west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
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Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

UIC Permit Reissuance

BASE PETROLEUM, INC.
100 wilcox farm lane
South charleston, WV 25309

Dear JOHN BARRY WILC

Enclosed you will find the Underground Injection Control Renewal Permit # UIC2D0810281 dated June 29, 2016. Be advised that the duration of the permit is for a period of five (5) years.

Also be advised that all conditions established by the UIC Permit Number UIC2D0810281 either expressly or incorporated by reference, must be strictly adhered to. All monitoring forms shall be submitted to the Office of Oil and Gas in the manner and frequency prescribed. The monitoring forms will be compared with the scope of the permitted activity to verify compliance.
Please review the permit carefully and be aware of all permit conditions. Compliance of all permit conditions will be strictly enforced.

The operation of this injection well facility in general, including maintenance of all related surface equipment, shall be conducted so as to preclude any unlawful discharge of waste materials into the surface or ground waters of the state.

James Martin
Chief,
Office of Oil and Gas

Enclosures as stated

UNDERGROUND INJECTION CONTROL PERMIT

For

Base Petroleum, Inc.

Number UIC2D0810281

AUTHORIZATION TO OPERATE AN UNDERGROUND INJECTION CONTROL (UIC) INJECTION WELL PERMIT NUMBER # UIC 2D0810281

In compliance with provisions of the West Virginia Code, Chapter 22, Article 6, Article 11 and Article 12, as well as Legislative Rules, Title 47, Series 13 and Series 58, Title 47, Series 55, and Title 35 Series 1 and Series 4.

PERMITTEE

NAME	Base Petroleum, Inc.	FACILITY TYPE	Brine Disposal
ADDRESS	100 Wilcox Farm Lane	WELL API #	**47-081-00281**
ADDRESS	South Charleston, WV 25309	FIELD NAME	NA

is authorized by this permit to inject Class II fluids that are brought to the surface in connection with conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection into the **Weir** formations in accordance with the conditions set forth herein. The permitted injection depth shall be **3,082** feet to **3,242** feet. The injection well is located in **Raleigh** County, 7.5' **Eccles** Quadrangle. The coordinates for this injection well are:

UTM NAD 83 Northing **4182868.1** and UTM NAD 83 Easting **469282.9**.

The maximum Permitted wellhead injection pressure is established as **638** PSI.

All references to West Virginia Regulations are to those that are in effect on the date that this permit becomes effective.

Any person who holds a permit shall pay an annual permit fee in accordance with the provisions of Title 47 Series 9 section 7 of the Legislative Rule. The first annual permit fee shall be remitted to the Office of Oil and Gas one (1) calendar year from the date of permit issuance; subsequent annual permit fees shall be remitted on or before the anniversary date of the permit issuance. The annual permit fee for a Class II disposal well is twenty five dollars ($25). The permit becomes void if the annual permit fee has not been paid within one hundred eighty (180) days of the due date. The Chief shall not reissue a permit until all annual permit fees due during prior terms of that permit have been paid in full.

Failure to pay the annual groundwater fee of $75.00 for Class IID as required by the West Virginia Code, Chapter 22, Article 11 and/or Article 12, shall be cause for revocation of this permit. The annual permit fee is due on the anniversary date of permit issuance and shall be paid on the anniversary date of issuance of this permit.

Non-compliance with the terms of this permit shall be cause for revocation of Certification under the terms of Chapter 22, Article 12, and revocation of the permit under Chapter 22, Article 11 of the West Virginia Code.

This permit and its authorization to inject shall remain in effect for five (5) years from the date of issuance of the final permit provided all terms of the permit are met.

James Martin, Chief
Office of Oil and Gas

PART I

A. REAPPLICATION

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must submit an administratively complete application, along with application fee payment, for a new permit at least one hundred and eighty (180) days before this permit expires.

B. IMMEDIATE REPORTING

The Permittee shall report any noncompliance which may endanger human health or the environment immediately after becoming aware of the circumstances by using the WVDEP Emergency Spill line number, 1-800-642-3074. Written submission shall also be provided within five (5) days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, Permittee shall provide the anticipated time it is expected to continue; and the steps taken or planned to be taken to reduce, eliminate, and prevent reoccurrence of the noncompliance. The following shall be included as information which must be reported immediately:

i. Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water (USDWs).

ii. Any non-compliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between the USDWs, or failure of mechanical integrity test demonstrations.

C. RIGHT OF APPEAL

Notice is hereby given of your right to appeal the terms and conditions of this permit by which you are aggrieved to the State Environmental Quality Board by filing a NOTICE OF APPEAL on the form prescribed by such Board for this purpose, with the Board, in accordance with the provisions of Chapter 22 Article 11, Section 21 of the code of West Virginia within thirty (30) days after the date of receipt of the above permit.

D. EFFECT OF PERMIT

The Permittee is allowed to engage in underground injection in accordance with the conditions of this permit based on an approved permit application. The Permittee shall not allow the underground injection activity authorized by this permit to cause or allow the movement of fluid containing any contaminant into underground sources of drinking water and may not cause a violation of any primary drinking water regulation or any health-based limit promulgated under 40 CFR Chapter 1, Part 142, of the Code of Federal Regulations, or of any water quality standard promulgated by the West Virginia Department of Environmental Protection/Division of Water and Waste Management. Any underground injection activity not authorized in this permit is prohibited. Compliance with the terms of this permit does not constitute a defense to any action brought under Part C and the imminent and substantial endangerment provisions in Part D of the Safe Drinking Water Act (SDWA) or any other common or statutory law for any breach of any other applicable legal duty.

E. PERMIT ACTIONS

1. This permit can be modified, revoked and reissued or terminated for cause specified in Chapter 22, Article 11 (hereafter §22-11), and Chapter 22, Article 12 (hereafter §22-12) of the West Virginia Code, and Title 47, Series 13 (hereafter 47 CSR 13) of the Legislative Rules. The filing of a request by the Permittee for a permit modification, revocation and reissuance, suspension or revocation, or notification of planned changes or anticipated noncompliance, does not stay any permit condition.

2. Transfer of Permits. This permit is not transferable to any person unless notice is first provided to the Office of Oil and Gas and the Permittee complies with requirements of 47 CSR 13-13.17. The Office of Oil and Gas

may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary under the Safe Drinking Water Act (SDWA).

F. SEVERABILITY

The provisions of this permit are severable, and if any condition of this permit or the Permittee's application of any provision of this permit to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of other provisions of the permit and the remainder of this permit shall not be affected.

G. DURATION OF PERMIT

This permit and the authorization to inject are issued for a period of five (5) years unless terminated under Part I Section H paragraph 11 of this permit. However, when through no fault of the Permittee the West Virginia Department of Environmental Protection does not issue a new permit with an effective date on or before the expiration date of the previous permit and the Permittee has submitted a timely administratively complete application as required in Part I section A of this permit, which is a complete application for a new permit, the expired permit shall continue to remain fully effective and enforceable.

H. GENERAL REQUIREMENTS

1. Duty to Comply. The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the SDWA and the State Act and is grounds for enforcement action; for permit suspension or revocation, revocation and reissuance, or modification; or for denial of a permit renewal application. (47 CSR 13-13.12.a) Copies of UIC Program regulations (§22-11) may be obtained from the West Virginia Legislature's Web Site http://www.legis.state.wv.us/WVCODE/Code.cfm, and (47 CSR 13) may be obtained from the West Virginia Secretary of State's Web Site at http://www.sos.wv.gov/.

2. Duty to Reapply. If the Permittee wishes to continue activity regulated by this permit after the expiration date of this permit, the Permittee must apply for a new permit as required in Part I section A of this permit as well as obtain a new permit.

3. Duty to Halt or Reduce Activity Not a Defense. It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the Permitted activity in order to maintain compliance with the conditions of this permit.

4. Duty to Mitigate. The Permittee shall take all reasonable steps to minimize or correct any adverse impact on health of persons or the environment resulting from noncompliance with this permit.

5. Proper Operation and Maintenance. The Permittee shall at all times properly operate and maintain all facilities, systems of treatment and control, and related equipment which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, adequate security at the facility to prevent unauthorized access, adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facility or similar systems only when necessary to achieve compliance with the conditions of this permit.

6. Duty to Provide Information. The Permittee shall furnish to the Chief within a reasonable time, any information which the Chief may request to determine whether cause exists for modifying, revoking and reissuing, or revoking this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Chief, upon request, copies of records required to be kept by this permit. If the Permittee becomes aware of any incomplete or incorrect information in the permit application or subsequent report(s), the Permittee shall promptly submit information addressing these deficiencies to the Chief.

7. Inspection and Entry. The Permittee shall allow the Chief, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

a. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor, at reasonable times, for the purposes of assuring permit compliance for any substances or parameters at any location.

8. Penalties. Any person who violates a permit requirement is subject to civil penalties, criminal penalties, fines and other enforcement actions under §22-11 and §22-12.

