

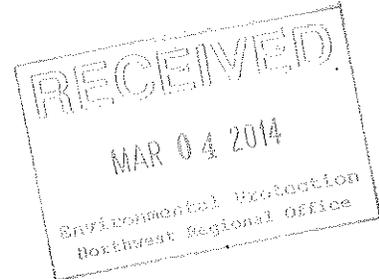


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

October 24, 2013

Mr. Jeremy Graham  
Stonehaven Energy Management, LLC  
1251 Waterfront Place, Suite 540  
Pittsburgh, PA 15222



RE: Final UIC Permit PAS2D010BVEN

Dear Mr. Graham:

Enclosed is the executed final Underground Injection Control (UIC) program permit for the construction and operation of one Class IID injection well. This injection well, the Latshaw #9, is to be used for the disposal of fluids produced in association with Stonehaven's oil and gas production at the Tippery Field located in Cranberry Township, Venango County, Pennsylvania.

The permit's effective date is specified on the signatory page. All permit conditions are effective and enforceable as of that date and your compliance with these conditions is required. You should respond to the provisions of Condition D.9. in Part I of this permit and provide an appropriate demonstration of the delegation of signatory authority. In addition, please note that permit Condition D.1. in Part II of this permit, requires that you report back to the Environmental Protection Agency within thirty days of your receipt of this letter and attest to the fact that you have read and are personally familiar with all terms and conditions of this permit.

Please direct any questions you may have on the permit, its conditions, or other UIC procedures to me at 215-814-5464.

Sincerely,

A handwritten signature in cursive script that reads "S. Stephen Platt".

S. Stephen Platt  
Ground Water & Enforcement Branch (3WP22)  
Office of Drinking Water & Source Water Protection

Enclosure



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029

**UNDERGROUND INJECTION CONTROL PERMIT NUMBER PAS2D010BVEN  
AUTHORIZATION TO OPERATE A CLASS IID INJECTION WELL**

In compliance with provisions of the Safe Drinking Water Act, as amended, (42 U.S.C. §§ 300f-300j-11, commonly known as the SDWA) and attendant regulations promulgated by the U. S. Environmental Protection Agency under Title 40 of the Code of Federal Regulations,

Stonehaven Energy Management, LLC  
1251 Waterfront Place, Suite 540  
Pittsburgh, PA 15222

is authorized by this permit to inject fluids produced in association with oil and gas production at the Tippery Field, located in Cranberry Township, Venango County, PA, through a Class II-D injection well, the Latshaw #9, into the Speechley Formation in accordance with the conditions set forth herein. The coordinates for this injection well are: Latitude 41° 23' 16.4" and Longitude -79° 37' 43.5".

All references to Title 40 of the Code of Federal Regulations are to all regulations that are in effect on the date that this permit is effective.

This permit shall become effective on October 24, 2013.

This permit and its authorization to inject shall remain in effect until midnight October 24, 2023.

Signed this 24<sup>th</sup> day of October, 2013.

A handwritten signature in black ink, appearing to read "Jon M. Capacasa".

Jon M. Capacasa, Director  
Water Protection Division

## PART I

### A. Effect of Permit

Stonehaven Energy Management, LLC (“the permittee”) is allowed to engage in underground injection in accordance with the conditions of this permit. The underground injection activity, otherwise authorized by this permit, shall not allow the movement of fluid containing any contaminant into underground sources of drinking water (USDW), if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 141 or may otherwise adversely affect the health of persons. Any underground injection activity not authorized in this permit or otherwise authorized by rule is prohibited. 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, or any infringement of State or local law or regulations. Compliance with 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.

### B. Permit Actions

This permit can be modified, revoked and reissued or terminated for cause as specified in 40 CFR §§ 144.12, 144.39 and 144.40. Also, the permit is subject to minor modifications as specified in 40 CFR § 144.41. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes, or anticipated noncompliance on the part of the permittee shall not stay the applicability or enforceability of any permit condition.

### C. Severability

The provisions of this permit are severable, and if any provision of this permit or the permittee’s application, dated June, 2011 is held invalid, the remainder of this permit shall not be affected thereby.

### D. General Requirements

1. Duty to Comply. The permittee shall comply with all applicable UIC Program regulations and conditions of this permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit issued under 40 C.F.R. 144.34. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application.

2. Need 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.

3. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

4. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control and related appurtenances 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 and operation of the well and 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.

5. Duty to Provide Information. The permittee shall furnish to the Director of the Water Protection Division ("Director"), within a time specified by the Director, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, 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 reports, the permittee shall promptly submit information addressing these deficiencies.

6. Inspection and Entry. The permittee shall allow the Director, 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 any substances or parameters at any location, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by SDWA.

7. Penalties. Any person who violates a permit requirement is subject to civil penalties, fines and other enforcement actions under the SDWA and may be subject to the same such actions pursuant to RCRA. Any person who willfully violates permit conditions is subject to criminal prosecution.

8. Transfer of Permits. This permit is not transferable to any person except after notice is sent on EPA Form 7520 and approval is given by the Director and the requirements of 40 CFR § 144.38 are satisfied. The Director may require modification or revocation of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the SDWA.

