DISPOSAL WELL APPLICATION
JOSEPH BITTINGER #3 (API# 37-123-33945)

FOR THE:
BEAR LAKE PROPERTIES, LLC
CLASS II UIC SALTWATER DISPOSAL FACILITY
1889 CORNISH HILL ROAD (SR 4004)
COLUMBUS, PENNSYLVANIA 16405

PREPARED FOR:
Bear Lake Properties, LLC
5459 State Route 29
Springville, PA 18844

February 2021
# TABLE OF CONTENTS

**PERMIT APPLICATION TO DRILL AND OPERATE A CONVENTIONAL WELL**

<table>
<thead>
<tr>
<th>Permit Number</th>
<th>Date Rev.</th>
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<tr>
<td>8000-PM-OOGM0001a</td>
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**OIL AND GAS OPERATOR OWNERSHIP AND CONTROL INFORMATION**

<table>
<thead>
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<td>8000-FM-OOGM0118</td>
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**WELL RECORD**

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**WELL LOCATION PLAT**

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<tr>
<td>8000-PM-OOGM0002</td>
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**SURETY BOND**

**PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES PENNSYLVANIA NATURAL DIVERSITY INVENTORY (PNDI)**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) – REGION III UNDERGROUND INJECTION CONTROL PERMIT NUMBER PAS2D219BWAR**

**AUTHORIZATION TO OPERATE CLASS II-D INJECTION WELL**

**EFFECTIVE: OCTOBER 31, 2016 / EFFECTIVE UNTIL: OCTOBER 31, 2026**

**USEPA APPROVED PERMIT APPLICATION AND RELATED DOCUMENTS**

**CONTROL & DISPOSAL PLAN**

- PREPAREDNESS, PREVENTION, AND CONTINGENCY PLAN
- NUSIANCE CONTROL PLAN

**EROSION & SEDIMENTATION PLAN**

**GEOLOGICAL REPORT**

- LICENSED PROFESSIONAL GEOLOGIST STAMPED/SEALED
- WRITTEN NARRATIVE OF GEOLOGIC INFORMATION
- OIL & GAS WELLS WITHIN 1-MILE BUFFER
- WATER WELLS WITHIN 1-MILE BUFFER
- GEOLOGICAL ISOPACH MAP – MEDINA & WHIRLPOOL FORMATIONS
- STRUCTURE CONTOUR MAP – TOP OF PACKER SHELL & TOP OF QUEENSTON FORMATIONS
- GEOLOGIC CROSS SECTIONS

**GEOPHYSICAL LOGS**

**GAS WELLS WITHIN 1/2-MILE BUFFER**

<table>
<thead>
<tr>
<th>WELL</th>
<th>API #</th>
<th>OWNER</th>
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<tr>
<td>BITTINGER 2</td>
<td>37-123-33944</td>
<td>BEAR LAKE PROPERTIES, LLC.</td>
</tr>
<tr>
<td>R. CRAKER 1</td>
<td>37-123-37903</td>
<td>BEAR LAKE ENERGY.</td>
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DISPOSAL WELL APPLICATION
BEAR LAKE PROPERTIES, LLC. - DISPOSAL FACILITY
WARREN COUNTY, PENNSYLVANIA

- D. WRIGHT 1  37-123-39213  BEAR LAKE ENERGY.
- SMITH RAS  37-123-34843  BEAR LAKE PROPERTIES, LLC.
- GOODRICH 1  21201
- HAROLD CORNISH UNIT 2  19194

Additional Information in USEPA Approved Permit Application Section 2.

WATER WELL DEPTHS (Within 1-mile radius, if known)
- Jack McCoy Property – Water well depth: 155-feet

Additional Information Provided in USEPA Permit Application Section 2.

JOSEPH BITTINGER 3
- BOTTOMHOLE PRESSURE: 4074 PSI
- FRACTURE GRADIENT: 0.934 PSI/FT
- PROPOSED INJECTION RATE: 30,000 BBLS PER MONTH

WELL CONSTRUCTION – INJECTION WELL CONFIGURATION PROVIDED IN SECTION 7 OF THE USEPA APPROVED PERMIT APPLICATION DOCUMENTS
- CURRENT WELL COMPLETION RECORD

MONITORING PROGRAM PROVIDED IN SECTION 8 OF USEPA APPROVED PERMIT APPLICATION DOCUMENTS

SEISMIC MONITORING AND MITIGATION PLAN (DECEMBER 2017)

SEISMIC MONITORING REPORT (AUGUST 2020)

APPLICATION FEE (INJECTION – DISPOSAL WELL)
APPLICATION PERMIT FEE: (4501 TO 5000 FT) $550
SURCHARGE: $50
$600
PERMIT APPLICATION TO DRILL AND OPERATE A CONVENTIONAL WELL

**DEP USE ONLY**

<table>
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<tr>
<th>Notes</th>
<th>Client Id</th>
<th>Bond #</th>
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<th>Watershed Name:</th>
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<tr>
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<td>Designation:</td>
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**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**OFFICE OF OIL AND GAS MANAGEMENT**

PERMIT APPLICATION TO DRILL AND OPERATE A CONVENTIONAL WELL

**WELL INFORMATION**

- **Well Operator**: Bear Lake Properties, LLC
- **DEP ID#**: 283543
- **Well API #**: 37 123-33945
- **West Farm Name**: Bittinger
- **Well #**: 3

**Address**: 5459 State Route 29

- **City**: Springville
- **State**: PA
- **Zip**: 18844

**Phone**: 570-737-3075

**Fax**: 570-737-3076

**Email**: Kenneths@kendra2.com

- **Project Number**: 247
- **Serial #:**

**LAT**: 41° 59' 45.52"

**LONG**: 79° 31' 42.33"

**NAD 83**:

**Municipality Name/City, Borough, Township**: Columbus

**County**: Warren

**USGS 7.5 min. quadrangle map**: Columbus

**Section**: 3

**911 address of well site if available**: 1655 Cornish Hill Road, Bear Lake, PA 16402

**24/7 Emergency Phone contact number**: 724-971-0788

**Well Pad Name/identification**: Bittinger # 3

**Wells drillable**: 247

**Check if this is a new address**: Y

**Check if this is a new address**: N

**Centralized Impoundment Name/identification**:

**Surface Elev**: 1630'

**Deepest Formation to be penetrated**: Queenston

**Anticipated TVD**: 4566'

**Number of wellbore laterals proposed under this application**: 1

**Total feet of wellbore to be drilled under this application**: Ft.

**If applying for a permit to rework an existing well not registered or permitted**: check this box and enter date drilled, if known: (see instructions)

**PDN Attached**: Y

**Any threatened or endangered “hit” must include a copy of the clearance letter from the applicable agency(ies)**.

**Application submitted as**: Coal well: X Attach Coal Module

**CBM well**: X Attach CBM Module

**Non coal well**: X Attach justification.

- **Application for a permit to rework an existing well not registered or permitted**: check this box

**Coordinated with regulations and other permits**: Yes

**Application Fee**: $600

**Conventional**: X

**$200 (Home Use Well)**

**Total Application Fee**: $600

**Bond Agreement Id**:

**Configuration**: Vertical

**Horizontal**: X

**Deviated**: X

**Multiple laterals**: X

**OTHER PERMITS**

1. Will the well be subject to the Oil and Gas Conservation Law? If “No,” go to 2).  
   a. If “Yes” to #1, is the well at least 330 feet from outside lease or unit boundary?  
   b. Does the location fall within an area covered by a spacing order?  
   c. If the well will be multilateral, identify the wellbores on the sketch on page 3 of the plat that will be completed as conservation and non-conservation.

2. Will the edge of the disturbed area of any portion of the well site of a conventional well be within 100 feet from the edge of any solid blue lined stream, spring or body of water identified on the most current 7½' topographic quadrangle map or wetland greater than one acre in size or in a wetland?

   If yes, is a waiver request (form 5500-FM-OG0057) and site-specific E&S control plan attached?
3. Will the well penetrate or be within 2,000 feet of an active gas storage reservoir boundary? 
   a. If Yes, print the names of: Storage Field: Operator: 
   [ ] ☑

4. Is the proposed well location within the permitted area of a landfill? 
   [ ] ☑

5. Will the well be drilled within 200 feet from any existing building or an existing water supply? 
   a. If "Yes," is written consent from the owner attached? 
      [ ] ☑
   b. If written consent is not attached, is a variance request (form 8000-FM-OOGM0058) attached? 
      [ ] ☑

6. Will the well be located where it may impact a public resource as outlined in the "Coordination of a Well Location with Public Resources" form 5500-PM-OG0076? If yes, attach a competed copy of the form and clearance letters from applicable agencies. 
   [ ] ☑

7. Will any portion of the well site be in a Special Protection High Quality (HQ) or Exceptional Value (EV) watershed? 
   Provide name of special protection stream 
   [ ] ☑

7.1 Will the well be drilled using enhanced drilling or completion technologies into a formation that typically produces gas or petroleum? 
   [ ] ☑

8. Is this well part of a development which requires an Earth Disturbance Permit for Oil and Gas Activities disturbing more than 5 acres? If yes, list the number of the ESCGP approval if the permit has been issued. 
   [ ] ☑

8.1 Is the disturbed area of the well site between 1 to 5 acres and in a Special Protection Watershed 
   [ ] ☑

9. Is waste, including drill cuttings, from the drilling of this well is to be disposed of on this well site? Yes [ ] No ☑

10. Will the well or well site be located within a defined 100 year floodplain or where the floodplain is undefined, within 100 feet of the top of the bank of a perennial stream or within 50 feet of the top of the bank of an intermittent stream. Yes [ ] No ☑
    a. If yes, is a waiver request attached that will protect the Waters of the Commonwealth? Yes [ ] No ☑

11. Is the well to be located within a H2S area pursuant to §78.77a? Yes [ ] No ☑

12. Attach a current Ownership & Control form 8000-FM-OOGM0118.

<table>
<thead>
<tr>
<th>Signature of Applicant</th>
<th>The person signing this form attests that they have the authority to submit this application on behalf of the applicant, and that the information, including all related submissions, is true and accurate to the best of their knowledge.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature of Person Authorized to Submit Application</td>
<td>Kenneth Scavone</td>
</tr>
<tr>
<td>(Print or Type) Name of Signer: Kenneth Scavone</td>
<td>Managing Member</td>
</tr>
<tr>
<td>Title: Managing Member</td>
<td>Date: 1/15/2021</td>
</tr>
<tr>
<td>Application Preparer/Contact: Kenneth Scavone</td>
<td>Phone: 570-737-3075</td>
</tr>
</tbody>
</table>
December 8, 2020

Department of Environmental Protection
230 Chestnut Street
Meadville, PA 16335

Dear Sir or Madam,

I have examined a map provided by the Department of Conservation and Natural Resources titled "Distribution of Pennsylvania Coals" and determined that there is no minable coal in the area of the Smith Ras Well #1 of Bittinger Well #3. Both wells are in Columbus Township, Warren County and are near the border with New York State. I have attached a copy of the map and have noted the location of the wells on the map.

Sincerely,

Scott R. Johnson, PLS
PERMIT APPLICATION TO DRILL AND OPERATE
A CONVENTIONAL WELL
Record of Notification

List the following: surface landowner; surface landowners and water purveyors with water supplies within 1000 feet; municipality where the well will be drilled; adjacent municipality; gas storage operator if within 2000 feet. Mark the boxes, "X," which show the parties interests. Use additional forms if you need more space. You are required to notify each of these parties.

Notification: Signature below name indicates the party's acknowledgement of receipt of the well location plat and serves as proof of notification.

<table>
<thead>
<tr>
<th>Print Name</th>
<th>Address</th>
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<tbody>
<tr>
<td>David Burkholder</td>
<td>1608 Cornish Hill Road, Bear Lake, PA 16402</td>
</tr>
<tr>
<td>Signature</td>
<td></td>
</tr>
</tbody>
</table>

Print Name: David Burkholder
Signature:

Print Name: Lor Burkholder
Signature:

Print Name:
Signature:

Print Name:
Signature:

Print Name:
Signature:

Notification
Certified Mail Dates
Sent | Return Receipt | Affidavit | Written Consent |
--- | --- | --- | --- |

Record of Written Consent

Written Consent: Signature below indicates the party's approval of the well location, or indicates written consent and waives the 15-day objection period where applicable.

Check applicable box

<table>
<thead>
<tr>
<th>Print and Sign Name</th>
<th>Address</th>
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<tbody>
<tr>
<td>Enos Miller</td>
<td>1892 Cornish Hill Rd. Bear Lake, PA 16402</td>
</tr>
<tr>
<td>Nettie Miller</td>
<td></td>
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<td>Print Name</td>
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<tr>
<td>Columbus Township</td>
<td>PO Box 291 Columbus, PA 16405</td>
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<tr>
<td>Print Name</td>
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<tr>
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<td>Print Name</td>
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<tr>
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Notification:

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<th>Print and Sign Name</th>
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<th>Surface Owner</th>
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<th>Building within 200 feet</th>
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**PERMIT APPLICATION TO DRILL AND OPERATE A CONVENTIONAL WELL**

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<table>
<thead>
<tr>
<th>Print Name:</th>
<th>Todd Walker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature</td>
<td>[Signature]</td>
</tr>
<tr>
<td>Address:</td>
<td>455 Cornish Hill Rd</td>
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<td>Bear Lake, PA 16402</td>
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<table>
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<th>Bear Lake Properties, LLC</th>
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<tr>
<td>Address:</td>
<td>1889 Cornish Hill Rd, Bear Lake, PA 16402</td>
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# COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS MANAGEMENT

## PERMIT APPLICATION TO DRILL AND OPERATE
A CONVENTIONAL WELL
Record of Notification

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<tr>
<th>Print Name</th>
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<th>Surface Landowner</th>
<th>Gas Storage Operator</th>
<th>Surface Landowners of Water Supplies within 1000 feet</th>
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<tr>
<td>City of Corry</td>
<td>100 South Center St Corry, PA 16407</td>
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<td>Concord Township</td>
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<table>
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<tbody>
<tr>
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<td>9590 9402 1432 5329 0232 97</td>
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<td>Columbus, PA 16405</td>
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<td></td>
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</tbody>
</table>

### Complete this section on delivery

- **A. Signature**
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- **B. Received by**
  - 

- **C. Date of Delivery**
  - 12/23/20

- **D. Is delivery address different from item 1?**
  - Yes (if yes, enter delivery address below): 

### Complete this section on delivery

- **A. Signature**
  - 

- **B. Received by**
  - 

- **C. Date of Delivery**
  - 12/14/20

- **D. Is delivery address different from item 1?**
  - Yes (if yes, enter delivery address below): 

### Complete this section on delivery

- **A. Signature**
  - 

- **B. Received by**
  - 

- **C. Date of Delivery**
  - 12/11/2020

- **D. Is delivery address different from item 1?**
  - Yes (if yes, enter delivery address below): 

### Complete this section on delivery

- **A. Signature**
  - 

- **B. Received by**
  - 

- **C. Date of Delivery**
  - 12/18/2020

- **D. Is delivery address different from item 1?**
  - Yes (if yes, enter delivery address below): 

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*Certified Mail® RECEIPT*  
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**Certified Mail Only**

**Form 3811, July 2015 PSN 7530-0-000-9053**

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**OFFICIAL USE**

**Official Use**

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**Official Use**

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**Official Use**
### General Operator Information

Enter the name and address under which you or your organization operate oil and gas wells in Pennsylvania which must be the same name as is providing the bond.

<table>
<thead>
<tr>
<th>Corporate, Company, Partnership or Registered Fictitious Name</th>
<th>Type of Organization / Code</th>
<th>Federal Tax ID#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear Lake Properties, LLC</td>
<td></td>
<td>27-2480275</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Individual or Partner - Last Name</th>
<th>First Name</th>
<th>MI</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scavone</td>
<td>Kenneth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mailing Address</th>
<th>Check if this is a new address.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5459 State Route 29</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City</th>
<th>State</th>
<th>ZIP+4</th>
<th>Country (If Other Than USA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Springville</td>
<td>PA</td>
<td>18844</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phone (Daytime)</th>
<th>Ext.</th>
<th>FAX</th>
<th>Email Address</th>
<th>Person to Contact - Last Name</th>
<th>First Name</th>
<th>MI</th>
<th>Suffix</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>570-737-3075</td>
<td></td>
<td>570-737-3076</td>
<td><a href="mailto:KennethS@kendra2.com">KennethS@kendra2.com</a></td>
<td>Scavone</td>
<td>Kenneth</td>
<td></td>
<td></td>
<td>Managing Member</td>
</tr>
</tbody>
</table>

If the applicant is an individual or partnership operating under a name that is different than your full personal name, the name must be registered as a fictitious name with the Department of State. Please attach a copy of your APPROVED fictitious name registration.

Registration attached | X | Registration previously submitted and still active

If the applicant is a domestic or foreign corporation or limited liability company, it must be registered to conduct business in Pennsylvania with the Department of State. Please attach a copy of your APPROVED corporate registration or authorization to conduct business in Pennsylvania.

Registration attached | | Authorization to conduct business in PA attached | X | Registration previously submitted still active

If the applicant has NO parent company, check the following box.

X | No parent.

If the applicant has a parent company, include the following information for the parent company: the name of the company, its address, phone number, taxpayer ID No., and state of incorporation, if the company is a corporation.

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone No. ( )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Taxpayer ID No.</th>
<th>If corporation, state of incorporation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If the applicant has **NO subsidiaries**, indicate by checking the following box.

- **No subsidiary.**

If the applicant has **one or more subsidiaries**, include the following information for each subsidiary company: the name of the company, its address, phone number, taxpayer ID No., and state of incorporation, if the company is a corporation.

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone No. (   )</th>
<th>Address</th>
<th>Taxpayer ID No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kendra II, LLC</td>
<td></td>
<td>5459 State Route 29, Springville, PA 18844</td>
<td>82-2217615</td>
</tr>
<tr>
<td>Lluvia Bear Lake, LLC</td>
<td></td>
<td>5459 State Route 29, Springville, PA 18844</td>
<td>82-2307446</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- (Attach additional sheet, in the same format, if necessary.)
SIGNATURES

Under penalty of law, the undersigned hereby certify that they have the authority to submit this application on behalf of the applicant, that they have reviewed the information contained in this application and certify that the information is true and correct to the best of their knowledge and belief.

Bear Lake Properties, LLC

(Print Name of Applicant)

Kenneth Scavone- Managing Member

(Print Name & Title of Signatory)

(Signature)

Date 9/24/2020

Please call 717-772-2199 with any questions.
WELL RECORD

8000-FM-OOGM0004a
Rev. 12/2015
## WELL INFORMATION

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Operator</td>
<td>Bear Lake Properties, LLC</td>
</tr>
<tr>
<td>DEP ID#</td>
<td>283543</td>
</tr>
<tr>
<td>Well API #</td>
<td>37-123-33945</td>
</tr>
<tr>
<td>Well Farm Name</td>
<td>Bittinger</td>
</tr>
<tr>
<td>Well #</td>
<td>3</td>
</tr>
<tr>
<td>Address</td>
<td>5459 State Route 29</td>
</tr>
<tr>
<td>Site ID</td>
<td></td>
</tr>
<tr>
<td>Client Id</td>
<td></td>
</tr>
<tr>
<td>Sub Facility Id</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>Springville</td>
</tr>
<tr>
<td>State</td>
<td>PA</td>
</tr>
<tr>
<td>Zip</td>
<td>18844</td>
</tr>
<tr>
<td>Municipality</td>
<td>Columbus</td>
</tr>
<tr>
<td>County</td>
<td>Warren</td>
</tr>
<tr>
<td>Phone</td>
<td>570-737-3075</td>
</tr>
<tr>
<td>Fax</td>
<td>570-737-3076</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:KennethS@kendra2.com">KennethS@kendra2.com</a></td>
</tr>
<tr>
<td>Address</td>
<td>Bear Lake Properties, LLC, 5459 State Route 29, Springville, PA 18844, 570-737-3075, <a href="mailto:KennethS@kendra2.com">KennethS@kendra2.com</a></td>
</tr>
<tr>
<td>Phone</td>
<td>570-737-3075</td>
</tr>
<tr>
<td>Fax</td>
<td>570-737-3076</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:KennethS@kendra2.com">KennethS@kendra2.com</a></td>
</tr>
</tbody>
</table>

## CEMENT

<table>
<thead>
<tr>
<th>Casing String</th>
<th>Type/Class of Cement (Lead/Tail)</th>
<th>Slurry Temp °F</th>
<th>Amount of Cement (sks) (Lead/Tail/Total)</th>
<th>WOC hrs</th>
<th>Wt PPG</th>
<th>Yield/ft³</th>
<th>Gas Migration Controls Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface</td>
<td>A</td>
<td>*</td>
<td>200 / / 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal Protective</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>/</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>A</td>
<td>*</td>
<td>225 / /</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If additional strings attach form(s): Total

## CASING AND TUBING

<table>
<thead>
<tr>
<th>Hole Size</th>
<th>Pipe Size</th>
<th>Wt. #/ft.</th>
<th>Grade Casing / Tubing Type</th>
<th>Thread / Weld – New/ Used</th>
<th>Amount in Well (ft.)</th>
<th>CO R</th>
<th>Hardware - Baskets / Packer / Centralizers (Total/String)</th>
<th>Date Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 3/8&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>38&quot;</td>
<td></td>
<td></td>
<td>10/16/84</td>
</tr>
<tr>
<td>8 5/8&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>405&quot;</td>
<td></td>
<td></td>
<td>10/17/84</td>
</tr>
<tr>
<td>4 1/2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4506&quot;</td>
<td></td>
<td></td>
<td>10/20/84</td>
</tr>
</tbody>
</table>

If any casing is welded, provide the name(s) of the welder(s):

## PLUG-BACK/WELLBORE ALTERATION

<table>
<thead>
<tr>
<th>Fill Material &amp; Plugs</th>
<th>Depth</th>
<th>Date</th>
<th>Casing &amp; Tubing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>From</td>
<td>To</td>
<td>Size Pulled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## LOG OF FORMATIONS

Well AP#: 37-123-33945

(If you will need more space than this page, please photocopy the blank form before filling it in.)