9. Signatory Requirements. Only a duly authorized person may sign documents and reports associated with this permit.

   a. All reports required by this permit and other information requested by the Chief shall be signed as follows:

      (1) For a corporation, by a responsible corporate officer of at least the level of vice-president;

      (2) For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or

      (3) For a Municipality, State, Federal, or other public agency by either a principal executive or a ranking elected official.

   b. A duly authorized representative of the official designated in paragraph a. above may also sign only if:

      (1) The authorization is made in writing by a person described in paragraph a. above;

      (2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, and;

      (3) The written authorization is submitted to, and approved by, the Chief.

   c. If an authorization under paragraph (b) of this section is no longer accurate because a different individual has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the Chief prior to or together with any reports, information or applications to be signed by an authorized representative.

   d. Any person signing a document under paragraph (b) of this section shall make the following certification: (47 CSR 13-13.11.d). "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."

10. Property Rights. Issuance of this permit does not convey property rights or mineral rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, any infringement of State or local law or regulations, or any exclusive privilege.

11. Permit Actions. This permit may be modified, revoked and reissued, suspended, or revoked for cause. The filing of a request by the Permittee for a permit modification, revocation and reissuance, suspension or revocation, or notification of planned changes or anticipated noncompliance, does not stay any permit condition.

12. Confidentiality of Information.

    a. In accordance with 47 CSR 13-13.21, any information submitted to the State pursuant to this rule may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions, or in the case of other submissions, by stamping the words "CONFIDENTIAL BUSINESS INFORMATION" on each page containing such information. If no claim is made at the time of submission, the State may make the information available to the public without further notice.

    b. Claims of confidentiality for the following information will be denied:

        i. The name and address of any permit applicant or Permittee.

        ii. Information which deals with the existence, absence, or level of contaminants in drinking water.

13. Monitoring Reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

14. Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than thirty (30) days following each schedule date.

15. Other information. Where a Permittee becomes aware that he/she failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Chief, he/she shall promptly submit such facts or information.

16. It shall be unlawful for any person, unless an authorization has been issued by a groundwater regulatory agency, to deliberately allow crude oil, or any petroleum product derived from crude oil, or seepage, or natural gas, or condensate, or salt water, or any chemical mixture which may impact groundwater quality to escape from any well, pipeline, impoundment, storage tank, treatment unit, or storage container, or be deliberately allowed to flow onto or under the land surface in such a manner that could impact groundwater quality.

17. State or Federal Laws. Nothing in this permit shall be construed to preclude the institution on any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any State or Federal law or regulation.

PART II

A. RECORD RETENTION

1. Required Records. The Permittee shall retain all records concerning the Permitted underground injection well until three (3) years after completion of any plugging and abandonment. The Chief may require the owner or operator to deliver the records to the Chief at the conclusion of the retention period.

B. MONITORING REQUIREMENTS

1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the fluid to be analyzed

and the procedure for analysis of the sample shall be in accordance with test procedures approved under 40 CFR 136.3, unless otherwise approved by the Chief. The Permittee shall identify the types of tests and methods used to generate the monitoring data.

2. All environmental measurements required by the permit, including but not limited to, measurements of pressure, temperature, mechanical, and chemical analyses shall be done in accordance with state guidance on quality assurance. All analysis must be performed by a West Virginia certified laboratory.

3. Records of monitoring information shall include:

    a. The date, exact place, and time of sampling or measurements;
    b. The individual(s) who performed the sampling or measurements;
    c. The date(s) analysis(es) were performed;
    d. Individual(s) who performed the analyses;
    e. The analytical techniques or methods used; and
    f. The results of such analyses.

4. The Permittee shall daily monitor all the casing annuli with pressure sensitive devices or with such a method as approved or required by the Office of Oil and Gas to allow early detection of any leaks from the injection zone or casing. The Permittee shall also monitor injection pressure, volume, and rate daily. This information shall be reported monthly using the Office of Oil and Gas electronic WR-40 Form. Submittal shall be through the current WVDEP Electronic Submittal System (ESS).

5. The Permittee shall utilize a pressure recording device capable of both positive and negative pressure reading/recording. The pressure recording device must have an accuracy of +/- 1% of span to continuously record the tubing / casing (2 3/8" x 4 1/2") annulus pressure. Prior to injection, the operator shall note the daily annulus pressure (daily baseline). Any deviation plus or minus 25 psi during injection of the daily baseline annulus pressure shall be considered a MIT failure. Injection operations must cease and the Office of Oil and Gas must be notified in writing if a MIT failure occurs.

6. The Permittee shall determine the tubing / casing (2 3/8" x 4 1/2") annulus fluid level (feet below surface elevation) and retain the measurements at the facility office. Should the fluid level rise to within 100' of the lowermost USDW then immediately cease operations and report such findings to the Office of Oil and Gas. The annulus fluid level will be measured annually.

7. The Permittee shall sample, analyze and record the nature of all the injected fluid for the parameters listed in TABLE 1 below at the initiation of the injection operation and upon request by the Chief or whenever the operator observes or anticipates a change in the injection fluid.

TABLE 1

-pH	-Manganese
-Specific Gravity	-Total Dissolved Solids
-Barium	-Hydrogen Sulfide
-Specific Conductance	-Sodium
-Iron	-Alkalinity
-Magnesium	-Hardness
-Chloride	-Total Organic Carbon (TOC)
-Dissolved Oxygen	

8. Any analysis result of specific gravity greater than 1.2 or any analysis of TOC greater than 250.0 mg/L shall be reported to the Chief within twenty-four (24) hours of the results.

9. Within thirty (30) days of permit issuance date, the Permittee shall designate stream monitoring points adjacent to the injection well facility. These monitoring points shall be located immediately upstream and downstream of the injection well location and shall be sampled for the parameters listed in Table 1. Sampling shall be completed on a nine (9) month schedule and reported to the WVDEP Office of Oil and Gas, accompanied by a map identifying the sampling points and corresponding coordinates.

10. The Permittee shall maintain a record (manifest) of every load of fluid received. The record shall include the hauler's name and signature, the operator's name and signature, API number for the well the fluid was collected or the location from where the load was obtained, the volume of the load and whether the load of fluid delivered was a split load. If the load was a split load, each operator's name and location shall be listed and, if possible, the volumes of fluid received from each operator documented. This information shall be maintained on the Class II disposal manifest attached to this permit and maintained at the facility.

11. A wellhead pressure gauge shall be installed and maintained on the injection tubing to facilitate inspection and ensure compliance of maximum injection pressures as approved on Oil and Gas Form WR-37. A daily reading of the injection pressure shall be taken and reported on Form WR-40.

12. All pipeline(s) from the injection pump to the injection well shall be tested for integrity at least once every five (5) years with the results reported and on WR-37 Form along with the pressure test recording graph/chart and then submitted to the Office of Oil and Gas within thirty (30) days. The pipeline integrity test shall pressurize the injection pipeline(s) to 100 psi greater than the maximum injection pressure for a minimum of thirty (30) minutes, allowing for no more than five (5) percent loss after completion. The Permittee shall notify the Chief of his or her intent to conduct an integrity test of the pipeline(s) no less than twenty-four (24) hours prior to such test. Upon failure of a mechanical integrity test or expiration of the five (5) year mechanical integrity test regulatory period, the Permittee shall cease operation/injection and shut-in the well immediately until successfully repaired, replaced and then tested. Repairs shall be completed by the Permittee and approved by the Office of Oil and Gas. All repairs shall be completed within ninety (90) days of the failure date. If repaired, the well must be re-tested and an updated WR-37 Form must be submitted to the Office of Oil and Gas for approval. Any change made to the pipeline fittings or piping will require integrity testing.

13. The Permittee shall conduct a mechanical integrity test of the injection well at a minimum frequency of once every five (5) years per 35 CSR 4-7.7.b. The Permittee shall notify the Chief of his or her intent to conduct a mechanical integrity test no less than twenty-four (24) hours prior to such demonstration. The Permittee must submit a WR-37 Form to the Office of Oil and Gas within thirty (30) days of each mechanical integrity test conducted. If test is a pressure test then the Permittee must submit a pressure recording graph/chart with the WR-37. Upon failure of a mechanical integrity test or expiration of the five (5) year mechanical integrity test regulatory period, the Permittee shall cease operation/injection and shut-in the well immediately until successfully repaired, tested or permanently plugged and abandoned per regulation. A WR-37 must be submitted to document MIT failure. Corrective action for repairs shall be completed for approval by the Office of Oil and Gas and be conducted within ninety (90) days of the failure date. If repaired, the well must be re-tested and an updated WR-37 Form must be submitted to the Office of Oil and Gas for approval.

14. In addition to the above requirement, a mechanical integrity test demonstration shall be conducted whenever protective casing or tubing is removed from the well, the packer is replaced or reseated, if well failure is likely, or as requested by the Chief. The Permittee may continue operation only if he or she has successfully demonstrated to the Chief the mechanical integrity of the permitted well. The Permittee shall cease injection operations if a loss of mechanical integrity becomes evident or if mechanical integrity cannot be demonstrated.

C. REPORTING AND NOTIFICATION REQUIREMENTS

1. Anticipated Noncompliance. The Permittee shall give advance notice to the Chief of any planned changes

in the Permitted facility or activity which may result in noncompliance with permit requirements.

2. Other Noncompliance. The Permittee shall report all instances of noncompliance not reported under paragraphs Part I Section B, and Part II Section C Paragraph 3 of this permit, at the time monitoring reports are submitted. The report shall contain the information listed in Part I Section B of this permit. The Permittee shall report all other instances of noncompliance in writing within ten (10) days of the time the Permittee becomes aware of the circumstances. The reports shall contain the information listed in this permit.