9. Signatory Requirements.

a. All reports required by this permit and other information requested by the Director 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, such as the position of plant manager, operator of a well or a well field, superintendent, or a position of equivalent responsibility. A duly authorized representative may thus be either a named individual or any individual occupying a named position; and
- (3) the written authorization is submitted to the Director.

c. If an authorization under paragraph b. of this section is no longer accurate because a different individual or position 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 Director 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 a. or b. of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

10. Confidentiality of Information.

a. In accordance with 40 CFR Parts 2 (Public Information) and § 144.5, any information submitted to the Director pursuant to these permits may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2.

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

- (1) The name and address of any permit applicant or permittee.
- (2) Information which deals with the existence, absence, or level of contaminants in drinking water.

11. Reapplication. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must submit a complete application for a new permit at least 100 days before this permit expires.

12. State Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation.

## PART II

### A. General

Copies of all reports and notifications required by this permit shall be signed and certified in accordance with the requirements of Section D(9) of Part I of this permit and shall be submitted to the Director at the following address:

Ground Water & Enforcement Branch (3WP22)  
Office of Drinking Water & Source Water Protection  
U. S. Environmental Protection Agency  
Region III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103

### B. Record Retention

1. The permittee shall retain records of all monitoring and other information required by this permit, including the following (if applicable), for a period of at least five years from the date of the sample, measurement, report or application, unless such records are required to be retained for a longer period of time under paragraph B.2 below. This period may be extended by request of the Director at any time.

a. All data required to complete the Permit Application form for this permit and any supplemental information submitted under 40 CFR § 144.31.

b. Calibrations and maintenance records and all original strip chart recordings for continuous monitoring instrumentation.

c. Copies of all reports required by this permit.

2. The permittee shall retain records concerning the nature and composition of all injected fluids, as listed in Part II, paragraphs C.3. and C.4. of this permit, until three years after the completion of any plugging and abandonment procedures. After three years from the completion of plugging and abandonment, the permittee shall continue to retain these records unless he or she delivers the records to the Director or obtains written approval from the Director to discard the records.

3. Records of monitoring information shall include:

a. The date, exact place, and the time of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

- c. A precise description of both sampling methodology and the handling (custody) of samples;
- d. The date(s) analyses were performed;
- e. The individual(s) who performed the analyses;
- f. The analytical techniques or methods used; and
- g. The results of such analyses.

4. Monitoring the nature of injected fluids shall comply with applicable analytical methods cited in Part II, paragraph C.1., below.

5. All environmental measurements required by the permit, including, but not limited to; measurements of pressure, temperature, mechanical integrity (as applicable) and chemical analyses shall be done in accordance with EPA guidance on quality assurance.

### C. 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 Director. The permittee shall identify the types of tests and methods used to generate the monitoring data.

2. Injection pressure, annular pressure, flow rate and cumulative volume shall be observed and recorded continuously beginning on the date on which the well commences operation and concluding when the well is plugged and abandoned. The permittee shall monitor and record, semi-annually, the fluid level from monitoring wells Latshaw #12, Latshaw # 15, Latshaw #25 and Stover #8 located within the Tippery Field injection facility property. Each of these monitoring wells shall completely isolate the Speechley formation from the rest of the wellbore by placement of a monitoring string on a packer set immediately above the Speechley formation.

3. The permittee shall sample, analyze and record the nature of the injected fluid for the parameters listed below at the initiation of the injection operation and every two years thereafter, or whenever the operator observes or anticipates a change in the injection fluid (see condition C.4. below).

-pH  
-Specific Gravity

-Manganese  
-Total Dissolved Solids

- |                       |                       |
|-----------------------|-----------------------|
| -Barium               | -Hydrogen Sulfide     |
| -Specific Conductance | -Dissolved Oxygen     |
| -Sodium               | -Alkalinity           |
| -Iron                 | -Hardness.            |
| -Magnesium            | -Total Organic Carbon |
| -Chloride             |                       |

4. Any analysis of specific gravity greater than 1.08 and any analysis of TOC greater than 250 mg/l shall be reported to the Director within twenty four hours of the results.

5. A demonstration of mechanical integrity in accordance with 40 CFR § 146.8 shall, after the initial demonstration, be made at least once every five years. Subsequent five year demonstrations shall be conducted no more than 30 days prior to the anniversary date of the previous test. 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 reseated, or a well failure is evident. The permittee may continue operation only if he or she has successfully demonstrated to the Director 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. Any such test shall be conducted in keeping with the notification requirements of Permit Condition D.11. of Part II of this permit.

D. Reporting and Notification Requirements.

1. Report on Permit Review. Within 30 days of receipt of this permit, the permittee shall report to the Director that he or she has read and is personally familiar with all terms and conditions of this permit.

