1890' | 41'   |
| Cement                      | 150'  | 0'    |               |       |
|                             |       |       |               |       |
|                             |       |       |               |       |
|                             |       |       |               |       |
|                             |       |       |               |       |
|                             |       |       |               |       |
|                             |       |       |               |       |
| 6% Gel Between Cement Plugs |       |       |               |       |

Description of monument: 7" x 4"

and that the work of plugging and filling said well was completed on the 17th day of July, 2009  
And further deponents saith not.

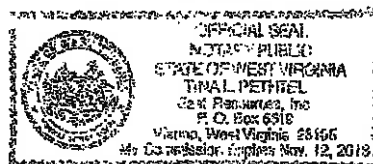
Sworn and subscribe before me this 23 day of

My commission expires: Nov. 12, 2015

Affidavit reviewed by the Office of Oil and Gas:

Title: Manager

Notary Public



API# 47-087-2526

### AFFIDAVIT OF PLUGGING AND FILLING WELL

Operator Well No.: no. 5  
 Quadrangle: Looneyville 7.5'  
 County: Roane  
 Deg.          Min.          Sec.           
 Deg.          Min.          Sec.         

Coal Operator  
or Owner

RECEIVED  
Office of Oil & Gas  
AUG 25 2009  
WV Department of  
Environmental Protection

Received

**Title:** \_\_\_\_\_

Completed on \_\_\_\_\_  
*Steven Fields*  
*Richard W. Morel*  
 of \_\_\_\_\_  
*August 2009*  
*Danielle Pelouze*

**Notary Public**  
**OFFICIAL SEAL**  
**NOTARY PUBLIC**  
 STATE OF WEST VIRGINIA  
 S. DEBORAH ORANNEY  
 P.O. Box 6011  
 Vienna, West Virginia 25105  
 My Commission Expires Oct. 4, 2016

**STATE OF WEST VIRGINIA  
DEPARTMENT OF ENERGY  
DIVISION OF OIL AND GAS**

**AFFIDAVIT OF PLUGGING AND FILLING WELL**

AFFIDAVIT SHOULD BE IN TRIPLICATE, one copy mailed to the Division, one copy to be retained by the Well Operator and the third copy (and extra copies if required) should be mailed to each coal operator at their respective addresses.

Farm name: E.S. Fisher  
 LOCATION: Elevation: 976'  
 District: Smithfield  
 Latitude: \_\_\_\_\_  
 Longitude: \_\_\_\_\_

Operator Well No.: No. 2  
 Quadrangle: Looneyville 7.5'  
 County: Roane  
 Deg. \_\_\_\_\_ Min. \_\_\_\_\_ Sec. \_\_\_\_\_  
 Deg. \_\_\_\_\_ Min. \_\_\_\_\_ Sec. \_\_\_\_\_

Well Type: Oil X Gas \_\_\_\_\_ WIW \_\_\_\_\_

Company: East Resources Inc.  
P.O. Box 5519  
Vienna, WV 26105  
 Agent: Philip S. Ondrusek  
 Inspector: Ed Gainer  
 Permit Issued: 12/23/2009

Coal Operator NA  
 or Owner \_\_\_\_\_  
 Coal Operator NA  
 or Owner \_\_\_\_\_

**AFFIDAVIT**

STATE OF WEST VIRGINIA,  
 County of Wood ss: \_\_\_\_\_  
Steve Fields and Rick Moore being  
 first duly sworn according to law depose and say that they are experienced in the work of plugging and filling oil and gas wells and were employed by East Resources Inc.,  
 well operator, and participated in the work of plugging and filling the above well, that said work was commenced on the 6th day of January, '2009', and that the well was plugged and filled in the following manner:

| TYPE                        | FROM  | TO    | PIPE REMOVED                           | LEFT  |
|-----------------------------|-------|-------|----------------------------------------|-------|
| Cement                      | 1985' | 1960' | 6 5/8" 530'                            | 1382' |
| Cement                      | 1885' | 1700' | 5 1/2" 1885'                           | 77'   |
| Cement                      | 1300' | 1200' |                                        |       |
| Cement                      | 850'  | 750'  |                                        |       |
| Cement                      | 580'  | 480'  |                                        |       |
| Cement                      | 100'  | 0'    |                                        |       |
|                             |       |       |                                        |       |
|                             |       |       | Ripped 6 5/8" Casing Every Collar From |       |
|                             |       |       | 1300'-1200' & 850' to 750'             |       |
|                             |       |       |                                        |       |
| 6% Gel Between Cement Plugs |       |       |                                        |       |

Description of monument: 7" x 4"

and that the work of plugging and filling said well was completed on  
 the 29th day of January, 2009  
 And further deponents saith not.

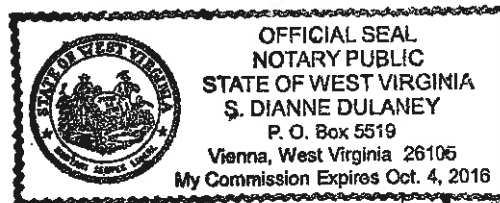
Sworn and subscribe before me this 10th day of February, 2009

My commission expires: Oct. 4, 2016

Affidavit reviewed by the Office of Oil and Gas:

Title: \_\_\_\_\_

Steve Fields  
Richard D. Moore  
February 2009  
[Signature]  
 Notary Public



## AFFIDAVIT OF PLUGGING AND FILLING WELL

Operator Well No.: No. 14  
 Quadrangle: Looneyville 7.5'  
 County: Roane  
 Deg.        Min.        Sec.         
 Deg.        Min.        Sec.       

|                           |    |
|---------------------------|----|
| Coal Operator<br>or Owner | NA |
|---------------------------|----|

Completed on 2

Richard W. Moore

Steve Fields

August, 2009

Dianne Dulaney

Notary Public Seal  
NOTARY PUBLIC  
STATE OF WEST VIRGINIA  
S. DIANNE DULANEY  
P. O. Box 5519  
Vienna, West Virginia 26105  
My Commission Expires Oct. 4, 2018

## AFFIDAVIT OF PLUGGING AND FILLING WELL

 OFFICIAL SEAL  
NOTARY PUBLIC  
STATE OF WEST VIRGINIA  
S. DIANNE DULANEY  
P. O. Box 5519  
Vienna, West Virginia 28105  
My Commission Expires Oct. 4, 2016

## AFFIDAVIT OF PLUGGING AND FILLING WELL

Operator Well No.: No. 2  
 Quadrangle: Looneyville 7.5'  
 County: Roane  
 Deg. \_\_\_\_\_ Min. \_\_\_\_\_ Sec. \_\_\_\_\_  
 Deg. \_\_\_\_\_ Min. \_\_\_\_\_ Sec. \_\_\_\_\_

|                           |    |
|---------------------------|----|
| Coal Operator<br>or Owner | NA |
|---------------------------|----|

Completed on October 3, 2009  
Richard D. Moore  
Spencer Fulmer  
 Notary Public  
 OFFICIAL SEAL  
 NOTARY PUBLIC  
 STATE OF WEST VIRGINIA  
 S. DIANNE DULANEY  
 P. O. Box 5519  
 Vienna, West Virginia 26105  
 My Commission Expires Oct. 4, 2016

**State of West Virginia  
Division of Environmental Protection  
Section of Oil and Gas  
Well Operator's Report of Well Work**

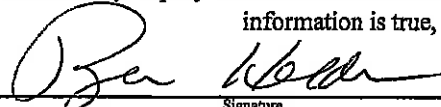
Farm name: NIDAY, ORLAND B. Operator Well No.: P.A. BAYS 101  
LOCATION: Elevation: 1,173' Quadrangle: LOONEYVILLE 7.5'  
District: SMITHFIELD County: ROANE  
Latitude: 14,275 Feet south of 38 Deg 45 Min 0 Sec.  
Longitude: 9,060 Feet west of 81 Deg 15 Min 0 Sec.