3. Planned Changes. The Permittee shall give notice to the Chief as soon as possible of any planned significant physical alterations, additions to the Permitted facility, and/or any significant changes planned in the operation of the facility.

4. Cessation of Injection Activity. Any well which is not in use for a period of twelve (12) consecutive months shall be presumed to have been abandoned and shall promptly be plugged by the operator in accordance with the provisions in Chapter 22, Article 6 Section 24 of the West Virginia Code, unless the operator furnishes satisfactory proof to the Chief that there is a bona fide future use for such well.

5. Report on Permit Review. Within thirty (30) days of receipt of this permit, the Permittee shall report to the Chief that he or she has read and understands and accepts all terms and conditions of the permit.

6. The owner or operator or person in charge of a facility subject to this rule from which a reportable discharge as described in subsection 3.3 of 35CSR1 occurs shall notify the Office of Oil and Gas by calling 1-800-642-3074 immediately; but in no case, later than twenty-four (24) hours after becoming aware of the discharge.

7. Within sixty (60) days prior to the commencement of injection, the Permittee shall sample the injection fluid for the following parameters: TPH GRO, TPH DRO, TPH ORO, BTEX, pH, Aluminum, Arsenic, Barium, Calcium, Chloride, Detergents (MBAS), Iron, Manganese, Sodium, Sulfate, Total Dissolved Solids, Total Suspended Solids, Total Organic Carbon, Dissolved Methane, Dissolved Ethane, Dissolved Butane, Dissolved Propane, Bacteria (Total Coliform), Specific Gravity and Radiation (NORM). Upon receipt of the laboratory analyses, the Permittee shall submit a complete copy to the Office of Oil and Gas.

8. Within sixty (60) days of the issuance date of this permit, UIC 2D0810281, all potential drinking water sources (potable drinking water well(s), cistern(s), etc.) and USDWs (Underground Sources of Drinking Water) within the AOR (1/4 mile radius of well 47-081-00281) must be sampled. If no sources are available, stream samples may be substituted for the USDW sampling, as per Part II Section B Paragraph 9. The Permittee shall sample for the following parameters: TPH GRO, TPH DRO, TPH ORO, BTEX, pH, Aluminum, Arsenic, Barium, Calcium, Chloride, Detergents (MBAS), Iron, Manganese, Sodium, Sulfate, Total Dissolved Solids, Total Suspended Solids, Total Organic Carbon, Dissolved Methane, Dissolved Ethane, Dissolved Butane, Dissolved Propane and Bacteria (Total Coliform). Upon receipt of the laboratory analyses, the Permittee shall submit a complete copy to the Office of Oil and Gas.

PART III

A. OPERATING REQUIREMENTS

1. The UIC Permit and all attachments must be kept on location at all times.

2. Injection Fluid. The Permittee shall not inject any hazardous substances, as defined by 40 CFR 261, or any other fluid, other than the fluids produced solely in association with oil and gas production operation.

3. The Permittee shall install and maintain a barrel counter on the injection line. The results are to be recorded and reported on the WR-40.

4. The Permittee shall sample the injectate pursuant to the permit requirement Part II B.7 within thirty (30) days prior to commencement of injection operations.

5. Any well that penetrates the injection zone with an inactive and/or abandoned status within the Permitted Area of Review, that does not have cement casing through the injection zone, shall be monitored immediately by a method approved by the Office of Oil and Gas, as well as properly plug and abandon such wells, as necessary.

6. Injection between the outermost casing protecting underground sources of drinking water and the wellbore is prohibited, as is injection into any USDW.

7. Corrective Action. The applicant must satisfy the requirement of the Office of Oil and Gas regarding any corrective action needed on all known wells penetrating the injection zone within the area of review. This must be done in a manner which satisfies the requirements of 47 CSR 13-13.9.

8. Loading and unloading stations shall have spill prevention and control facilities and procedures as well as secondary containment. Spill containment and cleanup equipment shall be readily accessible.

9. The Permittee shall ensure that secondary containment for existing above ground storage tank(s) shall be adequately designed and constructed to be sufficiently impervious to prevent the released substance from penetrating the containment structure until the release can be detected and recovered, but in no case will that time be less than seventy-two (72) hours.

10. The above ground storage tank(s) associated with this underground injection facility shall have secondary containment sufficient capacity to contain 110% volume of the largest tank. Tank batteries or tanks connected in series by manifold, the combined volume of the tanks must be considered if the tanks are capable of simultaneous release. The combined capacity of the tanks connected by manifold shall be considered, unless the tanks are operated in a manner that prevents fluids flowing from one tank to another under any conditions.

11. Above ground storage tanks connected in series by manifold shall utilize a system where valves are closed and locked to isolate tanks when their combined volume exceeds the secondary containment capacity. At no point in time shall the combined volume be accessible through the manifold system exceed the capacity of the secondary containment without someone being on site to monitor.

12. All above ground storage tanks within the floodplain, as defined by the Federal Emergency Management Agency "FEMA" 100 year floodplain map, shall be anchored significantly enough to prevent movement in the case of a high water flood event. Contact the county floodplain manager to confirm.

13. All wellheads shall be reinforced or otherwise armored to protect against accidental collisions.

14. Pumps and ancillary equipment (e.g. valves, flanges, filters, condensate lines and instrumentation) handling materials that have the potential to contaminate groundwater shall be selected and installed to prevent or contain any spills or leaks.

15. Sumps containing materials which have the potential to contaminate groundwater shall be designed, constructed, and operated utilizing leak detection or secondary containment, or other appropriate controls that are capable of preventing groundwater contamination.

16. No third party haulers shall be permitted without approval by the Office of Oil and Gas. For approval, the Permittee shall designate by letter to the Office of Oil and Gas, any third party hauler proposed to be used

for the transportation of fluids to the facility. The third party hauler may not commence transportation of fluids to the facility until approved by the Office of Oil and Gas.

17. Within thirty (30) days of issuance of the final permit, UIC2D0810281, the Permittee shall complete a permit determination with the West Virginia Department of Environmental Protection Division of Air Quality. The following web link will provide access for filing: http://www.dep.wv.gov/daq/permitting/Pages/nsr-forms.aspx

18. Facility Security. The gate on the access road to the site shall be closed and locked at all times when there is not a company representative at the facility. All valves, water drains, containment areas, and storage areas shall be secured and locked utilizing locking devises and/or plugs. During the life of this permit all gates and access points shall be secured and locked while no representative is at the facility. All visitors must check in upon arriving at the facility. Haulers (if used) shall not be allowed to off load without the proper paperwork and documentation.

19. Within thirty (30) days the Permittee shall submit a Facility Improvement Plan that addresses the repair/replacement of the tanks, secondary containment, piping, valves, wellhead security/protection, offloading facility, and collection sumps. A detailed work schedule must also be included within the plan. Once approved the Permittee will have sixty (60) days to implement the Facility Improvement Plan.

B. PLUGGING AND ABANDONMENT

1. Any well which is not in use for a period of twelve (12) consecutive months shall be presumed to have been abandoned and shall promptly be plugged by the operator in accordance with the provisions of Chapter 22, Article 6, of the West Virginia Code, unless the operator furnishes satisfactory proof to the Chief that there is a bona fide future use for such well.

2. Prior to well plugging, the Permittee shall apply for and receive a plugging permit from the Office of Oil and Gas to plug and abandon the well in accordance with an approved plugging and abandonment plan.

3. Plugging and abandonment shall be conducted in a manner to prevent movement of fluids into or between USDWs (underground sources of drinking water).

4. Pursuant to Legislative Rule 47-13-13.7.f, the Permittee's plugging and abandonment plan shall be incorporated into the UIC permit. See Attachment 1.

PART IV

A. SITE SPECIFIC CONDITIONS

1. Appendix A: Specific operational conditions.

2. Appendix H: Groundwater Protection Plan (GPP) The GPP shall be maintained and updated as necessary to protect groundwater quality.

3. Appendix I: Requirement for Financial Responsibility to plug/abandoned an injection well.

4. Attachment 1: Plugging and Abandonment Plan.

5. Attachment 2: Site/Facility Diagram.

APPENDIX A
Injection Well Form

1) GEOLOGIC TARGET FORMATION Weir Formation (Weir Sandstone)

Depth 3,082 Feet (top) 3,242 Feet (bottom)

2) Estimated Depth of Completed Well, (or actual depth of existing well): 3,283 Feet

3) Approximate water strata depths: Fresh 90, 100 Feet Salt 1,123, 1,180 Feet

4) Approximate coal seam depths: 83', 832', 1,010', 1,044'

5) Is coal being mined in the area? Yes _____ No X

6) Virgin reservoir pressure in target formation 710 psig Source Well Record

7) Estimated reservoir fracture pressure N/A psig (BHFP)

8) MAXIMUM INJECTION OPERATIONS:

Injection rate (bbl/hour) 15

Injection volume (bbl/day) 360

Injection pressure (psig) 638

Bottom hole pressure (psig) 1,700

9) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES

Produced brine fluid

Temperature of injected fluid: (°F) 70 Degrees Fahrenheit

10) FILTERS (IF ANY) 50 Micron

11) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL

N/A

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	13 ⅜"				22	22	
Fresh Water	9 ⅝"			32	1,498	1,498	40 sks
Coal							
Intermediate 1	7"			20	2,504	2,200-2,504	30 sks
Intermediate 2							
Production	4 ½"		J-55	10.5	3,283	3,283	Cemented
Tubing	2 ⅜"		J-55	4.6		3,074	Packer
Liners							