<table>
<thead>
<tr>
<th>Formation Name or Lithology</th>
<th>Top (feet)</th>
<th>Bottom (feet)</th>
<th>Gas at (feet)</th>
<th>Oil at (feet)</th>
<th>Water at (fresh / brine; ft.)</th>
<th>Source of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconsolidated Gravel</td>
<td>-----------</td>
<td>30’</td>
<td></td>
<td></td>
<td>Fresh at 60’</td>
<td>Drillers records and geophysical logs</td>
</tr>
<tr>
<td>Devonian Shales</td>
<td>30’</td>
<td>2816’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Tully&quot; LS</td>
<td>2816’</td>
<td>2926’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamilton Shale</td>
<td>2926’</td>
<td>3097’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onondaga</td>
<td>3097’</td>
<td>3256’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unconformity Interval</td>
<td>3256’</td>
<td>3285’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Akron-Bertie</td>
<td>3285’</td>
<td>3370’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camillus</td>
<td>3370’</td>
<td>3442’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syracuse</td>
<td>3442’</td>
<td>3641’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt Zone</td>
<td>3637’</td>
<td>3828’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernon</td>
<td>3641’</td>
<td>3900’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lockport</td>
<td>3900’</td>
<td>4108’</td>
<td></td>
<td></td>
<td>Salt at 4070’</td>
<td></td>
</tr>
<tr>
<td>Rochester</td>
<td>4108’</td>
<td>4224’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irondequoit-Reynesals</td>
<td>4224’</td>
<td>4260’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grimsby</td>
<td>4260’</td>
<td>4386’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Glen</td>
<td>4386’</td>
<td>4424’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whirlpool</td>
<td>4424’</td>
<td>4439’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queenston</td>
<td>4439’</td>
<td>TD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4556’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If no show of oil, gas or water, explain why:

---

**WELL SERVICE COMPANIES** (Provide the name, address, and telephone number of all well service companies involved.)

<table>
<thead>
<tr>
<th>Casing Source</th>
<th>Name</th>
<th>Address</th>
<th>City – State – Zip</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cementing Company</th>
<th>Name</th>
<th>Address</th>
<th>City – State – Zip</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware Supplier</th>
<th>Name</th>
<th>Address</th>
<th>City – State – Zip</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Logging Company</th>
<th>Name</th>
<th>Address</th>
<th>City – State – Zip</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

I do hereby certify to the best of my knowledge, information and belief that the well identified on this Well Record has been properly cased and cemented in accordance with the requirements of 25 Pa. Code Chapter 78 and any conditions contained in the permit for this well. In addition, I do hereby certify that any casing which is attached to a blow-out preventer with a pressure rating greater than 3,000 psi has passed a pressure test in accordance with 25 Pa. Code §78.84(f). I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

---

**Driller**

<table>
<thead>
<tr>
<th>Name</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Well Operator’s Signature**

[Signature]

02/03/2021

**DEP USE ONLY**

<table>
<thead>
<tr>
<th>Reviewed by:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Printed Name / Title:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenneth Scavone/Managing Member</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
Well located on topo map 1480 feet south of latitude 42° 00' 00" N

LEGEND
- Found iron stake
- Set 3/4" Rebar
- Gas/Oil Well
- Water Well

PA Grid North

Well is located on topo map 7720 feet west of longitude 79° 30' 00" W

Surveyor's Notes: Contours and topographic data were obtained from the Columbus, PA 7.5 Minute Series Quadrangle Map in Warren County, PA.

Applicant/Well Operator Name: Bear Lake Properties, LLC

DEP ID #: 283543

Well Name: Biltlinger

County: Warren

Municipality: Columbus Township

Well Type: Inject-Disp

Address: 5459 State Route 29, Springville, PA 18844

911 address of well site:

1655 Cornish Hill Road, Bear Lake, PA

Surveyor or Engineer: Daniel L. Barry Land Surveyor, LLC.

Phone #: 716-763-1254

Dwg #: 3493A-20

Date: 9/14/2020

Scale: 1" = 500'

Tract Acreage: 66.2

Lat. & Long Metadata Method: Direct G.P.S.

Accuracy: 1' +/- ft.

Datum: NAD83

Elevation Metadata Method: Direct GPS

Accuracy: 1' +/- ft.

Datum: NAVD88

Survey Date: 5/3/2017
DEP Statewide toll-free phone number for reporting cases of water contamination which may be associated with development of oil and gas resources is 1-866-255-5158.

<table>
<thead>
<tr>
<th>Applicant / Well Operator Name</th>
<th>DEP ID#</th>
<th>Well (Farm) Name</th>
<th>Serial #</th>
<th>Angle &amp; Course of Deviation (Drilling)</th>
<th>Anticipated True Vertical Depth Feet (TVD): 4566</th>
<th>Anticipated Total Measured Depth Feet (TMD): 4566</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear Lake Properties, LLC</td>
<td>283543</td>
<td>Bittinger</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Target Formation(s):

- Grimsby
- Power Glen
- Whirlpool

Deepest Formation to be penetrated:

- Queenston

Latitude Longitude of Water Supply:

- Enos & Nettie Miller, 1892 Cornish Hill: N41°59.896' W079°31.642' per AG AEGIS Co. Inc.
- David & Lori Burkholder, 1608 Cornish Hill: N41°59.686' W079°31.597' per AG AEGIS Co. Inc.

Municipality: where the well will be drilled, adjacent to the well, or within 3000 feet

- Bear Lake Borough: 1232 Greendale, St. Bear Lake, PA 16402
- City of Corry: 100 South Center St., Corry, PA 16407
- Clymer Township: P.O. Box 274, Clymer, NY 14724
- Concord Township: 12677 Ormsbee Rd., Corry, PA 16407
- Columbus Township: P.O. Box 291, Columbus, PA 16405
- Freehold Township: 139 Lottsville-Neube Rd., Bear Lake, PA 16402
- Spring Creek Township: 4373 Picidilli Hill Road, Corry, PA 16407
- Wayne Township: 17395 Sciota Road, Corry, PA 16407

Coal related parties
SURETY BOND FOR OIL AND GAS WELLS

TO BE FILLED IN BY OPERATOR

Purpose:

☐ (a) Original Bond
☐ (b) Replacement Bond
☐ (c) Additional Bond

WHEREAS, Bear Lake Properties, LLC (Name of Well Operator)

(“Operator”),

(1) a corporation, incorporated under the laws of the State of (Name of State), or

(2) a(n) Limited Liability Company (Limited / general partnership, individual, limited liability company)

with a place of business at 5459 State Route 29, Springville, PA 18844 (Operator address and telephone number)

has filed with the Pennsylvania Department of Environmental Protection ("Department") applications for permits to drill and operate new oil and gas wells or to operate existing permitted or registered wells under the Act of December 19, 1984, No. 223, P.L. 1140, as amended, 58 P.S. § 601.101 et seq. (repealed) ("1984 Oil and Gas Act") and the Act of February 14, 2012, No. 13, P.L. 87, 58 Pa. C.S. §§ 2301 - 3503 ("2012 Oil and Gas Act"); and

WHEREAS, the Operator has chosen to file this Surety Bond for Oil and Gas Wells ("Surety Bond");

NOW THEREFORE, the Operator, as principal and

Atlantic Specialty Insurance Company (Name of surety)

(“Surety”),

with a place of business at 1777 Sentry Parkway West, Suite 230, Blue Bell, PA 19422 (Surety address and telephone number)

licensed to do business in the Commonwealth of Pennsylvania ("Commonwealth"), as surety, in consideration of the issuance of the permits/registrations for the Covered Wells, as that term is defined in paragraph 2 of this Surety Bond, are held and firmly bound unto the Commonwealth in the just and full sum of Two Thousand Five Hundred Dollars ($2,500.00 ), to the payment whereof, well and truly to be made, we bind ourselves, our heirs, executors, administrators, assigns and successors, jointly and severally, firmly by these presents:
1. **Condition of the Obligation.** If the Operator shall faithfully perform and conform to all of the applicable drilling, restoration, water supply replacement and plugging requirements of the following:

   (a) the 1984 Oil and Gas Act and the 2012 Oil and Gas Act;
   
   (b) all subsequent amendments to, additions to, and replacements of the 2012 Oil and Gas Act;
   
   (c) all regulations previously or hereafter promulgated under the 1984 Oil and Gas Act or the 2012 Oil and Gas Act (or amendments thereto, additions thereto, or replacements thereof);
   
   (d) the terms and conditions of the Operator’s permit(s) for the Covered Wells, and all amendments or additions to the permit(s); and
   
   (e) all Department orders issued relating to the Operator and its Covered Wells;

   (the requirements described in (a) through (e), inclusive, immediately above, collectively called the “Law”), then this obligation shall be null and void, otherwise, this obligation shall remain in full force and effect.

2. **Wells Covered by this Surety Bond (“Covered Wells”).** This Surety Bond assumes and covers any and all liability and obligations accrued and to be accrued on all wells listed on Exhibit A, under the Law, until such time as the Department shall release, in writing, such liability and obligations. The Operator and the Surety expressly agree that this Surety Bond shall cover all additional wells in Pennsylvania for which the Operator obtains a Department well permit. The Operator and the Surety agree that such additional wells shall be deemed to be covered by this Surety Bond, and waive any rights of prior notice or objection to such addition of wells.

3. **Amount and Duration of Bond Liability.** Liability under this Surety Bond shall be for the amount specified herein. Liability under this Surety Bond shall continue until the Covered Wells are properly plugged in accordance with the Law, and for a period of one (1) year after a Certificate of Plugging is filed with the Department and approved for every well, unless released by the Department, in writing, prior thereto, as provided by the Law. It is hereby acknowledged and agreed by and among the parties that the liability under this Surety Bond is a penal sum. As such, the Department retains a property interest in such surety guarantee, and any related agreements, until release of such liability, in writing, as provided by the Law.

4. **Default.** Upon the happening of any default of the provisions, conditions and obligations assumed under this Surety Bond and the declaration of a forfeiture by the Department, the Operator and the Surety hereby authorize and empower the Attorney General of the Commonwealth of Pennsylvania, or any other attorney of any court of record in Pennsylvania or elsewhere by him or her deputized for this purpose, to appear for and confess judgment against the Operator and/or the Surety, their heirs, executors, administrators, successors or assigns, in favor of the Commonwealth for any sum or sums of money, which may be due hereunder, with or without defalcation or declaration filed, with interest and cost, with release of errors, without stay of execution, and with ten percent (10%) added for collection fees, and for the exercise of this power, this instrument, or a copy thereof, any rule of court to the contrary notwithstanding, shall be full warrant and authority. This power shall be inexhaustible. The Operator and the Surety further agree that execution may issue upon judgment so confessed for the full amount of money and accrued interest that is owing from the Operator and/or the Surety to the Commonwealth, with costs and collection fees, upon filing information in writing in the court where such judgment shall be entered.
5. **Events Not Affecting Bond Liability.** The Operator and/or the Surety agree that their liability under this Surety Bond shall not be impaired or affected by (1) any renewal or extension of the time for performance of any of the provisions, conditions or obligations upon which this Surety Bond agreement is based; or (2) any forbearance or delay in declaring this Surety Bond to be forfeit or in enforcing payment on this Surety Bond.

6. **No Surety Right to Perform.** The Surety hereby agrees and acknowledges that it has no right to cover or perform the obligations of the Operator upon the Operator's default; provided, however, that the Department may authorize, in writing, the Surety to perform such defaulted obligations in lieu of collection of the bond amount if the Department determines that it is in its interest to do so.

7. **Remedies.** Nothing herein shall limit or preclude the Department from seeking any remedy, in addition to the forfeiture of this Surety Bond, which may be authorized or provided by the Law.

8. **Replacement Bond.** If this Surety Bond is a replacement bond, this Surety Bond assumes and covers any and all liability and obligations accrued and to be accrued under the Law. This Surety Bond replaces the following existing bonds:

<table>
<thead>
<tr>
<th>Date of Bond</th>
<th>Type of Bond (Surety or Collateral)</th>
<th>Name of Surety, Financial Institution, or Govt. Issuer</th>
<th>Type of Collateral</th>
<th>Surety Bond No. / Collateral ID No.</th>
<th>Dollar Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

9. **Additional Bond.** The Department reserves the right to require additional bonding from the Operator, as provided by the Law, which additional bonding shall be a supplement to and augment the bond liability provided herein.

10. **Attachments.** The Surety Power of Attorney and Exhibit A must be attached.

11. **Applicable Law.** This Surety Bond shall be governed by and interpreted and enforced in accordance with the laws of the Commonwealth and the decisions of the Pennsylvania courts. The Operator and Surety consent to the jurisdiction of any court of the Commonwealth and any federal courts in Pennsylvania, waiving any claim or defense that such forum is not convenient or proper. The Operator and Surety agree that any such court shall have in personam jurisdiction over them and consent to service of process in any manner authorized by law.

12. **Headings.** The paragraph headings herein are for descriptive purposes only and are intended to have no legal force or effect.
IN WITNESS WHEREOF, intending to be legally bound hereby, the Operator and the Surety hereunto set their hands and seals, on the dates indicated.

SURETY:
Atlantic Specialty Insurance Company
(Print or Type Name of Surety)

By: ________________________________  10/29/20
(Signature) (Date)

Leonard E Callahan, Attorney-in-Fact  10/29/20
(Print or Type Name and Title)

By: ________________________________  10/29/20
(Signature) (Date)

Michele M. Moore, Surety Bond Assistant  10/29/20
(Print or Type Name and Title)

OPERATOR:
Bear Lake Properties, LLC
(Print or Type Operator Name)

By: ________________________________  11/2/20
(Signature) (Date)

Kenneth Scavone, Managing Member
(Print or Type Name and Title)

By: ________________________________
(Signature) (Date)

(Print or Type Name and Title)

Approved as to legality and form:

Pre-Approved  OAG  9-11-12
Office of Attorney General  (Date)

Pre-Approved  OGC  8-30-12
Office of General Counsel  (Date)

Chief Counsel / Assistant Counsel  (Date)
Department of Environmental Protection

Approved for the Department:

Department representative  (Date)
ACKNOWLEDGEMENT

COMMONWEALTH / STATE OF Pennsylvania : SS
COUNTY OF Susquehanna : SS

[Operator – please complete only A. or B. and this document must be notarized]

A. TO BE USED BY AN OPERATOR THAT IS A CORPORATION, PARTNERSHIP, LIMITED LIABILITY COMPANY, OR MUNICIPAL AUTHORITY

On 11/2/20, Kenneth Scavone, [and ], personally appeared before me, and identified [himself] and/or herself or themselves – please CIRCLE what is accurate) as the
Managing Member [and , respectively,]
of Bear Lake Properties, LLC (Name of Operator – must be identical to Operator identified in Bond)

each affiant stated that, in accordance with (1) (please CIRCLE ONE AND ONLY ONE) [the bylaws of the corporation or municipal authority] [the partnership agreement] [the Operating Agreement of the LLC or the LLP] and (2) any other documents applicable to authority to sign the attached Bond, the affiant was authorized to sign the attached Bond on behalf of the Operator.

B. TO BE USED BY AN OPERATOR THAT IS AN INDIVIDUAL

On , personally appeared before me, and acknowledged that he or she executed the attached Bond for the purposes therein contained.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

(SEAL)  

My Commission Expires:  

Commonwealth of Pennsylvania – Notary Seal
Hendrik K. Vanden Hengel, Notary Public
Susquehanna County
My Commission Expires April 03, 2023
Commission Number 1348717
<table>
<thead>
<tr>
<th>Farm Name &amp; Well Number</th>
<th>Permit # / Registration #</th>
<th>Description of Coll./Surety (Example: CD #, LOC #, Surety Bond #)</th>
<th>Unconventional wells only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bittinger #3</td>
<td>PAS2D218BWA</td>
<td>Surety Bond</td>
<td>☑️</td>
</tr>
<tr>
<td>Smith-Ras #1</td>
<td>PAS2D219BWA</td>
<td>Surety Bond</td>
<td>☑️</td>
</tr>
</tbody>
</table>

Name of Operator:
Bear Lake Properties, LLC
Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: Leonard E. Callahan, James F. Jones, Steven T. Johnson, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, provided that no bond or undertaking executed under this authority shall exceed in amount the sum of: unlimited and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof. In pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an “Authorized Officer”) may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this twenty-seventh day of April, 2020.

STATE OF MINNESOTA
HENNEPIN COUNTY
On this twenty-seventh day of April, 2020, before me personally came Paul J. Brehm, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.

I, the undersigned, Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.


This Power of Attorney expires January 31, 2025

Please direct bond verifications to safety@intactinsurance.com
PNDI
This is the receipt for your purchase at DCNR BUREAU OF FORESTRY CONSERVATION EXPLORER.

**Order Information**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Unit</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Id: PNDI-717496; Title: Bear Lake - UIC Well; Project Type: Waste Transfer, Treatment, and Disposal, Liquid waste/Effluent, Other; Project Size: Standard;</td>
<td>40.00 USD</td>
<td>40.00</td>
</tr>
</tbody>
</table>

**This order is now complete. Transaction approved!**

Here is your receipt:

========== TRANSACTION RECORD ==========
BUREAU OF FORESTRY
400 MARKET ST
HARRISBURG, PA 17101
United States
WWW.PA.GOV

TYPE: Pre-Authorization

ACCT: American Express $ 40.00 USD

CARDHOLDER NAME : John McCollums
CARD NUMBER : ############1024
DATE/TIME : 01 Sep 20 11:16:37
REFERENCE # : 001 0673375 M
AUTHOR. # : 157769
TRANS. REF. : 55563

Approved - Thank You 100

Please retain this copy for your records.

Cardholder will pay above amount to card issuer pursuant to cardholder agreement.

========================================
1. PROJECT INFORMATION

Project Name: Bear Lake - Bittinger 3 - UIC Well
Date of Review: 9/1/2020 12:35:32 PM
Project Category: Waste Transfer, Treatment, and Disposal, Liquid waste/Effluent, Other
Project Area: 16.22 acres
County(s): Warren
Township/Municipality(s): COLUMBUS
ZIP Code: 16405
Quadrangle Name(s): COLUMBUS
Watersheds HUC 8: Upper Allegheny
Watersheds HUC 12: Coffee Creek
Decimal Degrees: 41.996574, -79.529344
Degrees Minutes Seconds: 41° 59' 47.6678" N, 79° 31' 45.6372" W

2. SEARCH RESULTS

<table>
<thead>
<tr>
<th>Agency</th>
<th>Results</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA Game Commission</td>
<td>NoKnown Impact</td>
<td>No Further Review Required</td>
</tr>
<tr>
<td>PA Department of Conservation and Natural Resources</td>
<td>NoKnown Impact</td>
<td>No Further Review Required</td>
</tr>
<tr>
<td>PA Fish and Boat Commission</td>
<td>NoKnown Impact</td>
<td>No Further Review Required</td>
</tr>
<tr>
<td>U.S. Fish and Wildlife Service</td>
<td>NoKnown Impact</td>
<td>No Further Review Required</td>
</tr>
</tbody>
</table>

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.
3. AGENCY COMMENTS
Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies strongly advise against conducting surveys for the species listed on the receipt prior to consultation with the agencies.

**PA Game Commission**
RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

**PA Department of Conservation and Natural Resources**
RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

**PA Fish and Boat Commission**
RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

**U.S. Fish and Wildlife Service**
RESPONSE: No impacts to federally listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION
The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP’s permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at [https://conservationexplorer.dcnr.pa.gov/content/resources](https://conservationexplorer.dcnr.pa.gov/content/resources).
5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
Email: IR1_ESPenn@fws.gov

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov

7. PROJECT CONTACT INFORMATION

Name: Kenneth Scavone
Company/Business Name: Bear Lake Properties, LLC
Address: 5459 State Route 29
City, State, Zip: Springville, PA 18844
Phone: (570) 737-3075 Fax: (570) 737-3076
Email: Kenneths@kendra2.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

______________________________  __________________________
applicant/project proponent signature  date
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) – REGION III
UNDERGROUND INJECTION CONTROL PERMIT NUMBER PAS2D219BW2R
AUTHORIZATION TO OPERATE CLASS II-D INJECTION WELL
EFFECTIVE: OCTOBER 31, 2016 / EFFECTIVE UNTIL: OCTOBER 31, 2026
UNDERGROUND INJECTION CONTROL PERMIT NUMBER PAS2D218BWAR
AUTHORIZATION TO OPERATE CLASS II-D INJECTION WELL

In compliance with provisions of the Safe Drinking Water Act, as amended, 42 U. S. C. §§ 300f et seq. (SDWA) and the SDWA implementing regulations promulgated by the U. S. Environmental Protection Agency at Parts 144 -147 of Title 40 of the Code of Federal Regulations, this permit authorizes

Bear Lake Properties, LLC
3000 Village Run Road, Unit 103, #223
Wexford, Pennsylvania 15090

to convert the Bittinger #3 well into a Class II-D commercial brine disposal Injection Well (hereinafter, “Injection Well” or “Facility”) and to operate the Injection Well for the purpose of injecting fluids produced in association with oil and gas production operations in accordance with the provisions of this permit. The Injection Well will be located in Columbus Township, Warren County, Pennsylvania. The coordinates for the Injection Well are: Latitude 41° 59’ 45.7” and Longitude -79° 31’ 41.0”.

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

This permit shall become effective on October 31, 2016.

This permit shall remain in effect until midnight October 31, 2026.

Signed this 31st day of October, 2016.

[Signature]
Jon M. Capacasa, Director
Water Protection Division
PART 1

A. Effect of a Permit

Bear Lake Properties, LLC (the “Permittee”) is allowed to engage in underground injection at the Injection Well in accordance with the conditions of this permit. The Permittee shall not allow the underground injection activity, otherwise authorized by this permit, to cause or contribute to the movement of fluid containing any contaminant into any underground source(s) of drinking water (USDW), if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 C.F.R. Part 141 or if it may otherwise adversely affect the health of persons. Any underground injection activity not authorized in this permit or otherwise authorized by permit or 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 the terms of this permit does not constitute a defense to any action brought under Part C or D of the SDWA, 42 U.S.C. §§ 300f-300j-11, 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 or upon request as specified in 40 C.F.R. §§ 144.12, 144.39 and 144.40. Also, the permit is subject to minor modifications as specified in 40 C.F.R. § 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 March 24th, 2015, and the supplemental submission dated October 7, 2015, collectively referred to as the “Application”, is held invalid, the application of such provision to other circumstances, and 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 regulations, including 40 C.F.R. Parts 124, and 144-147, and with the conditions of this permit, except to the extent and for the duration that EPA authorizes any noncompliance in 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 or 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 the 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 to prevent unauthorized access and operation of the Injection Well and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities 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 the law to:

   a. Enter upon the Permittee's premises where the 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, the Facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times any substances or parameters at any location for the purposes of assuring permit compliance or as otherwise authorized by the SDWA.

7. Penalties. Any person who violates a requirement of this permit is subject to administrative or civil penalties, fines and other enforcement actions under the SDWA. Any person who willfully violates conditions of this permit 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 7520-7, approval is received from the Director, and the requirements of 40 C.F.R. § 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 or its implementing regulations. The transferee is not authorized to inject under this Permit unless and until the Director notifies the transferee that the transferee is so authorized through issuance of a revised permit identifying the transferee as the permittee.


a. The Permittee shall sign all reports required by this permit and other information requested by the Director 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 officer or a ranking elected official.

b. A duly-authorized representative of the person 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 the 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 C.F.R. Parts 2 (Public Information), and § 144.5, any information submitted to the Director pursuant to this permit 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 C.F.R. Part 2.

b. EPA will deny any claims of confidentiality for the following information:

(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 the 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**

The Permittee shall sign and certify copies of all reports and notifications required by this permit in accordance with the requirements of paragraph I.D.9 of this Permit and shall submit such information to the Director at the following address:

Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water and 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 II. B.2 below. This period may be extended by the Director at any time. If the period is extended, the Permittee shall comply with the new period.

   a. All data required to complete the Permit Application form for this permit and any supplemental information submitted under 40 C.F.R. § 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 paragraphs II.C.4 and C.5 of this permit, until at least three years after the plugging and abandonment procedures are complete. The Permittee shall continue to retain these records after the three year retention period 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;
   g. The results of such analyses.

C. Monitoring Requirements

1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The Permittee shall obtain representative sample(s) of the fluid to be analyzed and conduct analysis(es) of the sample(s) in accordance with the approved methods and test procedures provided in 40 C.F.R. § 136.3 and EPA’s SW-846 Compendium, or methods and test procedures otherwise approved by the Director. The Permittee shall identify in its monitoring records the types of tests and methods used to generate the monitoring data.

2. The Permittee shall continuously monitor and record surface injection pressure, annular pressure, flow rate and cumulative volume in the Injection Well beginning on the date the Injection Well commences operation and concluding when the Injection Well is plugged and abandoned. The Permittee shall compile the monitoring data monthly to complete the Annual Report referenced in paragraph II.D.8 of this permit.