|                                     |                                                        |                 |                  |              |                        |
|-------------------------------------|--------------------------------------------------------|-----------------|------------------|--------------|------------------------|
| Company Address:                    | HG Energy<br>5260 DuPont Road<br>Parkersburg, WV 26101 | Casing & Tubing | Used in Drilling | Left in Well | Cement Fill Up Cu. Ft. |
| Inspector:                          | Ed Gainer                                              |                 |                  |              |                        |
| Date Permit Issued:                 | 09/06/2012                                             |                 |                  |              |                        |
| Date Well Work Commenced:           | 12/03/2012                                             |                 |                  |              |                        |
| Date Well Work Completed:           | 12/09/2012                                             |                 |                  |              |                        |
| Verbal Plugging:                    |                                                        |                 |                  |              |                        |
| Date Permission Granted On:         |                                                        |                 |                  |              |                        |
| Rotary X Cable Rigg                 |                                                        | 8 5/8"          | 587'             | 587'         | 245 sks                |
| Total vertical Depth (ft):          | 2360'                                                  |                 |                  |              |                        |
| Total Measured Depth (ft):          | 2360'                                                  |                 |                  |              |                        |
| Fresh Water Depth (ft):             | none                                                   | 4 1/2"          | 2329.4'          | 2329.4'      | 280 sks                |
| Salt Water Depth (ft):              | 1790'                                                  |                 |                  |              |                        |
| Is Coal being mined in ares (Y/N)?  | No                                                     |                 |                  |              |                        |
| Coal Depths (ft):                   | None                                                   |                 |                  |              |                        |
| Void(s) encountered (Y/N) depth(s): | NONE                                                   |                 |                  |              |                        |

**OPEN FLOW DATA**

Producing formation \_\_\_\_\_ Pay zone depth (ft) \_\_\_\_\_  
Gas: Initial open flow \_\_\_\_\_ MCF/d Oil: Initial open flow \_\_\_\_\_ Bbl/d  
Final open flow \_\_\_\_\_ MCF/d Final open flow \_\_\_\_\_ Bbl/d  
Time of open flow between initial and final tests \_\_\_\_\_ Hours  
Static rock pressure \_\_\_\_\_ psig (surface pressure) after \_\_\_\_\_ Hours  
Second producing formation \_\_\_\_\_ Pay zone depth (ft) \_\_\_\_\_  
Gas: Initial open flow \_\_\_\_\_ MCF/d Oil: Initial open flow \_\_\_\_\_ Bbl/d  
Final open flow \_\_\_\_\_ MCF/d Final open flow \_\_\_\_\_ Bbl/d  
Time of open flow between initial and final tests \_\_\_\_\_ Hours  
Static rock pressure \_\_\_\_\_ psig (surface pressure) after \_\_\_\_\_ Hours

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments 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.

  
Signature

3/7/12  
Date

**C.B. CHAMBERS NO. 6**  
**COMPENSATED DENSITY / GAMMA RAY LOG**

**CLOVER WATERFLOOD PROJECT**  
**ROANE CO., WEST VIRGINIA**

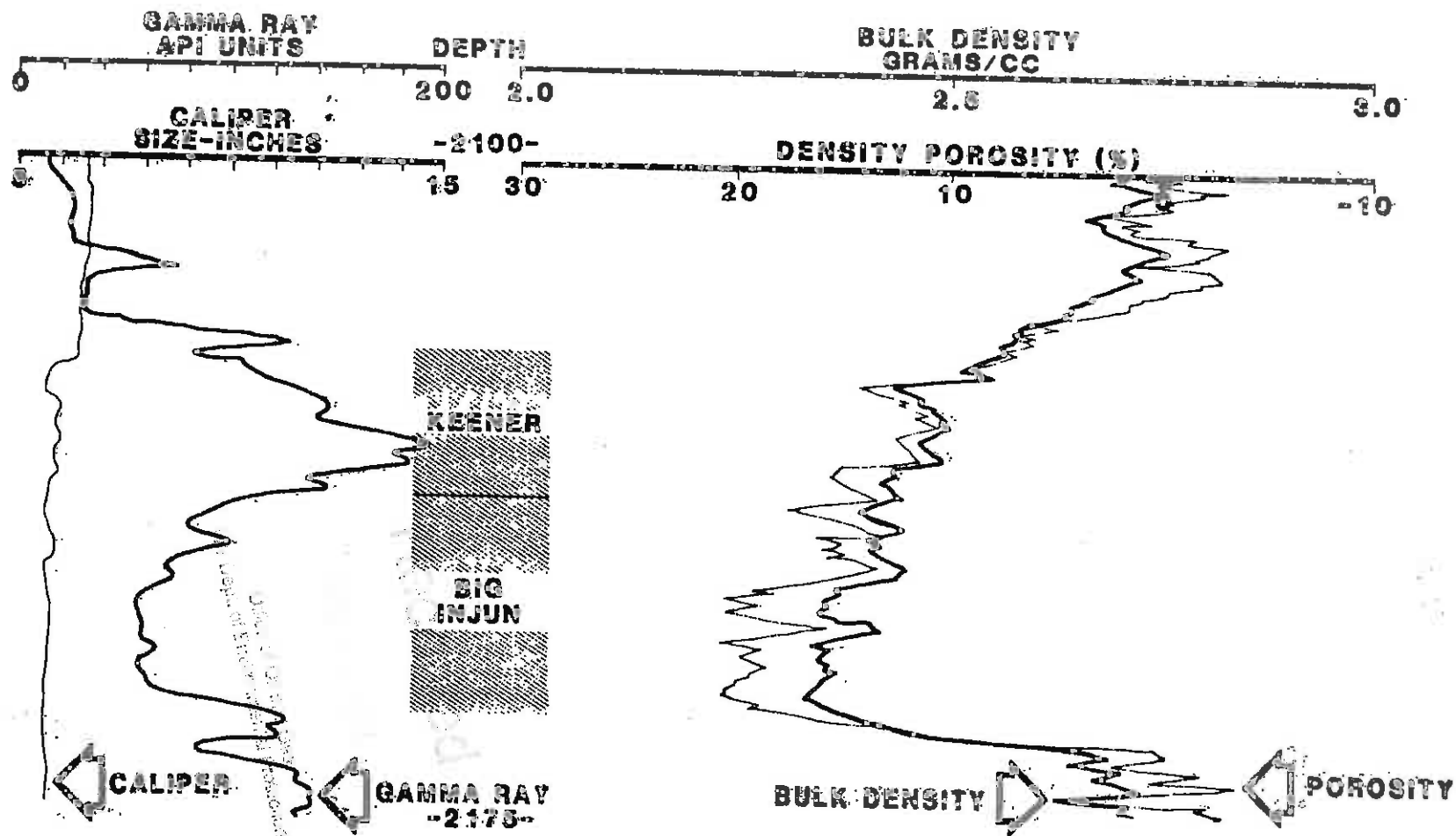


FIGURE NO. 1

*Petroleum Reservoir Engineering*  
DALLAS, TEXAS

PENNZOIL COMPANY  
C.B. CHAMBERS NO. 6 WELL  
CLOVER FIELD  
ROANE COUNTY, W. VA.

DATE: 12-2-77  
FORMATION: BIG INJUN SANDSTONE  
DRLG. FLUID: FRESH WATER GEL  
LOCATION:

FILE NO: 3602-343  
ENGINEER: ANTWINE  
ELEVATION:

\* INDICATES PLUG PERM

S INDICATES PRESERVED SAMPLE

| SMP.<br>NO.            | DEPTH       | PERM.<br>MAXIMUM | TO AIR MD.<br>90 DEG | VERT. | POROSITY<br>GEX. FLD. | FLUID SATS.<br>OIL WTR. | GR.<br>DEN. | DESCRIPTION |
|------------------------|-------------|------------------|----------------------|-------|-----------------------|-------------------------|-------------|-------------|
| FULL DIAMETER ANALYSIS |             |                  |                      |       |                       |                         |             |             |
| 1                      | 2119.0-20.0 | 1.4              | 1.4                  | 0.4   | 15.3                  | 12.2 67.1               | 2.70        | SD, CALC    |
| 2                      | 2120.0-21.0 | 0.6              | 0.6                  | <0.1  | 15.5                  | 12.2 67.0               | 2.77        | SD, CALC    |
| 3                      | 2121.0-22.0 | 0.3              | 0.2                  | <0.1  | 15.7                  | 13.0 70.9               | 2.76        | SD, CALC    |
| 4                      | 2122.0-23.0 | 1.6              | <0.1                 | <0.1  | 12.7                  | 14.3 78.4               | 2.79        | SD, CALC    |
| 5                      | 2123.0-24.0 | 0.2              | 0.2                  | <0.1  | 14.9                  | 10.4 65.7               | 2.74        | SD, CALC    |
| 6                      | 2124.0-25.0 | 0.2              | 0.1                  | <0.1  | 15.0                  | 11.3 72.2               | 2.76        | SD, CALC    |
| 7                      | 2125.0-26.0 | 0.4              | 0.2                  | <0.1  | 14.1                  | 10.1 64.2               | 2.76        | SD, CALC    |
| 8                      | 2126.0-27.0 | 3.7              | 3.0                  | 0.1   | 14.9                  | 10.3 67.3               | 2.77        | SD, CALC    |
| 9                      | 2127.0-28.0 | 0.2              | 0.1                  | <0.1  | 15.4                  | 11.7 76.8               | 2.76        | SD, CALC    |
| 10                     | 2128.0-29.0 | 0.7              | 0.4                  | <0.1  | 16.3                  | 11.6 74.2               | 2.75        | SD, CALC    |
| 11                     | 2129.0-30.0 | 1.1              | 0.6                  | 0.3   | 17.3                  | 11.5 71.9               | 2.75        | SD, CALC    |
| 12                     | 2130.0-31.0 | 0.7              | 0.7                  | 0.3   | 18.0                  | 11.4 70.6               | 2.72        | SD, CALC    |
| 13                     | 2131.0-32.0 | 0.9              | 0.8                  | 0.4   | 16.2                  | 12.1 66.9               | 2.72        | SD, CALC    |
| 14                     | 2132.0-33.0 | 0.7              | 0.7                  | 0.4   | 14.7                  | 13.8 76.2               | 2.80        | SD, CALC    |
| 15                     | 2133.0-34.0 | 0.8              | 0.7                  | 0.2   | 16.4                  | 12.1 66.6               | 2.70        | SD, CALC    |
| 16                     | 2134.0-35.0 | 2.5              | 2.3                  | 2.5   | 18.1                  | 12.2 61.6               | 2.69        | SD, CALC    |
| 17                     | 2135.0-36.0 | 2.8              | 2.7                  | 1.9   | 17.8                  | 12.2 61.3               | 2.66        | SD          |
| 18                     | 2136.0-37.0 | 2.4              | 1.9                  | 2.2   | 14.7                  | 13.1 65.9               | 2.68        | SD          |
| 19                     | 2137.0-38.0 | 3.6              | 3.5                  | 2.9   | 18.5                  | 13.8 60.6               | 2.71        | SD, CALC    |
| 20                     | 2138.0-39.0 | 2.4              | 2.1                  | 1.8   | 18.7                  | 14.1 61.7               | 2.69        | SD, CALC    |
| 21                     | 2139.0-40.0 | 1.2              | 1.0                  | 0.5   | 17.7                  | 15.0 65.8               | 2.70        | SD, CALC    |
| 22                     | 2140.0-41.0 | 0.4              | 0.4                  | 0.1   | 16.7                  | 15.7 70.2               | 2.72        | SD, CALC    |
| 23                     | 2141.0-42.0 | 0.7              | 0.6                  | <0.1  | 16.3                  | 16.1 71.8               | 2.72        | SD, CALC    |
| 24                     | 2142.0-43.0 | 4.7              | 4.0                  | 0.9   | 18.0                  | 12.9 57.4               | 2.74        | SD, CALC    |
| 25                     | 2143.0-44.0 | 4.6              | 4.5                  | 7.5   | 19.5                  | 8.3 57.7                | 2.71        | SD, CALC    |
| 26                     | 2144.0-45.0 | 3.8              | 3.8                  | 1.4   | 19.9                  | 9.3 64.7                | 2.70        | SD, CALC    |

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Petrochem Research, Inc.  
Petroleum Research Engineering  
DALLAS, TEXAS

PENNIZOIL COMPANY  
C.B. CHAMBERS NO. 6 WELL

DATE: 12-2-77  
FORMATION: BIG INJUN SANDSTONE

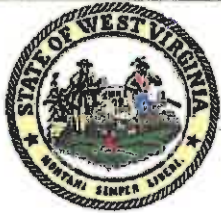
FILE NO: 3602-343  
ENGINEER: ANTWINE

| SMP.<br>NO. | DEPTH       | PERM.<br>MAXIMUM | TO AIR MD.<br>90 DEG | VERT. | POROSITY<br>GEX. FLD. | FLUID SATS.<br>OIL WTR. | GR.<br>DEN. | DESCRIPTION |
|-------------|-------------|------------------|----------------------|-------|-----------------------|-------------------------|-------------|-------------|
| 27          | 2145.0-46.0 | 5.1              | 4.4                  | 1.8   | 20.4                  | 9.6 63.5                | 2.72        | SD, CALC    |
| 28          | 2146.0-47.0 | 9.9              | 8.7                  | 6.7   | 20.7                  | 9.0 59.1                | 2.72        | SD, CALC    |
| 29          | 2147.0-48.0 | 9.9              | 9.7                  | 13.0  | 21.1                  | 8.7 57.0                | 2.72        | SD, CALC    |
| 30          | 2148.0-49.0 | 5.5              | 5.2                  | 9.5   | 20.4                  | 9.7 56.4                | 2.72        | SD, CALC    |
| 31          | 2149.0-50.0 | 4.6              | 4.4                  | 5.7   | 19.9                  | 10.1 58.8               | 2.68        | SD          |
| 32          | 2150.0-51.0 | 5.7              | 5.4                  | 11.0  | 20.9                  | 10.2 53.8               | 2.70        | SD, CALC    |
| 33          | 2151.0-52.0 | 6.1              | 5.5                  | 7.0   | 20.2                  | 10.9 57.8               | 2.68        | SD          |
| 34          | 2152.0-53.0 | 7.7              | 7.2                  | 11.0  | 20.6                  | 15.6 49.9               | 2.68        | SD          |
| 35          | 2153.0-54.0 | 3.2              | 3.1                  | 4.5   | 19.4                  | 17.2 54.9               | 2.68        | SD          |
| 36          | 2154.0-55.0 | 4.2              | 3.9                  | 5.2   | 19.0                  | 12.2 56.0               | 2.69        | SD          |
| 37          | 2155.0-56.0 | 14.0             | 8.0                  | 13.0  | 21.0                  | 12.0 55.0               | 2.70        | SD, CALC    |
| 38          | 2156.0-57.0 | 6.9              | 6.2                  | 12.0  | 20.9                  | 11.9 82.1               | 2.70        | SD, CALC    |
| 39          | 2157.0-58.0 | 6.8              | 6.8                  | 5.2   | 20.2                  | 12.1 55.7               | 2.72        | SD, CALC    |
| 40          | 2158.0-59.0 | 3.5              | 3.5                  | 4.2   | 19.3                  | 11.1 59.0               | 2.70        | SD, CALC    |
| 41          | 2159.0-60.0 | 7.7              | 2.4                  | 0.9   | 18.8                  | 11.3 60.4               | 2.70        | SD, CALC    |
| 42          | 2160.0-61.0 | 2.8              | 2.7                  | 0.9   | 18.4                  | 7.9 66.7                | 2.71        | SD, CALC    |
| 43          | 2161.0-62.0 | 2.0              | 1.8                  | 1.1   | 18.4                  | 7.7 65.0                | 2.69        | SD, CALC    |

CONVENTIONAL (PLUG) ANALYSIS

|    |             |      |     |
|----|-------------|------|-----|
| 1  | 2119.0-20.0 | 1.7  | 2.7 |
| 2  | 2120.0-21.0 | 1.0  |     |
| 3  | 2121.0-22.0 | 0.2  |     |
| 4  | 2122.0-23.0 | <0.1 |     |
| 5  | 2123.0-24.0 | 0.2  | 0.2 |
| 6  | 2124.0-25.0 | 0.4  |     |
| 7  | 2125.0-26.0 | 0.6  |     |
| 8  | 2126.0-27.0 | 0.6  |     |
| 9  | 2127.0-28.0 | 0.2  | 0.2 |
| 10 | 2128.0-29.0 | 0.6  |     |
| 11 | 2129.0-30.0 | 1.0  |     |
| 12 | 2130.0-31.0 | 1.4  |     |