2. Commencing Injection. The operator of an injection well may not commence injection until construction or well rework is complete and all of the following conditions have been satisfied:

a. The permittee has demonstrated to EPA that the injection well has mechanical integrity in accordance with 40 CFR § 146.8 and the permittee has received written notice from the Director that such demonstration is satisfactory;

b. The permittee has submitted notice of completion of construction (EPA Form 7520-10) to the Director; and

c.(1) The Director has inspected or otherwise reviewed the new injection well and finds it is in compliance with the conditions of the permit; or

c.(2) The permittee has not received notice from the Director of his or her intent to inspect or otherwise review the new injection well within 13 days of the date of the notice in

paragraph (a) of this permit condition, in which case, prior inspection or review is waived and the permittee may commence injection.

3. Twenty-four Hour Reporting.

a. The permittee shall report to the Director any noncompliance which may endanger health or the environment. Such report shall be provided orally (phone numbers: (215)814-5464 or (215)814-5445) within 24 hours from the time the permittee becomes aware of the circumstances. The following shall be included as information which must be reported orally within 24 hours:

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

(2) Any noncompliance with a permit condition, or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water, or failure of mechanical integrity test demonstrations.

b. A written submission shall also be provided within five 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, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

4. Anticipated Noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

5. Other Noncompliance. 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 Permit Condition D.3., of Part II of this permit.

6. Planned Changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility.

7. Conversion. The permittee shall notify the Director thirty days prior to the conversion of the well to an operating status other than an injection well.

8. Annual Report. The permittee shall submit an Annual Report to the Director summarizing the results of the monitoring required by Permit Condition C within Part II of this permit. This report shall include monthly monitoring records of injected fluids, fluid level

monitoring results, the results of any mechanical integrity test(s), and any major changes in characteristics or sources of injected fluids. The permittee shall complete and submit this information with its Annual Report EPA Form 7520-11 (Annual Disposal/Injection Well Monitoring Report). The Annual Report shall be submitted not later than January 31st of each year, summarizing the activity of the calendar year ending the previous December 31st.

9. Plugging and Abandonment Reports and Notifications.

a. The permittee shall notify the Director 45 days before the plugging and abandonment of the well. The Director may allow a shorter notice period upon written request.

b. Revisions to the Plugging and Abandonment Plan must be submitted to the Director no less than 45 days prior to plugging and abandonment on EPA Plugging and Abandonment Form 7520-14. The Director must approve the revisions prior to the start of plugging operations.

c. Within 60 days after plugging the well, the permittee shall submit a report to the Director which shall consist of either:

(1) A statement that the well was plugged in accordance with the plan previously submitted to and approved by the Director; or

(2) Where actual plugging differed from the plan previously submitted, an updated version of the plan, on the form supplied by the Director, specifying the different procedures used.

The report shall be certified as accurate by the person who performed the plugging operation.

10. 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 30 days following each schedule date.

11. Mechanical Integrity Tests. The permittee shall notify the Director of his or her intent to conduct a mechanical integrity test at least 30 days prior to such a demonstration.

12. Cessation of Injection Activity. After a cessation of injection for two years the owner or operator shall plug and abandon the well in accordance with the Plugging and Abandonment Plan unless he:

a. Provides notice to the Director; and

b. Describes actions or procedures, satisfactory to the Director, which the permittee will take to ensure that the well will not endanger USDWs during the period of temporary abandonment. These actions and procedures shall include compliance with the technical requirements applicable to an active injection well unless waived in writing by the Director.

E. Mechanical Integrity Standards

1. Standards. The permittee shall have and maintain the mechanical integrity of the permitted injection well pursuant to 40 CFR § 146.8.

2. Request from Director. The Director may, by written notice, require the permittee to demonstrate mechanical integrity at any time.

PART III

A. Construction Requirements

1. Notwithstanding any other provision of this permit, the injection well shall inject only into formations which are separated from any underground source of drinking water by a confining zone that is free of known open faults or fractures within the Area of Review.

2. Casing and Cementing. The permittee shall case and cement the well to prevent the movement of fluids into or between underground sources of drinking water. The casing and cement used in the construction of the well shall be designed for the life expectancy of the well. Cemented surface casing shall be installed from the surface to a depth at least fifty feet below the lowermost underground source of drinking water, a depth of approximately 410 feet, and cemented back to the surface. The injection zone shall be isolated by the placement of long string casing to total depth, approximately 1992 feet, and cemented back at least 100 feet above the injection zone. Injection shall occur through a tubing string and packer installed inside the long string casing and set above the injection zone.

3. Logs and Tests. The logs and tests listed below shall be conducted during the drilling and construction of the well or, in the event that the well is being converted to an injection well, obtain and submit the logs and tests from the well's original construction. A descriptive report interpreting the results (which specifically relate to (1) the lowermost underground source of drinking water and the confining zone adjacent to it and (2) the injection zone and adjacent formations) shall be prepared by a knowledgeable log analyst and submitted to the Director. At a minimum, such logs and or tests shall include the following:

- A cement bond log and variable density log which document the cemented portion of the long string casing.

- A log which documents the location of the surface casing.
- Records documenting the cementing of the surface casing.
- Gamma Ray logs which document the geologic formations in the wellbore.