3. The Permittee shall also monitor and record semi-annually the fluid level of all of the following depleted gas production wells identified in the Application:
a. R. Trisket #1, located approximately 5400 ft. west of the Injection Well;

b. R. Trisket #2, located approximately 5400 ft. to the west of the Injection Well;

c. T. Reed #4, located approximately 3500 ft. to the southwest of the Injection Well;

d. D. Wright #1, located approximately 2,000 ft. to the southeast of the Injection Well; and

e. R. Craker #1, located approximately 1,900 ft. northeast of the Injection Well.

In the event that in the future the T. Reed #4 is converted from a monitoring well to a UIC-Permitted well, upon issuance of the UIC permit for T. Reed #4, the Permittee will used both the W.W. Hammond #1 and the T. Reed #2 wells as replacement monitoring wells for the T. Reed #4.

If fluid levels in any of the monitoring wells listed above is observed to rise within 100 feet of the base of the USDW, the Permittee shall stop disposal operations immediately, and shall notify the EPA orally (phone numbers: (215) 814-5469 or (215) 814-5498) within 24 hours of the observation and shall send written notification to EPA within 5 days of the observation. EPA will evaluate the operating conditions in order to instruct the Permittee on how to control the fluid level.

If the fluid level in a monitoring well is observed to rise within 100 feet of the top of cement of the long-string casing, that is, it rises to the depth listed in the table below, the permittee shall stop injection operations immediately, and shall notify the EPA orally (phone numbers: (215) 814-5469 or (215) 814-5498) within 24 hours of the observation and shall send written notification to EPA within 5 days of the observation. The permittee shall demonstrate mechanical integrity of the monitoring well where fluid reached the trigger depth prior to resuming injection. The MIT test will be required on that monitoring well every two years thereafter.

<table>
<thead>
<tr>
<th>Monitor Well</th>
<th>Depth of Well (ft)</th>
<th>Top of Cement (Depth - Thickness) (ft)</th>
<th>MIT Trigger Depth(ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craker 1</td>
<td>4584</td>
<td>3418</td>
<td>3318</td>
</tr>
<tr>
<td>Hammond 1</td>
<td>4676</td>
<td>3510</td>
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<td>Reed 2</td>
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<td>Trisket 2</td>
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<tr>
<td>Wright 1</td>
<td>4479</td>
<td>3313</td>
<td>3213</td>
</tr>
</tbody>
</table>

4. The Permittee shall monitor the nature and composition of the injected fluid by sampling, analyzing and recording the injected fluid for the parameters listed below, at the initiation of the injection operation and every two years thereafter, and whenever the operator anticipates a change in the injection fluid
(e.g., from different geologic formations, geographic regions, different customers, etc.).

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

5. The Permittee shall measure the specific gravity of each truckload prior to unloading.

6. The Permittee shall verbally report to the Director analytical results for specific gravity that are greater than 1.218 or for TOC greater than 250 mg/l within twenty-four hours of obtaining the results.

7. The Permittee shall make a demonstration of mechanical integrity in accordance with 40 C.F.R. § 146.8, after the initial demonstration, at least once every two (2) years. Subsequent two (2) year demonstrations shall be conducted no more than thirty (30) days prior to the anniversary date of the issuance of this permit. In addition to the above requirement, the Permittee shall conduct a mechanical integrity test demonstration on the Injection Well when the protective casing or tubing is removed from the well, the packer is reseated, or a well failure is likely, or as requested by the Director. The Permittee may continue operation of the Injection Well only if the Permittee has demonstrated the mechanical integrity of the Injection Well to the Director’s satisfaction. The Permittee shall cease injection operations if a loss of mechanical integrity becomes evident or if the Permittee cannot demonstrate mechanical integrity. The Injection Well shall be equipped with an automatic shut-off device which would be activated in the event of a mechanical integrity failure.

8. The Permittee shall perform all environmental measurements required by the permit, including, but not limited to: measurements of pressure, temperature, mechanical integrity (as applicable) and chemical analyses in accordance with EPA guidance on quality assurance.

9. The Permittee shall maintain a record of every load of fluid received. The record shall include the hauler’s name, the producing well operator’s name, and the location from which 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 the volumes from each operator documented.
D. Reporting and Notification Requirements

1. **Report on Permit Review.** Within 30 days of receipt of this permit, the Permittee shall ensure the person designated pursuant to paragraph I.D.9 of this permit reports 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 Permittee shall not commence injection until construction or well rework is complete and all of the following conditions have been satisfied:
   
   a. The Permittee has submitted notice of completion of construction (EPA Form 7520-10) to the Director;
   
   b. The Permittee has demonstrated to EPA that the Injection Well has mechanical integrity in accordance with 40 C.F.R. § 146.8 and the Permittee has received written notice from the Director that such demonstration is satisfactory; and
   
   (i) The Director has inspected or otherwise reviewed the Injection Well and finds it is in compliance with the conditions of this permit; or
   
   (ii) The Permittee has not received notice from the Director of his or her intent to inspect or otherwise review the Injection Well within 13 days of the date of the notice in paragraph II.D.2.a of this permit, 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, or has endangered, health or the environment. The Permittee shall provide such report orally (phone numbers: (215) 814-5469 or (215) 814-5498) within 24 hours from the time the Permittee becomes aware of the circumstances. The Permittee shall include the following information in the oral report:

   (1) Any monitoring or other information which indicates that any contaminant may endanger, or has endangered an underground source of drinking water.
(2) Any noncompliance with a permit condition, malfunction of the injection system which may cause, or has caused, fluid migration into or between underground sources of drinking water, or failure of mechanical integrity test demonstrations.

b. The Permittee shall provide a written submission within five days of the time the Permittee becomes aware of the circumstances described above. 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 recurrence 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 to the Director in writing within ten (10) days of the time the Permittee becomes aware of the circumstances. The report shall contain the information listed in paragraph II.D.3 of this permit.

6. **Planned Changes.** The Permittee shall provide written notice to the Director as soon as possible of any planned physical alterations or additions to the permitted Facility.

7. **Conversion.** The Permittee shall provide written notice to the Director 30 days prior to the conversion of the Injection Well to an operating status other than an injection well.

8. **Annual Report.** The Permittee shall submit a written Annual Report to the Director summarizing the results of the monitoring required in Permit Condition C of Part II of this permit. This report shall include monthly monitoring records of injected fluids, the results of any mechanical integrity test(s), and any major changes in characteristics or sources of injected fluids. The report shall list the additives used in the operation of the well. The Permittee shall complete and submit this information with its Annual Report EPA Form 7520-11 (Annual Disposal Injection Well Monitoring Report). The Permittee shall submit the Annual Report to the Director no 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 in writing at least 45 days before plugging and abandonment of the Injection Well as described in condition in Part III.C of this permit. The Director may allow a shorter notice period upon written request.

b. The Permittee shall submit any revisions to the Plugging and Abandonment Plan attached to and incorporated into this permit (Attachment 1) to the Director no less than 45 days prior to plugging and abandonment on EPA Plugging and Abandonment Form 7520-14. The Permittee shall not commence plugging and abandonment until it receives written approval of the revisions to the Plan from the Director.

c. To the extent that any unforeseen circumstances occur during plugging and abandonment of the Injection Well that cause the Permittee to believe the Plugging and Abandonment Plan should be modified, the Permittee shall obtain written approval from EPA of any changes to the Plugging and Abandonment Plan prior to plugging the Injection Well.

d. Within 60 days after plugging the Injection Well, the Permittee shall submit a Plugging and Abandonment Report to the Director which shall consist of either:

(i) A statement that the Injection Well was plugged in accordance with the EPA approved Plugging and Abandonment Plan; or

(ii) Where actual plugging differed from the Plugging and Abandonment Plan previously submitted, the Permittee shall provide to the Director an updated version of form 7520-14 specifying the different procedures used.

e. The Permittee shall ensure that the Plugging and Abandonment Report is certified as accurate by the person who performed the plugging operation.

10. **Compliance Schedules.** The Permittee shall submit reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit no later than 30 days following each schedule date.

11. **Mechanical Integrity Tests.** The Permittee shall notify the Director in writing at least 30 days prior to conducting Mechanical Integrity Testing on the Injection Well.

12. **Cessation of Injection Activity.** Two years after the Permittee has ceased injection into the Injection Well, the Permittee shall plug and abandon the
Injection Well in accordance with the Plugging and Abandonment Plan unless the Permittee:

a. Provides written notice to the Director describing actions and/or procedures, necessary to ensure that the Injection Well will not endanger any USDW during the period of temporary abandonment. These actions and procedures shall include compliance with the requirements of this permit applicable to active injection wells unless waived, in writing, by the Director;

b. Receives approval from the Director that the actions and/or procedures described in the notice are satisfactory; and

c. Implements such EPA approved actions and/or procedures.

E. Mechanical Integrity

1. Standards. The Permittee shall maintain the mechanical integrity of the permitted Injection Well pursuant to 40 C.F.R. § 146.8.

2. Request from Director. The Director may by written notice require the Permittee to demonstrate mechanical integrity at any time during the term of this permit and the Permittee shall comply with the Director’s request.

Part III

A. Construction Requirements

1. Confining Zone. Notwithstanding any other provision of this permit, the Permittee shall inject through the Injection Well only into a formation which is separated from any Underground Source of Drinking Water by a confining zone, as defined in 40 C.F.R. § 146.3, that is free of known open faults or fractures within the Area of Review as required in 40 C.F.R. § 146.22.

2. Casing and Cementing. The Permittee shall:

a. ensure the Injection Well is cased and cemented to prevent the movement of fluids into or between underground sources of drinking water and in accordance with 40 C.F.R. §§ 146.22 and 147.1955(b);

b. ensure the casing and cement used in the Injection well is designed for the life expectancy of the well;
c. ensure the Injection Well has surface casing installed from the surface to 405 feet below land surface and cemented back to the surface;

d. ensure the Injection Well has long string casing installed from the surface to 4508 feet and cemented back to approximately 3343 feet below land surface to isolate the injection zone; and

e. install in the Injection Well a tubing string set on a packer placed above the injection zone’s perforated interval at approximately 4220 feet.

3. **Logs and Tests.** In accordance with 40 C.F.R. § 146.22(f), the Permittee shall prepare logs and perform tests as follows during the construction or rework of the Injection Well: electric, gamma ray and caliper logs in the open hole, a cement bond, temperature or density log on the surface casing (if cement returns are not achieved), and a cement bond log/variable density log on the long string casing. The Permittee shall submit to the Director, for the Injection Well, cement records, a narrative report that interprets the well log(s) and test results, which specifically relate to the results of the cementing operation, and a detailed description of the rationale used to make these interpretations. The narrative report shall be prepared by a knowledgeable log analyst and submitted to the Director. The Director may prescribe additional logs or waive logging requirements in the future should field conditions so warrant.

4. **Mechanical Integrity.** The Permittee is prohibited from conducting injection operations in the Injection Well until it (i) demonstrates the mechanical integrity of the Injection Well in accordance with 40 C.F.R. § 146 and (ii) receives notice from the Director that such a demonstration is satisfactory in accordance with paragraph II.D.2 of this permit.

5. **Corrective Action.** The Permittee is prohibited from conducting injection operations in the Injection Well until it has plugged all abandoned wells identified within the area of review. If an abandoned well is discovered within the one-quarter mile area of review as identified in the Permit Application, the permittee shall notify the Director upon discovery and within five (5) days of discovery submit to the Director for approval a plan for corrective action and implement the approved plan.

6. **Completion Reports.** The Permittee shall prepare a written Completion Report that summarizes the activities and the results of the testing required in Condition A.1 through 5 of Part III of this permit and submit the Completion Report to the Director prior to the commencement of injection operations.

B. **Operating Requirements**
1. **Injection Formation.** The Permittee shall inject only into the Grimsby, Power Glen, and Whirlpool sandstone of the Medina Group located in the subsurface interval between approximately 4260 feet and 4439 feet below surface elevation.

2. **Injection Fluid.** The Permittee shall not inject any hazardous waste as defined in 40 C.F.R. Part 261 or any fluid, other than fluids produced solely in association with oil and gas production operations and additives necessary to maintain the integrity of the well.

3. **Injection Volume Limitation.** Injection volume shall not exceed 30,000 barrels per month. A barrel consists of 42 gallons.

4. **Injection Pressure Limitation.** The Permittee shall not exceed a surface injection pressure maximum of 1733 psi and a bottom-hole injection pressure maximum of 4074 psi. These pressures were calculated based on a maximum injection fluid specific gravity of 1.218. If the specific gravity of the injection fluid exceeds 1.218, then the Permittee shall reduce the surface injection pressure by an amount necessary to avoid exceeding the bottom-hole pressure maximum. The Permittee shall not inject fluid at a pressure which initiates fractures in the confining zone, as defined in 40 C.F.R. § 146.3, adjacent to underground sources of drinking water (USDW) or causes the movement of injection or formation fluids into an USDW.

5. The Permittee shall inject fluids into the well solely through the tubing string installed inside the long string casing. The Permittee is prohibited from injecting between the outermost casing protecting the USDW and the well bore, and also from injecting into any USDW.

C. **Plugging and Abandonment.**

1. **Plugging and Abandonment.** The Permittee shall plug and abandon the Injection Well as provided in the EPA approved Plugging and Abandonment Plan (EPA Form 7520-14) (Attachment 1).

2. The Permittee shall plug and abandon the Injection Well in such a manner that fluids shall not move into or between USDWs.

D. **Financial Responsibility**

1. The Permittee shall maintain continuous compliance with the requirement to maintain financial responsibility and resources to close, plug and abandon the Injection Well in accordance with 40 C.F.R. § 144.52(a)(7) in the amount of at least $23,383. The well may not be constructed, reworked or operated if the financial responsibility for that well has not been established. Further, the
Permittee must provide documentation to the Director that financial responsibility has been established for the Injection Well prior to construction, rework or operation. The Permittee will provide a Letter of Credit and Standby Trust Agreement assuring the plugging costs for the Injection Well. The Permittee shall not substitute this Letter of Credit with an alternative demonstration of financial responsibility, unless it has previously submitted evidence of that alternative demonstration to the Director and the Director notifies it 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.

2. **Insolvency of Financial Institution.** In the event of the bankruptcy of the trustee or issuing institution of the financial mechanism, or a suspension or revocation of the authority of the trustee institution to act as a trustee or the institution issuing the financial mechanism to issue such an instrument, the Permittee must immediately notify the Director in writing and submit an alternative demonstration of financial responsibility acceptable to the Director within sixty days after such an event.
Table of Contents
Underground Injection Control (UIC) Class II Well Permit Application
Bear Lake Properties, LLC
Bittinger #3 Well
Columbus Township, Warren County, PA

Section 1 – Area of Review Methods/Calculations

Section 2 – Maps of Well Area and Area of Review

Section 3 – Corrective Action Plan and Well Data

Section 4 – Name and Depth of USDWs

Section 5 – Geologic Data On Injection and Confining Zones

Section 6 – Operating Data

Section 7 – Well Construction Details

Section 8 – Monitoring Program

Section 9 – Plugging and Abandonment Plan

Section 10 – Necessary Resources

Section 11 – Plan for Well Failures

Appendix A – Surrounding Landowner Information
### Application Information

<table>
<thead>
<tr>
<th>Application approved</th>
<th>Date received</th>
<th>Permit Number</th>
<th>Well ID</th>
<th>FINDS Number</th>
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### Owner Name and Address

<table>
<thead>
<tr>
<th>Owner Name</th>
<th>Bear Lake Properties, LLC</th>
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<table>
<thead>
<tr>
<th>Street Address</th>
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<tbody>
<tr>
<td>3000 Village Run Road, Unit 103, #223</td>
<td>(724) 444-7501</td>
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<tr>
<th>Phone Number</th>
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<tbody>
<tr>
<td>(724) 444-7501</td>
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### Well Information

#### Operating Wells

- **A. Operating Wells**
  - Date Started: [ ]
  - [ ] Operating

#### Proposed Wells

- **B. Proposed Wells**
  - [ ] B. Modification/Conversion
  - [ ] C. Proposed

### Well Details

- **Number of Existing Wells**: 1
- **Number of Proposed Wells**: [Blank]
- **Name(s) of field(s) or project(s)**: Bittinger #3

### Well Location

#### Location of Well(s) Approximate Coordinates

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<th>Latitude</th>
<th>Longitude</th>
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<tr>
<td>Deg</td>
<td>Min</td>
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<tr>
<td>-79</td>
<td>31</td>
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### Well Cross Section

- **Kilometer Marker**: [Blank]

### Well 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)

<table>
<thead>
<tr>
<th>Name and Title</th>
<th>Phone Number</th>
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<tr>
<td>Karl Kimmich, President</td>
<td>(724) 444-7501</td>
</tr>
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</table>

<table>
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**EPA Form 7520-6 (Rev. 12-06)**
## Well Class and Type Codes

**Class I**  Wells used to inject waste below the deepest underground source of drinking water.

**Type**  
- “I”  Nonhazardous industrial disposal well  
- “M”  Nonhazardous municipal disposal well  
- “W”  Hazardous waste disposal well injecting below USDWs  
- “X”  Other Class I wells (not included in Type “I,” “M,” or “W”)

**Class II**  Oil and gas production and storage related injection wells.

**Type**  
- “D”  Produced fluid disposal well  
- “R”  Enhanced recovery well  
- “H”  Hydrocarbon storage well (excluding natural gas)  
- “X”  Other Class II wells (not included in Type “D,” “R,” or “H”)

**Class III**  Special process injection wells.

**Type**  
- “G”  Solution mining well  
- “S”  Sulfur mining well by Frasch process  
- “U”  Uranium mining well (excluding solution mining of conventional mines)  
- “X”  Other Class III wells (not included in Type “G,” “S,” or “U”)

### Other Classes  
Wells not included in classes above.  
Class V wells which may be permitted under §144.12.  
Wells not currently classified as Class I, II, III, or V.

## Attachments to Permit Application

<table>
<thead>
<tr>
<th>Class</th>
<th>Attachments</th>
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<tr>
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<td>A, B, C, D, F, H – S, U</td>
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<td>A, B, C, D, F, H – U</td>
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<td></td>
<td>A, B, C, D, F, H, J, K, M – U</td>
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<tr>
<td>Other Classes</td>
<td>To be specified by the permitting authority</td>
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</table>
INSTRUCTIONS - Underground Injection Control (UIC) Permit Application

Paperwork Reduction Act: The public reporting and record keeping burden for this collection of information is estimated to average 224 hours for a Class I hazardous well application, 110 hours for a Class I non-hazardous well application, 67 hours for a Class II well application, and 132 hours for a Class III well application. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, DC 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

This form must be completed by all owners or operators of Class I, II, and III injection wells and others who may be directed to apply for permit by the Director.

I. EPA ID. NUMBER - Fill in your EPA Identification Number. If you do not have a number, leave blank.

II. OWNER NAME AND ADDRESS - Name of well, well field or company and address.

III. OPERATOR NAME AND ADDRESS - Name and address of operator of well or well field.

IV. COMMERCIAL FACILITY - Mark the appropriate box to indicate the type of facility.

V. OWNERSHIP - Mark the appropriate box to indicate the type of ownership.

VI. LEGAL CONTACT - Mark the appropriate box.

VII. SIC CODES - List at least one and no more than four Standard Industrial Classification (SIC) Codes that best describe the nature of the business in order of priority.

VIII. WELL STATUS - Mark Box A if the well(s) were operating as injection wells on the effective date of the UIC Program for the State. Mark Box B if wells(s) existed on the effective date of the UIC Program for the State but were not utilized for injection. Box C should be marked if the application is for an underground injection project not constructed or not completed by the effective date of the UIC Program for the State.

IX. TYPE OF PERMIT - Mark "Individual" or "Area" to indicate the type of permit desired. Note that area permits are at the discretion of the Director and that wells covered by an area permit must be at one site, under the control of one person and do not inject hazardous waste. If an area permit is requested the number of wells to be included in the permit must be specified and the wells described and identified by location. If the area has a commonly used name, such as the "Jay Field," submit the name in the space provided. In the case of a project or field which crosses State lines, it may be possible to consider an area permit if EPA has jurisdiction in both States. Each such case will be considered individually, if the owner/operator elects to seek an area permit.

X. CLASS AND TYPE OF WELL - Enter in these two positions the Class and type of injection well for which a permit is requested. Use the most pertinent code selected from the list on the reverse side of the application. When selecting type X please explain in the space provided.

XI. LOCATION OF WELL - Enter the latitude and longitude of the existing or proposed well expressed in degrees, minutes, and seconds or the location by township, and range, and section, as required by 40 CFR Part 146. If an area permit is being requested, give the latitude and longitude of the approximate center of the area.

XII. INDIAN LANDS - Place an "X" in the box if any part of the facility is located on Indian lands.

XIII. ATTACHMENTS - Note that information requirements vary depending on the injection well class and status. Attachments for Class I, II, III are described on pages 4 and 5 of this document and listed by Class on page 2. Place EPA ID number in the upper right hand corner of each page of the Attachments.

XIV. CERTIFICATION - All permit applications (except Class II) must be signed by a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, and by a principal executive or ranking elected official for a public agency. For Class II, the person described above should sign, or a representative duly authorized in writing.
INSTRUCTIONS - Attachments

Attachments to be submitted with permit application for Class I, II, III and other wells.

A. **AREA OF REVIEW METHODS** - Give the methods and, if appropriate, the calculations used to determine the size of the area of review (fixed radius or equation). The area of review shall be a fixed radius of 1/4 mile from the well bore unless the use of an equation is approved in advance by the Director.

B. **MAPS OF WELL/AREA AND AREA OF REVIEW** - Submit a topographic map, extending one mile beyond the property boundaries, showing the injection well(s) or project area for which a permit is sought and the applicable area of review. The map must show all intake and discharge structures and all hazardous waste treatment, storage, or disposal facilities. If the application is for an area permit, the map should show the distribution manifold (if applicable) applying injection fluid to all wells in the area, including all system monitoring points. Within the area of review, the map must show the following:

**Class I**

The number, name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, and other pertinent surface features, including residences and roads, and faults, if known or suspected. In addition, the map must identify those wells, springs, other surface water bodies, and drinking water wells located within one quarter mile of the facility property boundary. Only information of public record is required to be included in this map;

**Class II**

In addition to requirements for Class I, include pertinent information known to the applicant. This requirement does not apply to existing Class II wells;

**Class III**

In addition to requirements for Class I, include public water systems and pertinent information known to the applicant.

C. **CORRECTIVE ACTION PLAN AND WELL DATA** - Submit a tabulation of data reasonably available from public records or otherwise known to the applicant on all wells within the area of review, including those on the map required in B, which penetrate the proposed injection zone. Such data shall include the following:

**Class I**

A description of each well's types, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require. In the case of new injection wells, include the corrective action proposed to be taken by the applicant under 40 CFR 144.55.

**Class II**

In addition to requirement for Class I, in the case of Class II wells operating over the fracture pressure of the injection formation, all known wells within the area of review which penetrate formations affected by the increase in pressure. This requirement does not apply to existing Class II wells.

**Class III**

In addition to requirements for Class I, the corrective action proposed under 40 CFR 144.55 for all Class III wells.

D. **MAPS AND CROSS SECTION OF USDWS** - Submit maps and cross sections indicating the vertical limits of all underground sources of drinking water within the area of review (both vertical and lateral limits for Class I), their position relative to the injection formation and the direction of water movement, where known, in every underground source of drinking water which may be affected by the proposed injection. (Does not apply to Class II wells.)
E. NAME AND DEPTH OF USDWs (CLASS II) - For Class II wells, submit geologic name, and depth to bottom of all underground sources of drinking water which may be affected by the injection.

F. MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA - Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of injection and confining intervals) and generalized maps and cross sections illustrating the regional geologic setting. (Does not apply to Class II wells.)

G. GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES (Class II) - For Class II wells, submit appropriate geological data on the injection zone and confining zones including lithologic description, geological name, thickness, depth and fracture pressure.

H. OPERATING DATA - Submit the following proposed operating data for each well (including all those to be covered by area permits): (1) average and maximum daily rate and volume of the fluids to be injected; (2) average and maximum injection pressure; (3) nature of annulus fluid; (4) for Class I wells, source and analysis of the chemical, physical, radiological and biological characteristics, including density and corrosiveness, of injection fluids; (5) for Class II wells, source and analysis of the physical and chemical characteristics of the injection fluid; (6) for Class III wells, a qualitative analysis and ranges in concentrations of all constituents of injected fluids. If the information is proprietary, maximum concentrations only may be submitted, but all records must be retained.

I. FORMATION TESTING PROGRAM - Describe the proposed formation testing program. For Class I wells the program must be designed to obtain data on fluid pressure, temperature, fracture pressure, other physical, chemical, and radiological characteristics of the injection matrix and physical and chemical characteristics of the formation fluids.

For Class II wells the testing program must be designed to obtain data on fluid pressure, estimated fracture pressure, physical and chemical characteristics of the injection zone. (Does not apply to existing Class II wells or projects.)

For Class III wells the testing must be designed to obtain data on fluid pressure, fracture pressure, and physical and chemical characteristics of the formation fluids if the formation is naturally water bearing. Only fracture pressure is required if the program formation is not water bearing. (Does not apply to existing Class III wells or projects.)

J. STIMULATION PROGRAM - Outline any proposed stimulation program.

K. INJECTION PROCEDURES - Describe the proposed injection procedures including pump, surge, tank, etc.

L. CONSTRUCTION PROCEDURES - Discuss the construction procedures (according to §146.12 for Class I, §146.22 for Class II, and §146.32 for Class III) to be utilized. This should include details of the casing and cementing program, logging procedures, deviation checks, and the drilling, testing and coring program, and proposed annulus fluid. (Request and submission of justifying data must be made to use an alternative to packer for Class I.)

M. CONSTRUCTION DETAILS - Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.

N. CHANGES IN INJECTED FLUID - Discuss expected changes in pressure, native fluid displacement, and direction of movement of injection fluid. (Class III wells only.)

O. PLANS FOR WELL FAILURES - Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or wells failures, so as to prevent migration of fluids into any USDW.

P. MONITORING PROGRAM - Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.

Q. PLUGGING AND ABANDONMENT PLAN - Submit a plan for plugging and abandonment of the well including: (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade, and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the well in a state of static equilibrium prior to placement of the plugs. Also for a Class III well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDWs. Submit this information on EPA Form 7520-14, Plugging and Abandonment Plan.
R. **NECESSARY RESOURCES** - Submit evidence such as a surety bond or financial statement to verify that the resources necessary to close, plug or abandon the well are available.

S. **AQUIFER EXEMPTIONS** - If an aquifer exemption is requested, submit data necessary to demonstrate that the aquifer meets the following criteria: (1) does not serve as a source of drinking water; (2) cannot now and will not in the future serve as a source of drinking water; and (3) the TDS content of the ground water is more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system. Data to demonstrate that the aquifer is expected to be mineral or hydrocarbon production, such as general description of the mining zone, analysis of the amenability of the mining zone to the proposed method, and time table for proposed development must also be included. For additional information on aquifer exemptions, see 40 CFR Sections 144.7 and 146.04.

T. **EXISTING EPA PERMITS** - List program and permit number of any existing EPA permits, for example, NPDES, PSD, RCRA, etc.

U. **DESCRIPTION OF BUSINESS** - Give a brief description of the nature of the business.
Section 1 – Area of Review Methods/Calculations
TECHNICAL MEMORANDUM

TO: Dale Skoff, Tetra Tech OGA
FROM: Jeffrey Benegar
DATE: February 4, 2015
RE: Area of Review/Zone of Endangerment Analysis for Bittinger #3 and Smith-Ras #1 Wells – Bear Lake Properties

EXECUTIVE SUMMARY

This technical memorandum (TM) summarizes the analytical modeling we have performed for the area of review/zone of endangerment analysis for the Bittinger #3 and Smith-Ras #1 wells. The scenarios involved injecting simultaneously at existing Bear Lake Properties UIC Class IID brine disposal wells Bittinger #1, #4, and #2, all of which are located in Columbus Township, Warren County, Pennsylvania (the Bittinger #1 and Bittinger #4 wells received their final UIC Class IID (Commercial) well permits in November 2012 and Bittinger #2 in late 2014). The relevant parameters for our analysis were obtained from Bear Lake Properties, LLC or estimated in the absence of any information. Our analysis is described in more detail below.

OVERVIEW AND METHODOLOGY

There are several methods proposed for calculating the zone of endangerment of an injection well. The most simplistic method is the use of a fixed radius, based on the type of injection well being permitted. Other methods involve calculation of the radius based on well and formation properties. Most regulatory agencies require the use of calculations to determine the zone of endangerment. The method used here is the graphical method first used by US EPA Region 6. It involves the calculation of the increase of pressure in the formation due to injection, then converting that pressure into equivalent feet of head. The increase in head in the formation due to injection is then compared to the equivalent head of the lowest most underground source of drinking water (USDW). When plotted graphically, the intersection of those two curves at some distance, r, determines the radius of the zone of endangerment.

The increase in pressure in the formation due to injection depends on the properties of the injection fluid and the formation, the rate of fluid injection, and the length of time of injection. The most common mathematical expression to describe this increase in pressure was developed
by Matthews and Russell (1967). Matthews and Russell assume that, for a single well injecting into an infinite, homogeneous and isotropic, non-leaking formation, the increase in pressure (delta p) can be described as:

delta p = 162.6 Qμ / kh * [(log(kt / ΦμCr²) – 3.23] where:

delta p = pressure change (psi) at radius, r and time, t
Q = injection rate (barrels/day)
μ = injectate viscosity (centipoise)
k = formation permeability (millidarcies)
h = formation thickness (feet)
t = time since injection began (hours)
C = compressibility (total, sum of water and rock compressibility) (psi⁻¹)
r = radial distance from wellbore to point of investigation (feet)
Φ = average formation porosity (decimal)

PARAMETERS USED IN THE ANALYSIS

The following parameters were used in the zone of endangerment analysis. For injection rate, we used the average daily rate based on the permitted monthly rate for the three existing permitted Bear Lake Properties UIC Class IID wells, which is 30,000 bbls/month for each well, which averages approximately 1,000 bbls/day per well. For permeability, we used a value of 50 md, which we feel is conservative based on the injection rate sustainable for existing disposal wells at the site and the substantial volume of natural gas produced from the reservoir, both of which indicate significant permeability. The initial pressure at the top of the injection formation was based upon measurements taken prior to injection at the Bittinger #4 well.

**Bittinger #3 Medina Group Well**
Q = 1000 barrels/day
t = 10 years = 87,600 hours
μ = 1 centipoise
k = 50 md
h = 61 feet
C = 3.0e-06 psi⁻¹
Φ = 0.08
Specific gravity of injectate = 1.218
Surface elevation = 1638 feet
Depth to injection formation = 4260 feet
Base of lowest most USDW (MSL) = 1338 feet
Initial pressure at top of injection formation = 128 psi

**Smith-Ras #1 Medina Group Well**
Q = 1000 barrels/day
t = 10 years = 87,600 hours
μ = 1 centipoise
k = 50 md
h = 61 feet
C = 3.0e-06 psi^{-1}
Φ = 0.08
Specific gravity of injectate = 1.218
Surface elevation = 1575 feet
Depth to injection formation = 4222 feet
Base of lowest most USDW (MSL) = 1275 feet
Initial pressure at top of injection formation = 128 psi

Bittinger #2 Medina Group Well
Q = 1000 barrels/day
t = 10 years = 87,600 hours
μ = 1 centipoise
k = 50 md
h = 61 feet
C = 3.0e-06 psi^{-1}
Φ = 0.08
Specific gravity of injectate = 1.218
Surface elevation = 1621 feet
Depth to injection formation = 4279 feet
Base of lowest most USDW (MSL) = 1321 feet
Initial pressure at top of injection formation = 128 psi

Bittinger #1 Medina Group Well
Q = 1000 barrels/day
t = 10 years = 87,600 hours
μ = 1 centipoise
k = 50 md
h = 61 feet
C = 3.0e-06 psi^{-1}
Φ = 0.08
Specific gravity of injectate = 1.218
Surface elevation = 1518 feet
Depth to injection formation = 4210 feet
Base of lowest most USDW (MSL) = 1218 feet
Initial pressure at top of injection formation = 128 psi

Bittinger #4 Medina Group Well
Q = 1000 barrels/day
t = 10 years = 87,600 hours
μ = 1 centipoise
k = 50 md
h = 61 feet
C = 3.0e-06 psi^{-1}
Φ = 0.08
Specific gravity of injectate = 1.218
Surface elevation = 1561 feet
Depth to injection formation = 4285 feet
Base of lowest most USDW (MSL) = 1261 feet
Initial pressure at top of injection formation = 128 psi

RESULTS

The Matthews and Russell equation was solved for various distances from the wellbore based on the parameters listed above. The distance between each of the wells is:

<table>
<thead>
<tr>
<th>Wells</th>
<th>Distance (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bittinger #3 to Bittinger #2</td>
<td>2,052</td>
</tr>
<tr>
<td>Bittinger #3 to Bittinger #4</td>
<td>3,566</td>
</tr>
<tr>
<td>Bittinger #3 to Bittinger #1</td>
<td>3,779</td>
</tr>
<tr>
<td>Smith-Ras #1 to Bittinger #2</td>
<td>1,714</td>
</tr>
<tr>
<td>Smith-Ras #1 to Bittinger #4</td>
<td>2,584</td>
</tr>
<tr>
<td>Smith-Ras #1 to Bittinger #1</td>
<td>2,180</td>
</tr>
<tr>
<td>Smith-Ras #1 to Bittinger #3</td>
<td>1,980</td>
</tr>
<tr>
<td>Bittinger #1 to Bittinger #4</td>
<td>1,300</td>
</tr>
<tr>
<td>Bittinger #1 to Bittinger #2</td>
<td>2,000</td>
</tr>
<tr>
<td>Bittinger #2 to Bittinger #4</td>
<td>1,600</td>
</tr>
</tbody>
</table>

The Matthews and Russell equation was used to calculate the increase in pressure in the formation with only one well injecting. This was done for all five wells. Then, the calculated pressures for each well were added together and this sum was added to the value of existing pressure in the injection formation to obtain the total pressure in the formation when all five wells are injecting.

These values were then converted to feet of head of formation brine. The values are plotted against distance from the wellbore and are shown in Figure 1 for the Bittinger #3 well and Figure 2 for the Smith-Ras #1 well. The plot shows the calculated pressure surface within the injection formation, measured as feet of head of formation brine above the top of the injection formation. Also shown is the head of the lowest most USDW. Where the two lines intersect, the radius of the zone of endangerment can be estimated. The results indicate that the increase in head in the formation due to injection will intersect the elevation of the lowestmost USDW at a distance of approximately 4 feet for the Bittinger #3 well and approximately 60 feet for the Smith-Ras #1 well. These distances are well within the ¼ mile standard fixed radius for area of review/zone of endangerment.

CONCLUSIONS

Our analysis of the area of review/zone of endangerment for the Bittinger #3 and Smith-Ras #1 wells (injecting together with the Bittinger #2, #4, and #1 wells) is based on a methodology typically used by US EPA. Based on the results, we believe the Bittinger #3 and Smith-Ras #1 wells are excellent candidates for use as brine disposal wells. The increase in head in the formation due to injection intersects the elevation of the lowestmost USDW well within ¼ mile.
for each well. The standard fixed radius of ¼ mile can be used for the area of review/zone of endangerment for the Bittinger #3 and Smith-Ras #1 wells.

REFERENCES

Figure 1. Feet of head of injection formation and USDW vs. distance for Bittinger #3 when all wells (Bittinger #2, #1, #4 and Smith-Ras #1) are injecting, \( K = 50 \text{ md} \)
Figure 2. Feet of head of injection formation and USDW vs. distance for Smith-Ras #1 when all wells (Bittinger #2, #1, #4 and #3) are injecting, $K = 50$ md
Section 2 – Maps of Well Area and Area of Review
Section 2 – Maps of Well Area and Area of Review

According to publicly available records in the area, there are no intake or discharge structures, hazardous waste treatment, storage, or disposal facilities, mines, or quarries within one mile of the Bittinger #3 well. An intermittent unnamed tributary (UNT) to Tamarack Swamp is located approximately 1 mile southwest of the Bittinger #3 well. Tamarack Swamp is located approximately 1 mile southwest, Brokenstraw Creek is located approximately 1 mile northwest, and an UNT to Pine Valley Creek is located approximately 0.3 miles south of Bittinger #3.

The Pennsylvania Geologic Survey “Ground Water Inventory System” (GWIS) database was accessed to determine the sources of groundwater sources in the site area. The database search identified one well within the quarter mile AOR. It is noted that the well reporting requirement was established in 1968 is not considered to be a complete record of water wells and other wells may be present. (Pennsylvania Topographic and Geologic Survey, September 15, 2010). In addition to the one well on the PA GWIS database, eight additional water wells were identified with the AOR based on public input and a foot survey by Bear Lake Properties staff. Attached are a map showing the location of the above-referenced wells and a table summarizing information on the wells.

The names and addresses of residents located within ¼ mile of the proposed injection well are provided in Appendix A.
### Wells Located Within the 1/4 Mile Radius Area of Review (AOR) For The Bittinger #3 Well

<table>
<thead>
<tr>
<th>Well Owner / Name</th>
<th>API #</th>
<th>Lat</th>
<th>Long</th>
<th>TD</th>
<th>Drilling Completed</th>
<th>Last Csg</th>
<th>Csg depth</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear Lake Properties Bittinger #3 (Proposed InjectionWell)</td>
<td>123-33945</td>
<td>41.996022</td>
<td>-79.528068</td>
<td>4566 ft</td>
<td>10/19/1984</td>
<td>4.5 in</td>
<td>4508 ft</td>
<td>Perf’d and frac’d</td>
</tr>
<tr>
<td>405218*</td>
<td></td>
<td>41.99812</td>
<td>-79.5288</td>
<td>86 ft</td>
<td>34304</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>David Bemis #2</td>
<td>N/A</td>
<td>41.999667</td>
<td>-79.52733</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casper Goodrich</td>
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<td>-79.528217</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enos Miller</td>
<td>N/A</td>
<td>41.998267</td>
<td>-79.527367</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lion/Bear Lake Property</td>
<td>N/A</td>
<td>41.998367</td>
<td>-79.528617</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ted Smith</td>
<td>N/A</td>
<td>41.994867</td>
<td>-79.527767</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ron Cracker</td>
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<td>41.994767</td>
<td>-79.526617</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Charlie Williams</td>
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<td>41.993583</td>
<td>-79.526300</td>
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<td></td>
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<tr>
<td>Jeff McRay</td>
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<td>41.993650</td>
<td>-79.525033</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Oil and Gas and Proposed Injection Wells**

**Water Wells**
OIL & GAS WELL LOCATIONS
JOSEPH BITTINGER 3 WELL
BEAR LAKE PROPERTIES, LLC
WARREN COUNTY, PENNSYLVANIA
AREA OF REVIEW MAPS

GROUNDWATER WELLS
Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service.
3) Wells located based on foot survey conducted by Bear Lake Properties staff and input at public meetings.
Section 3 – Corrective Action Plan and Well Data
Section 3 - Corrective Action Plan and Well Data

According to publicly available records of oil and gas wells and a survey conducted by foot, there are no existing, or plugged and abandoned wells within the ¼ mile radius AOR for the Bittinger #3 well. The R. Craker #1 and D. Wright #1 wells will be used as monitoring wells. If the fluid level in either monitoring well is observed to rise up to within 100 feet of the base of the USDW, disposal operations in the Bittinger #3 well will be stopped immediately, EPA will be notified, and operating conditions will be evaluated in order to control the fluid levels.

Existing Oil and Gas Wells within the Area of Review

Well completion records are required to be submitted for all wells located within the AOR in order to evaluate the need for corrective action specific to each well. As mentioned above, there are no oil and gas wells located within the AOR.

Plugged and Abandoned Wells

No plugged and abandoned wells have been identified within the ¼ mile AOR for the Bittinger #3 well.
Section 4 – Name and Depth of USDWs
Section 4 - Underground Sources of Drinking Water (USDW)

The site lies within the Glaciated Plateau section of the Appalachian Plateaus Physiographic province. Both unconsolidated glacial units and bedrock are used for potable water. The uppermost unit at the site is mapped as Wisconsin age glacial kame deposits. Kame deposits consist primarily of sand and gravel interbedded with minor amounts of silt and clay (Pennsylvania Topographic and Geologic Survey, 1959). The well log for Bittinger #3 indicates that unconsolidated gravel is present from the surface to a depth of 30 feet below ground surface. The uppermost bedrock beneath the site is mapped as the Devonian age Venango formation. The Venango formation consists of interbedded pebble conglomerate, crossbedded sandstone, siltstone, and shale. This unit is up to 330 feet thick in Venango County; however, only a portion of the unit is present in the site area. This unit is used as an aquifer throughout Warren County. The well log for Bittinger #3 indicates that Devonian age shale is present from 30 ft to a depth of 2,816 ft below ground surface. This is believed to include the Venango Formation, the Chadokoin formation, and the underlying Bradford Group. Wells deeper than approximately 100 feet deep usually encounter salt water, which is supported by the generally shallow well depths in Columbus Township. (PADER, 1982, US Geologic Survey, 2007)

The Devonian age Chadakoin formation underlies Venango formation and consists of fine-grained marine clastics (siltstone and shale) and includes a purplish pink sequence which is often used as a marker unit. This unit is up to 450 thick in Warren County.

The Pennsylvania Geologic Survey “Ground Water Inventory System” (GWIS) database was accessed to determine the sources of groundwater sources in the site area. The database search identified one well within the quarter mile AOR. It is noted that the well reporting requirement was established in 1968 is not considered to be a complete record of water wells and other wells may be present. (Pennsylvania Topographic and Geologic Survey, September 15, 2010). In addition to the one well on the PA GWIS database, eight additional water wells were identified within the AOR based on public input and a foot survey by Bear Lake Properties staff. Section 2 of this application includes a map showing the location of the above-referenced wells and a table summarizing information on the wells.

The New York Department of Environmental Conservation (DEC) “Water Well Program Information Search Wizard” website was utilized to determine if there were any water wells in New York State within the ¼ mile AOR of the Bittinger #3 well. No water wells were identified within the AOR of the Bittinger #3 well.

Based on the available information, the glacial units and the top 100 feet of bedrock is considered the underground sources of drinking water in the site area. The well logs indicate that the glacial material is approximately 30 feet thick beneath the site. Freshwater is expected to be encountered to a depth of approximately 100 feet with increasing salinity beyond that depth. The Bittinger #3 well has 8 5/8 inch surface casing cemented to a depth of 405 feet below ground surface, providing a buffer of approximately 300 feet beyond the base of the underground sources of drinking water based on the well data in Columbus Township (maximum well depth of 130 feet) and the references indicating brine being encountered at depths over 100 feet within the bedrock units. In addition, production casing extends several thousands of feet below the drinking water source and is cemented approximately 900 feet above the injection interval. (Injection well construction is described in detail in the “Well Construction” section.)
In calculating the depth to the base of the lowermost USDW, the depth of the deepest well in the area 130 feet (it is believed that the generally shallow well depth in the area was related to water quality issues based on the available literature) was doubled and rounded upward to the nearest 100 feet, providing a conservative maximum depth estimate of the underground source of drinking water of 300 feet.

References:


UNDERGROUND SOURCES OF DRINKING WATER

BEDROCK MAP
BEDROCK MAP
JOSEPH BITTINGER 3 WELL
BEAR LAKE PROPERTIES, LLC
WARRENS COUNTY, PENNSYLVANIA

Legend
Dv  Venango Formation
Dch Chadakoin Formation
Ms  Shenango Formation
Mc  Cuyahoga Formation
MDcr Corry Sandstone through Riceville Formation

Image Source:
UNDERGROUND SOURCES OF DRINKING WATER

GLACIAL MAP
GLACIAL MAP
JOSEPH BITTINGER 3 WELL
BEAR LAKE PROPERTIES, LLC
WARREN COUNTY, PENNSYLVANIA

Legend
k Kames, kame terraces, kame moraines, and eskers
ol Outwash (valley trains), river terraces, lake deposits including beaches of former high levels of Lake Erie

Image Source:

DRAWN BY: S. PAXTON 01/28/15
CHECKED BY: D. SKOFF 01/28/15
APPROVED BY:
CONTRACT NUMBER: 2122-PB-00103

TETRA TECH
Section 5 – Geologic Data on Injection and Confining Zones
Section 5 – Geologic Data on Injection and Confining Zones

The well is designed to inject into the Grimsby and Whirlpool sandstone units of the Medina Group which occurs at depths between 4,260 and 4,439 feet below grade in the Bittinger #3 well. The Medina is a depleted reservoir in this area.

As seen on the generalized stratigraphic column (attached), most of the geologic “groups” and “formations” overlying the Medina can be considered confining units totaling approximately 2,000 feet. Although many of these units are predominantly shale, they also contain reservoir rock and are shown with shading in confining unit column. Therefore, the Lockport and the Salina are seen as the most significant confining units and have a combined thickness of approximately 800 feet in the site area. As indicated, these units provide only a portion of the confining capacity and there are numerous other units that provide further protection.

The characteristics of the Medina Group formations including the Grimsby and Whirlpool are described in the attached report prepared by Billman Geologic Consultants entitled, “Geologic Review of the Bittinger Area, Planned SWD Site”, dated August 2, 2010, and the cover letter dated April 5, 2014 discussing the Bittinger #2 well geologic characteristics. The subject report includes cross-sections in the vicinity of the Bittinger #3 well. As demonstrated by the cross-sections, the formation characteristics (lithology, thickness, porosity, etc.) of the Medina Group rocks in the Bittinger #3 well are very similar to those of the nearby wells including the three permitted brine disposal wells (Bittinger #1, #2 and #4 wells) operated by Bear Lake Properties.

Also attached are the following:

- Bittinger #3 completion record and geophysical log,
- Maximum Injection Pressure (MIP) calculations based on Instantaneous Shut-In Pressure (ISIP) data for the nearby Smith/Ras #1 well
- Smith/Ras #1 treatment reports.

Potential for Faults and Seismicity

As discussed in the attached Billman Geologic Consultants Report, geologic mapping performed at the Bear Lake Properties site as part of natural gas exploration and development in the Medina Group sandstone units has not identified evidence of significant faulting (e.g., duplicated intervals evident in log analysis, unusual thickening or thinning of intervals, etc.). Likewise the production of large volumes of natural gas from the Medina Group indicates the lack of significant faults which would allow for migration of the entrapped gas out of the Medina.

It is also noted that the Medina Group wells at the site are largely depleted resulting in lower than natural rock pressures. Production data for the Bittinger #3 are summarized on the attached table (referenced above) along with six other nearby wells. Cumulative gas production from the Bittinger #3 well is approximately 213 MMCF. Total production from all seven wells is over 1.75 BCF. The impact of removal of this large volume of gas is, as expected, a decrease in reservoir pressure. Injecting brine at or below the proposed maximum injection pressure would therefore not likely result in “overpressuring” faults (if any do exist in the area) and causing movement.