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# Earthquake Epicenters of West Virginia

1824 through 2014

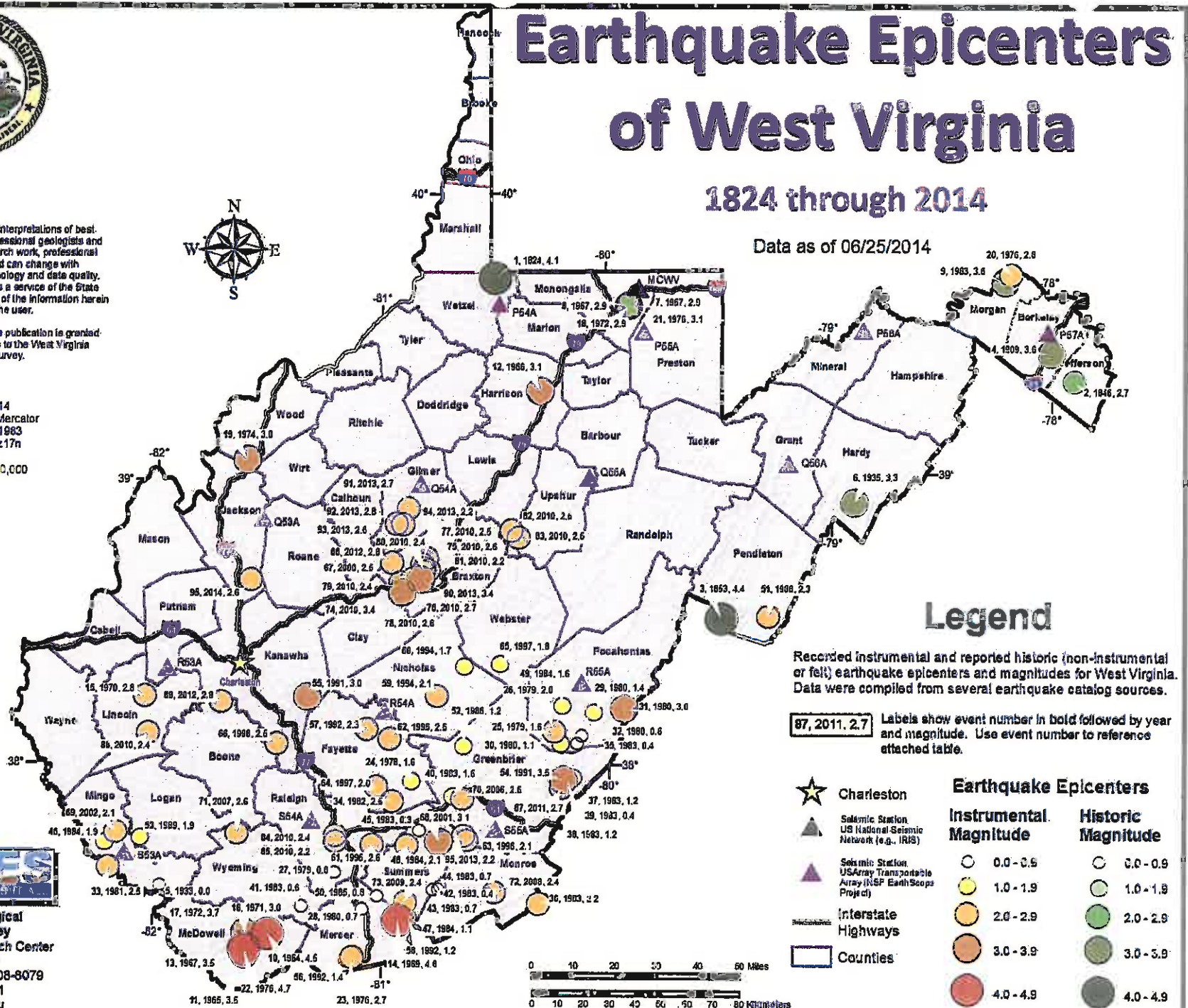
Data as of 06/25/2014

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Map Date: June 25, 2014  
Projection: Transverse Mercator  
Horizontal Datum: NAD 1983  
Coordinate System: UTMz17n  
Map scale for full  
8.5" x 11" display: 1:2,000,000



West Virginia Geological  
and Economic Survey  
Mont Chateau Research Center  
1 Mont Chateau Road  
Morgantown, WV 26508-8079  
Phone: (304) 694-2331  
www.wvgs.wvnet.edu