TYPE	Wellbore Diameter	Casing Size	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)	Cement to Surface ?
Conductor							
Fresh Water							
Coal							
Intermediate 1							
Intermediate 2							
Production							
Tubing							
Liners							

Packers

	Packer #1	Packer #2	Packer #3	Packer #4
Kind:	Parmaco			
Sizes:	4 ½" x 2 ⅜"			
Depths Set:	3,074'			

(4/25)

APPENDIX H

GROUNDWATER PROTECTION PLAN

Facility Name: Base Petroleum Daniels #2 SWD

County: Raleigh

Facility Location:

Postal Service Address:	Clopped area of the Clopped Branch Watershed	
Latitude and Longitude:	37.792862 / -81.348883	

Contact Information:

Person:	John Wilcox
Phone Number:	304-756-2827
E-mail Address:	jhnwilcox@aol.com

RECEIVED
Office of Oil and Gas
SEP 09 2014
WV Department of
Environmental Protection

Date: 8/23/14

1. A list of all operations that may contaminate the groundwater.

There is one transfer point where tanker trucks operated by Kermit Tyree Contracting are able to dump produced fluids from various wells as indicated in Appendix G into a series of two 210 bbl. storage tanks. Fluids are then pumped approximately 50 feet to the salt water disposal well.

2. A description of procedures and facilities used to protect groundwater quality from the list of potential contaminant sources above.

Tanker trucks are backed onto the site to the transfer point which is located directly above the tank battery and the secondary containment. The transfer point has a plastic tub lined with absorbent pads to collect any drippings from the transfer. Any line breaks in the transfer would be contained in the secondary containment. The secondary containment provides 12,877 gallons of storage capacity which is significantly more than the 9,240 gallons of required capacity by law. An illustration of the secondary containment is provided. Mechanical integrity tests were conducted and passed all requirements on the facility on 1/17/14.

3. List procedures to be used when designing and adding new equipment or operations.

No new equipment or operations are anticipated for this facility at this time.

environment.

4. Summarize all activities at your facility that are already regulated for groundwater protection.

UIC regulations are applicable to the disposal well and oil and gas laws and regulations are applicable to all associated operations.

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

Little information exists for the general area due to the lack of water supply wells. Historical information and limited water samples from the area indicate fair water quality due to typical higher iron concentrations throughout many areas of the state.

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 will be used for deicing or fill material on the property.

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.

Kermit Tyree Contracting currently operates this well for Base Petroleum Inc. and will provide employees instruction and training in the recognition and prevention of groundwater contamination and the potential sources of contamination on quarterly basis. Employees will be trained on proper procedures for filling tanker trucks at the producing well locations in order to eliminate contamination at other sites as well as transportation of those fluids. Once the tanker truck enters the disposal facility, employees will be given instruction as to the proper procedures for connecting to the transfer station and pumping of the fluids into the storage tanks. Employees will be instructed on measures to be taken in the event of a spill and will be provided with materials in order to begin clean up of any spills. The proper procedures and contacts for the reporting of any spills will be provided to all employees. Instruction and training for employees will be updated as conditions and requirements change.

8. Include provisions for inspections of all GPP elements and equipment. Inspections must be made quarterly at a minimum.

Representatives for Base Petroleum will conduct quarterly inspections using the attached form. Employees will visually inspect the tank for any signs of material damage or leakage. Any pipelines will be walked and checked for leaks. All transfer points and hoses associated with the disposal well will be checked for flaws or areas of weakness. Secondary containment berms will be checked for any signs of weakness and any standing water will be removed. The filter will be checked and cleaned if necessary. Any findings of possible contamination will be noted on the inspection form and the remedial measures to address these concerns will be documented on the inspection form. All inspection forms will be maintained at Base Petroleum's office for a minimum of three years. Mechanical integrity test will be conducted every five years.

Signature: John B Wilcox

Date: 10/25/14

(4/25)

APPENDIX I

Requirement for Financial Responsibility to Plug/Abandon an Injection Well

To: WV Department of Environmental Protection
Office of Oil and Gas
601 57th Street, SE
Charleston, West Virginia 25304-2345
ATTN: Underground Injection Control Program

From: John B. Wilcox
Base Petroleum, Inc
100 Wilcox Farm Lane
South Charleston, WV 25309

Date: 6/23/2014

Subject: Underground Injection Control (UIC) Permit Application
UIC2D0810281
Requirement for Financial Responsibility

I, John B. Wilcox, 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: John B. Wilcox

Signature: John B. Wilcox

Date: 6/23/14

RECEIVED
Office of Oil & Gas
JUN 25 2014
WV Department of
Environmental Protection

Attachment 1

Base Petroleum
Plugging Procedure
47-081-00281 Daniels #2 Disposal Well

Rig up the rig

Run the tubing down the hole to 3,200'

Gel the hole

Cement from 3,200' to 3,000'

Cement from 2,700' to 2,500'

Pull the tubing from the hole

Free point and cut the 4 ½" casing at 2,100'

Pull the 4 ½" casing from the hole

Run tubing in the hole to 2,150'

Gel the hole

Cement from 2,150' to 2,050'

Cement from 1,600' to 1,500'

Pull the tubing from the hole

Free point and cut the 9 5/8" casing at 1,300'

Pull the 9 5/8" casing from the hole

Run tubing in the hole to 1,350'

Cement from 1,350' to 1,250'

Cement from 1,100' to 950'

Cement from 850' to 750'

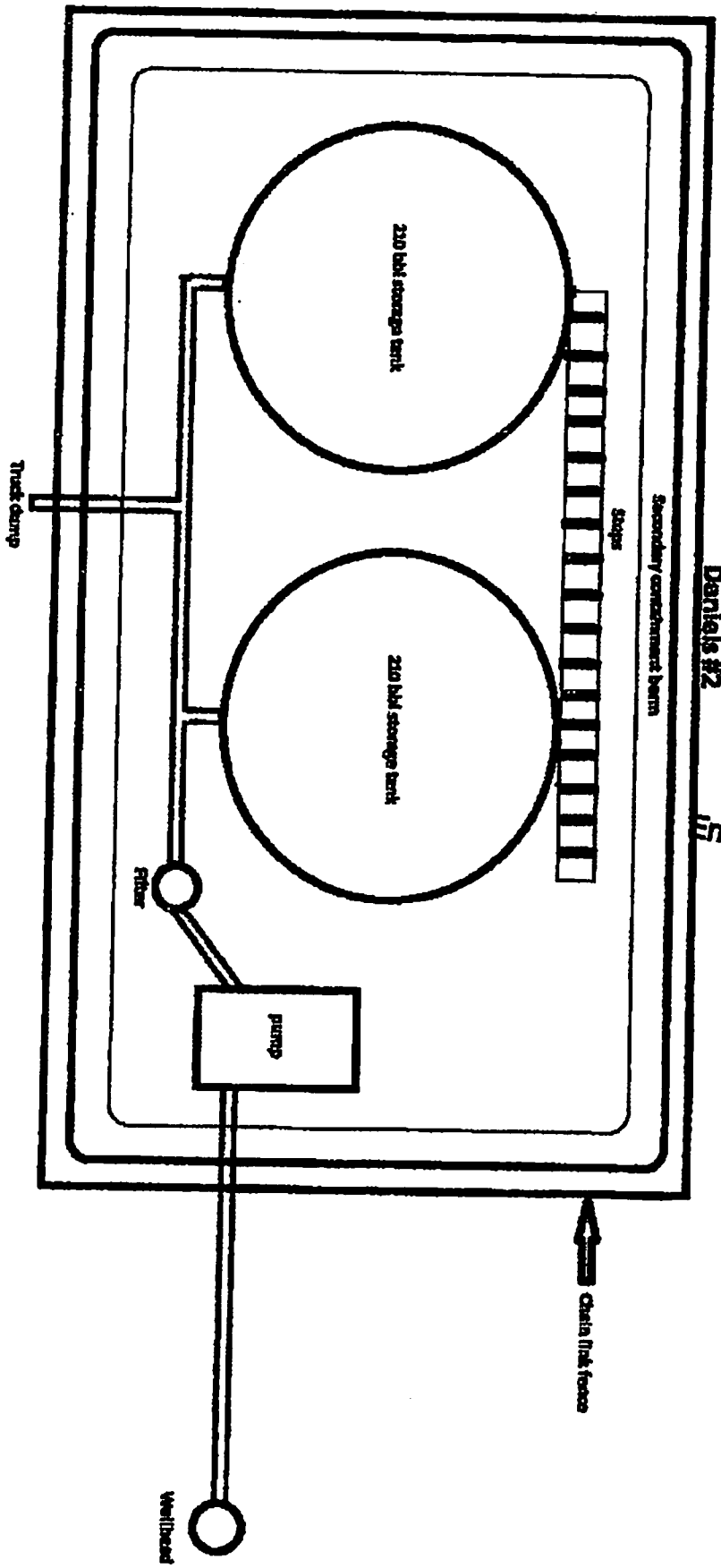
Cement from 400' to 300'

Cement from 100' to the surface

Pull the 13 3/8" conductor casing from the hole

Erect a monument with the API number attached

Attachment 2



Page ___ of___

Class II Manifest

UIC # _____

*I hereby certify that the contents of this shipment are Class II fluids that were brought to the surface in connection with oil or natural gas production.