Finally, it is highly unlikely that injection at the site would engage any deep, Pre-Cambrian basement faults. According to the PA DCNR “Precambrian Basement Map of the Appalachian Basin and Piedmont Province in Pennsylvania” http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_016250.pdf the depth to
A review of the PA DCNR “Earthquake Epicenters in and Near Pennsylvania” (attached) indicates that there have been no recorded seismic events within 25 miles of the disposal project area since 1724, the start of the reporting period.

In summary, a detailed review of the zone of injection and data on geologic strata surrounding the zone of injection for the proposed brine disposal well, indicates the following supporting evidence that seismicity is highly unlikely: 1) The detailed geologic cross-sections (Appendix 2 of the Billman Geologic Consultants Report) and isopach and structural mapping completed by Billman Geologic Consultants show no evidence of faulting in the study area. 2) Historic production of over 1.75 billion cubic feet of gas among the Bittinger #1, #2, #3 and #4, Smith Ras #1 and Trisket #1 and #2 wells and unknown volumes of formation brine from the proposed zone of injection near the Bittinger #3 has depleted the zone of almost 90% of its original reservoir pressure. The disposal operations will re-fill this void space over the life of the project. 3) There have been no recorded seismic events within 25 miles of the disposal project area since 1724, the start of the reporting period referenced in the PA DCNR earthquake epicenters map.
GEOLOGIC DATA

GENERALIZED STRATIGRAPHIC COLUMN
## Generalized Stratigraphic Column

**Bittinger No 3**  
**Warren County, PA**

<table>
<thead>
<tr>
<th>Age</th>
<th>Group</th>
<th>Formation</th>
<th>Predominant Rock Type</th>
<th>Total Depth to Base (Feet)</th>
<th>Thickness (Feet)</th>
<th>Confining Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glacial Units</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Venango</td>
<td></td>
<td>Shale/sandstone</td>
<td></td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Chadakoin</td>
<td></td>
<td>Shale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Bradford</td>
<td></td>
<td>Shale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Elk</td>
<td></td>
<td>Shale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Java</td>
<td></td>
<td>Shale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>West Falls</td>
<td></td>
<td>Shale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Sonyea</td>
<td></td>
<td>Shale</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Upper Devonian</td>
<td>Genesee</td>
<td></td>
<td>Shale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Tully Limestone</td>
<td></td>
<td>Limestone</td>
<td></td>
<td>2926</td>
<td>110</td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Hamilton</td>
<td>Mahantango</td>
<td>Shale, some sandstone</td>
<td></td>
<td>3097</td>
<td>171</td>
</tr>
<tr>
<td>Upper Devonian</td>
<td>Hamilton</td>
<td>Marcellus Shale</td>
<td>Shale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle Devonian</td>
<td>Onondaga</td>
<td></td>
<td>Limestone</td>
<td></td>
<td>3256</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unconformity Interval</td>
<td></td>
<td></td>
<td>3285</td>
<td>29</td>
</tr>
<tr>
<td>Upper Silurian</td>
<td>Salina - including Akron-Berite, Camillus, Syracuse, Vernon</td>
<td>Evaporites/Dolomite</td>
<td></td>
<td></td>
<td>3900</td>
<td>615</td>
</tr>
<tr>
<td>Upper Silurian</td>
<td>Lockport Dolomite</td>
<td></td>
<td>Dolomite</td>
<td></td>
<td>4108</td>
<td>208</td>
</tr>
<tr>
<td>Lower Silurian</td>
<td>Clinton</td>
<td>Rochester Shale, Irondequoit-Reynales Dolomite</td>
<td>Sandstone</td>
<td></td>
<td>4260</td>
<td>122</td>
</tr>
<tr>
<td>Lower Silurian</td>
<td>Medina, including the Grimsby and Whirlpool Sandstones</td>
<td>Sandstone/Shale</td>
<td></td>
<td></td>
<td>4439</td>
<td>179</td>
</tr>
</tbody>
</table>

### Notes
- Black shading indicates that this unit is considered to be a confining zone
- Diagonal shading indicates that this unit is a confining unit that also contains producing zones within it
- No shading indicates that this unit is a producing zone and is not considered to be a confining unit
GEOLOGIC DATA

BITTINGER #3 COMPLETION RECORD
COLUMBUS FIELD DEWEY CORNERS PA W

PF: U. S. Energy Development Corporation

PHONE NO: 716-856-9764

STREET: Staller Building, Buffalo, New York

ZIP: 14202

TOWNSHIP: Columbus

COUNTY: Matter

DRILLING COMMENCED: 10/16/94

DRILLING COMPLETED: 10/17/94

ELEVATION: 1638' DL

CAGING AND TUBING RECORD

PIPE SIZE | AMOUNT IN WELL | MATERIAL | MENT | Type | Size | Depth | DATE RUN
---|---|---|---|---|---|---|---
13 3/8" | 38' | CEMENT (lbs) | | | | | 10/16/94
8 5/8" | 405' | GEL (lbs) | | | | | 10/17/94
4 1/2" | 4508' | CEMENT (lbs) | | | | | 10/20/94

T.D. | O.P.I. | Class | S.G. | Lease
---|---|---|---|---
4334' | | | | 

PERFORATION RECORD

DATE | INTERVAL PERFORATED FROM TO | STIMULATION RECORD
---|---|---
10/26/84 | 4321' | 4334' | 11/3/84 | 4321' | 1188 bbls | 85,000# | 27 BPM

NATURAL GHE FLOW

3000 BPH

2,524 SCF/BD

DIEF

72 DEG

REAPPS

Driller's TD 4528'

Lauger's TD 656-

MEDINA

RECEIVED

JUL 12 1986

PA GEOLOGIC SURVEY

(1-15 KS)
<table>
<thead>
<tr>
<th>FORMATIONS</th>
<th>TOP</th>
<th>BOTTOM</th>
<th>GAS AT</th>
<th>OIL AT</th>
<th>WATER AT (FRESH OR SALT WATER)</th>
<th>SOURCE OF DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconsolidated Gravel</td>
<td>0'</td>
<td>30'</td>
<td></td>
<td></td>
<td>Fresh at 60'</td>
<td>Driller's records and geophysical logs</td>
</tr>
<tr>
<td>Devonian Shales</td>
<td>30'</td>
<td>2816'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Tully&quot; LS</td>
<td>2816'</td>
<td>2926'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamilton Shale</td>
<td>2926'</td>
<td>3097'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onondaga</td>
<td>3097'</td>
<td>3256'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unconformity Interval</td>
<td>3256'</td>
<td>3285'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Akron-Bertie</td>
<td>3285'</td>
<td>3370'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camillus</td>
<td>3370'</td>
<td>3442'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syracuse</td>
<td>3442'</td>
<td>3641'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt Zone</td>
<td>3641'</td>
<td>3828'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernon</td>
<td>3828'</td>
<td>3900'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lockport</td>
<td>3900'</td>
<td>4108'</td>
<td></td>
<td></td>
<td>Salt at 4070'</td>
<td></td>
</tr>
<tr>
<td>Rochester</td>
<td>4108'</td>
<td>4224'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irondequoit-Reynales</td>
<td>4224'</td>
<td>4260'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grimsby</td>
<td>4260'</td>
<td>4386'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Glen</td>
<td>4386'</td>
<td>4424'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whirlpool</td>
<td>4424'</td>
<td>4439'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queenston</td>
<td>4439'</td>
<td>TD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

November 20, 1980

R. L. W

Dorothy K. Welsh, Geophysicist
GEOLOGIC DATA

MAXIMUM INJECTION PRESSURE CALCULATIONS
Maximum Injection Pressure (MIP) Calculations for Bear Lake Properties Bittinger #3 Well
Warren County, PA

1) Frac Gradient (FG) Based on Nearby Smith-Ras #1 Well

\[
FG = \frac{ISIP + (0.433 \times SG \times D)}{D}
\]

Where:
ISIP = 2200 psi
SG = 1.0 (frac fluid)
D = 4391

<table>
<thead>
<tr>
<th>Well</th>
<th>ISIP (psi)</th>
<th>Hydrostatic Factor (psi/ft)</th>
<th>SG</th>
<th>D (ft)</th>
<th>Fracture Gradient (psi/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith/Ras #1</td>
<td>2200</td>
<td>0.433</td>
<td>1</td>
<td>4391</td>
<td>0.934</td>
</tr>
</tbody>
</table>

2) Maximum Injection Pressure (MIP) Calculation for Bittinger #3 Well Using FG from Smith-Ras #1 Frac

\[
MIP = [FG - (0.433 \times SG)] \times D
\]

FG = 0.934
SG = 1.218 (brine)

Depth:
Medina Top 4260

<table>
<thead>
<tr>
<th>Well</th>
<th>Hydrostatic Factor (psi/ft)</th>
<th>SG</th>
<th>D (ft)</th>
<th>Fracture Gradient (psi/ft)</th>
<th>MIP (Surface)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bittinger #3</td>
<td>-</td>
<td>0.433</td>
<td>1.218</td>
<td>0.934</td>
<td>1732</td>
</tr>
</tbody>
</table>
GEOLOGIC DATA

BILLMAN GEOLOGIC CONSULTANTS REPORT
GEOLOGIC DATA

SMITH - RAS #1 WELL DATA
**WELL RECORD**

**WELL OPERATOR:** U.S. Energy Development Corporation  
**TELEPHONE NO.:** (716)836-9764

**ADDRESS:** 870 Statler Building; Buffalo, NY  
**ZIP:** 14202

**FARM NAME:** Smith/Res Unit  
**FARM NO.:** #1  
**SERIAL NO.:** 72  
**ACRES:**

**TOWNSHIP:** Columbus  
**COUNTY:** Warren

**DRILLING COMMENCED:** 3/24/84  
**DRILLING COMPLETED:** 3/26/84

**ELEVATION:** 1575'  
**QUADRANGLE:** Columbus

### Casing and Tubing Record

<table>
<thead>
<tr>
<th>PIPE</th>
<th>AMOUNT IN WELL</th>
<th>MATERIAL BEHIND PIPE</th>
<th>Packer</th>
<th>DATE RUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 5/8&quot;</td>
<td>4067'</td>
<td>150</td>
<td></td>
<td>3/22/84</td>
</tr>
<tr>
<td>4 1/2&quot;</td>
<td>4803'</td>
<td>75</td>
<td></td>
<td>3/26/84</td>
</tr>
</tbody>
</table>

### Perforation Record

<table>
<thead>
<tr>
<th>DATE</th>
<th>INTERVAL PERFORATED</th>
<th>AMOUNT</th>
<th>AMOUNT</th>
<th>INJECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/27/84</td>
<td>4202' - 4383'</td>
<td>4202' - 4383'</td>
<td>874 bbl</td>
<td>50,000#</td>
</tr>
</tbody>
</table>

### Stimulation Record

<table>
<thead>
<tr>
<th>DATE</th>
<th>INTERVAL PERFORATED</th>
<th>AMOUNT</th>
<th>AMOUNT</th>
<th>INJECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/22/84</td>
<td>4202' - 4383'</td>
<td>4202' - 4383'</td>
<td>874 bbl</td>
<td>50,000#</td>
</tr>
</tbody>
</table>

**Natural Open Flow:** Not Taken  
**Natural Rock Pressure:** Not Taken  
**After Treatment Open Flow:** 1240 PSF  
**After Treatment Rock Pressure:** 1240 PSF

**Remarks:** Driller's TD 4525'  
Logger's TD 4518'

(formation on reverse side)
<table>
<thead>
<tr>
<th>FORMATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NAME</strong></td>
</tr>
<tr>
<td>Unconsolidated Gravel</td>
</tr>
<tr>
<td>Devonian Shale</td>
</tr>
<tr>
<td>&quot;Tully&quot; Limestone</td>
</tr>
<tr>
<td>Hamilton Shales</td>
</tr>
<tr>
<td>Onondaga</td>
</tr>
<tr>
<td>Unconformity Interval</td>
</tr>
<tr>
<td>Akron-Bertie</td>
</tr>
<tr>
<td>Camillus</td>
</tr>
<tr>
<td>Syracuse</td>
</tr>
<tr>
<td>Vernon</td>
</tr>
<tr>
<td>Salt Zone</td>
</tr>
<tr>
<td>Lockport</td>
</tr>
<tr>
<td>Rochester</td>
</tr>
<tr>
<td>Irondequoit-Reynales</td>
</tr>
<tr>
<td>Grimsby</td>
</tr>
<tr>
<td>Power Glen</td>
</tr>
<tr>
<td>Whirlpool</td>
</tr>
<tr>
<td>Queenston</td>
</tr>
<tr>
<td>TD</td>
</tr>
</tbody>
</table>

**DATE**: July 17, 1984

**APPROVED BY**: Douglas K. Walch, Geophysicist
PERFORATION RECORD

Company: E L McCallough
Formation: Water
Date: 6/26/86

Pumped in 500 gal. acid and 500 gal. water; ran Gamma Ray and collar log.
FSTD: 4182 ft. Perf. as follows:

<table>
<thead>
<tr>
<th>Size of shots</th>
<th>Total Shots</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>10</td>
</tr>
</tbody>
</table>

FRAC JOB

Company: Davell Schubert
Date: 6/27/86

Loaded hole. Broke formation @ 2100 ft. Back to 250 ft. Pumped in 500 gals.
152 HCL Acid @ 20 BPM @ 3500 ft, waited 5 min. & froced as follows:

<table>
<thead>
<tr>
<th>BBLS./GALL</th>
<th># Per Gall</th>
<th>SAND</th>
<th>Size</th>
<th>BPM</th>
<th>Press</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 0-16</td>
<td>2</td>
<td>24</td>
<td>20/50</td>
<td>23</td>
<td>3350</td>
</tr>
<tr>
<td>2. 144-325</td>
<td>2</td>
<td>24</td>
<td>20/50</td>
<td>21</td>
<td>3350</td>
</tr>
<tr>
<td>3. 326-630</td>
<td>3</td>
<td>24</td>
<td>20/50</td>
<td>21</td>
<td>3350</td>
</tr>
<tr>
<td>4. 631-675</td>
<td>4</td>
<td>24</td>
<td>20/50</td>
<td>20</td>
<td>3500</td>
</tr>
<tr>
<td>5. 676-679</td>
<td>4</td>
<td>24</td>
<td>20/50</td>
<td>20</td>
<td>3500</td>
</tr>
<tr>
<td>6. 680-689</td>
<td>4</td>
<td>24</td>
<td>20/50</td>
<td>20</td>
<td>3500</td>
</tr>
</tbody>
</table>

ISIP: 2200 # 5 MIN. 1950 # Job complete 12:26 P.M.

Open to pit 11:26 P.M. Flowed back 24 hrs. Total water 675 bbls.
52,000 # 20/50 & --- --- 80/100. Avg. pump rate 21 BPM @ 3360 # Press
HHP used 1724. Nitrogen used 150,000.

REMARKS: At 340 BBLS cut H2 due to high pressure - at 615 BBLS cut sand due to high pressure - well screened off - 4 BBLS short of flush to perf.

[Signature]

7-6-86
GEOLOGIC DATA

MEDINA GAS PRODUCTION SUMMARY

<table>
<thead>
<tr>
<th>Permit</th>
<th>Company</th>
<th>Year</th>
<th>Product</th>
<th>Quantity</th>
<th>Days</th>
<th>County</th>
<th>Municipality</th>
<th>Farm_Name</th>
<th>Farm_Well_No</th>
<th>Field</th>
<th>Pool</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>123-39874</td>
<td>US ENERGY DEV CORP</td>
<td>1987</td>
<td>GAS 25,581</td>
<td>308</td>
<td>WARREN COLUMBUS</td>
<td>R TRISKET</td>
<td>1</td>
<td>COLUMBUS DEWEY CORNERS</td>
<td>14-Dec-84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>123-39874</td>
<td>US ENERGY DEV CORP</td>
<td>1987</td>
<td>GAS 26,012</td>
<td>322</td>
<td>WARREN COLUMBUS</td>
<td>R TRISKET</td>
<td>1</td>
<td>COLUMBUS DEWEY CORNERS</td>
<td>14-Dec-84</td>
<td></td>
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<td></td>
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<tr>
<td>123-39874</td>
<td>US ENERGY DEV CORP</td>
<td>1988</td>
<td>GAS 34,865</td>
<td>307</td>
<td>WARREN COLUMBUS</td>
<td>R TRISKET</td>
<td>1</td>
<td>COLUMBUS DEWEY CORNERS</td>
<td>14-Dec-84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>123-39874</td>
<td>US ENERGY DEV CORP</td>
<td>1989</td>
<td>GAS 60,104</td>
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**Permit** | **Company** | **Year** | **Product** | **Quantity** | **Days** | **County** | **Municipality** | **Farm_Name** | **Field** | **Completion Date** |
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<td>1994</td>
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Total All 7 wells: 1,751,614
GEOLOGIC DATA

EARTHQUAKE EPICENTERS MAP (PA DCNR)
Section 6 – Operating Data
Section 6 - Operating Data

The proposed commercial brine disposal well will primarily be utilized to inject produced and flowback water from wells completed in the Marcellus Shale, the Medina Group and other natural gas and oil producing formations. Other oil and gas related wastewaters associated with the production of oil and natural gas or natural gas storage operations, which are approved by EPA for injection under a UIC Class II D injection well, may also be injected. According to Title 40 Chapter I Sec. 144.6 (b)(1), such fluids include those “Which are brought to the surface in connection with natural gas storage operations, or 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.”

Injection Rate

Injection rate and pressure data collected to date for the nearby Bittinger #4 permitted brine disposal well indicate the well is capable of a sustainable injection rate of approximately 1,000 bbls/day while operating within the maximum injection pressure permit limit. This is consistent with the permitted injection volume of 30,000 bbls/month for this well. (The 2014 Annual Disposal/Injection Well Monitoring Report for Bittinger #4 is attached.) Considering the proximity of the Bittinger #3 well to the Bittinger #4 well (which is located approximately 0.5 mile to the west) and the similarity in the injection interval based on log analysis, it is anticipated that the Bittinger #3 well can also be operated at this injection rate while staying below the proposed MIP. (Please see the attached Billman Geologic Consultants report and included geologic cross-sections.) An injection rate of 30,000 bbls/month is therefore also proposed for the Bittinger #3 well.

Maximum Allowable Surface Injection Pressure (MASIP) and Average Surface Injection Pressure

MASIP calculations based on EPA approved equations are included in the “Geologic Data” section of this application. Based on these calculations, the proposed MASIP is 1732 psi. It is estimated that the average surface injection pressure will be approximately 1000 psi.

Laboratory Analysis of Injection Fluid Samples

Laboratory analytical results for samples representative of the types of brine which will be injected into the proposed injection well are attached. Samples were collected from produced water generated from gas wells in the vicinity of the injection well as well as Marcellus brine from a brine processing facility.

Monitoring of Injection Fluid Samples and Well

The following identifies the UIC Class II underground injection well regulatory requirements and operational procedures which will be conducted to meet the subject requirements:

1. **Monitoring of the nature of injected fluids at time intervals sufficiently frequent to yield data representative of their characteristics.** An initial sample of fluid will be collected and analyzed from initial loads proposed for disposal from new disposal customers. In addition, samples will be collected for analysis from new types of sources (e.g., from different geologic formations, geographic regions, etc.) which would be expected to differ significantly from brine previously characterized for disposal at the facility. Samples will be analyzed for the following parameters at a minimum: specific gravity, total dissolved solids and pH.

2. **Observation of injection pressure, flow rate, and cumulative volume at least weekly based on the regulatory requirements for produced fluid disposal operations.** Injection pressures,
annular pressure, injection rate, and cumulative volume will be continuously monitored and recorded electronically.

3. **A demonstration of mechanical integrity pursuant to 40 CFR Sec. 146.8 at least once every two years during the life of the injection well.** A mechanical integrity test will be performed prior to initiating injection and at least once every two years.

4. **Maintenance of the results of all monitoring until the next permit review.** All monitoring records will be maintained throughout the life of the well.

Reporting requirements consist of the following:

An annual report will be submitted to EPA summarizing the results of the required monitoring, including monthly records of injected fluids, and any major changes in characteristics or sources of injected fluid.

**Proposed Annulus Fluid**

The proposed annulus fluid for the proposed injection well will consist of fresh water and a water soluble corrosion inhibitor. The corrosion inhibitor will be mixed in accordance with the manufacturer's recommendations then loaded into the well annulus prior to conducting injection operations. Product information for the type of corrosion inhibitor which will be utilized is attached. A similar type product may be used instead of the example product referenced.

**Facility Layout and Operation**

The attached drawing shows the following elements of the existing Bear Lake Properties brine disposal well facility including the recently permitted and constructed brine storage area. The brine storage facility was permitted as a residual waste transfer facility under PADEP residual waste regulations. The following key elements of the brine disposal facility are shown on the attached drawing:

- Existing permitted brine offloading facility located at the corner of State Route 4004 and State Line Road;
- The brine storage facility (located near the Bittinger #2 well) which is connected to the unloading area by underground double-walled piping; and,
- The three existing permitted UIC Class IID wells (Bittinger #1, #2 and #4) plus proposed UIC Class IID wells (Bittinger #3 and Smith-Ras Unit #1).

The brine storage facility has a capacity of 3,000 barrels and is anticipated to be operational during the First Quarter of 2015. A drawing showing details of the brine storage facility is attached.

Once the brine storage facility is operational, brine will be pumped from the offload station via the dual (secondary containment) pipeline to the storage tanks at the brine storage facility. The brine will then be pumped from the brine storage facility via high pressure dual (secondary containment) pipelines to the permitted brine disposal wells for injection.

The storage tanks in the brine storage area are located within a diked containment area with the containment area sized to account for the entire volume of the largest container, plus 10%. Automatic shut-off valves are incorporated into the tank design to prevent overflow during filling operations. The facility is surrounded by a fence having locking entrance and exit gates. A security camera is also strategically situated on the site.
OPERATING DATA

TYPICAL BRINE LABORATORY ANALYSIS
KCS LENAPE RESOURCES CORP.  
9489 ALEXANDER ROAD  
ALEXANDER NY 14005

Subject: LION ENERGY - BRINE SAMPLE SUBMITTED 7/13/01

<table>
<thead>
<tr>
<th>LION ENERGY - BRINE SAMPLE</th>
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<tr>
<td>BY WT. SALTS IN BRINE</td>
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<tr>
<td>CI:</td>
</tr>
<tr>
<td>CHLORIDE</td>
</tr>
<tr>
<td>POTASSIUM</td>
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<td>MAGNESIUM</td>
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<tr>
<td>SODIUM</td>
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<td>SPECIFIC GRAVITY</td>
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<tr>
<td>CALCIUM CHLORIDE</td>
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<tr>
<td>SODIUM CHLORIDE</td>
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<tr>
<td>POTASSIUM CHLORIDE</td>
</tr>
<tr>
<td>MAGNESIUM CHLORIDE</td>
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<tr>
<td>TOTAL CHLORIDES</td>
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</tr>
<tr>
<td>TOTAL CHLORIDES</td>
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<tr>
<td>WEIGHT OF 1 GALLON OF BRINE</td>
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ANALYSIS BY NYS LAB: 10121

\[ S. G. = \frac{10.15 \text{ lbs/gal}}{8.73 \text{ lbs/gal}} = 1.218 \]

Certificate Of Analysis Continued On Next Page
## Client Sample Results

**Client:** Bear Lake Properties, LLC  
**Project/Site:** Injection Well Permitting

**Sample ID:** CW 011013  
**Lab Sample ID:** 180-17986-1

**Date Collected:** 01/10/13 13:30  
**Date Received:** 01/11/13 09:30

## Method: 200.8 - Metals (ICP/MS) - Total Recoverable

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## General Chemistry

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Corrosion Inhibitor Sticks™

WHAT ARE CORROSION INHIBITOR STICKS™?
Corrosion Inhibitor Sticks™ are water soluble or oil soluble sticks that contain a blend of Imidazolines which have excellent film forming characteristics and low emulsion tendencies. This unique blend gives effective corrosion control for most oil field corrosion problems.