| Event Num | WVQID       | County     | UTC Year | UTC Month | UTC Day | UTC HH | UTC MM | UTC SS | Latitude (N) | Longitude (W) | Magnitude | Recorded     | MMI    | Magnitude Type | Source 1 | Source 2  | USGS Link    |
|-----------|-------------|------------|----------|-----------|---------|--------|--------|--------|--------------|---------------|-----------|--------------|--------|----------------|----------|-----------|--------------|
| 55        | 19910628180 | Kanawha    | 1991     | 6         | 28      | 18     | 34     | 35.50  | 38.23100     | -81.33300     | 3.0       | Instrumental | 0.0    | Mb             | VTSO     | ANSS      |              |
| 56        | 19920329200 | Mercer     | 1992     | 3         | 29      | 20     | 16     | 48.20  | 37.31400     | -81.14900     | 1.4       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 57        | 19920506210 | Fayette    | 1992     | 5         | 6       | 21     | 20     | 23.90  | 38.11800     | -81.06900     | 2.3       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 58        | 19921124020 | Summers    | 1992     | 11        | 24      | 2      | 26     | 50.70  | 37.45700     | -80.88400     | 1.2       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 59        | 19940204070 | Nicholas   | 1994     | 2         | 4       | 7      | 40     | 32.40  | 38.23600     | -80.75900     | 2.1       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 60        | 19940619080 | Nicholas   | 1994     | 6         | 19      | 8      | 36     | 41.30  | 38.33900     | -80.64000     | 1.7       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 61        | 19951115100 | Raleigh    | 1995     | 11        | 15      | 10     | 29     | 24.80  | 37.71700     | -81.04300     | 2.6       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 62        | 19951228230 | Fayette    | 1995     | 12        | 28      | 23     | 48     | 30.40  | 38.08400     | -80.96800     | 2.5       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 63        | 19960811090 | Greenbrier | 1996     | 8         | 11      | 9      | 11     | 21.30  | 37.73100     | -80.62800     | 2.1       | Instrumental | <NULL> | Mc             | ANSS     | <NULL>    |              |
| 64        | 19970222140 | Fayette    | 1997     | 2         | 22      | 14     | 32     | 33.10  | 37.92100     | -81.02700     | 2.0       | Instrumental | <NULL> | Mc             | ANSS     | <NULL>    |              |
| 65        | 19970315050 | Webster    | 1997     | 3         | 15      | 5      | 56     | 36.40  | 38.34700     | -80.48400     | 1.8       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 66        | 19970315050 | Kanawha    | 1998     | 10        | 2       | 10     | 1      | 6.90   | 38.06800     | -81.46600     | 2.5       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 67        | 20001016170 | Braxton    | 2000     | 10        | 16      | 17     | 56     | 13.80  | 38.63600     | -80.92000     | 2.5       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 68        | 20011204210 | Summers    | 2001     | 12        | 4       | 21     | 15     | 13.90  | 37.72600     | -80.75200     | 3.1       | Instrumental | 0.0    | Mb             | VTSO     | ANSS      |              |
| 69        | 20020327080 | Mingo      | 2002     | 3         | 27      | 8      | 25     | 3.30   | 37.75300     | -82.17100     | 2.1       | Instrumental | 0.0    | Md             | VTSO     | ANSS      |              |
| 70        | 20060711120 | Greenbrier | 2006     | 7         | 11      | 12     | 1      | 43.10  | 37.87800     | -80.64900     | 2.6       | Instrumental | 0.0    | Mb             | CERI     | VTSO      |              |
| 71        | 20070830120 | Wyoming    | 2007     | 8         | 30      | 12     | 52     | 9.34   | 37.75300     | -81.63600     | 2.6       | Instrumental | 0.0    | Lg GS          | CERI     | USGS ENS  | Further Info |
| 72        | 20080129010 | Monroe     | 2008     | 1         | 29      | 1      | 4      | 20.70  | 37.54480     | -80.50980     | 2.4       | Instrumental | <NULL> | Md             | CERI     | ANSS      |              |
| 73        | 20090411180 | Summers    | 2009     | 4         | 11      | 18     | 11     | 9.07   | 37.51330     | -80.89570     | 2.4       | Instrumental | <NULL> | Md             | CERI     | ANSS      |              |
| 74        | 20100404090 | Braxton    | 2010     | 4         | 4       | 9      | 19     | 14.01  | 38.59900     | -80.91617     | 3.4       | Instrumental | 0.0    | MbLg           | CERI     | USGS ENS  | Further Info |
| 75        | 20100129010 | Braxton    | 2010     | 4         | 29      | 1      | 36     | 22.59  | 38.68567     | -80.81483     | 2.6       | Instrumental | 0.0    | MbLg           | CERI     | USGS ENS  | Further Info |
| 76        | 20100429120 | Braxton    | 2010     | 4         | 29      | 12     | 38     | 53.43  | 38.64700     | -80.87200     | 2.7       | Instrumental | 0.0    | MbLg           | USGS ENS | CERI      | Further Info |
| 77        | 20100429130 | Braxton    | 2010     | 4         | 29      | 23     | 26     | 39.47  | 38.72200     | -80.80300     | 2.5       | Instrumental | 0.0    | Lg GS          | CERI     | USGS ENS  | Further Info |
| 78        | 20100507100 | Braxton    | 2010     | 5         | 7       | 10     | 26     | 3.47   | 38.60650     | -80.91317     | 2.6       | Instrumental | 0.0    | MbLg           | CERI     | USGS ENS  | Further Info |
| 79        | 20100508030 | Braxton    | 2010     | 5         | 8       | 3      | 3      | 0.62   | 38.62300     | -80.91133     | 2.4       | Instrumental | 0.0    | Md             | CERI     | USGS ENS  | Further Info |
| 80        | 20100724090 | Braxton    | 2010     | 7         | 24      | 9      | 15     | 44.13  | 38.67533     | -80.82017     | 2.4       | Instrumental | 0.0    | Md             | CERI     | USGS ENS  | Further Info |
| 81        | 20100725030 | Braxton    | 2010     | 7         | 25      | 3      | 48     | 70.00  | 38.67900     | -80.79700     | 2.2       | Instrumental | 0.0    | Md             | USGS ENS | LDEO      |              |
| 82        | 20100815040 | Lewis      | 2010     | 8         | 15      | 4      | 38     | 47.38  | 38.81833     | -80.42983     | 2.5       | Instrumental | 0.0    | Md             | CERI     | USGS      | Further Info |
| 83        | 20100821030 | Upshur     | 2010     | 8         | 21      | 3      | 16     | 21.99  | 38.79250     | -80.39767     | 2.5       | Instrumental | 0.0    | Md             | USGS ENS | LDEO      | Further Info |
| 84        | 20100826040 | Raleigh    | 2010     | 8         | 26      | 4      | 22     | 15.19  | 37.74833     | -81.20467     | 2.4       | Instrumental | 0.0    | Md             | CERI     | USGS      |              |
| 85        | 20100826041 | Raleigh    | 2010     | 8         | 26      | 4      | 24     | 55.39  | 37.72733     | -81.20433     | 2.2       | Instrumental | 0.0    | Md             | CERI     | USGS ENS  |              |
| 86        | 20100913150 | Lincoln    | 2010     | 9         | 13      | 15     | 8      | 46.47  | 38.10000     | -82.03400     | 2.4       | Instrumental | 0.0    | Md             | CERI     | ANSS      |              |
| 87        | 20110825050 | Greenbrier | 2011     | 8         | 25      | 5      | 59     | 13.76  | 37.91600     | -80.21533     | 2.7       | Instrumental | 4.0    | Md             | CERI     | USGS      | Further Info |
| 88        | 20120111190 | Braxton    | 2012     | 1         | 10      | 19     | 38     | 58.66  | 38.70400     | -80.95900     | 2.8       | Instrumental | 4.0    | unk            | CERI     | USGS      | Further Info |
| 89        | 20120316150 | Boone      | 2012     | 3         | 16      | 15     | 5      | 55.00  | 38.21200     | -81.71400     | 2.8       | Instrumental | 2.0    | MbLg           | CERI     | USGS NEIC | Further Info |
| 90        | 20130331140 | Braxton    | 2013     | 3         | 31      | 14     | 1      | 24.03  | 38.64500     | -80.83317     | 3.4       | Instrumental | 5.0    | Mw             | CERI     | USGS NEIC | Further Info |
| 91        | 20130720110 | Gilmer     | 2013     | 7         | 20      | 11     | 38     | 46.18  | 38.89567     | -80.88700     | 2.7       | Instrumental | <NULL> | MbLg           | CERI     | USGS ENS  | Further Info |
| 92        | 20130730060 | Gilmer     | 2013     | 7         | 30      | 6      | 9      | 4.85   | 38.83933     | -80.90867     | 2.8       | Instrumental | <NULL> | Md             | CERI     | USGS ENS  | Further Info |
| 93        | 20130816110 | Gilmer     | 2013     | 8         | 16      | 11     | 2      | 21.04  | 38.84150     | -80.93867     | 2.6       | Instrumental | 3.0    | MbLg           | CERI     | USGS ENS  | Further Info |
| 94        | 20131013090 | Braxton    | 2013     | 10        | 13      | 9      | 20     | 58.55  | 38.70117     | -80.82417     | 2.2       | Instrumental | <NULL> | Md             | CERI     | USGS ENS  | Further Info |
| 95        | 20131019080 | Greenbrier | 2013     | 10        | 19      | 8      | 41     | 57.43  | 37.74767     | -80.64333     | 2.2       | Instrumental | <NULL> | Md             | CERI     | USGS ENS  | Further Info |
| 96        | 20140606220 | Jackson    | 2014     | 6         | 6       | 22     | 15     | 40.79  | 38.64383     | -81.58550     | 2.6       | Instrumental | <NULL> | Md             | CERI     | USGS ENS  | Further Info |

Data as of June 25, 2014. For a more detailed listing, please download the West Virginia Earthquake spreadsheet from WVGES at <http://www.wvgs.wvnet.edu/www/earthquakes/seismic.html>

If you view this map and data as a PDF, you can click any of the blue hyperlinked text to view further information on a web site.  
Please note that USGS Links, above, are considered "beta" at the time of this publication and USGS may change destinations, pages, etc. afterward.

Definition of terms on next page.



Office of Environmental Protection  
West Virginia Department of Environmental Protection