Hauler' Name	*Signature	Receiver's Name	*Signature	API or Other	Volume of Load (Barrels)	Was the Load Split (Y/N)	Date

Make as many copies of the document as necessary to comply with the UIC permit.
Page numbers should be maintained sequentially to provide an adequate record.

RIGHT OF APPEAL

Notice is hereby given of your right to appeal the terms and conditions of this permit of which you are aggrieved to the Environmental Quality Board by filing a NOTICE OF APPEAL, on the form prescribed by such Board for this purpose, in accordance with the provisions of Section 21, Article 11, Chapter 22 of the Code of West Virginia within thirty (30) days after the date of receipt of this permit.

Underground Injection Control Permit

CERTIFICATION DOCUMENT

West Virginia Department of Environmental Protection
Office of Oil and Gas

Permit Id: 2D0810281

Permit Name: Base Petroleum, Inc.

In accordance with Part II, Reporting and Notification Requirements, I hereby certify that I have read and am personally familiar with all the terms and conditions of this permit.

I understand that the underground injection of any waste streams other than those provided for in this permit is strictly prohibited. I understand that failure to pay the Annual Permit Fee or any other associated fees required by West Virginia Code, Chapter 22, Articles 11 and 12 shall be cause for revocation of this Permit. I further understand that reporting is required, and noncompliance with the terms of this permit will be cause for revocation of the permit and subject me to significant penalties including the possibility of fines and imprisonment.

_____

Signature

_____

Name and Title (Type or Print)

_____

Date

west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
Phone: (304) 926-0450; Fax: (304) 926-0452

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

Base Petroleum, Inc. Underground Injection Control Permit **UIC2D0810281** Public Comments and Response to Public Comments and Final UIC Permit.

On January 7, 2016, the Draft Underground Injection Control Permit No. **UIC2D0810281** was presented to the public by an advertisement being published in The Register-Herald Newspaper for a 30 day review and comment period, as required by Legislative Rule 47-13. The comment period was extended to May 2, 2016 as a result of a public hearing, held on April 20, 2016. The following is a summary of comments received during the comment period and West Virginia Department of Environmental Protection, Office of Oil and Gas's response to public comment(s).

1. *Part I - H.6:* The word "Director" in the second sentence of this condition should be changed to "Chief" to match the wording in the rest of the condition.

   WVDEP Response: The Office of Oil and Gas agrees with the comment and the change has been incorporated into the final permit.

2. A new condition is required in this and all future permits to satisfy the requirements of 40CFR144.51(n): "The permittee shall notify the Director at such times as the permit requires before conversion or abandonment of the well . . ." We believe this new condition should appear in Part I – H, perhaps between conditions 15 and 16.

   WVDEP Response: The requirements of 40CFR144.51(n) are currently and have been met pursuant to WV Code Article 22-6, 22-6A, and Legislative Rule 35-4 & 35-8. These regulations require an operator to obtain a permit for well work. Well work is defined as conversion, plugging and abandonment, drill deeper, and/or plug-back.

3. We have noticed in our study of the Office's online databases that there have been instances, not explained in the permitting or inspection databases, where an operator has converted a UIC well to a producing oil or gas well (for example UIC2D1091093). The UIC well then appears in the databases as an abandoned well when it is in fact an actively producing well. An operator's notification of abandonment or conversion should be made using a special form. In the case of conversion, steps to be taken to plug the disposal formation(s) and perforate and fracture a new formation for production while preserving the integrity of the confining formations above or below the disposal formation(s) should be plainly stated. An official notice of abandonment would help encourage enforcement for plugging wells.

Federal law in 40CFR144.52(a)(6) requires plugging and abandoning an injection well within 2 years of end of use for injection.

We suggest the wording of the new condition should be something on the order of:

> The permittee shall notify the Chief within 30 days of the permittee's intention to abandon the well or convert the well to production. A well that has not been used for injection for 12 months is, under state law, considered abandoned.

WVDEP Response: Pursuant to the West Virginia Code of Regulations:

> ***§22-6-19. Same -- Continuance during life of well; dry or abandoned wells.***
>
> *In the event that a well becomes productive of natural gas or petroleum, or is drilled for or converted for the introduction of pressure, whether liquid or gas, or for the introduction of liquid for the purposes provided for in section twenty-five of this article or for the disposal of pollutants or the effluent therefrom, all coal-protecting strings of casing and all water-protecting strings of casing shall remain in place until the well is plugged or abandoned. During the life of the well the annular spaces between the various strings of casing adjacent to workable beds of coal shall be kept open, and the top ends of all such strings shall be provided with casing heads, or such other suitable devices as will permit the free passage of gas and prevent filling of such annular spaces with dirt or debris. Any well which is completed as a dry hole or which is not in use for a period of twelve consecutive months shall be presumed to have been abandoned and shall promptly be plugged by the operator in accordance with the provisions of this article, unless the operator furnishes satisfactory proof to the director that there is a bona fide future use for such well.*

The commenter's concern is addressed pursuant to the code above, and therefore the recommendation will not be included in the final permit.

On April 29th 2014 the injection formation interval of well 47-109-01093 was plugged and the well was put back into production. A well work permit is required anytime changes to the well bore is needed. Any well is considered abandoned if not in use for 12 consecutive months. Currently there are injection wells that both produce gas and that are utilized for injection operations. Monthly monitoring reports (WR-40s) are filed for all injection wells, which show the specifics of operations. The Office of Oil and Gas uses the monitoring reports to determine a well's status and to ensure compliance of all operations.

4. New Permit Condition After B.4. The well's construction is similar to UIC2D0550319 in that it was completed in two formations, one of which is above the confining zone for the injection formation. The draft permit for UIC2D0550319 had a condition (II B.5) which

forms part of the special MIT requirements for that well which should be included in this well's permit:

> The Permittee shall utilize a pressure recording device with a resolution of one tenth (0.1) psi to continuously record the annulus pressure. Prior to injection the operator shall note the daily annulus pressure (daily baseline). Any deviation plus or minus 25 psi during injection of the daily baseline annulus pressure shall be considered a MIT failure.

WVDEP Response: The Office of Oil and Gas agrees with the comment and the change has been incorporated into the final permit. A pressure recording device and fluid level monitoring will be utilized on well 47-081-00281 and has been incorporated as a permit condition in Part III Section A Paragraph 3 in the final permit UIC2D0810281.

5. New Permit Condition Before B.5. The operator took fluid samples after submitting their permit application just before the 2008 permit expired in 2013. That permit application was not complete. A similar permit application was returned in 2014 after program review required a new permit application. The 2013 analysis did not cover the constituents found on Attachment A of permits before the 2014 program review and does not cover the constituents found in the Office's 2014 UIC Permit Application Instructions and Guidance Package. Lab analysis of fluid is required for this commercial well before a permit is granted and should be a permit condition:

> The Permittee shall sample and analyze injection fluid thirty (30) days prior to issuance of the UIC permit for the parameters listed in TABLE 1 below and submit the laboratory results to the Office of Oil and Gas within fifteen (15) days of receipt of analysis.

WVDEP Response: The Office of Oil and Gas agrees with the comment and the change has been incorporated into the final permit in Part III.A.3. The Permittee shall be required to sample and analyze the injection fluid thirty (30) days prior to commencement of injection operations. The analysis shall be submitted to the Office of Oil and Gas for review.

> *"The Permittee shall sample the injectate pursuant to the permit requirement Part II B.7 within thirty (30) days prior to commencement of injection operations."*

6. *Part II – Monitoring Requirements:* B.5 The permit's injection fluid lab analysis parameters (Table 1) is not protective and does not show the range of constituents characteristic of the fluids the operator is injecting. This permit condition requires lab analysis of fluid only once every five years. Region 3's non-commercial permit requires testing a sample every 2 years

which we believe is more useful for this commercial well, especially considering condition B.6.
The permit application package has its own list of parameters which is better suited for the range of fluids injected in this state.

Table 1 therefore should be:

Table 1	
TPH GRO	Aluminum
TPH DRO	Arsenic
TPH ORO	Barium
BTEX	Calcium
pH	Chloride
Sulfate	Iron
MBAS	Manganese
Dissolved Methane	Sodium
Dissolved Ethane	Total Dissolved Solids
Dissolved Butane	Total Suspended Solids
Dissolved Propane	Total Organic Carbon
Specific Gravity	Total Coliform Bacteria
NORM	

WVDEP Response: The Office of Oil and Gas acknowledges your comment and will continue to require sampling every five years, or when there is a change of fluid source, or at the Chief's discretion. The required test parameters do characterize the Class II injection fluid.

7. B.9 We approve of the pipeline MIT condition. Normally the Office's pipeline MIT uses a multiple (1.5) of the injection pressure, not a pressure that is less than half the maximum injection pressure, as the basis for a test. Since the maximum injection pressure for this well is 638 psi, the pipeline MIT should be held at 957 psi, or a stated pressure close to that. We also wish the tests were required annually instead of every 5 years.

   WVDEP Response: It is the Office of Oil and Gas Policy to evaluate the pipeline between the pump and the injection well at 100 psi greater than the maximum injection pressure. Part II Section B paragraph 10 will now be revised to reflect this policy. The Office of Oil and Gas believes the 5 year MIT testing program is adequate. The Office of Oil and Gas does have the authority to require more frequent evaluation if deemed necessary.