4. Mechanical Integrity. Injection operations are prohibited until the permittee demonstrates that the well covered by this permit has mechanical integrity in accordance with 40 CFR § 146.8 and the permittee has received notice from the Director that such a demonstration is satisfactory in accordance with the provisions of Condition D.2. of Part II of this permit.

5. Corrective Action. If necessary, corrective action, in the form of plugging and abandoning wells within the one-quarter mile area of review, which could provide conduits for fluid migration into USDWs, will be completed prior to the authorization of injection. If an abandoned well is discovered within the one-quarter mile area of review after injection commences, the permittee shall notify the Director upon discovery, and within five (5), days submit to the Director for approval a plan for corrective action and implement the approved plan.

#### B. Operating Requirements

1. Injection Formation. Injection shall be limited to the Speechley Formation in the subsurface interval between approximately 1935 feet and 1992 feet.

2. Injection Fluid. The permittee shall not inject any hazardous substances, as defined by 40 CFR 261, nor any other fluid, other than the fluids produced solely in association with oil and gas production activity from Stonehaven Energy's Tippery Field operations in Venango County, PA. This includes all fluids which are brought to the surface in association with oil and gas production.

3. Injection Volume Limitation. Injection volume shall not exceed 4500 barrels per month.

4. Injection Pressure Limitation. Injection pressure shall not exceed a surface injection pressure maximum of 1358 psi. This pressure calculation is based on the specific gravity of the injection fluid not exceeding 1.08. If the specific gravity of the injection fluid should exceed 1.08, then the surface injection pressure may need to be revised downward. Injection at a pressure which initiates new fractures or propagates existing fractures in the confining zone adjacent to underground sources of drinking water or causes the movement of injection or formation fluids into an underground source of drinking water is prohibited.

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

### C. Plugging and Abandonment

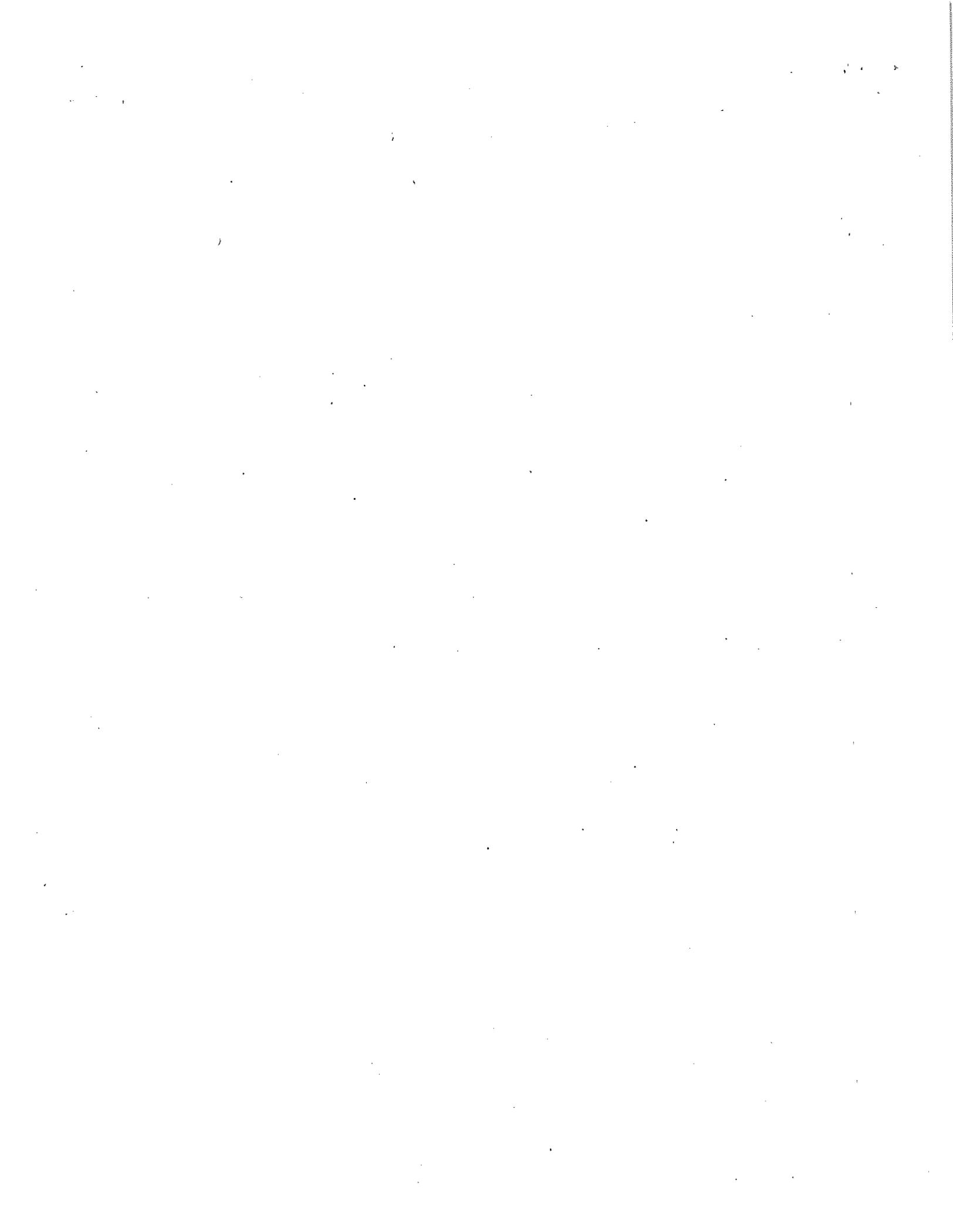
1. The permittee shall plug and abandon the well in accordance with the approved plugging and abandonment plan, EPA Form 7520-14, incorporated as Attachment 1 in this permit.