| Event Num | WVQID       | County     | UTC Year | UTC Month | UTC Day | UTC HH | UTC MM | UTC SS | Latitude (N) | Longitude (W) | Magnitude | Recorded     | MMI | Magnitude Type | Source 1       | Source 2       | USGS Link    |
|-----------|-------------|------------|----------|-----------|---------|--------|--------|--------|--------------|---------------|-----------|--------------|-----|----------------|----------------|----------------|--------------|
| 1         | 18240715160 | Wood       | 1824     | 7         | 15      | 16     | 20     | 0.00   | 39.70000     | -80.50000     | 4.1       | Historic     | 4.0 | Mb             | VTSO           | NCEER          |              |
| 2         | 18461019020 | Jefferson  | 1846     | 10        | 19      | 2      | 0      | 0.00   | 39.30000     | -77.90000     | 2.7       | Historic     | 3.0 | <NULL>         | VTSO           | <NULL>         |              |
| 3         | 18530502140 | Pendleton  | 1853     | 5         | 2       | 14     | 20     | 0.00   | 38.50000     | -79.50000     | 4.4       | Historic     | 5.5 | <NULL>         | NCEER          | Wheeler I-2737 |              |
| 4         | 19090402070 | Berkeley   | 1909     | 4         | 2       | 7      | 25     | 0.00   | 39.40000     | -78.00000     | 3.6       | Historic     | 5.0 | Mb             | VTSO           | Wheeler I-2737 |              |
| 5         | 19330615010 | Mingo      | 1933     | 6         | 15      | 1      | 14     | 36.80  | 37.56800     | -81.97300     | 0.0       | Historic     | 0.0 | <NULL>         | VTSO           | <NULL>         |              |
| 6         | 19351101080 | Hardy      | 1935     | 11        | 1       | 8      | 30     | 0.00   | 38.90000     | -78.90000     | 3.3       | Historic     | 4.0 | <NULL>         | VTSO           | NCEER          |              |
| 7         | 19570307210 | Monongalia | 1957     | 3         | 7       | 21     | 5      | 9.00   | 39.60000     | -79.90000     | 2.9       | Historic     | 3.0 | Mb             | VTSO           | <NULL>         |              |
| 8         | 19570313210 | Monongalia | 1957     | 3         | 13      | 21     | 0      | 41.00  | 39.60000     | -79.90000     | 2.9       | Historic     | 3.0 | Mb             | VTSO           | <NULL>         |              |
| 9         | 19631010000 | Morgan     | 1963     | 10        | 10      | 0      | 0      | 0.00   | 39.65500     | -78.19700     | 3.6       | Historic     | 0.0 | <NULL>         | Wheeler I-2737 | <NULL>         |              |
| 10        | 19641125020 | McDowell   | 1964     | 11        | 25      | 2      | 50     | 5.00   | 37.40000     | -81.50000     | 4.5       | Instrumental | 0.0 | Mb             | ANSS           | <NULL>         |              |
| 11        | 19650426150 | McDowell   | 1965     | 4         | 26      | 15     | 26     | 19.70  | 37.32500     | -81.60200     | 3.5       | Instrumental | 0.0 | MbLg           | VTSO           | NCEER          |              |
| 12        | 19660928000 | Harrison   | 1966     | 9         | 28      | 0      | 0      | 0.00   | 39.30000     | -80.30000     | 3.1       | Instrumental | 4.0 | <NULL>         | NCEER          | <NULL>         |              |
| 13        | 19671216120 | McDowell   | 1967     | 12        | 16      | 12     | 23     | 33.40  | 37.36000     | -81.60400     | 3.5       | Instrumental | 0.0 | Mb             | VTSO           | NCEER          |              |
| 14        | 19691220010 | Mercer     | 1969     | 11        | 20      | 1      | 0      | 9.30   | 37.44900     | -80.93200     | 4.6       | Instrumental | 6.0 | MbLg           | VTSO           | NCEER          |              |
| 15        | 19700811060 | Lincoln    | 1970     | 8         | 11      | 6      | 14     | 25.50  | 38.23000     | -82.05000     | 2.8       | Instrumental | 4.0 | MbLg           | VTSO           | NCEER          |              |
| 16        | 19710401050 | McDowell   | 1971     | 4         | 1       | 5      | 5      | 11.00  | 37.40000     | -81.60000     | 3.0       | Instrumental | 0.0 | Mb             | NCEER          | ANSS           |              |
| 17        | 19720109230 | McDowell   | 1972     | 1         | 9       | 23     | 24     | 29.00  | 37.40000     | -81.60000     | 3.7       | Instrumental | 0.0 | MbLg           | NCEER          | ANSS           |              |
| 18        | 19720912150 | Monongalia | 1972     | 9         | 12      | 15     | 17     | 13.70  | 39.60000     | -79.90000     | 2.9       | Historic     | 3.0 | Mb             | VTSO           | NCEER          |              |
| 19        | 19741020150 | Wood       | 1974     | 10        | 20      | 15     | 13     | 55.60  | 39.06000     | -81.60900     | 3.8       | Instrumental | 5.0 | Mb             | VTSO           | NCEER          | Further Info |
| 20        | 19760130180 | Morgan     | 1976     | 1         | 30      | 18     | 58     | 49.80  | 39.68300     | -78.17000     | 2.8       | Instrumental | 0.0 | Lg             | USGS           | ANSS           | Further Info |
| 21        | 19760506180 | Monongalia | 1976     | 5         | 6       | 18     | 46     | 8.10   | 39.60000     | -79.90000     | 3.1       | Historic     | 4.0 | Mb             | VTSO           | NCEER          |              |
| 22        | 19760619050 | McDowell   | 1976     | 6         | 19      | 5      | 54     | 13.40  | 37.34400     | -81.60200     | 4.7       | Instrumental | 5.0 | Mb             | VTSO           | NCEER          | Further Info |
| 23        | 19760703200 | Mercer     | 1976     | 7         | 3       | 20     | 53     | 45.80  | 37.32000     | -81.13000     | 2.7       | Instrumental | 0.0 | MbLg           | VTSO           | <NULL>         |              |
| 24        | 19780814040 | Fayette    | 1978     | 8         | 14      | 4      | 50     | 5.40   | 37.93900     | -80.87400     | 1.6       | Instrumental | 0.0 | Mc             | VTSO           | ANSS           |              |
| 25        | 19790916090 | Pocahontas | 1979     | 9         | 16      | 9      | 39     | 22.60  | 38.09900     | -80.24000     | 1.6       | Instrumental | 0.0 | Mc             | ANSS           | <NULL>         |              |
| 26        | 19790919000 | Pocahontas | 1979     | 9         | 19      | 0      | 45     | 57.40  | 38.11000     | -80.24300     | 2.0       | Instrumental | 0.0 | Mc             | ANSS           | <NULL>         |              |
| 27        | 19791031080 | Raleigh    | 1979     | 10        | 31      | 8      | 32     | 47.30  | 37.61700     | -81.20700     | 0.8       | Instrumental | 0.0 | Mc             | ANSS           | <NULL>         |              |
| 28        | 19800410220 | Mercer     | 1980     | 4         | 10      | 22     | 33     | 15.70  | 37.48700     | -81.08600     | 0.7       | Instrumental | 0.0 | Mc             | VTSO           | ANSS           |              |
| 29        | 19800921100 | Pocahontas | 1980     | 9         | 21      | 10     | 2      | 46.30  | 38.17500     | -80.07000     | 1.4       | Instrumental | 0.0 | Mc             | VTSO           | ANSS           |              |
| 30        | 19801016030 | Pocahontas | 1980     | 10        | 16      | 3      | 48     | 7.60   | 38.06600     | -80.21500     | 1.1       | Instrumental | 0.0 | Mc             | VTSO           | ANSS           |              |
| 31        | 19801105210 | Pocahontas | 1980     | 11        | 5       | 21     | 48     | 14.20  | 38.18800     | -79.93600     | 3.0       | Instrumental | 0.0 | ML             | ANSS           | <NULL>         |              |
| 32        | 19801125070 | Pocahontas | 1980     | 11        | 25      | 7      | 44     | 4.00   | 38.09500     | -80.12300     | 0.6       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 33        | 19811130170 | Mingo      | 1981     | 11        | 30      | 17     | 33     | 11.00  | 37.63000     | -82.20000     | 2.5       | Instrumental | 0.0 | Mc             | VTSO           | ANSS           |              |
| 34        | 19820623160 | Fayette    | 1982     | 6         | 23      | 16     | 17     | 34.10  | 37.87000     | -80.95700     | 2.5       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 35        | 19830121050 | Pocahontas | 1983     | 1         | 21      | 5      | 33     | 20.40  | 38.06700     | -80.14400     | 0.4       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 36        | 19830526010 | Monroe     | 1983     | 5         | 26      | 1      | 4      | 44.80  | 37.50600     | -80.31600     | 2.2       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 37        | 19830610000 | Greenbrier | 1983     | 6         | 10      | 0      | 18     | 40.40  | 37.94800     | -80.16300     | 1.2       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 38        | 19830610001 | Greenbrier | 1983     | 6         | 10      | 0      | 24     | 57.00  | 37.95100     | -80.18900     | 1.2       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 39        | 19830610002 | Greenbrier | 1983     | 6         | 10      | 0      | 31     | 8.30   | 37.93800     | -80.16800     | 0.4       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 40        | 19830720040 | Greenbrier | 1983     | 7         | 20      | 4      | 41     | 40.90  | 37.88500     | -80.69100     | 1.6       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 41        | 19830725030 | Wyoming    | 1983     | 7         | 25      | 3      | 27     | 0.20   | 37.49600     | -81.35200     | 0.6       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 42        | 19831113160 | Summers    | 1983     | 11        | 13      | 16     | 51     | 6.70   | 37.55600     | -80.77500     | 0.4       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 43        | 19831113170 | Monroe     | 1983     | 11        | 13      | 17     | 50     | 50.10  | 37.55900     | -80.75300     | 0.7       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 44        | 19831125160 | Monroe     | 1983     | 11        | 25      | 16     | 27     | 47.80  | 37.56800     | -80.74500     | 0.7       | Instrumental | 0.0 | Md             | VTSO           | <NULL>         |              |
| 45        | 19831223100 | Summers    | 1983     | 12        | 23      | 10     | 51     | 21.90  | 37.76600     | -80.83700     | 0.3       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 46        | 19840202050 | Mingo      | 1984     | 2         | 2       | 5      | 10     | 19.70  | 37.71700     | -82.21800     | 1.9       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 47        | 19840311040 | Summers    | 1984     | 3         | 11      | 4      | 1      | 38.90  | 37.47400     | -80.90000     | 1.1       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 48        | 19841009050 | Summers    | 1984     | 10        | 9       | 5      | 33     | 31.50  | 37.71300     | -80.89100     | 2.1       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 49        | 19841221130 | Pocahontas | 1984     | 12        | 21      | 13     | 12     | 21.90  | 38.19800     | -80.20800     | 1.6       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 50        | 19850614070 | Mercer     | 1985     | 6         | 14      | 7      | 57     | 10.20  | 37.53400     | -81.02000     | 0.8       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 51        | 19860226210 | Pendleton  | 1986     | 2         | 26      | 21     | 53     | 20.80  | 38.50700     | -79.29200     | 2.3       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 52        | 19861220080 | Greenbrier | 1986     | 12        | 20      | 8      | 13     | 12.80  | 38.05800     | -80.64300     | 1.2       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 53        | 19890319100 | Logan      | 1989     | 3         | 19      | 10     | 7      | 55.80  | 37.73500     | -82.06400     | 1.9       | Instrumental | 0.0 | Md             | VTSO           | ANSS           |              |
| 54        | 19910422010 | Greenbrier | 1991     | 4         | 22      | 1      | 1      | 20.20  | 37.94200     | -80.20500     | 3.5       | Instrumental | 0.0 | Md             | VTSO           | ANSS           | Further Info |