8. B.10 The well's construction is similar to UIC2D0550319 in that it was completed in two formations, one of which is above the confining zone for the injection formation. The draft permit for UIC2D0550319 had a condition (II B.5) which forms part of the special MIT requirements for that well which should be included in this well's permit. The first sentence of this condition should be replaced by the following two sentences and Attachment 3 from UIC2D0550319 permit should be added to this permit as a special condition:

> The permittee shall conduct a mechanical integrity test (see Attachment 3) of the injection well at a minimum frequency of once every five (5) years per 35 CSR 4-7.7b. The MIT procedure, as set forth in Attachment 3, may be deviated from with written approval from the WVDEP/Office of Oil and Gas.

We did notice a small error in Attachment 3: "consent" in the second paragraph should be changed to "constant."

WVDEP Response: The Office of Oil and Gas concurs and the modification will be reflected within the final permit.

Also, the typographical error in Attachment 3 has been corrected.

9. *B.11* An addition of a verb is needed for this condition:

. . . if well failure is likely, . . .

WVDEP Response: The addition of the verb "is" has been added to section B.11 of the final UIC permit.

10. Appendix A: The completion report for the well shows that "salt" water was encountered at 1523 feet but is not shown on Appendix A. The fresh and salt water depths shown on Appendix A come from an unknown source, as is the 400 foot fresh water depth shown on the well schematic but not included on Appendix A.

The maximum injection pressure for the well is shown on Appendix A as 0 psi (the well is supposedly gravity fed). This conflicts with the maximum injection pressure of 638 psi found on the Authorization page for the draft permit. Attachment 2, a condition of the permit, shows a pump between the fluid storage tanks and the wellhead.

We examined the casing and cementing record provided in the completion report which is carried over into Appendix A. Appendix A shows that 40 sacks of cement were used for the surface casing (approximately 470 cubic feet of annulus). It appears from the completion report that most of the annulus was filled with gel (300 cubic feet). It is unfortunate that the surface casing's annulus was not cemented to surface to protect ground water. The intermediate casing was set at 2504 feet and 2200 feet were removed

after cementing, leaving an open annulus. Thirty sacks were used to cement the casing left in the well. The completion report has the production casing as "cemented" without stating that the casing was cemented to surface or how much cement was used. The plugging plan requires removing the production casing at 2100 feet seeming to indicate that only a minimum of cement was used.

Inspectors have noted gas production on the backside. Which annulus is producing gas is not indicated in the online databases. If the surface casing (without cement to surface) is leaking gas, then the well is not suitable for use as an UIC well and should be plugged and abandoned. If the production casing or tubing annulus is leaking gas those annuli require special monitoring as found in the new conditions in our comments. It is questionable whether this well should be used anyway since the surface casing is not cemented to the surface.

WVDEP Response: The salt water depth of 1,523 feet was determined from the well record and is consistent with other wells in the area. The depth for the fresh water (400 feet) was estimated by the applicant on the application well schematic. The Office of Oil and Gas reviewed the completion logs and cement bond logs in detail. The Office of Oil and Gas based the coal elevations off of the WVGES database and recalculated cement volumes. Based on the Office of Oil and Gas review, the lowest USDW is at approximately 800 feet or roughly below the Beckley coal seam. The Office of Oil and Gas calculations indicate that the 9 5/8 inch coal/freshwater casing is cemented from 1,498 feet to 400 feet with the Aquagel occupying the remaining space from 400 feet to surface (100 cubic feet). In addition, the 7 inch casing is cemented from 2,504 feet to 2,200 feet and the 4 1/2 inch casing is cemented from 3,283 feet to 2,060 feet. The 13 3/8 inch surface casing from 0 to 22 feet is not required to be cemented to surface.

In regards to the comment concerning the maximum injection pressure of 0 psi (gravity feed) in Appendix A of the permit application is correct. The operator utilizes a small pump to induce a syphoning system from the tank battery to the well head therefore the operating pressure is 0 psi. The maximum injection pressure, when calculated for the construction of the well, establishes a maximum injection pressure of approximately 950 psi. The Office of Oil and Gas reduced the maximum injection pressure by 33% to 638 psi in the event the operator chooses to inject under pressure in the future.

11. Groundwater Protection Plan: The operator's GPP is fairly decent. The operator, however, omits underground injection of waste itself in Section 1 as an operation which could contaminate ground water. Surface water sample analysis, as we discuss in the next section of our comments, appears to indicate a problem with facility operation or well integrity.

WVDEP Response: The Groundwater Protection Plan (GPP) meets the requirements of the application.

12. Area of Review: There appear to be no oil or gas wells within the injection well's area of review.

As part of the Area of Review the operator is expected to provide groundwater quality monitoring of some sort. In lieu of groundwater monitoring, the operator has provided surface water sample analysis. The analysis appears to show oil and gas industry contamination, possibly caused by on site activities at the UIC well or injection of waste underground. Accurate location of where surface water samples are taken and a program of specified periodic monitoring should be required. If other samples show similar results, then a careful inspection of the site and well should be made by the Office.

WVDEP Response: The Office of Oil and Gas has conducted an extensive survey of the area including both branches of the stream. There was no visual evidence of a release from the UIC facility. The Office of Oil and Gas has established a surface water monitoring program adjacent to the facility as a permit condition for permit UIC 2D0810281.

13. Condition for Operator's Financial Responsibility for Plugging State law (47CSR13-13.7.g) requires the permit have a condition that the operator maintain financial responsibility for plugging the well. "The permittee must show evidence of financial responsibility to the Director by submission of a surety bond, or other adequate assurance, such as a financial statement or other material acceptable to the Director."

What we are not seeing in operators' applications, except in one instance (the permit application for UIC2D0873432), is evidence of financial responsibility. Without that evidence the certification included in the permit as a condition is meaningless. Either this operator and other operators need to provide documentation in their applications providing evidence of financial responsibility, or the Chief needs to include in the application materials made available to the public certification that the Office has seen and reviewed evidence of financial responsibility.

Financial responsibility needs to be based on a realistic cost estimate for the plugging of the well.

Without actual evidence of financial responsibility the operator's certification that serves as a condition in the permit is meaningless.

We have presented this comment in the past and wish that the Office had not so blithely passed over it.

If the state didn't have at least 10 UIC 2D wells that have been abandoned and not plugged this wouldn't be such an important issue. UIC2D0870658's permit expired in 2001 according to the Office's databases, UIC2D1070819's also in 2001. It is unacceptable that these and other wells have not been plugged and properly abandoned according to state and federal law.

We see no evidence in the current permitting program regarding financial responsibility for plugging to show that there have been changes from the permitting program of a few years ago. We see every indication that operators will continue to ignore their legal obligations because of the Office's flimsy financial responsibility requirements.

WVDEP Response: The Office of Oil and Gas acknowledges your comment. As part of the UIC permitting process, all operators are required by the Office of Oil and Gas to declare financial responsibility with the "Requirement for Financial Responsibility to Plug/Abandon an Injection Well" form (Appendix I). The Appendix I form certifies that the operator verifies in accordance with 47CSR13-13.7.g, that financial responsibility and resources to close, plug, and abandon underground injection wells in a manner prescribed by the Chief.

14. Plugging Plan: The operator's plugging plan is a condition of the permit (47CSR13-13.7.f). What surprises us is how so many of the plans submitted in applications that we have reviewed the past few months have been inadequately prepared.

State law in §22-6-24 and 35CSR4-13 and federal law in 40CFR146.10 have clear requirements. Federal law in 40CFR146.10.a.3 requires static equilibrium with mud weight equalized top to bottom when plugging an injection well. Federal law requires cement plugs and the intention, though not the requirement, is that the entire well bore be plugged with cement. State law has a clear methodology and clear work order requirements for a plugging permit. It stands to reason that a permit condition for a UIC Class IID well would present a carefully constructed work order satisfying 35CSR4-13.4.

The draft permit states as condition III B.4 that "the permittee's plugging and abandonment plan shall be incorporated into the UIC permit." Condition III B.2 requires the well be plugged with "an approved plugging and abandonment plan." The Office's response to previous draft permits with deficient plugging plans is that the "final" plugging plan will be submitted when the operator submits an application for a plugging permit. So the plugging plan that is approved by the Office and included as a condition in the UIC permit is not actually the plugging plan and does not, for that reason, have to satisfy state law for plugging wells. We are not sure what the Office is doing if it is approving UIC permits with plugging plans incorporated as part of those permits if it is not at the same time approving those plugging plans as being appropriate under state and federal law.

The plugging plan as a condition for the permit for UIC2D0810281 is deficient. It does not include plugging of the location of the Big Lime perforations at 2678 to 2691 feet below the surface. The production casing is removed 100 feet above the top of the intermediate casing. The operator then intends to place plugs above the cut casings, rather than 50 feet above and below (across) the cut casing ends. The operator intends then apparently to periodically cement the production and intermediate casing's hole with gel spacers. The surface casing is to be removed at 1350 feet and periodic cementing with gel spacers would continue. Cementing would miss the 1180 and 1123 "salt" water locations, barely cover the 1523 salt water and 400, 100 and 90 foot water locations.

We believe a revised plugging plan should be made a condition of the permit.