2. Plugging and Abandonment shall be conducted in such a manner that movement of fluids will not be allowed into or between underground sources of drinking water.

### D. Financial Responsibility

The permittee shall maintain financial responsibility and resources to close, plug and abandon the underground injection well in accordance with 40 CFR Section 144.52(a)(7) in the amount of at least \$10,000. If the circumstances regarding the acceptability of the Letter of Credit and Standby Trust Agreement submitted to EPA to demonstrate financial responsibility should change, the permittee shall provide advance notification to the Director, and the Director may seek an alternative financial demonstration from the permittee.

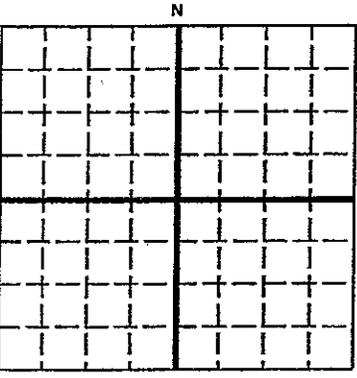
The permittee shall not substitute an alternative demonstration of financial responsibility for that which the Director has approved, unless he or she has previously submitted evidence of that alternative demonstration to the Director and the Director notifies him or her that the alternative demonstration of financial responsibility is acceptable. The Director may require the permittee to submit a revised demonstration of Financial Responsibility if the Director has reason to believe that the original demonstration is no longer adequate to cover the costs of plugging and abandonment.





United States Environmental Protection Agency  
Washington, DC 20460

### PLUGGING AND ABANDONMENT PLAN

Name and Address of Facility <b>TIPPERY FIELD #9</b>		Name and Address of Owner/Operator <b>STONEHAVEN ENERGY MANAGEMENT, LLC 1351 WATERFRONT PLACE SUITE 540 PITTSBURGH, PA 15222</b>	
Locate Well and Outline Unit on Section Plat - 640 Acres  	State <b>PENNSYLVANIA</b>	County <b>VENANGO</b>	Permit Number <b>37-12J-44484</b>
	Surface Location Description ____ 1/4 of ____ 1/4 of ____ 1/4 of ____ 1/4 of Section ____ Township ____ Range ____		
	Locate well in two directions from nearest lines of quarter section and drilling unit Surface Location ____ ft. from (NS) ____ Line of quarter section and ____ ft. from (EW) ____ Line of quarter section.		
	TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells <u>1</u>		WELL ACTIVITY <input type="checkbox"/> CLASS I <input checked="" type="checkbox"/> CLASS II <input checked="" type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III
Lease Name <b>M. LATSHAW</b>		Well Number <b>#9</b>	

CASING AND TUBING RECORD AFTER PLUGGING					METHOD OF EMPLACEMENT OF CEMENT PLUGS			
SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE	<input checked="" type="checkbox"/> The Balance Method	<input type="checkbox"/> The Dump Baller Method	<input type="checkbox"/> The Two-Plug Method	<input type="checkbox"/> Other
9 5/8"	26	22'	22'	12 1/4"				
7"	17	396'	396'	8 7/8"				
5 1/2"	17	750'	750'	6 1/4"				
3 1/2"	9.2	1928'	100'					

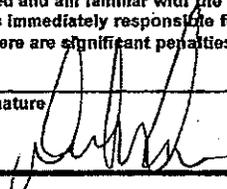
CEMENTING TO PLUG AND ABANDON DATA:							
	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches)	4 1/2"	6 1/4"	6 3/8"				
Depth to Bottom of Tubing or Drill Pipe (ft)	1928'	1040'	500'				
Sacks of Cement To Be Used (each plug)	8	63	18				
Slurry Volume To Be Pumped (cu. ft.)	9.44	74.34	21.24				
Calculated Top of Plug (ft.)	1828'	690'	400'				
Measured Top of Plug (if tagged ft.)	1828'	690'	400'				
Slurry Wt. (Lb./Gal.)	15.6	15.6	15.6				
Type Cement or Other Material (Class III)	Class A	Class A	Class A				