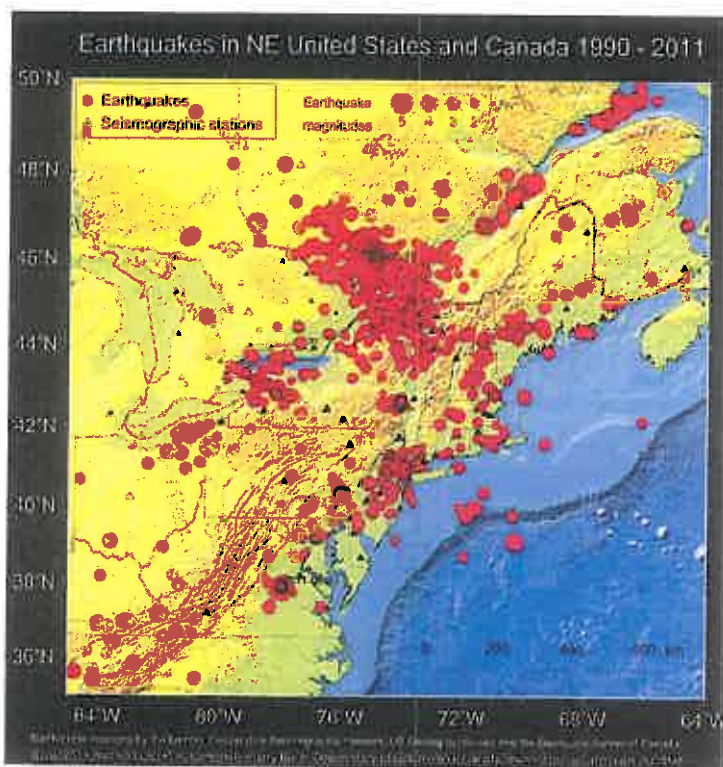
#### Definitions and Explanations:

- **County:** the name of the county where the epicenter was located, derived from spatial selection.
- Dates and times are in Coordinated Universal Time (UTC) for Year, Month, Day, Hours (HH), Minutes (MM) and Seconds (SS). (For Eastern Standard Time, the offset is - 5 hours).
- **Magnitude (Mag):** Magnitude numbers indicative of an earthquake's relative size and is the measured maximum motion as recorded by a seismograph. The numbers are pulled from various sources; the primary source whenever possible.
- **Recorded:** refers to the means by which magnitudes were recorded: if they were reported as "felt" (Historical) or recorded via scientific instrumentation (Instrumental) as retrieved from Source1 or Source2.
- **Latitude (Lat\_N)** and **Longitude (Lon\_W)** values are expressed in decimal degrees for the northern (\_N) and western (\_W) hemispheres, respectively.
- **MMI:** The Modified Mercalli Intensity scale for epicenter intensity, usually designated with Roman numerals. Visit USGS at <http://earthquake.usgs.gov/learn/topics/mercalli.php> for further information.
- **Mag\_Type:** Magnitude type code; the method used in measuring magnitudes (e.g., *Mb* for "body-wave", *Mc* for "coda amplitude", *Md* for "coda duration").
- **Depth\_KM:** The reported depth of the earthquake hypocenter or focus (below the epicenter on the surface) in kilometers.

For other or more detailed earthquake and seismological definitions, please visit the USGS (<http://earthquake.usgs.gov/learn/glossary/>) and Rapid Earthquake Viewer (<http://rev.sels.sc.edu/definition.html>).

#### Sources (Source1 and Source2):

- VTSO – [Virginia Tech Seismological Observatory](#) (Primary Source)
- ANSS – [Advanced National Seismic System](#)
- CERl – [Center for Earthquake Research and Information](#)
- LDEO – [Lamont-Doherty Earth Observatory](#)
- NCEER – [National Center for Earthquake Engineering Research](#)
- USGS ENS – [United States Geological Survey, Earthquake Notification Service](#)
- Wheeler I-2737 -- Wheeler, Russell L., *Earthquakes in and Near the Northeastern United States, 1638-1998* (Used only as reference here)



Northeastern United States and southeastern Canadian earthquakes from 1990 to 2011. Image courtesy of the Lamont-Doherty Earth Observatory (Won-Young Kim) of Columbia University, New York. Used by permission.



West Virginia Geological and  
Economic Survey  
<http://www.wvgs.wvnet.edu/>

Injection waters are currently being sampled and will be reported to WVDEP once analysis is obtained.

Received

DATE: 06/10/2014  
TIME: 10:00 AM  
BY: [illegible]  
FOR: [illegible]



# Material Safety Data Sheet

## 1. Product and company identification

**Product name** : CRW9214 CORROSION INHIBITOR  
**Supplier** : Baker Petrolite  
A Baker Hughes Company  
12645 W. Airport Blvd.  
Sugar Land, TX 77478  
For Product Information/MSDSs Call: 800-231-3606  
(8:00 a.m. - 5:00 p.m. cst, Monday - Friday) 281-276-5400

**Material Uses** : Special: Corrosion Inhibitor.  
**Code** : CRW9214  
**Validation date** : 6/19/2013.  
**Print date** : 6/19/2013.  
**Version** : 3  
**Responsible name** : Global Regulatory Affairs - Telephone 281-276-5400 or 800-231-3606  
**In case of emergency** : CHEMTREC: 800-424-9300 (U.S. 24 hour)  
Baker Petrolite: 800-231-3606  
(001)281-276-5400  
CANUTEC: 613-996-6666 (Canada 24 hours)  
CHEMTREC Int'l 01-703-527-3887 (International 24 hour)

## 2. Hazards Identification

**Physical state** : Liquid. [Clear.]  
**odor** : Mercaptan.  
**Color** : Colorless.  
**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).  
**Emergency overview** : **WARNING!**  
COMBUSTIBLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.  
At elevated temperatures, vapors can form an ignitable or explosive mixture with air. Can form explosive mixtures at temperatures at or above the flash point. Static discharges can cause ignition or explosion when container is not bonded. Keep away from heat, sparks and flame. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling. Vapors can travel to a source of ignition and flashback. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.