WVDEP Response: The Office of Oil and Gas acknowledges your comment. Base Petroleum, Inc. was required to submit a plugging and abandonment plan for the disposal well as part of 2D0810281 Class II UIC application package, just as all operator/permittees are required. UIC plugging and abandonment plan is a proposal and is subject to change, and maybe likely to change by the time such plugging activities are conducted. State Regulations require an approved plugging and abandonment permit to be issued no more than two years prior to such activities.

15. In UIC 2D0810281 permit application, in *Section 5: Description of the Injection Zone*, it states that the Weir Must Be hydraulically fractured. If this is the case, is it completely legal to hydraulically fracture a Class II UIC? If Base Petroleum plans on hydraulically fracturing UIC2D0810281, then they are required to get a hydraulic fracturing permit?

WVDEP Response: There appears to be some confusion in this matter. The section in question was copied from the initial permit application dated 6/1/1996 and included in the current draft permit application to describe the Weir Formation. The statement simply means that the Weir Formation, in general, must be hydraulically fractured in order to be an economically viable gas producer. The subject well was hydraulically fractured when it was drilled in 1966. No additional hydraulic fracturing is planned in connection with this UIC permit.

16. How does the WVDEP methods of handling, storing, and disposing of Technologically Enhanced Naturally Occurring Radioactive Material TENORM chemicals compare with Nuclear Regulatory Commission methods of handling, storing, and disposing of TENORM chemicals?

WVDEP Response: The United States Nuclear Regulatory Commission (USNRC) regulates source, byproduct, and special nuclear material but does not license TENORM. Currently there are no federal regulations specifically controlling TENORM but there are many federal laws that do regulate parts of the TENORM producing industries. The USEPA has approved oil and gas liquid waste products for injection into Class II wells and does not require testing for TENORM prior to injection.

17. What does the WVDEP consider the pathways of endangerment to underground source drinking water from Underground Injection Control 2D0810281?

WVDEP Response: Potential pathways of endangerment to underground sources of drinking water from an injection control well in general is the failure of the casing program. For that reason mechanical integrity tests are performed and the well pressures are monitored during the injection to determine if there is a potential for the migration of fluids. Migration of the injectate into a USDW would require the incredibly unlikely simultaneous failure of multiple layers of steel pipe casing and cement. In addition, the injectate would have to overcome over 2,000 feet of hydraulic head to reach the deepest conceivable USDW. Another factor to consider is the density of the injectate which is approximately 17% heavier than fresh water. There is no physical driving force to push the heavy injectate upward to mix with the lighter fresh water. In the specific case of injection wells, there is also the addition of geologically tight confining layers.

18. Is there a satisfactory confining layer to hold TENORM chemicals, volatile organic compounds (VOCs), and all other materials that pose a risk to human health associated with oil and gas production? Is this UIC capable of containing these chemicals for thousands of years due to the alarming amount of Radium 226 and Radium 228 with a half-life of 1,600 years that is associated with shale gas waste?

WVDEP Response: The McCrady Shale is approximately 114 feet thick within the area of review and is a geologically adequate confining layer. In addition, the casing program for the injection well is adequate to protect any potential USDW. The McCrady Shale has been an effective confining layer for several hundred million years allowing the Weir Sandstone to become a natural trap for oil, gas, and natural salt brine without migration. While the McCrady Shale is the primary confining layer immediately above the injection zone, there is over 1,400 feet of additional rock between the top of the McCrady Shale and the top of the salt water zone. This includes the Greenbrier Limestone (Big Lime) which is 364 feet thick and is a proven oil and gas trap in its own right. Above the Greenbrier Limestone is an additional 1,000 feet of rock composed of the Bluefield, Hinton, and Bluestone Formations which are collectively 90% impermeable shale in this local area.

19. Define the confining layers also in terms of depositional environment. Is there a possibility of stratigraphically connected porous facies that shorten the distance between injected waste in the Weir Sandstone and underground source drinking waters?

WVDEP Response: See response to Comments 17 and 18 above. The McCrady Shale is interpreted as a nearshore tidal mud deposit. The geologic data indicates that it is relatively uniform in the local area of the injection well and any lateral facies change, if present, would be regional and not local in scale. The possibility of stratigraphically connected porous facies that "*shorten*" the distance between injected waste in the Weir Sandstone and underground source of drinking water (USDW) is physically impossible. Local well records indicate that the top of the salt water zone is approximately 1,500 feet below the surface. All potential USDW zones must therefore be above this level. The vertical distance between the injection zone and the reported top of the salt water zone is an additional 1,600 feet. These distances would remain constant even with a hypothetical facies change and would not "*shorten*".

20. Can the WVDEP define the confining layers responsible for isolating fluids in the Weir sandstone from above geologic units in terms of permeability and porosity, more specifically total porosity, naturally occurring fracture zone porosity, and artificially produced fracture zone porosity?

WVDEP Response: See response to Comments 17, 18, and 19 above. Porosity and permeability characteristics of the confining layer are derived from the drill logs, electronic logs, and historical data. Fracture zone porosity is usually associated with major structural axes and their immediate flanks and is not considered to be a significant factor in the subject area according to publically available geological studies. Fracture zone porosity, if present, is not likely to extend vertically with any continuity beyond individual bed boundaries. The probability of vertical fracture continuity from the injection zone over 1,600 feet to the top of the salt water zone is vanishingly small. The only artificially produced or enhanced fractures are the result of rudimentary completion operations in the Weir Sandstone when the well was drilled in 1966.

21. Citing the McCrady Shale as the confining layer for the Weir Sandstone implies that the Big Injun Sandstone is also going to be holding this waste. This is contrary to the specific injection zone limited to the Weir Sandstone in the permit and permit application. If the McCrady Shale is the confining formation for UIC2D0810281, then the permit and permit application should include all stratigraphic units between the Weir Sandstone (the current target injection zone) and the McCrady Shale.

WVDEP Response: Well logs indicate that the McCrady Shale rests directly on the Weir Sandstone in the subject area. Publically available geologic references indicate that the Big Injun Sandstone is not present and was either never deposited or eroded off by the pre-Greenbrier unconformity.

22. If there is any naturally occurring or manmade (well bore, abandoned mines) fracture zone porosity values available from the Weir Sandstone to the McCrady Shale? Where are these areas with fracture zone porosity and do they pose a threat to surface and groundwater drinking sources?

WVDEP Response: See response to Comments 17, 18, 19, and 20 above. The subject injection well does not penetrate any abandoned mine works and the lowest potentially minable coal seam is located over 2,100 feet above the injection zone. Publically available geologic studies of the Eccles quadrangle indicate that the subject injection well lies outside of any areas identified as having potential naturally enhanced fracture zone porosity.

23. Given that Dr. Avner Vengosh has reported contamination consistent with oil and gas production in surface waters in Fayette County, has the WVDEP made any efforts to incorporate the parameters tested for by Dr. Vengosh in testing requirements for Class II UIC facilities?

WVDEP Response: The parameter list set forth by regulation is adequate to determine the presence of oil and gas waste.

24. Why is it that there is no requirement for Radium testing in UIC2D0810281 permit and permit application? Given that tests for Class II injectate show combined radium 226 and radium 228 at levels over 3,000 pCi/L. Three thousand picocuries per liter is 600 times safe drinking water limits and 50 times allowable concentrations of combined radium 226 and radium 228 in industrial effluent for any other industry, according to standards set forth by the Nuclear Regulatory Commission.

WVDEP Response: See response to Comment 16 above. Injectate is not effluent. It is not being discharged to any surface waters or USDW. The USEPA does not require radiological testing of injectate and recognizes underground injection as the current best practice method for the disposal of oil and gas waste fluids and the WVDEP is in compliance with the USEPA in the administration of UIC wells.

25. Given that the WVDEP has the information mentioned in UIC2D0810281 and chooses not to require any Radium 226 and Radium 228 testing for Class II UICs across the state, how am I supposed to believe that the WVDEP is using the best available technology to protect the health and safety of residents and the environment?

WVDEP Response: See response to Comments 16, 18, and 24 above.

26. Can the WVDEP demonstrate accurately that the above ground storage tanks included in UIC permit 2D0810281 are capable of completely isolating the VOCs contained inside the tank from the air outside of the tank? Keep in mind that VOCs, toxic in parts per trillion, are commonly associated with modern unconventional Oil and Gas waste.

WVDEP Response: The Office of Oil and Gas has notified the Division of Air Quality. The Permittee may be required to prepare an Air Quality Permit Determination.

27. What steps have to be taken to get the permits rescinded to no more than one year, not five years?

WVDEP Response: Pursuant to Legislative Rule 47-13-13.13. Duration of Permits. UIC permits for Class 1, 2, 3 and Class 5 wells shall be effective for a fixed term not to exceed five (5) years. The UIC well is under a constant state of monitoring during the operating period. In the event of an issue, a permit may be modified, revoked, and/or suspended during its term for cause as set forth in Subsections 13.18 and 13.19.

28. When does the public health and safety become part of the political platform? And what good does the public comment do if the DEP has already decided what they're going to do?