CORROSION INHIBITOR STICK™ USES
Corrosion Inhibitor Sticks™ are primarily used to control common corrosion problems found in producing oil and gas well systems. They can be used to treat hard to reach ‘dead’ areas such as the annulus space above the packer, rat-hole, or the bottom of water supply tanks.

ADVANTAGES OF CORROSION INHIBITOR STICKS™
Corrosion Inhibitor Sticks™ can provide corrosion control throughout the entire production system. Regular usage will help control corrosion at the point they begin - down-hole.

They are available in two different formulations (oil soluble and water dispersable) or (water soluble and oil dispersable). The oil soluble type is soluble in oil, condensate and wet gas and can slowly disperse inhibitor into the water phase. The water soluble type is soluble in water and can slowly disperse inhibitor into the oil phase.

Corrosion Inhibitor Sticks™ can effectively inhibit corrosion in wells that produce both water and distillate or oil phases. In this case, it may be desirable to treat the well with both types of sticks by first dropping water soluble sticks and allowing them to fall through the oil into the water, thus dissolving and releasing inhibitor in

TREATMENT DETERMINATION
The number of Corrosion Inhibitor Sticks™ used is based on the volume of total fluid produced (oil or condensate plus water). Field experience indicates that for most corrosive environments the best results are achieved by using a larger initial slug treatment (80 PPM daily) until the problem is under control then reduce to smaller periodic treatments (40 PPM daily) thereafter. EXAMPLE: An initial slug treatment of 80 PPM would require 0.64 lbs of Corrosion Inhibitor Stick™ per 24 BBL (1000 gallons) of total fluid produced.

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<th>COR. INH. STICK™ SIZES</th>
<th>STICKS PER BBL</th>
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<tr>
<td>SENIOR (1 5/8&quot; x 18&quot;)</td>
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<td>JUNIOR (1 3/8&quot; x 16&quot;)</td>
<td>1 per 40 bbls</td>
</tr>
<tr>
<td>JUNIOR (1 1/4&quot; x 15&quot;)</td>
<td>1 per 29 bbls</td>
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<tr>
<td>THRIFTY (1&quot; x 15&quot;)</td>
<td>1 per 18 bbls</td>
</tr>
<tr>
<td>MIDGET (5/8&quot; x 15&quot;)</td>
<td>1 per 7 bbls</td>
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NOTE: To successfully control any corrosion problem, the inhibitor insertion into the fluid stream must be constant. For intermittent treatment or extreme corrosive environments increase the number of sticks accordingly.

THE MOST COMMON PROCEDURE for producing wells is to shut-in well and drop sticks through lubricator. Leave well shut until sticks fall to the bottom. The time in minutes for the sticks to fall to the bottom (assuming well is shut-in with fluid at surface) is equal to the depth divided by 100. (Time, min. = Depth, ft / 100).

FOR WATER INJECTION SYSTEMS drop the sticks into the water supply tank to inhibit more of the system.
the water column). Then drop the oil soluble sticks which will "FLOAT" at where the oil and water contact thus slowly dissolving and releasing inhibitor in the oil column.

The sticks are economical when compared to conventional corrosion control operations and therefore save investment in pumps, drums of chemical, and equipment maintenance.

Corrosion Inhibitor Sticks™ may be used in wells with bottom hole temperatures (BHT) of up to 375 degrees Fahrenheit.

**Production Specifications**

**Oil Soluble**: The stick will dissolve in 20 to 120 minutes (in moving diesel) depending on temperature, salt content, and relative fluid motion. The stick will melt at 135 degrees Fahrenheit and the specific gravity is 0.95.

**Water Soluble**: The stick will dissolve in 12 to 24 hours (in 60,00 PPM moving brine water) depending on temperature, salt content, and relative fluid motion. The stick will melt at 125 degrees Fahrenheit and the specific gravity is 1.10.

**Product Packaging**

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<td>lb/stick</td>
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<td>216/chest</td>
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**Where to Buy**

All good oil field supply stores carry Aqua-Clear, Inc. Corrosion Inhibitor Sticks™, but you can also buy direct from us.

**Ordering Information**

Should you wish to speak to a sales representative about any of our products, you can call or email Tommy Halloran Jr., Ronald "Buster" Wilson, or Russell Cook directly:

**Tommy Halloran Jr.**
W 304-343-4792
H 304-345-5152
C 304-546-8526
tom@aquaclear-inc.com

**Ronald "Buster" Wilson**
W 304-546-8518
H 304-965-7996
Fax 304-965-2713
buster@aquaclear-inc.com

**Russell Cook**
W 304-546-2940
H 304-842-7050
Fax 304-842-7050
russell@aquaclear-inc.com

OPERATING DATA

FACILITY LAYOUT SCHEMATIC
# ANNUAL DISPOSAL/INJECTION WELL MONITORING REPORT

## Name and Address of Existing Permittee
- Bear Lake Properties, LLC
  - 3000 Village Run Road, Unit 103, #223, Wexford, PA 15090

## Name and Address of Surface Owner
- Miles Sampsel
  - 8250 Pangan Rd., Erie, PA 16509

## Locate Well and Outline Unit on Section Plat - 640 Acres

![Well Location Diagram]

## State
- Pennsylvania

## County
- Warren

## Permit Number
- PAS2Z215 BWAR

## 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. frm (N/S) _______ Line of quarter section
  - _______ ft. from (E/W) _______ Line of quarter section

## WELL ACTIVITY
- [ ] Brine Disposal
- [ ] Individual
- [ ] Enhanced Recovery
- [ ] Area
- [ ] Hydrocarbon Storage

## TYPE OF PERMIT
- [ ] Number of Wells

## Lease Name
- Bittinger

## Well Number
- 4

## INJECTION PRESSURE

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<th>MONTH</th>
<th>YEAR</th>
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<th>MAXIMUM PSIG</th>
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<td></td>
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<td></td>
<td>1200</td>
<td>1460</td>
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<td>14586</td>
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<td>1580</td>
<td>1620</td>
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<td>200</td>
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<tr>
<td>December-2014</td>
<td></td>
<td>1590</td>
<td>1620</td>
<td>8559</td>
<td>200</td>
</tr>
</tbody>
</table>

## 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):**
- John C. Holko, Vice President

**Signature:**

**Date Signed:**
- 01/29/15

EPA Form 7520-11 (Rev. 12-11)
OPERATING DATA

TYPICAL CORROSION INHIBITOR
Corrosion Inhibitor Sticks™

WHAT ARE CORROSION INHIBITOR STICKS™?
Corrosion Inhibitor Sticks™ are water soluble or oil soluble sticks that contain a blend of Imidazolines which have excellent filming characteristics and low emulsion tendencies. This unique blend gives effective corrosion control for most oil field corrosion problems.

CORROSION INHIBITOR STICK™ USES
Corrosion Inhibitor Sticks™ are primarily used to control common corrosion problems found in producing oil and gas well systems. They can be used to treat hard to reach 'dead' areas such as the annulus space above the packer, rat-hole, or the bottom of water supply tanks.

ADVANTAGES OF CORROSION INHIBITOR STICKS™
Corrosion Inhibitor Sticks™ can provide corrosion control throughout the entire production system. Regular usage will help control corrosion at the point they begin - down-hole.

They are available in two different formulations (oil soluble and water dispersable) or (water soluble and oil dispersable). The oil soluble type is soluble in oil, condensate and wet gas and can slowly disperse inhibitor into the water phase. The water soluble type is soluble in water and can slowly disperse inhibitor into the oil phase.

Corrosion Inhibitor Sticks™ can effectively inhibit corrosion in wells that produce both water and distillate or oil phases. In this case, it may be desirable to treat the well with both types of sticks by first dropping water soluble sticks and allowing them to fall through the oil into the water, thus dissolving and releasing inhibitor in

TREATMENT DETERMINATION
The number of Corrosion Inhibitor Sticks™ used is based on the volume of total fluid produced (oil or condensate plus water). Field experience indicates that for most corrosive environments the best results are achieved by using a larger initial slug treatment (80 PPM daily) until the problem is under control then reduce to smaller periodic treatments (40 PPM daily) thereafter. EXAMPLE: An initial slug treatment of 80 PPM would require 0.64 lbs of Corrosion Inhibitor Stick™ per 24 BBL (1000 gallons) of total fluid produced.

<table>
<thead>
<tr>
<th>COR. INH. STICK™ SIZES</th>
<th>STICKS PER BBL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENIOR (1 5/8&quot; x 18&quot;)</td>
<td>1 per 58 bbls</td>
</tr>
<tr>
<td>JUNIOR (1 3/8&quot; x 16&quot;)</td>
<td>1 per 40 bbls</td>
</tr>
<tr>
<td>JUNIOR (1 1/4&quot; x 15&quot;)</td>
<td>1 per 29 bbls</td>
</tr>
<tr>
<td>THRIFTY (1&quot; x 15&quot;)</td>
<td>1 per 18 bbls</td>
</tr>
<tr>
<td>MIDGET (5/8&quot; x 15&quot;)</td>
<td>1 per 7 bbls</td>
</tr>
</tbody>
</table>

NOTE: To successfully control any corrosion problem, the inhibitor insertion into the fluid stream must be constant. For intermittent treatment or extreme corrosive environments increase the number of sticks accordingly.

THE MOST COMMON PROCEDURE for producing wells is to shut-in well and drop sticks through lubricator. Leave well shut until sticks fall to the bottom. The time in minutes for the sticks to fall to the bottom (assuming well is shut-in with fluid at surface) is equal to the depth divided by 100. (Time, min. = Depth, ft / 100).

FOR WATER INJECTION SYSTEMS drop the sticks into the water supply tank to inhibit more of the system.
the water column). Then drop the oil soluble sticks which will "FLOAT" at where the oil and water contact thus slowly dissolving and releasing inhibitor in the oil column.

The sticks are economical when compared to conventional corrosion control operations and therefore save investment in pumps, drums of chemical, and equipment maintenance.

Corrosion Inhibitor Sticks™ may be used in wells with bottom hole temperatures (BHT) of up to 375 degrees Fahrenheit.

**PRODUCTION SPECIFICATIONS**

**OIL SOLUBLE:** The stick will dissolve in 20 to 120 minutes (in moving diesel) depending on temperature, salt content, and relative fluid motion. The stick will melt at 135 degrees Fahrenheit and the specific gravity is 0.95.

**WATER SOLUBLE:** The stick will dissolve in 12 to 24 hours (in 60,00 PPM moving brine water) depending on temperature, salt content, and relative fluid motion. The stick will melt at 125 degrees Fahrenheit and the specific gravity is 1.10.

**PRODUCT PACKAGING**

<table>
<thead>
<tr>
<th></th>
<th>Senior</th>
<th>Junior(1)</th>
<th>Junior(2)</th>
<th>Thrifty</th>
<th>Midget</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/stick</td>
<td>1.55</td>
<td>1.20</td>
<td>0.76</td>
<td>0.49</td>
<td>0.19</td>
</tr>
<tr>
<td>case/pail</td>
<td>24</td>
<td>36</td>
<td>36</td>
<td>49</td>
<td>108</td>
</tr>
<tr>
<td>pail/chest</td>
<td>31</td>
<td>n/a</td>
<td>52</td>
<td>72</td>
<td>204</td>
</tr>
</tbody>
</table>

**WHERE TO BUY**

All good oil field supply stores carry Aqua-Clear, Inc. Corrosion Inhibitor Sticks™, but you can also buy direct from us.

---

**Ordering Information**

Should you wish to speak to a sales representative about any of our products, you can call or email Tommy Halloran Jr., Ronald "Buster" Wilson, or Russell Cook directly:

<table>
<thead>
<tr>
<th>Tommy Halloran Jr.</th>
<th>Ronald &quot;Buster&quot; Wilson</th>
<th>Russell Cook</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 304-343-4792</td>
<td>W 304-546-8518</td>
<td>W 304-546-2940</td>
</tr>
<tr>
<td>H 304-345-5152</td>
<td>H 304-965-7996</td>
<td>H 304-842-7050</td>
</tr>
<tr>
<td>C 304-546-8526</td>
<td>Fax 304-965-2713</td>
<td>Fax 304-842-7050</td>
</tr>
<tr>
<td><a href="mailto:tom@aquaclear-inc.com">tom@aquaclear-inc.com</a></td>
<td><a href="mailto:buster@aquaclear-inc.com">buster@aquaclear-inc.com</a></td>
<td><a href="mailto:russell@aquaclear-inc.com">russell@aquaclear-inc.com</a></td>
</tr>
</tbody>
</table>
Section – 7 Well Construction Details
WELL CONSTRUCTION

INJECTION WELL CONFIGURATION
Figure 1
Well Construction Diagram

Bear Lake Properties, LLC
Bittinger #3
Columbus Township
Warren County, PA
37-123-33945

Pressure Gauge (Typ.)
Valve (Typ.)

8 5/8" Ceg @ 405'
Cemented w/ 200 sacks

4 1/2" Ceg @ 4508'
Cemented with 225 sacks

2 7/8" Tubing

Top of Cement @ 3343'
Top Salt Zone - 3,637'
Bottom Salt Zone - 3,828'

Packer set approx. 4220 to 4221.6'
Top Medina - 4260'
Perf and frac - 4,280 - 4439'
Top Queenston - 4439'

TD 4566'

Key
- Cement
- Perforated interval
- Packer
- Tubing

Diagram Not to Scale
WELL CONSTRUCTION

BITTINGER #3 COMPLETION RECORD
WELL RECORD

FARM NAME: Biltinger
FARM NO: 03
SERIAL NO: 160

TOWNSHIP: Columbus
COUNTY: Warren

DRILLING COMMENCED: 10/16/84
DRILLING COMPLETED: 10/19/84
ELEVATION: 1630' GL

CAGING AND TUBING RECORD

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>AMOUNT IN WELL</th>
<th>MATERIAL BEHIND PIPE</th>
<th>PACKER</th>
<th>DATE RUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 3/8&quot;</td>
<td>38'</td>
<td>CEMENT (50%)</td>
<td></td>
<td>10/16/84</td>
</tr>
<tr>
<td>9 5/8&quot;</td>
<td>405'</td>
<td>GEL (40%)</td>
<td></td>
<td>10/17/84</td>
</tr>
<tr>
<td>4 1/2&quot;</td>
<td>450'</td>
<td></td>
<td>225</td>
<td>10/20/84</td>
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PERFORATION RECORD

<table>
<thead>
<tr>
<th>DATE</th>
<th>INTERVAL PERFORATED FROM</th>
<th>TO</th>
<th>INTERVAL TREATED FROM</th>
<th>TO</th>
<th>TREATMENT</th>
<th>AMOUNT</th>
<th>AMOUNT</th>
<th>INJECTION</th>
</tr>
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<tbody>
<tr>
<td>10/26/84</td>
<td>4321'</td>
<td>4334'</td>
<td>4321'</td>
<td>4334'</td>
<td>1188 lbs</td>
<td>850000</td>
<td>27 BPM</td>
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STIMULATION RECORD

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<th>NATURAL ROCK PRESSURE</th>
<th>INJECTION</th>
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<td>3000 BPM</td>
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<td>2520 gpm</td>
</tr>
<tr>
<td>2,520 gpm</td>
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<td>1225 psi</td>
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REMARKS

Driller's TD 4522'
Lequer's TD 5568'
MEDINA

RECEIVED

PA GEOLOGICAL SURVEY

JUL 1 1986

PA GEOLOGICAL SURVEY

( Oil & Gas Geology Division)
<table>
<thead>
<tr>
<th>FORMATIONS</th>
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<tr>
<td><strong>NAME</strong></td>
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<tr>
<td>Unconsolidated Gravel</td>
</tr>
<tr>
<td>Devonian Shales</td>
</tr>
<tr>
<td>&quot;Tully&quot; LS</td>
</tr>
<tr>
<td>Hamilton Shale</td>
</tr>
<tr>
<td>Onondaga</td>
</tr>
<tr>
<td>Unconformity Interval</td>
</tr>
<tr>
<td>Akron-Bertie</td>
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<td>Camillus</td>
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<td>Salt Zone</td>
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<td>Vernon</td>
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<td>Lockport</td>
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<tr>
<td>Rochester</td>
</tr>
<tr>
<td>Irondequiot-Reynolds</td>
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<tr>
<td>Grimsby</td>
</tr>
<tr>
<td>Power Glen</td>
</tr>
<tr>
<td>Whirlpool</td>
</tr>
<tr>
<td>Queenston</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
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</table>
Section 8 – Monitoring Program
Section 8 - Monitoring Program

The fluid levels in the following nearby depleted Medina natural gas wells will be measured and recorded semi-annually, at a minimum. The monitoring well locations are shown on the attached figure.

<table>
<thead>
<tr>
<th>Injection Well</th>
<th>Monitoring Well</th>
<th>Approximate Distance and Direction From Injection Well</th>
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<tbody>
<tr>
<td>Bittinger #3</td>
<td>R. Craker #1</td>
<td>1,900 ft to the northeast</td>
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<tr>
<td></td>
<td>D. Wright #1</td>
<td>2,000 ft to the southeast</td>
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</table>
Section 9 – Plugging and Abandonment Plan
Section 9 - Plugging and Abandonment Plan

At the point when the well is no longer used, the well will be abandoned in accordance with EPA and PADEP regulations. With regard to PADEP regulations, this currently includes providing a “Notice of Intent to Plug a Well” no less than 3 days and no more than 30 days prior to abandoning the well, to allow a PADEP inspector to be present during the plugging procedure. The PADEP may waive the notification period. The notification will include well location plat, well logs, production logs, injection logs, construction details, and proposed abandonment method. After receiving approval from PADEP to proceed, the well will be abandoned and the abandonment procedures will be documented on a “Certificate of Plugging”.

The USEPA will be notified of the plugging activity at least 45 days prior to commencing activities. This notification will include USEPA Form No. 7514-20. A proposed plugging plan (Form 7514-20) is attached based on the current PADEP and USEPA regulations. However, this may be modified prior to plugging in order to meet the requirements at the time of the plugging activity. A contractor cost estimate to perform plugging and abandonment according to the proposed plugging plan is attached. The contractor estimate is $30,000 for these services.
PLUGGING AND ABANDONMENT PLAN

PLUGGING AND ABANDONMENT ESTIMATED COSTS
03/18/2014

Re: Plugging Estimate for the Bittenger 2  API 37-165-3394

Dear Sirs,

The following is an estimate for the plugging to abandon the above mentioned well.

Rig Time:
Two twelve hour days rig at $195/hour, crew truck $100/day, 4th man 8 hours $40/hr for laying down casing, $5,200.00

Wire line service:
Jet Cut 4 ½ casing: $2,500.00

Cement and pumping service:
Up to 500 sacks cement and 10 hours on site pump time.
Includes gel spacers between plugs. $17,045.00

Water Hauling and Disposal:
Delivery of fresh water and removal of returned fluid $855.00

Rentals:
500 bbl. Water tank and open top returns tank 5 day minimum $500.00

Support equipment:
Dozer at 2 days $500.00

Trucking: mob and de mob dozer, excavator, water tank, open top, casing and tangibles (20 hrs) $1,900.00

Remedial Work
Pea stone plug back with delivery, tank cleaning, excavating and cutting off surface casing, welding cap and monument, reclamation and seeding. $1,500.00

Total $30,000.00

If you have any questions, please feel free to contact me at (716) 410-1543.

Best Regards,

Bill Weaver

Bill Weaver
Operations Supervisor
DLH Energy Service
PLUGGING AND ABANDONMENT PLAN

Locate Well and Outline Unit on
Section Plat - 640 Acres

W

E

S

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location Description

1/4 of 1/4 of 1/4 of 1/4 of Section Township Range

Surface

Location ft. frm (N/S) Line of quarter section

and ft. from (E/W) Line of quarter section.

TYPE OF AUTHORIZATION

☑ Individual Permit
☐ Area Permit
☐ Rule

Number of Wells:

WELL ACTIVITY

☐ CLASS I
☐ CLASS II
☑ Brine Disposal
☐ Enhanced Recovery
☐ Hydrocarbon Storage
☐ CLASS III

Lease Name

Bittinger

Well Number

#2

CASING AND TUBING RECORD AFTER PLUGGING

<table>
<thead>
<tr>
<th>SIZE</th>
<th>WT (LB/FT)</th>
<th>TO BE PUT IN WELL (FT)</th>
<th>TO BE LEFT IN WELL (FT)</th>
<th>HOLE SIZE</th>
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<tbody>
<tr>
<td>8.625</td>
<td>24</td>
<td>428</td>
<td>428</td>
<td>12.25</td>
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<tr>
<td>4.5</td>
<td>10.5</td>
<td>4457</td>
<td>1267</td>
<td>7.875</td>
</tr>
<tr>
<td>2.375</td>
<td>4.7</td>
<td>4280</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

METHOD OF EMPLACEMENT OF CEMENT PLUGS

☐ The Balance Method
☐ The Dump Bailer Method
☐ The Two-Plug Method
☐ Other

CEMENTING TO PLUG AND ABANDON DATA:

<table>
<thead>
<tr>
<th>PLUG #1</th>
<th>PLUG #2</th>
<th>PLUG #3</th>
<th>PLUG #4</th>
<th>PLUG #5</th>
<th>PLUG #6</th>
<th>PLUG #7</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5</td>
<td>7.875</td>
<td>7.875</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Size of Hole or Pipe in which Plug Will Be Placed (Inches):

<table>
<thead>
<tr>
<th>Depth to Bottom of Tubing or Drill Pipe (ft)</th>
<th>Sacks of Cement To Be Used (each plug)</th>
<th>Slurry Volume To Be Pumped (cu. ft)</th>
<th>Calculated Top of Plug (ft)</th>
<th>Measured Top of Plug (if tagged ft)</th>
<th>Slurry Wt. (Lb/Gal.)</th>
<th>Type Cement or Other Material (Class III)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4457</td>
<td>16</td>
<td>19</td>
<td>4240</td>
<td>1700</td>
<td>15.6</td>
<td>Class A</td>
</tr>
</tbody>
</table>

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

(See Attached Drawing)

Estimated Cost to Plug Wells:

$30,000 See attached Estimate and Plugging Drawing

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):
John C. Hollko, Vice President

Signature:

Date Signed:
03/19/2014

EPA Form 7520-14 (Rev. 12-11)
PLUGGING AND ABANDONMENT PLAN
Bittenger #2; Columbus Township, Warren County, Pennsylvania
API/Permit: 37-165-3394

This well will be plugged using the tubing balanced plug placement method. All plugs will be set through tubing at the desired locations with a gel spacer between each plug. The cement to be used will be class A common cement mixed to 15.6 #/gal with a yield of 1.18 cubic feet per sack.

The first and deepest cement plug will be set across the injection interval from a depth of 4,240 to 4,450 feet across the existing injection interval and tagged before proceeding with additional cement plugs.