**Routes of entry** : Dermal contact. Eye contact. Inhalation.  
**Potential acute health effects**  
**Inhalation** : Irritating to respiratory system.  
**Ingestion** : Toxic if swallowed.  
**Skin** : Harmful in contact with skin. Irritating to skin. May cause sensitization by skin contact.  
**Eyes** : Irritating to eyes.  
**Potential chronic health effects**

## 2. Hazards identification

- Chronic effects** : Contains material that may cause target organ damage, based on animal data. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
- Target organs** : Contains material which may cause damage to the following organs: kidneys, liver, upper respiratory tract, skin, eyes.
- Over-exposure signs/symptoms**
- Inhalation** : respiratory tract irritation, coughing
- Ingestion** : None known.
- Skin** : irritation, redness
- Eyes** : pain or irritation, watering, redness
- Medical conditions aggravated by over-exposure** : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

## 3. Composition/information on ingredients

| <u>Name</u>     | <u>CAS number</u> | <u>%</u> |
|-----------------|-------------------|----------|
| Sulfur compound | Trade secret.     | 1 - 5    |

## 4. First aid measures

- Eye contact** : Get medical attention immediately. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wear suitable protective clothing and gloves. Remove contaminated clothing and shoes.

## 5. Fire-fighting measures

- Flammability of the product** : Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

### Extinguishing media

- Suitable** : Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

## 5 . Fire-fighting measures

- Hazardous thermal decomposition products** : carbon dioxide, carbon monoxide, sulfur oxides, phosphorus oxides, metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## 6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Absorb with an inert material. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.) Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

## 7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## 8. Exposure controls/personal protection

| Occupational exposure limits   |           | TWA (8 hours) |                   |       | STEL (15 mins) |                   |       | Ceiling |                   |       |           |
|--------------------------------|-----------|---------------|-------------------|-------|----------------|-------------------|-------|---------|-------------------|-------|-----------|
| Ingredients:                   | List name | ppm           | mg/m <sup>3</sup> | Other | ppm            | mg/m <sup>3</sup> | Other | ppm     | mg/m <sup>3</sup> | Other | Notations |
| No exposure limit value known. |           |               |                   |       |                |                   |       |         |                   |       |           |

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Use explosion-proof ventilation equipment.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location. Take off contaminated clothing and wash before reuse.
- Personal protection**
- Respiratory** : If a risk assessment indicates it is necessary, use a properly fitted, air purifying or supplied air respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant gloves: Nitrile or Neoprene gloves. 4H gloves.
- Eyes** : Wear chemical safety goggles. When transferring material wear face-shield in addition to chemical safety goggles.
- Skin** : Wear long sleeves and other protective clothing to prevent repeated or prolonged skin contact.

## 9. Physical and chemical properties

- Physical state** : Liquid. [Clear.]
- Flash point** : Closed cup: 72.8°C (163°F) [SFCC]
- Auto-ignition temperature** : Not available.
- Flammable limits** : Not available.
- Color** : Colorless.
- Odor** : Mercaptan.
- pH** : 5.9
- : Neat - without dilution.
- Boiling/condensation point** : Not available.
- Initial Boiling Point** : Not available.
- Melting/freezing point** : Not available.
- Relative density** : 1.185 (15.6°C)
- Density** : 9.87 (lbs/gal)
- Vapor density** : >1 [Air = 1]
- Odor threshold** : Not available.
- Evaporation rate** : Not available.
- VOC** : Not available.
- Viscosity** : Not available.
- Solubility (Water)** : Soluble
- Vapor pressure** : Not available.

## 9 . Physical and chemical properties

|                                |                  |
|--------------------------------|------------------|
| Boiling Point                  | : Not available. |
| Partition coefficient (LogKow) | : Not available. |

## 10 . Stability and Reactivity

|                                    |                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chemical stability                 | : The product is stable.                                                                                                                                                                                                             |
| Possibility of hazardous reactions | : Under normal conditions of storage and use, hazardous reactions will not occur.                                                                                                                                                    |
| Hazardous polymerization           | : Under normal conditions of storage and use, hazardous polymerization will not occur.                                                                                                                                               |
| Conditions to avoid                | : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. |
| Materials to avoid                 | : Reactive or incompatible with the following materials: oxidizing materials and alkalis.                                                                                                                                            |
| Hazardous decomposition products   | : Under normal conditions of storage and use, hazardous decomposition products should not be produced.                                                                                                                               |
| Conditions of reactivity           | : Flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.                                                                                                             |

## 11 . Toxicological information

### Acute toxicity

| Product/ingredient name | Result      | Species | Dose      | Exposure |
|-------------------------|-------------|---------|-----------|----------|
| Sulfur compound         | LD50 Dermal | Rabbit  | 251 mg/kg | -        |
|                         | LD50 Dermal | Rabbit  | 150 uL/kg | -        |
|                         | LD50 Oral   | Rat     | 244 mg/kg | -        |

### Chronic toxicity Remarks

Sulfur compound

This product contains a Sulfur compound. Skin allergy was observed in guinea pigs following repeated exposure. No birth defects were observed in the offspring of rats exposed orally during pregnancy, although slight adverse effects on the fetus were observed. No genetic changes were observed in tests using bacteria or human cells. Both positive and negative results were observed in tests using animal cells and animals (Vendor's MSDS).

## 12 . Ecological information

### Aquatic ecotoxicity

Conclusion/Summary : Not available.

### Biodegradability

Conclusion/Summary : Not available.

## 13. Disposal considerations

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Waste disposal | : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

## 14 . Transport information

| Regulatory information    | UN number      | Proper shipping name                                   | Classes             | PG* | Label | Additional information                                                                                                                              |
|---------------------------|----------------|--------------------------------------------------------|---------------------|-----|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DOT Classification</b> | NA1993         | Combustible liquid, n.o.s. (Contains: Sulfur compound) | Combustible liquid. | III |       | <b>Remarks</b><br>This material is not regulated by DOT if transported in a packaging <= 119 gallons. This material is not regulated by TDG or IMO. |
| <b>TDG Classification</b> | Not regulated. | -                                                      | -                   | -   |       | -                                                                                                                                                   |
| <b>IMDG Class</b>         | Not regulated. | -                                                      | -                   | -   |       | -                                                                                                                                                   |
| <b>IATA-DGR Class</b>     | Not regulated. | -                                                      | -                   | -   |       | -                                                                                                                                                   |

PG\* : Packing group

DOT Reportable Quantity Not applicable.

Marine pollutant Not applicable.

North-America NAERG : 128

## 15 . Regulatory information

**HCS Classification** : Combustible liquid  
Toxic material  
Irritating material  
Sensitizing material  
Target organ effects

**U.S. Federal regulations** : **United States inventory (TSCA 8b)**: All components are listed or exempted.  
**SARA 302/304/311/312 extremely hazardous substances**: No products were found.  
**SARA 302/304 emergency planning and notification**: No products were found.  
**SARA 302/304/311/312 hazardous chemicals**: Sulfur compound  
**SARA 311/312 MSDS distribution - chemical inventory - hazard identification**:  
CRW9214 CORROSION INHIBITOR: Immediate (acute) health hazard, Delayed (chronic) health hazard  
**CERCLA**: Hazardous substances.: No products were found.  
**Clean Water Act (CWA) 307**: No products were found.  
**Clean Water Act (CWA) 311**: No products were found.  
**Clean Air Act (CAA) 112 regulated flammable substances**: No products were found.  
**Clean Air Act (CAA) 112 regulated toxic substances**: No products were found.  
**Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)** :  
Not listed

**United States inventory (TSCA 8b)** : All components are listed or exempted.

Canada

Office of Chemical Safety  
U.S. Dept. of Environmental Protection

## 15 . Regulatory information

- WHMIS (Canada)** : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).  
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).  
Class D-2B: Material causing other toxic effects (Toxic).
- Canada (CEPA DSL):** : All components are listed or exempted.

## 16 . Other information

- Label requirements** : COMBUSTIBLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

**National Fire Protection Association (U.S.A.)** :



**Date of printing** : 6/19/2013.

☒ Indicates information that has changed from previously issued version.

### Notice to reader

**NOTE:** The information on this MSDS is based on data which is considered to be accurate. Baker Hughes, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This MSDS was prepared and is to be used for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

Received

Office of Oil and Gas  
WV Dept. of Environmental Protection