WVDEP Response: Public health and safety and protection of the waters of the State are of primary concern. For this reason the underground injection control regulations were mandated. The Office of Oil and Gas has no preconceived determination for a permit when a draft UIC permit is issued for public input. In fact the Office of Oil and Gas goes to great lengths to invite input from all stakeholders such as Federal, State, and interstate agencies with jurisdiction over fish and wildlife resources, public health, the State Historic Preservation Unit of the Department of Culture and History, and other appropriate government authorities to address potential concerns. In the event that a public comment points out a failure to comply with regulations, this would impact the final disposition of the permit. The Office of Oil and Gas is required to follow the regulations and if an applicant meets the regulatory requirements, a permit will likely be issued.

29. If this $h!t leaks into one of these underground coalmines and it runs into our streams and our drinking water, we're even more f*(#ed than we already are.

WVDEP Response: The subject injection well does not penetrate any abandoned mine works and the lowest potentially minable coal seam is located over 2,100 feet above the injection zone. Migration of the injectate would require the simultaneous failure of multiple layers of steel pipe casing and cement which is unlikely. In addition, the injectate would have to overcome over 2,000 feet of hydraulic head to reach the deepest conceivable USDW. Another factor to consider is the density of the injectate. The injection fluid is approximately 17% heavier than lighter fresh water. There is no physical driving force to push the heavy injection fluid upward to mix with the fresh water. In the case of an injection well, there is the addition of confining layers. For injectate to bypass the confining layer(s) and travel upward to the fresh water zone would require it to displace astronomical amounts of natural salt water already in place using equally astronomical amounts of pumping energy.

30. In 1996 when we started injecting the fluids into the well they were a certain type of fluid. Now that we've progressed on with technology and we've increased the intensity of the fluids, we're injecting in fluids into this well that weren't being injected in '96. And we don't have anything that represents the monitoring or the difference of those fluids, the toxicity of those fluids and there's no data that says we have been monitoring for certain types of leaks into the water systems. We know that these things are increasing in intensity as they go along into more toxicity.

WVDEP Response: The types of injection fluids disposed of at UIC 2D0810281 have not changed. The most common type of injection fluid disposed of at the UIC 2D0810281 is produced water from common oil and gas wells located in southern West Virginia. Chemicals used in the drilling, fracturing and completion process have not significantly changed since 1996. Pursuant to Legislative Rule 47-13, Class II injection fluids: are *fluids which are brought to the surface in connection with conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection.*

31. So we need to have a better monitoring of these systems, as these wells are filled with chemicals that we're not even privy to know what they are.

WVDEP Response: Geologic sequestration of oil and gas waste using injection wells is the accepted best practice for safely disposing of this waste. The monitoring program as identified in the UIC permit provides adequate real time information to determine if an imminent failure is pending or has just occurred within the UIC well. It is a common misconception that oil and gas operators are allowed to hide what chemicals are being used in hydraulic fracturing operations. This is not true. On average 99.7% of fracking fluid is water and sand, while the remaining 0.3% consists of chemical additives. Oil and gas operators must identify all chemicals utilized in the fracking process for each well to the FracFocus chemical disclosure registry web site but are allowed to withhold exact blends of some chemicals as commercially proprietary information.

32. So how are we supposed to know when you issue this permit that that's not going to pollute water that's already been polluted already?

WVDEP Response: The monitoring program as identified in the permit provides adequate information to determine if a failure has occurred either at the facility or within the UIC well.

33. It impacts well water. It also impacts the gardens and the land that we grow this stuff, these toxic chemicals come up through the ground, so we're all vulnerable to these toxic wastes that they're dumping in our communities.

WVDEP Response: The Class II fluids are not being injected into any fresh water source. The injection zone is located several thousand feet underground within the natural salt water zone that has no connection to the fresh water zone. OOG has no evidence that any Class II fluids are migrating upward from the designated injection zone to a fresh water zone at any permitted injection well.

34. But you can't tell me that you can monitor this stuff once you put it in the ground. Nobody knows where it goes. And there's no way that you could clean that up once it's injected into the ground, there's no way.

WVDEP Response: Hydrology, geology, and petroleum engineering are mature sciences and the determination of underground flow and migration is understood in considerable detail. Geologic sequestration has been a proven technology for well over eighty years. In the event of a release, there are well documented investigative approaches and remediation techniques.

35. I also know that they have a pumping station for --- if I'm not mistaken, for the old Beckley Mines. And that they dump it into the creek there in Sandlick. I've got a granddaughter that lives in Sandlick. But it still goes on down the river.

WVDEP Response: The UIC 2D0810281 injection well has nothing to do with the water outfall at Sandlick located over six miles away. The Class II fluids are injected 2,100 feet below the deepest coal seam and have no connection with any mine pools.

36. The DEP failed to respond to our questions during the first public comment period.

WVDEP Response: There has been only one public comment period for the draft UIC permit 2D0810281. The public comment period commenced January 7, 2016 and would have ended approximately February 8, 2016. Due to a request by the public for a hearing, the public comment period was automatically extended ten days after the close of the public hearing pursuant to Legislative Rule 47-13. The WVDEP OOG is unable to respond to comments until the comment period is over at which time all comments receive responses.

37. The first problem that I see with the permit is that none of the waste is classified as hazardous. Yet it should be.

WVDEP Response: The commenter is incorrect in assuming the waste should be classified as hazardous. Pursuant to the Federal Code of Regulations Chapter 40 Part 261.4

Exclusions.

(b) Solid wastes which are not hazardous wastes.

The following solid wastes are not hazardous wastes:

(5) Drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas or geothermal energy.

38. This waste is being injected into the Weir layer, at a depth of 3283 feet. As duly noted in the Fayette County ordinance that bans this practice, at that depth, we can't be certain that toxic, radioactive waste won't migrate into our water.

WVDEP Response: This UIC well is in Raleigh County which has no such ordinance. Pursuant to State and Federal regulations, the UIC permit can be issued provided the applicant meets the regulatory requirements. As described several times in the previous comment responses, geologic sequestration is a proven technology with a long history of success and is accepted by the USEPA as the best practice for the disposal of oil and gas waste.

39. Oil and gas waste is floating downstream from the toxic waste dump site in Trap Hill.

WVDEP Response: Upon receipt of this statement at the public hearing held April 20, 2016, the Office of Oil & Gas dispatched personnel to examine the area in detail. No oil and gas waste was identified in Claypool Hollow Creek after walking the entire length from the head to the junction of Claypool Hollow Road (CO 15/1) and Logan Turnpike (CO 15/8). Based on information provided by the commenter, it appears that commenter observed an iridescent film formed by iron fixing bacteria in a tributary of the creek not associated with the UIC facility.

40. The WVDEP and basic riparian rights should protect those people who downstream from Claypool Branch. The WVDEP tests for parameters associated with conventional oil and gas production, except for radium 226 and radium 228, apparently.

WVDEP Response: See response to comments 16, 18, and 24 above.

41. "Underground mines in some locations are being used to dispose of mine waste and fracturing water from oil and gas operations."

WVDEP Response: The disposal of mine waste is not regulated by the Office of Oil and Gas. Class II oil and gas waste fluids are prohibited from being comingled with mine waste or mine discharge water under any circumstances and are not being injected into mines or coal seams.

42. Abandoned mine pools are considered future sources of drinking water and are classified as Underground Source Drinking Water (USDW).

WVDEP Response: The commenter is correct.

43. We want to know if this Trap Hill well punches through abandoned mines as well.

WVDEP Response: UIC well 2D0810281 does not penetrate through any abandoned mine workings.

44. My question as a geologist would be why would anyone use HCl on carbonate cemented rocks if they intended for there to be integrity in the confining layer and the casing. These casings are made of cement. HCl breaks down cement.

WVDEP Response: Casings are not made of cement. The casing program consists of multiple steel pipes nested inside each other with cement grout pumped into the spaces between the pipe(s). Hydrochloric acid (HCl) solutions have been used for over 120 years in the completion and maintenance of oil and gas wells without problem. Acid solutions are used to clean the face of the production formation and to open up natural or induced fractures. Other additives such as corrosion inhibitors are used to protect associated pipes and casing during the process. The acid is consumed during the process and any residual is removed from the well during the production process. While some acid may contact cement in the area of the production/injection perforations, the likelihood that this acid could retain its chemical integrity and travel several thousand feet vertically up to separate casing(s) and cement used to seal off the USDW zone is extremely remote and not substantiated by any physical evidence. In the case of injection of acidization waste, the waste is spent acid diluted with produced water and other additives. This waste is further diluted when mixed with other wastes awaiting injection. Analysis of typical Class II injectate confirms that the solutions are not detrimental to the injection tubing, the injection formation, or the confining layer(s).

45. Could there be any abandoned oil or natural gas wells in the immediate area?

WVDEP Response: There are no known abandoned wells within the ¼ mile area of review.

46. This baffled me until Tom Rhule showed me the piece of the Groundwater Protection act that says none other wastes than that from conventional O&G production are supposed to go into class II wells.

WVDEP Response: The Groundwater Protection Act, Chapter 22 Article 12 Section 5 Authority of other agencies; applicability paragraph states:

> *(i) This article is not applicable to groundwater within area of geologic formations which are specific to:*
>
> > *(2) The injection zones of Class II and Class III wells permitted pursuant to the statues and rules governing the underground injection control program.*

The West Virginia Department of Environmental Protection, Office of Oil and Gas would like to express gratitude and appreciation for the attention to detail, time and effort spent in supplying the above comments. Future special considerations may be incorporated in the Underground Injection Control Permitting, Compliance and Enforcement Section's procedures and policies.