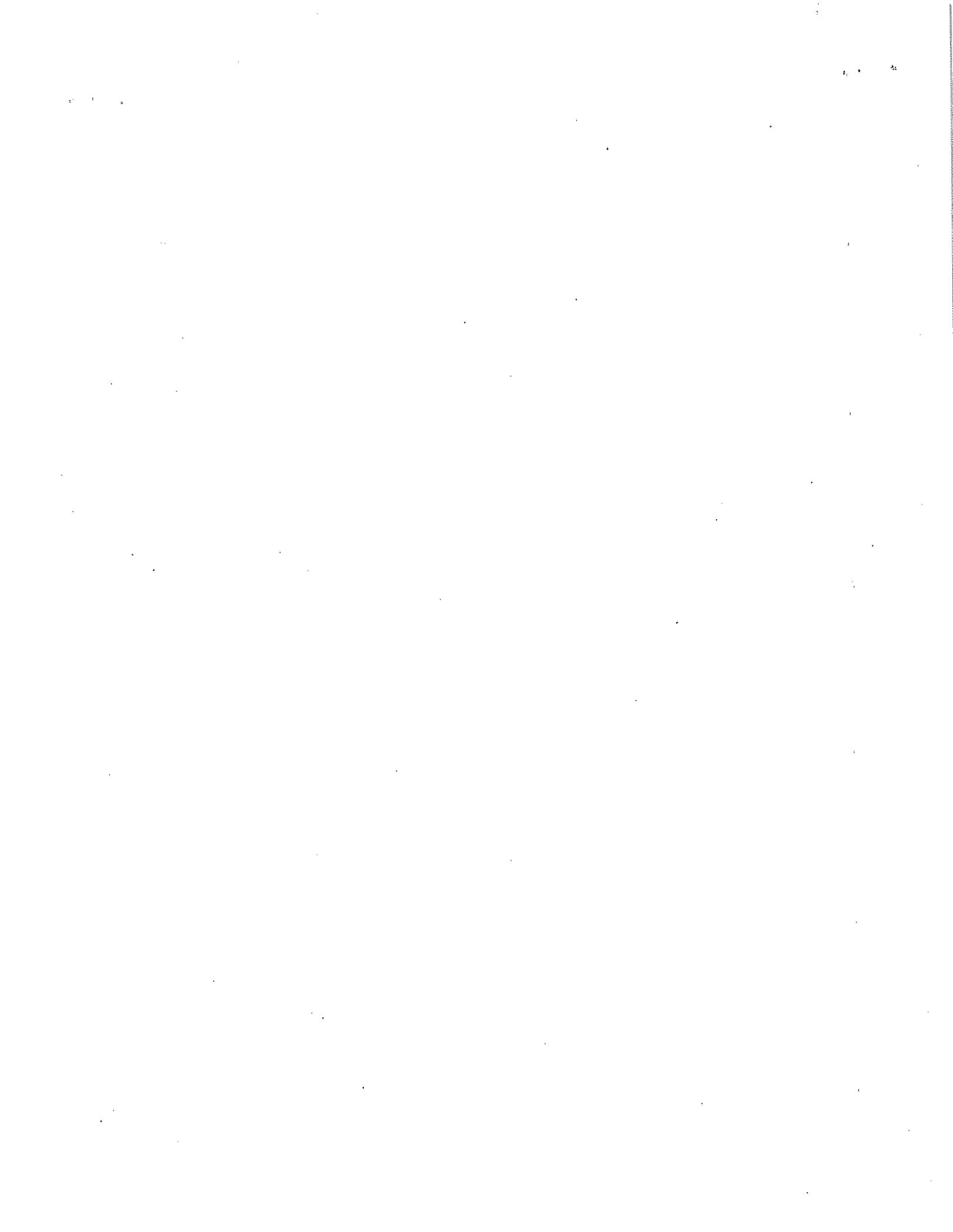
LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)			
From	To	From	To

Estimated Cost to Plug Wells  
**\$9483.00**

#### Certification

I certify under the 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. (Ref. 40 CFR 144.32)

Name and Official Title (Please type or print) <b>David Downs Vice President</b>	Signature 	Date Signed <b>10/22/11</b>
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029

**Underground Injection Control (UIC) Program  
Notice of Final Permit**

The United States Environmental Protection Agency (EPA), Region III, issued a final permit to Stonehaven Energy Management, LLC, on October 24, 2013, under the authority of the federal UIC regulations at 40 CFR Parts 124, 144, 145, 146 and 147. This permit authorizes the construction and operation of one UIC Class II-D brine disposal injection well, the Latshaw #9, at the Stonehaven Energy Management disposal facility, located at the Tippery Field in Cranberry Township, Venango County, Pennsylvania.

EPA Region III held a public hearing on this proposed permit on June 12, 2012, at the Seneca Volunteer Fire Department Community Center in Seneca, Pennsylvania. Region III evaluated oral testimony presented at the hearing, as well as written comments received during the public comment period, and initially issued the permit as final on September 24, 2012. After the permit was issued, a petition for appeal was filed with EPA's Environmental Appeals Board (EAB). On March 28, 2013, the EAB remanded the permit to EPA Region III. The remand indicated that, in issuing a final permit, the Region must address, based on evidence on the record, earthquake risk and the existence of faults or fractures in the confining zone. In particular, the EAB found that the Region did not identify in the record the basis for its conclusions that there is no evidence of seismic activity in the well area and that there are no transmissive faults that intersect or could be influenced by the intended zone of injection.