We will utilize the cement bond log run on 8/13/2013 which located the top of existing cement outside the 4.5” casing at 3,190 feet. At this point, the 4.5” casing will be cut and pulled to allow the next plugs to be placed in the open hole with OD of 7-7/8 inches. The plugs will cover all possible hydrocarbon intervals as well as providing a seal below the surface casing at 428 feet.

1. Gelled spacer will be placed between the top of the bottom plug and the bottom of the next plug from 4,240’ to 3,190’.
2. A 469 sack cement plug will be used to seal from the top of the cut 4.5” casing at approximately 3,190’ to above the last possible hydrocarbon zone at 1,700’. Utilizing this plug to cover the Oriskany, Marcellus, Rhinestreet and Dunkirk formations.
3. The next 16 sack plug will be placed just below the bottom of the 8-5/8” surface casing covering 50 feet from 430’ to 480’

The 8-5/8” casing from surface to 430 feet will be filled with pea gravel and the top of the casing will be cut at approximately 40 inches below the surface and a plate will be welded on the top of the casing.

Any remaining equipment will be removed and the location will be restored and seeded.
API/Permit: 37-123-33944
Bittinger #2

Pipe cut below plow depth with plate on top

Btm of surface csg 428’

16 sk cement plug 430’-480’

Dunkirk Shale Top 1,700’

469 sk cement plug 1700’-3190’

TOC 3,190’

Medina/Whirlpool Perfs 4,290’ to 4,420’

16 sk cement plug 4,240’-4,450’

Total casing 4,457 ft
Section 10 – Necessary Resources
Section 10 - Necessary Resources

Bear Lake Properties, LLC will provide Certificates of Deposit (CDs) to meet necessary resources requirements for properly plugging and abandoning the well. This documentation will be provided under a separate cover at a later date.
Section 11 – Plan for Well Failures
Section 11: Plans for Well Failure

General system design and monitoring: The system being utilized for monitoring and control will function with the use of pressure switch gauges with adjustable limit switches and motor valves. The gauges provide a sensing device for changes in pressure conditions and if the limit switches are reached, they will send responses to activate motor valves controlling injection flow and pressure relief. In addition to the automated portion of the system, the manual operation of all pumping equipment as well as the continual inspections of the pumping and monitoring equipment provide additional safeguards for appropriate actions necessary in case of well failures.

Injection Pressure Limit Monitoring: The primary safeguard to prevent over pressuring is the automated shutdown on the pumping equipment at which the maximum operating pressure can be set as a limit at which all pumping will cease.

Additional switch gauges and motor valves will be utilized at the wellhead to monitor pressure changes that would be caused by tubing or casing failures and the appropriate valve will be activated to cease injection.

Tubing and Packer Monitoring: With the monitoring switch gauge connected to the tubing, we will have a secondary system to prevent over pressuring of the tubing. When the maximum pressure is sensed, a response is sent to a motor valve which will stop additional injection into the tubing.

Tubing to Casing Annulus Monitoring: This annular space will be monitored for both increase and decreases in pressure. The switch gauge will have both a low and high shutdown tab limit. When either of the limits is reached, the sensor will send a response to a motor valve shutting down flow. The lower limit will be used to monitor damage to the casing which allows fluid to leave the casing, and the high limit will sense a pressure increase in the casing that may be caused by communication with the tubing or flow into the annular space. Both of these limits when reached will send responses shutting down the injection cycle.

8-5/8” Annular Monitoring: The PADEP requires the annular valve on the 8-5/8” casing head to remain open to the atmosphere at all times. We will connect this point to a storage tank capable of collecting any fluid and allowing visual monitoring of any fluid flow. The valve and associated gauge will be monitored and inspected visually for changes or fluid flow. If such is detected, the system will be shut down and the remaining equipment associated with the system will be inspected to evaluate the cause of the changes.

Under the monitoring provided above, well failures will either be identified by the automated equipment and switch gauges or by visual inspection during injection operations or at other times. Should any failure occur, all injections will cease and proper notifications to EPA will be made. Analysis of the failure will take place and the
necessary repairs to be implemented along with any equipment replacement will be coordinated with the EPA.
APPENDIX A

SURROUNDING LANDOWNER INFORMATION
### Pennsylvania Landowners

<table>
<thead>
<tr>
<th>PARCEL #</th>
<th>OWNER</th>
<th>ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2341</td>
<td>Bear Lake Properties, LLC 3010 Village Run, Suite 103, Wexford, PA 15090</td>
</tr>
<tr>
<td>G</td>
<td>2382</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>2633</td>
<td>Property East of Bittinger #3 Property South of Bittinger #3</td>
</tr>
</tbody>
</table>

### New York Landowners

<table>
<thead>
<tr>
<th>OWNER</th>
<th>PARCEL #</th>
<th>ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casper Goodrich</td>
<td>448.00-1-25</td>
<td>5 Weeks Rd Panama NY 14767</td>
</tr>
<tr>
<td>Jackson Bemis</td>
<td>449.00-1-5</td>
<td></td>
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</table>
CONTROL & DISPOSAL PLAN
PREPAREDNESS, PREVENTION, AND CONTINGENCY PLAN
NUSIANCE CONTROL PLAN
PREPAREDNESS, PREVENTION, AND CONTINGENCY PLAN

FOR THE:
KENDRA II, LLC
BEAR LAKE DISPOSAL FACILITY
1889 CORNISH HILL ROAD (SR 4004)
BEAR LAKE, PA 16402

PREPARED FOR:
Kendra II, LLC
(Bear Lake Properties, LLC)
5459 State Route 29
Springville, PA 18844

PREPARATION DATE: SEPTEMBER 2020
(Replaces Former PPC Plan)
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1.0 INTRODUCTION

This Preparedness, Prevention, and Contingency Plan (Plan) has been developed for the Kendra II, LLC (Kendra) KENDRA II – Bear Lake Disposal Facility (Facility), located at 1889 Cornish Hill Road (State Route 4004) in Columbus Township, Warren County, Pennsylvania. The objective of this Plan is to comply with the requirements of the Pennsylvania Department of Environmental Protection’s (PADEP or Department) Guidelines for The Development and Implementation of Environmental Emergency Response Plans (PADEP Document #400-2200-001), to satisfy the conditions set forth in the PADEP’s Form L – Contingency Plan for Environmental Procedures (PADEP Document #2540-PM-BWM0384, Rev. 10/2016). The contents of this Plan comply with the requirements of the Pennsylvania Solid Waste Management Act and Clean Streams Law, as well as the Federal Clean Water Act, and National Pollutant Discharge Elimination System (NPDES) codified at Title 40 of the Code of Federal Regulations (CFR) §122.
2.0 PLAN REVIEW

2.1 Plan Review and Amendments

This Plan will be reviewed periodically, and amended whenever there is a change in design, industrial process, operation, or maintenance practices which affect the Facility’s potential to release pollutants. This Plan will be revised if the review indicates that more effective control and prevention technology is feasible. The plan will also be amended when:

1. the applicable PADEP or federal regulations are revised;
2. the names and titles of the Pollution Prevention Team (PPT), emergency coordinators, and list of emergency equipment changes
3. the plan fails in an emergency; and/or
4. as otherwise required by PADEP.

2.2 Plan Availability and Retention

The Plan will be maintained at the Facility at all times and will be made available for review by Facility employees, the PADEP, emergency responders, or its authorized representative.

If the Plan is reviewed and the Facility is notified at any time that the Plan does not meet one or more of the requirements, revisions will be made to the Plan and written certification will be submitted to the PADEP that the changes have been made, within 14 calendar days.

2.3 Distribution of the Plan

A copy of the Plan and any subsequent revisions will be maintained at the Facility. All members of the Facility organization responsible for developing, implementing, and maintaining the Plan and all emergency coordinators will review the Plan and be thoroughly familiar with its contents.

Additional copies of the Plan can be made available to the following agencies, to the extent to which they may become involved in an actual emergency:

1. County and local Emergency Management Agencies
2. Local Fire Service Agencies and/or Hazmat Team
3. Local Emergency Medical Service Agencies
4. Local Police
3.0 CONTENTS OF THE PLAN

3.1 Facility Description
The Facility is located at 1889 Cornish Hill Road (State Route 4004) in Columbus Township, Warren County, Pennsylvania on 29.88 acres of land, of which approximately 1.0 acres are used for industrial processes. The property is located in a mixed residential-agricultural area of Columbus Township. The Facility is bordered to the north by State Line Road with residential and agricultural properties, to the east by Cornish Hill Road and agricultural properties, and to the south by residential and agricultural properties. Forested and undeveloped properties border the facility to the west. An unnamed tributary (64648) to Brokenstraw Creek is located approximately 0.3 miles to the southwest of the storage tank area and an unnamed tributary (56265) is located approximately 0.40 miles to the south of the unloading pad area. (Figure 1).

The historical use of the property included residential and agricultural activities up through 2010 when Bear Lake Properties, LLC. (BLP) built their transfer facility, storage, and commenced injection operations. BLP operated the facility through June 2020, at which time Kendra took over BLP and all operations.

Unloading Areas
The unloading area provides the mechanism for fluid transfers to the Facility by using transfer pumps or the pumps on each truck and is located in the eastern portion of the Facility near Cornish Hill Road. The unloading area is operated 24 hours per day, 6 days per week and are manned by Facility personnel. All offloading activities are completed by Facility personnel only. Trucks utilizing the offloading site park on a concrete pad while unloading into the pipeline, thus directing any spillage directly into a lined pit, where such spillage is contained for recovery.

Waste Processing Area
The brine is transferred via underground pipeline from the unloading area into a series of holding tanks, four (4) 400-BBL incoming brine tanks and four (4) 300-BBL feed tanks, located at the wellsite of the Bittinger #2 injection well. The tanks are situated within a secondary containment dike at a permitted Waste Transfer Facility. Brine from the incoming brine tanks is then pumped through Total Suspended Solids (TSS) filters and back into the feed tanks which supply brine to the injection pumps. From the injection pumps, the brine water is transferred into multiple USEPA UIC - permitted water disposal wells via underground piping. Each of the underground lines utilized to transport brine in this operation use secondary containment (functioning pipeline inside of a second pipeline). The secondary pipeline is connected to the tanks so that in the event of a leak in the primary pipeline, the fluid will be safely contained and returned to the tank while a leak is located and repaired. Any evidence of a leak in the primary pipeline will result in the immediate suspension of operations until repairs are completed. Any small appurtenances of the pipeline (valve risers or wellheads)
which are not contained in the secondary line are located above ground and will be visually inspected for leakage daily. And evidence of leakage will result in the cessation of operations until such leakage is repaired.

A list of chemicals stored within the Injection Pumps Building Area are provided on Table 1. All chemical loading and unloading are performed under direct Facility personnel supervision, within secondary containment.

3.1.1 Description of Industrial Activity
The Facility operates under the Standard Industrial Classification (SIC) Code of 1389 (Oil & Gas-Other) and provides disposal of saltwater brine from the oil and gas industry. The Facility houses an unloading pad area and transfer pumps, four (4) 400-BBL and four (4) 300-BBL aboveground storage tanks (AST), TSS filtration equipment and injection of filtered liquids. The Facility is operated under a PADEP Waste Transfer Facility Permit #301366 and multiple USEPA UIC permitted injection wells for the processing and disposal of oil and gas liquid wastes generated during the production of oil and natural gas.

3.1.2 Facility Maps
A Facility Map is provided as Figure 2, and includes the following information:

1. general layout of the Facility;
2. property boundaries;
3. topography;
4. areas occupied by manufacturing or commercial activities;
5. raw materials and product storage;
6. high risk areas where spills and leaks most likely would occur;
7. entrance and exit routes to the Facility; and,
8. general Facility information.

3.1.3 Description of Existing Emergency Response Plans
The Facility is currently in operation and this plan is compatible with existing emergency response and spill prevention plans. The operations and subcontractors will maintain the secondary containment measures detailed on the site drawings. Any 55-gallon drums containing chemicals or petroleum products stored on-site are situated on properly sized spill pallets or within secondary containment.
The Facility takes a very responsible attitude toward safety, health, and the wellbeing of all employees. Proper emergency planning and response are important elements of the safety and health program to help minimize exposure to injury. This Plan and any other applicable plan will be implemented by the Facility in the event of a spill, fire, or other emergency. The Plan will be located in an easily accessible location so the Emergency Coordinators and local emergency response agencies can readily access the document during an emergency.

3.1.4 Material Inventory

Table 1 identifies and lists by common chemical name and/or trade name the locations, sources, and quantities of raw materials, commercial chemical products, and manufacturing chemical intermediates managed at the Facility. The Facility is required to update the inventory if new chemicals and/or additional quantities are added. Safety Data Sheets (SDS) are provided as part of the Facility’s Hazard Communication Program.

3.1.5 Pollution Incident History

There have been no reportable releases at the Facility in the last three years.

3.1.6 Implementation Schedule for Plan Elements Not Currently in Place

This PPC Plan had originally been prepared in December 2014 by BLP and updated in January 2018. The Facility management and ownership within BLP changed in June 2020. The PPC Plan will be revised periodically, as needed, following initiation of operations to reflect those processes and procedures applicable to the facility.

3.2 Description of How Plan is Implemented by Organization

The PPT has been selected to lead the Facility in preventing and responding to releases. The PPT will consist of the emergency response coordinator, who will be directly responsible for the implementation of the Plan, and all Facility personnel identified as members of the PPT. All other Facility personnel not identified in the PPT, but directly involved in the operations of the Facility, will indirectly become part of the PPT as they will be advised of emergency measures to be taken in the event of any significant release.

3.2.1 Organizational Structure for Implementation

The PPT selected by the Facility to lead the pollution prevention efforts is designated in Appendix A. This team has been developed using staff who are actively and directly involved in the ongoing activities at the Facility. The PPT is responsible for observing the operations at the Facility and following the criteria included in the Plan. The PPT members will lead efforts to implement pollution prevention practices at the Facility, but
all Facility personnel are encouraged to observe activities and offer suggestions to the PPT to improve daily operations.

3.2.2 Duties and Responsibilities of Emergency Coordinator
At all times there will be at least one PPT member either on the Facility premises or on-call with the responsibility for coordinating all emergency response measures. This Emergency Coordinator will be thoroughly familiar with all aspects of the Facility’s Plan, all operations and activities at the Facility, the location and characteristics of all materials, the location of all records, and the Facility layout. In addition, this person will have the authority to commit the resources needed to carry out the Plan in the event of an emergency.

The Emergency Coordinator is the supervisor for the development and implementation of this Plan. In addition, the Emergency Coordinator is responsible for maintaining operational continuity within the Facility, for all relevant documentation, and for future revisions of the Plan. The Emergency Coordinator will supervise response activities in the event of an incident at the Facility by following the procedures identified in Sections 3.3, 3.4, and 3.5 of this Plan. The Emergency Coordinator will also make notifications of imminent or actual emergencies to the emergency response agencies and assessments of the health or environmental hazards.

The Emergency Coordinator for the Facility will be responsible for coordinating all training requirements associated with the Plan. The Emergency Coordinator is responsible for developing the required training program and maintaining all records of training as specified in Section 3.3.10.

The PPT will perform housekeeping procedures as specified in Section 3.3.7, perform inspections, identify necessary maintenance, and will follow all pollution prevention procedures outlined in Section 3.3 for each area of the Facility in which they are working. The Emergency Coordinator for the Facility will be responsible for coordinating and overseeing all inspections, monitoring, preventative maintenance, and housekeeping associated with the Plan.

3.2.3 Chain of Command
In the event of a spill or emergency, notify the Emergency Coordinator (Appendix A) on duty as soon as possible as to the nature of the emergency, location of the spill, the materials spilled, and an estimated amount spilled. Continue to call the Emergency Coordinators until one of them is reached and is able to take responsibility for the emergency and/or spill response and countermeasures.
The Action List for Spill Responses (Appendix B) will be posted in several prominent locations of the Facility as a quick reference for action items during a spill. The Emergency Contacts List provided as Appendix A will be posted along with Appendix B throughout the Facility.

3.3 Spill Leak Prevention and Response

3.3.1 Pre-Release Planning
The Facility Map shows the areas where the wastes are stored at the Facility. The Facility Maps also show areas where potential spills may occur, which include storage areas and loading/unloading areas.

3.3.2 Drainage and Prediction of Flow
Included on the Facility Map are topographic contours which indicate the apparent direction of drainage at the Facility. Stormwater drainage from the facility flows (sheet flow) south and west-southwest towards an unnamed tributary (64648) to Brokenstraw Creek located approximately 0.3 miles to the southwest of the storage tank area. No storm water is discharged from the secondary containment areas.

3.3.3 Potential Pollution Sources
Areas at the Facility that have the potential to release pollutants or cause an emergency can be divided into the following general areas:

- gravel parking lot with personal and company vehicle (pickup trucks, sedans, etc.) storage;
- unloading pad;
- injection pump house area; and
- the storage tank farm.

Below are activities and conditions that may contribute to spills or emergencies:

- Transfer of bulk liquids from truck-mounted storage vessels to containers at the Facility
  a. spills and overfills due to operator error;
  b. failure or damage to filling system, hoses, valves, fittings, etc.; and,
  c. accidents or collisions with tanks.

- Transfer of bulk liquids from one area of the Facility to another:
  a. failure or damage to piping, valves, fittings, etc.; and
  b. accidents of collisions involving equipment or vehicles.

- Storage of bulk liquids
  a. external corrosion and structural failure of containers;
  b. mechanical failure of delivery and transfer equipment; and
c. accidents or collisions involving equipment or vehicles.

• Loading and Unloading Materials
  a. transfer of bulk liquid containers from a truck to a storage container or vice versa;
  b. transfer of bags, boxes, drums, or other containers by personnel, trucks, or other material handling equipment.

The potential for spills during unloading operations is minimal when standard Facility procedures are followed. Filling and evacuation of bulk storage containers will be performed within secondary containment. An increased awareness of the potential for spills is the best method for preventing spills. Awareness training and spill prevention and response procedures are mandatory for all personnel involved in operations at the Facility.

3.3.4 Secondary Containment

Loading, unloading, as well as storage of bulk storage containers will occur within secondary containment. Below is a preliminary description of secondary containment measures for the Facility.

Unloading Areas

The unloading area provides the mechanism for fluid transfers to the Facility by using transfer pumps or the pumps on each truck and is located in the eastern portion of the Facility near Cornish Hill Road. The unloading area is operated 24 hours per day, 6 days per week and are manned by Facility personnel. All offloading activities are completed by Facility personnel only. Trucks utilizing the offloading site park on a concrete pad while unloading into the pipeline, thus directing any spillage directly into a lined pit, where such spillage is contained for recovery.

The trucks are backs up onto the concrete containment area and the hoses are connected to the piping within the containment area. Drip pans and portable plastic containment liners are placed under the connections to the trucks. These pans are placed to catch any fluids which are to drip during transfer operations.

Tank Farm Area

The tank farm area houses four (4) 400-BBL fiberglass ASTs for incoming fluid storage and four (4) 300-BBL fiberglass ASTs for filtered liquids. Incoming fluids are transferred from the unloading pad area and stored within the tanks until transferred through TSS Filters and eventually injected into the USEPA permit UIC disposal wells. The tanks are placed within a secondary containment engineered to contain 110% of the tank volume. Stormwater which accumulates in the secondary containment area is pumped into one of the ASTs and disposed within the injection wells.
3.3.5 Material Compatibility

Bulk storage containers are constructed of materials that are appropriate for the respective products. Storage tanks which contain volatile chemicals will be vented in a way to avoid ignition sources.

3.3.6 Inspection, Monitoring, and Preventative Maintenance Program

The Facility will be inspected for malfunctions, deterioration, operator errors, and operations which may be causing, or may lead to, spills, emergencies, and/or potential pollution. The inspection will be conducted at a frequency sufficient enough to identify problems in time to correct them before an emergency occurs. Inspections at the Facility will be performed by the Emergency Coordinator(s) or his/her designee(s). ASTs can be inspected in a manner consistent with the Facility’s SPCC Plan.

3.3.6.1 Daily Inspections

Storage containers, loading/unloading areas, and all secondary containment will be visually inspected for the following items on a daily basis:

- all storage containers and piping will be inspected for evidence of leakage, damage, and distortion;
- all injection wellheads and adjacent areas for leakage or evidence of spills;
- all loading and unloading areas will be inspected for evidence of spills; and,
- all secondary containment structures will be inspected for evidence of spills, damage, distortion, and to ensure sufficient freeboard.

If a problem is detected during the daily visual inspection, the Emergency Coordinator will be notified and the appropriate action(s) will be initiated.

3.3.6.2 Monthly Inspections

In addition to the daily visual inspections, the following areas of the Facility will be visually inspected on a monthly basis:

- all bulk chemical storage areas and associated secondary containment;
- all liquid transfer equipment and piping;
- all injection wellheads and adjacent areas;
- any areas where there is a potential for pollution substances to contact stormwater;
- all Facility security systems, including fences, alarms, and lighting; and,
the parking lots with vehicle storage.

Monthly inspections are intended to identify all of the following potential problems:

- pollution that may impact stormwater;
- evidence of leaks;
- evidence of spills;
- evidence of a situation that can cause a fire;
- poor housekeeping;
- staining;
- compromised storage containers;
- damage to shipping containers;
- overflow of containment areas;
- corroded or leaking valves/fitting;
- evidence of cracks or deterioration of containment structures;
- evidence of problems with storage tank alarm systems;
- security issues; and
- any other evidence of a situation that could cause an emergency.

On a monthly basis, the designated employee will also verify that adequate supplies of spill control materials are readily accessible to personnel in designated areas. If the need for housekeeping is identified in any area, he or she will complete the required task or notify the appropriate personnel.

If a problem is detected during the monthly inspection, the Emergency Coordinator will be notified and the appropriate action initiated. Preventive maintenance may include adjustment, repair or replacement of equipment, materials, or structures.

3.3.6.3 Record Keeping

The monthly inspections will be recorded on the Record of Testing and Preventive Maintenance Form provided in Appendix C. By signing this form, the inspector is also acknowledging that brief daily inspections of the noted areas have been completed. All inspection reports will be kept in Appendix D. Based on the results of the inspection, the Plan will be revised to address changes in the description of potential pollutant sources and necessary pollution prevention measures and controls, if needed. Plan revisions will be recorded in Appendix D.
The Record of Testing and Preventive Maintenance form will be completed as a report summarizing the findings of the inspection. The report will include the following items:

- scope of the inspection;
- personnel involved in the inspection;
- the dates of the inspection;
- records of the observations made in regard to the implementation of the Plan; and,
- any revisions made to the Plan.

The inspection requires certification by the Emergency Coordinator. Additional requirements are necessary for inspections of bulk storage tanks that contain oils, and this information can be found in the Facility’s SPCC Plan. Inspection records will be maintained at the Facility and may be kept in the same location as the SPCC Inspection Forms.

3.3.7 Good Housekeeping

The Facility will follow good housekeeping practices to reduce the possibility of accidental spills and fires, and to minimize safety hazards to Facility personnel.

The greatest potential for a spill identified by this Plan is a release from a bulk storage container or tanker truck. A release would most likely occur accidentally during the unloading or loading of a bulk storage container, during fluid transfers, or from an accidental impact between a vehicle and a bulk storage container. Preventing these accidental releases will be relatively simple by ensuring that the loading/unloading area is free of debris and equipment, and vehicles that are not necessary for the loading/unloading procedures are removed from the area. Clear communication between workers is crucial.

Secondary containment areas will be kept clean and organized. Chemical storage containers will be placed in the secondary containment structure with special consideration given to when they will be used. This will allow efficient access without having to move additional containers. All liquid chemical storage containers will be placed into secondary containment immediately following delivery.