Pursuant to the EAB remand, the Region documented the evidence that supports its conclusions regarding the lack of evidence of seismic activity and that there are no faults that intersect or could be influenced by the intended injection zone. The Region developed a Supplemental Statement of Basis which addresses the issues raised in the remand, and cites the evidence supporting its conclusions. On July 11, 2013, the Region issued the Supplemental Statement of Basis and a public notice to reopen the public comment period limited to the specific issues from the EAB remand mentioned above. It also provided the Supplemental Statement of Basis to all individuals who submitted oral and written comments regarding this permitting action and posted this information on EPA Region III's web site. The 60-day public comment period closed September 11, 2013. EPA received comments from one commenter in this supplemental public comment period. EPA did not receive any new information from the public to indicate that the proposed project would be a cause for seismicity in the area nor did it receive any information which indicated that any transmissive faults exist within the intended zone of injection.

The administrative record for this permitting action remains available for public review during normal business hours at the EPA Region/III Office of Drinking Water & Source Water Protection, Ground Water & Enforcement Branch (3WP22), 1650 Arch Street, Philadelphia, PA 19103. Pursuant to 40 C.F.R. § 124.19(f), the issuance of this permit completes the remand procedures and constitutes final agency action for the purposes of judicial review.

Interested persons may obtain further information, including copies of the final permit by contacting Stephen Platt by email at [platt.steve@epa.gov](mailto:platt.steve@epa.gov) , by telephone at 215-814-5464, or through regular mail at the above address.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029

**EPA Region III Responsiveness Summary to Public Comment on New Information  
For  
Underground Injection Control (UIC) Permit PAS2D010BVEN  
For  
Stonehaven Energy Management, LLC**

On March 28, 2013, the Environmental Appeals Board (EAB) of the United States Environmental Protection Agency (EPA) remanded to EPA Region III (Region) an Underground Injection Control (UIC) permit which the Region had issued to Stonehaven Energy Management, LLC (Stonehaven) in Cranberry Township, Venango County, Pennsylvania. (See *In re Stonehaven Energy Management, LLC*, UIC Appeal No. 12-02, EAB March 28, 2013.) This permit was to authorize the construction and operation of one Class II-D brine disposal injection well, the Latshaw #9.

The EAB remanded the permit to the Region based on its conclusion that the Region did not provide adequate support in the administrative record for its response to public comments on the geological features of the injection zone and the risk of earthquakes. In particular, the EAB indicated that the Region did not identify in the record the basis for its conclusions that there is no evidence of seismic activity in the well area and that there are no transmissive faults that intersect or could be influenced by the intended zone of injection. The EAB remanded the permit to the Region to address earthquake risk and the existence of faults or fractures in the confining zone.

On July 11, 2013, the Region issued a public notice requesting comment within 60 days solely on the specific issue on remand from the EAB. The public comment period expired on September 11, 2013. The responsiveness summary which follows provides responses to the comments received during this public comment period on the issue on remand. Comments on other aspects of the permit were considered during the period prior to issuing the permit on September 24, 2012 and were addressed by the Region in the responsiveness summary issued on the same date.

- 1) There are no known transmissive faults that intersect or could be influenced by the intended zone of injection, or the confining zone**

EPA did not receive any comments that identified the existence of any faults that intersect the injection zone or confining zone, or could be influenced by the zone of injection. One commenter submitted map fragments and excerpts copied from a number of publications, including: United States Geological Survey (USGS), *Bedrock Geology Map of the Oil City Quadrangle*, 1979; *Oil and Gas Geology of the Oil City Quadrangle* (Mineral Resources Report M25), 1943; and C.H. Schultz, ed., *Geology of Pennsylvania*, Pennsylvania Geological Survey and Pennsylvania Geological Society, 1999 (reprinted 2002). The excerpts and maps from the first two sources mentioned included geological information about the Oil City quadrangle where the Stonehaven well will be located, and this information included some mention of faults. However, these excerpts do not provide any evidence of faults that intersect the intended injection zone or confining zone, or could be influenced by the intended zone of injection. The excerpt from the Mineral Resources Report describes surface structures in the Oil City quadrangle, not faults in the deeper geological layers. Furthermore, the closest fault mentioned by these excerpts is located more than four miles away from the Stonehaven injection well site. The fault is located southeast of Oil City, Pennsylvania, along the Allegheny River. The Mineral Resources Report of the Oil City Quadrangle also states that "actual fault displacement of the beds was not seen here but the entire zone is suggestive of the surface expression of deeper faulting." The reference to deeper faulting refers to geologic formations below the Stonehaven injection formation. This is verified by the book referenced by the commenter and is discussed further below. *The Geology of Pennsylvania*, which discusses on pages 288 and 289 the structural geology of the Appalachian Plateau, indicates that "few faults have been recognized at the surface in the Plateau region of Pennsylvania" and further indicates that, "much of the subsurface faulting of the Plateau region die out in the overlying Devonian shales." This means that any potential faulting typically occurs below the intended Stonehaven injection and the confining formations, both which are located in the upper Devonian. In addition, the presence of any fault in the area is not indicative of any recent earthquake activity. These faults are simply minor bedrock displacements which formed many millions of years ago from tectonic activity which occurred well below the surface. *The Geology of Pennsylvania* explains further that the surface and subsurface structures were influenced by features in the deeper Precambrian crystalline bedrock beneath the Paleozoic bedrock (Paleozoic rock includes the Devonian and Mississippian rock mentioned above). Again, this refers to geological layers well below the receiving and the confining formations.

This information supports EPA's statements made in the "Supplement to the Statement of Basis. The "Supplement to the Statement of Basis" provided information from both the USGS and the PA Department of Conservation and Natural Resources indicating that they had not identified any faults in the Speechley formation, the intended injection zone, or in the confining units adjacent to the Speechley.



The history of oil and gas production from the Speechley formation is relevant for demonstrating the likely absence of a transmissive fault as well as formation confinement. For oil and gas to be produced from a formation, there needs to be a trapping mechanism (i.e., confinement of the fluids); otherwise the oil and gas would move to other formations. If a fault were present in the Speechley formation or in the confining zone above the Speechley, it would have to be a sealing fault (i.e., a non-transmissive fault) or the oil and gas would have migrated out of the Speechley formation through the fault. In addition, the drilling records for the Speechley formation which were submitted in the permit application do not show evidence of any geologic displacement (movement upwards or downwards) in the formation. Formation displacement would be indicative of past movement along a fault. Drilling records consistently show that the depth to the Speechley formation, taking into account topographic differences, remains consistent no matter the location of where a well is drilled.

The commenter also included excerpt describing the geology of the Titusville, Red Valley and Franklin quadrangles. The well is not located in these quadrangles.

**2) There is no evidence of seismic activity in the well area**

A commenter submitted a table from the book The Geology of Pennsylvania, at pp. 764-766, that catalogues earthquakes in Pennsylvania and adjacent areas, from 1724 to 1994. The table provides latitudes and longitudes of the epicenter locations. The book also provides a map locating the earthquake epicenters. Consistent with the information on the supplemental statement on basis, the table does not have any recorded earthquakes originating in Venango County, PA. As the book explains, most of the earthquakes centered in Pennsylvania have occurred in the southeastern part of the state. Id at p. 340-41, 763.

Some earthquakes originating in some other location may have been felt in Venango County. During an earthquake, energy radiates away from the epicenter in the form of seismic waves. This energy causes the ground to move as the seismic waves travel away from the fault. However, the fault where the earthquake originated does not extend to the whole area that felt the earthquake. The recently recorded seismic activity attributed to the Northstar 1 disposal well in Youngstown, Ohio is a good example. The earthquake is believed to have been generated by injection into Precambrian crystalline bedrock, a deeper receiving formation, with different geology, than what is proposed for the Stonehaven well. The seismic waves radiating away from this area were felt in locations at significant distances away from Youngstown, including western Pennsylvania, but they are not indicative of the existence of faults in Venango County.

Although seismic waves that originated elsewhere have been felt in Venango County there is no evidence to suggest that it has contributed, or will in the future contribute, to injection well failure. Of the hundreds of thousands of injection wells operating in the United

States, EPA is not aware of any case where a seismic event caused an injection well to contaminate an USDW. There have not been any reports of earthquakes having affected the integrity of injection wells in Pennsylvania or in the cases of induced-seismicity documented in Ohio, Texas, Oklahoma or Arkansas. A number of factors help to prevent injection wells from failing in a seismic event. Most deep injection wells, those that are classified as Class I or Class II injection wells are constructed to withstand significant amounts of pressure. They are typically constructed with multiple steel strings of casing that are cemented in place. The casing in these wells is designed to withstand both significant internal and external pressure. The American Petroleum Institute (API) (see [www.api.org](http://www.api.org)) and oil and gas service companies such as Halliburton Services (see Halliburton Cementing Tables, 1980), have developed industry standards for casing and cementing wells. Furthermore, brine disposal injection wells are required to be mechanically tested to ensure integrity before they are operated and many are continuously monitored after testing to ensure that mechanical integrity is maintained. If a seismic event were to occur, that affected the operation and mechanical integrity of the Stonehaven injection well, this would be detected by the continuous monitoring required by the permit. The well is designed to detect a pressure change within the well's annulus, between the long string casing and the injection tubing and packer, and a detection of such a change will cause the well to stop operating.

### **Final Permit Issuance**

Together with this responsiveness summary, EPA Region III is announcing the final permit issuance for UIC permit PAS2D010BVEN, which will be effective on October 24, 2013. Pursuant to 40 C.F.R. § 124.19(f), the issuance of this permit completes the remand procedures and constitute final agency action for the purpose of judicial review, as the EAB's remand order did not provide for EAB appeal of the permit decision following the remand. At this time, all administrative appeals have been exhausted, and any further challenges to the permit decision must be made in federal appellate court as provided in 42 U.S.C. § 300j-7.