All loading and unloading activities will be completed within containment. Small spills may occur during material handling and transfers. Any spilled material will be cleaned up immediately. It is the responsibility of all personnel to clean up any spilled material. Solid materials can be swept or shoveled into appropriate containers. Any liquid spills will be absorbed with granular material, pads, or booms. Spent material will
immediately be placed into an appropriate container. No spent spill control materials will be left on the ground surface for any longer than is necessary for them to have their intended effect.

All chemical storage containers will be secured from accidental releases to the extent possible. Some smaller bulk storage containers may have ports near the bottom of the tanks. These ports will be plugged and/or valved. All valves located on lower ports will have valve locks to prevent them from being opened accidentally. Small storage containers will be specifically designed for containing the specific chemical.

Only vehicles that are in good working order and are not leaking fluids will be stored outside. Vehicles with fluid leaks will be moved indoors or taken for service immediately. In the event that a vehicle in need of service will be temporarily staged outside at the Facility, all potential leaks will be identified, and appropriate steps will be taken to prevent a spill to the ground surface. The vehicle will be staged on an asphalt or concrete surface, and containment vessels (i.e., drip pans or “duck ponds”) will be used to contain leaks. Absorbent material will be placed into the containment vessel to eliminate standing product. Containment vessels will be checked frequently and addressed as necessary until the vehicle can be repaired or taken for repairs. Any spills to the ground surface outside will be addressed immediately to prevent migration.

The following additional good housekeeping measures will also be implemented at the Facility:

- vehicles will not be staged in traffic zones for any amount of time longer than required for loading/unloading to leave unobstructed movement for vehicles during an emergency;
- neat and orderly storage of bulk chemical containers;
- refuse containers must be covered when not in use;
- regular refuse pickup and disposal;
- maintenance of clean, dry floors by use of brooms, vacuum cleaners, and cleaning machines;
- storage of equipment and materials, such that walkways are not obstructed;
- prompt cleanup of small liquid spills to prevent discharge or transport to other areas; and
- strong encouragement of all personnel to actively engage in good housekeeping measures.

3.3.7.1 Nuisance Control

In addition to good housekeeping measures and controls, the Facility will take control measures to inspect for, and provide countermeasures for nuisance animals, vectors, noise, dust, litter, lighting, and odors. A Nuisance Control Plan has been developed for the Facility, and is provided as Appendix F.
3.3.8 Security

The Facility is manned only when the facility is in operation and to supervise the loading/unloading area. Cameras are installed in and around the Facility, and the real-time video footage 24 hours a day, 7 days per week is viewable in the office. Sufficient exterior lighting exists at the Facility, including high-output lights mounted on poles. The Facility perimeter is enclosed with fencing. The potential for vandalism or trespassing is low.

3.3.9 External Factor Planning

A power outage would limit Facility operations but would not significantly increase the potential of a release because the secondary containment structures do not rely on electricity. A sudden decrease in manpower (i.e. strike or walkout) would not have a significant effect on pollution potential as long as the monthly inspections and preventative maintenance schedule are maintained.

The Facility is located outside of the Federal Emergency Management Agency (FEMA) 100-year floodplain. Therefore, seasonal flooding will not affect the Facility.

3.3.10 Employee Training

An annual training program has been developed to inform Facility personnel of the components and goals of this Plan. The training program will be implemented concurrently with the training required by the Facility’s SPCC Plan and Occupational Safety and Health Administration (OSHA) Accident Prevention and Safety Practices. Training topics will address:

- the general goals of the Plan;
- daily and monthly inspections;
- record keeping;
- safety measures and health hazards;
- preventive maintenance;
- spill prevention and response including the location and proper use of emergency spill equipment;
- site evacuation procedures;
- response to fires and explosions;
- emergency communications;
- good housekeeping procedures; and
- applicable OSHA Accident Prevention and Safety Practices, as required.
• hazard communication;
• fall protection;
• lockout tagout (LOTO);
• hot work procedures;
• first aid procedures;
• any other required OSHA training.

Training will address how and why each component of the Plan will be implemented. Training will be provided to all members of the PPT and their alternates, and may also include maintenance, permanent, and transient personnel, as deemed necessary by the Emergency Coordinator.

The Emergency Coordinator is responsible for developing and implementing the training program. The Emergency Coordinator will determine the appropriate level of training required for each employee's position at the Facility. The Emergency Coordinator will also be responsible for maintaining current training records for each employee. All employees who receive training are recorded on the Record of Employee Training form provided in Appendix G. Records of the employee’s attendance in the training program will also be included in personnel files.

3.3.11 Spill History Record Keeping
A list of spills that have occurred at the Facility is included in Appendix H. Any additional spills occurring at the Facility will also be recorded on the Spill Report Form as provided in Appendix I. In the event that a significant spill or leak occurs, including hazardous substances equal to or in excess of reportable quantities, this section of the Plan will be updated to reflect the incident within 14 calendar days, and the amendments will be included in Appendix E. These records will include:

- a description of the release;
- the circumstances of the release; and
- the Plan will also be amended to prevent a reoccurrence of such a release.

This is consistent with the reporting requirements established in the SPCC Plan. In addition, the spill prevention and response procedures and countermeasures outlined in this Plan will be evaluated to determine if the planned response was adequate, and modified, if necessary, with expanded practices to minimize future spill potential. The SPCC Plan documents the additional procedures to follow in the event there is an oil spill at the Facility and is consistent with the procedures outlined in this Plan. Any oil spill occurring at the Facility will also be recorded on the Spill Report form in the SPCC Plan.
3.4 **Countermeasures**

An effective spill prevention and response program is an important part of the Plan. The following section will describe the proper method of handling spills at the Facility and summarize emergency procedures.

3.4.1 **Countermeasures Undertaken by the Facility**

Facility personnel will be familiar with the location and proper use of spill prevention and response equipment so that spills and fires can be contained and prevented from migrating from the area. Adequate supplies of emergency equipment, such as absorbent materials and fire extinguishers, are maintained throughout the Facility for convenient accessibility.

In the event of a spill at the Facility, the following steps will be implemented immediately:

1. **Ensure the safety of the personnel in the area.** Never compromise personnel safety. If an injury has occurred, immediately contact the supervisor or Emergency Coordinator for further instructions, or call 911.
2. **Extinguish any source of ignition.** If no danger exists to personnel, attempt to extinguish any source of ignition or small fires.
3. **All attempts will be made to stop the spill at its source.** If no danger exists to personnel, attempt to stop the spill at its source. Many times simple steps, such as turning valves or plugging leaks, can stop the flow at its source. Any incipient fires can be terminated using a fire extinguisher if safe to do so.
4. **Contain the material in the smallest possible area.** Using absorbent materials, which are located throughout the Facility, contain the spill before it can reach a site drainage feature, if possible. Table 2 lists the equipment available on-site for spill containment and cleanup.
5. **Identify the spilled material.** It is important to identify the spilled material so that the SDS can be used to identify health hazards, environmental warnings, and material compatibility.
6. **Notify the Emergency Coordinator.** Report the incident to the Emergency Coordinator immediately. The Emergency Coordinator will determine if outside contractors are needed to help clean up a spill or if agency reporting is required.
7. **Begin the Notification Procedures.** An assessment of potential hazards to public health and safety, public welfare, and the environment will be performed and the applicable notifications to emergency responders initiated.
8. **Recover or Clean Up the Spilled Material.** As much material as possible will be recovered and reused where appropriate. Liquids absorbed by solid materials will be shoveled into open top drums. All equipment used in the cleanup will be decontaminated. When drums are filled or the cleanup is finished, the drum lids will be secured and the drums will be appropriately labeled identifying the contents. Mixing of wastes will be avoided. Arrangement for proper disposal of the waste in accordance with applicable federal and state regulations will be made. Recovered wastes will be stored away from the affected area to avoid restricting the movement of emergency responders and/or cleanup crews.
9. **Prepare an Internal Report.** After the spill has been cleaned, the Emergency Coordinator will complete a Spill Report Form provided in Appendix I. This form will record the details of the incident. If it has been determined that written notification to a regulatory agency is
required, the Emergency Coordinator will prepare those written reports as specified in the rules listed in item six above.

10. **Evaluate the Plan and Amend if Necessary.** The cause of the incident will be determined and an evaluation of the spill response procedures will be completed. Any deficiencies will be corrected and an amendment to the Plan will be made accordingly. In the event that a significant spill occurs, **Section 3.3.11** of the Plan (Spill History) will be updated.

### 3.4.2 Countermeasures Undertaken by Contractors

If deemed necessary by the Emergency Coordinator, outside contractors will be contacted to assist the PPT with spill containment and recovery procedures. A list of emergency spill response contractors with availability to provide prompt services at short notice is provided in **Table 3**.

Equipment suppliers have been identified to ensure prompt delivery of equipment and materials needed for addressing spills. The equipment suppliers’ contact information is also provided in **Table 2**.

### 3.4.3 Internal and External Communications and Alarm Systems

The Facility will likely have a maximum of two employees on-site at any time. Messages for spill response, evacuation, and other emergencies will be communicated using mobile devices (two-way radios, cell phones, etc.) verbal communication, and hand signals.

In the event of an emergency, local police, fire departments, or the county’s emergency management agency can be contacted by mobile telephone. No direct alarm or communication system exists between the Facility and these departments. Emergency contact information is provided in **Appendix A**.

#### 3.4.3.1 Federal Spill Reporting Requirements

In accordance with 40 CFR §110, if the Facility discharges a “harmful quantity” of oil (e.g. gasoline or diesel fuel) to U.S. navigable waters, then the **National Response Center** (see Appendix A) shall be contacted. A “harmful quantity” is defined by 40 CFR §110.3 as discharges of oil in such quantities that may be harmful to the public health or welfare or the environment of the United States, including discharges of oil that:

a) Violate applicable water quality standards; or

b) Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.
Additionally, in accordance with 40 CFR §302 and §355, the State Emergency Response Commission (SERC), Local Emergency Planning Commission (LEPC), and National Response Center shall be contacted if a release of a hazardous substance that exceeds any calculated Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 Reportable Quantity (RQ) has occurred and migrated off-site. The person reporting the release (Emergency Coordinator) must provide the following information:

- Name, location, organization, and telephone number;
- Name and address of the party responsible for the incident;
- Date and time of the incident;
- Location of the incident;
- Source and cause of the release or discharge;
- Types of material(s) released or discharged;
- Quantity of materials released or discharged;
- Danger or threat posed by the release or discharge;
- Hazards associated with the release or discharge;
- Number and types of injuries (if any);
- Corrective action taken or planned to be taken;
- Media affected or threatened by the discharge (i.e. water, land, air);
- Weather conditions at the incident location; and
- Any other information that may help emergency personnel respond to the incident.

In addition to the above reporting, 40 CFR 112.4 requires that information be submitted to United States Environmental Protection Agency (US EPA) Regional Administrator in charge of oil pollution control activities whenever the following occurs:

1. a single discharge of more than 1,000 US gallons of oil to navigable waters or adjoining shorelines; OR
2. two discharges to navigable waters or adjoining shorelines each more than 42 US gallons of oil occurring within any twelve month period.

The following information must be submitted to the US EPA Regional Office within 60 days:

- Name of the Facility;
- Name of the owner/operator;
Location of the Facility;

Maximum storage or hauling capacity and normal daily throughput;

Corrective action and countermeasures taken, including a description of equipment repairs and replacements;

Description of facility, including maps, flow diagrams, and topographical maps;

Cause of the discharge(s) to navigable waters and adjoining shorelines, including a failure analysis of the system and subsystem in which the failure occurred;

Additional preventive measures taken or contemplated to minimize possibility or recurrence; and

Other pertinent information requested by these offices.

### 3.4.3.2 Pennsylvania Spill Reporting Requirements

PADEP regulations state that the RQs for spills or releases involving a regulated substance as “a quantity or an unknown quantity of regulated substance released to or posing an immediate threat to surface water, groundwater, bedrock, soil or sediment”. The term does not include the following, if the owner or operator has control over the release, the release is completely contained, and, within 24 hours of the release, the total volume of the release is recovered or removed in the corrective action:

- A release to the interstitial space of a double-walled aboveground or underground storage tank;
- A release of petroleum to an aboveground surface less than 25 gallons; and
- A release of a hazardous substance to an aboveground surface that is less that its reportable quantity under CERCLA.

The PADEP emergency response hotline telephone number is listed in Appendix A. The PADEP encourages responders to immediately report spills of any amount if the spill threatens a waterway, or will enter a waterway or storm sewer in the future due to rain or snowmelt if unaddressed. The PADEP recommends that the following information be provided when reporting a spill:

- **Responsible party** (name of carrier, owner, operator or facility).
- **Date/time** (discovered/occurred).
- **Location** (address, cross street, mile marker).
- **Material(s)** (chemical, product, or common name).
- **Quantity** (estimated release/total).
• **Hazards** (extremely hazardous substance, placard, materials safety data sheet [MSDS]).

• **Affected media/area** (air, land or waterway, including threats to ditches, sewers, streams).

• **Actions/notifications** (evacuations, containment, contractor hired).

• **Contacts on scene** (responder cell phone number, responsible party, contractor, facility point of contact).

• **Other useful information** (truck DOT or railcar number, chemical UN ID number, SDS, etc.)

The largest concern in the event of a major spill is that local drinking water supplies could be affected. Such local drinking water suppliers should be notified as soon as possible when a spill occurs. A list of downstream water users for a range of 20 miles downstream has been prepared using the PADEP’s eMapPA interactive web mapper. The list of downstream users is provided in Appendix A.

### 3.4.4 Evacuation Plan for Personnel

In the event that evacuation of the Facility is necessary, the Emergency Coordinator will direct employees to evacuate to a designated safe zone. After leaving buildings, persons will assemble at the gathering point designated by the Emergency Coordinator. Evacuated people will use caution when crossing roadways and driveways and avoid blocking a roadway or driveway at any time.

If it becomes necessary to evacuate the Facility or a portion of the Facility, the following procedures will also be implemented:

- Shut off all equipment and services (gas, electric, water), if deemed necessary.
- Each supervisor will account for his/her own people.
- If any personnel are injured or require medical attention they will be taken to the following nearest medical facility. If time permits, call to alert the medical facility.

**Corry Memorial Hospital**  
965 Shamrock Lane  
Corry, PA 16407  
814-664-4641
3.4.5 Emergency Equipment Available for Response

Table 2 provides a list of the equipment available for emergency spill response. The list provides the physical description, quantity, storage location, and brief summary of the intended use and capabilities for each item.

3.5 Emergency Spill Control Network

3.5.1 Arrangements with Local Emergency Response Agencies

Local hospitals, fire departments, police, and emergency response teams are available to respond to incidents at the Facility, if necessary. A list of response agencies and phone numbers is provided in Appendix A. In the event of an emergency, the PPC Plan will be made available to responders upon request. The Facility, as part of good housekeeping measures, will not allow vehicles to be staged in areas of traffic routes for longer than required to load/unload to allow for the unobstructed movement of emergency personnel and equipment in the event of an emergency. In the event of an emergency, the Facility will cease operations for the safety of on-site personnel and expedition of cleanup processes.

As part of emergency planning, the Facility will notify the state, county, and jurisdictional fire departments of the quantity, location, and hazard of on-site chemicals in accordance with Section 311/312 of the Emergency Planning and Community Right-to-Know Act (EPCRA), in the form of initial and annual inventory reports.

3.5.2 Notification Lists

The list of emergency response agencies, internal contacts, spill clean-up contractors, and external reporting contacts (with phone numbers) is provided in Appendix A. This list is prominently displayed in the Facility Office to be used in case of a spill or emergency.

3.5.3 Downstream Notification for Storage Tanks

For facilities with ASTs with an aggregate storage capacity of regulated substances greater than 21,000 gallons, Section II (E) (3) of the PADEP Guidelines for the Development and Implementation of Environmental Emergency Response Plans (August 6, 2005; PADEP Document #400-2200-001) and 25 Pa. Code §245 requires downstream notification for those Facilities. This Facility does not have ASTs with aggregate storage greater than 21,000 gallons and the material stored within the ASTs is considered to be residual waste, which does not meet the definition of a regulated substance in accordance with 25 Pa. Code §245. Therefore, downstream notification for this Facility is not required; however, in the event of a spill to surface water, downstream users may need to be notified of the conditions. A list of downstream water users for a
range of 20 miles downstream will be prepared using the PADEP's eMapPA interactive web mapper. The list of downstream users, along with a map of their locations will be prepared and maintained at the Facility and will be included in the SPCC plan.

3.5.4 Sediment and Erosion Prevention
All areas at the Facility are covered with concrete, gravel, and/or vegetation; therefore, sediment transport through erosion is not considered to be a significant source of potential pollution. If any area of the Facility cover is compromised and erosion and sedimentation becomes a potential source of pollution, this condition will be recognized during the regular Facility inspections and appropriate countermeasures will be implemented.

3.5.5 EPCRA, Section 313 Requirements
Although the Facility does not meet the definition of a Section 313 Facility as defined in Title 40 of the CFR §372.22, Section 313 water priority pollutants (WPPs) will be stored in sufficient quantities to cause pollution in the event of a catastrophic failure. The areas of the Facility that have the potential to release Section 313 WPPs can be divided into the following general areas:

1. loading/unloading areas;
2. injection wellhead areas;
3. processing equipment area; and
4. tank farm area.

Below are activities and conditions that may contribute to spills:

• Transfer of bulk chemicals from delivery trucks to the storage tank at the Facility,
  a. spills and overfills due to operator error;
  b. failure or damage to filling system, hoses, valves, fittings, etc.; and,
  c. accidents or collisions with containers.
• Storage of bulk chemicals
  a. external corrosion and structural failure of containers;
  b. mechanical failure of delivery equipment; and,
  c. accidents or collisions involving equipment or vehicles;
• Processing of bulk chemicals during filtration
  a. spills and overfills due to operator error; and,
  b. failure or damage to piping, hoses, valves, fittings, etc.
Secondary containment, material compatibility, spill countermeasures, and routine inspections of these areas are detailed in this Plan and the Facility’s SPCC Plan, and meet the additional requirements to minimize pollution of storm and surface water for Section 313 WPPs at the Facility.
4.1.6 Management Certification

I, Kenneth Scavone, 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 gathered and evaluated the information submitted. Based on my inquiry of the person or persons 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.

Signature

09/24/2020

Date
TABLES
## Preparedness, Prevention, and Countermeasures Plan

### Kendra II - Bear Lake Disposal Facility

1889 Cornish Hill Road

Bear Lake, Pennsylvania 16402

### Table 1
**Material Inventory**

<table>
<thead>
<tr>
<th>Pollutant Type</th>
<th>Container Size</th>
<th>Units</th>
<th>Number of Containers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquified Hydrocarbons - Separated from Incoming Liquids</td>
<td>500</td>
<td>Gal</td>
<td>1</td>
</tr>
<tr>
<td>Raw Incoming Fluids</td>
<td>16,800</td>
<td>Gal</td>
<td>4</td>
</tr>
<tr>
<td>Feed Tanks</td>
<td>12,600</td>
<td>Gal</td>
<td>4</td>
</tr>
<tr>
<td>Sodium Chloride (Salt)</td>
<td>20</td>
<td>Lbs</td>
<td>120</td>
</tr>
<tr>
<td>Sodium Hypochlorite Solution, 0.8% (w/v)</td>
<td>300</td>
<td>Gal</td>
<td>2</td>
</tr>
<tr>
<td>Methanol</td>
<td>55</td>
<td>Gal</td>
<td>1</td>
</tr>
<tr>
<td>Used Motor Oil</td>
<td>55</td>
<td>Gal</td>
<td>2</td>
</tr>
</tbody>
</table>

TBD = To be determined
## Table 2
### Emergency Equipment Available for Response

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Location</th>
<th>Description of Use</th>
<th>Minimum Quantity on Hand</th>
<th>Supplier</th>
<th>Maintenance or Testing Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granular Absorbent Material</td>
<td>Pump House and Storage Building</td>
<td>Liquid Spill Containment and Recovery</td>
<td>50 Pounds</td>
<td>New Pig or similar</td>
<td>Sustain inventory</td>
</tr>
<tr>
<td>Hand Tools (Shovels, Brooms, Gloves, etc)</td>
<td>Storage Building</td>
<td>Spent Absorbent Recovery</td>
<td>As Needed</td>
<td>Grainger, or Home Improvement Stores</td>
<td>Inspect after each use</td>
</tr>
<tr>
<td>55 Gallon Drums</td>
<td>Pump House and Storage Building</td>
<td>Spent Absorbent Storage</td>
<td>2</td>
<td>Action Supply Products, or similar</td>
<td>Inspect for defects upon receiving</td>
</tr>
<tr>
<td>Absorbent Boom</td>
<td>Pump House and Storage Building</td>
<td>Liquid Spill to Surface Water Sheen Containment</td>
<td>100’</td>
<td>New Pig</td>
<td>Sustain inventory</td>
</tr>
<tr>
<td>Universal Spill Kit</td>
<td>Storage Building</td>
<td>Acid, Base, Solvent Spill Containment and Neutralization</td>
<td>1</td>
<td>New Pig</td>
<td>Sustain inventory</td>
</tr>
<tr>
<td>Portable Fire Extinguishers</td>
<td>Throughout Facility</td>
<td>Termination of Incipient Stage Fires</td>
<td>4</td>
<td>Various</td>
<td>Annual and monthly inspections as required.</td>
</tr>
<tr>
<td>Explosive Gas Meters</td>
<td>Throughout Facility</td>
<td>Air Monitoring</td>
<td>1</td>
<td>Various</td>
<td>Calibration and maintenance per manufacturer specification</td>
</tr>
</tbody>
</table>
TABLE 3
EMERGENCY SPILL RESPONSE CONTRACTORS

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Phone</th>
<th>24/7 Dispatch</th>
</tr>
</thead>
<tbody>
<tr>
<td>McCutcheon Enterprises, Inc.</td>
<td>250 Park Road, Apollo, PA 15613</td>
<td>844-765-0001</td>
<td>724-568-3623</td>
</tr>
</tbody>
</table>
FIGURES
PROPOSED:
2-INCH DIAMETER UNDERGROUND
PRESSURE LINE TO INJECTION WELL.
PIPE CONTAINED IN SECONDARY
PIPING (700- FEET)
20-FOOT RIGHT OF WAY
APPENDIX A

Emergency Contacts and Downstream Users
APPENDIX A

EMERGENCY CONTACTS

### INTERNAL CALL LIST

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>24-Hour Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>John McCollums</td>
<td>Primary Emergency Coordinator</td>
<td>724-971-0788</td>
</tr>
<tr>
<td></td>
<td>Operations Manager</td>
<td></td>
</tr>
<tr>
<td>Henk VanHengel</td>
<td>Secondary Emergency Coordinator</td>
<td>702-328-1199</td>
</tr>
<tr>
<td></td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>Charleen Gemberling</td>
<td>Tertiary Emergency Coordinator</td>
<td>570-533-7019</td>
</tr>
<tr>
<td></td>
<td>Office Manager</td>
<td></td>
</tr>
</tbody>
</table>

### EXTERNAL CALL LIST

<table>
<thead>
<tr>
<th>Emergency Contacts</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Department</td>
<td>911</td>
</tr>
<tr>
<td>Police Department</td>
<td>911</td>
</tr>
<tr>
<td>PA Emergency Management Agency</td>
<td>717-651-2201</td>
</tr>
<tr>
<td>Emergency Medical Service</td>
<td>911</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Agency Contacts</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADEP Northwest Regional Office (24-hour)</td>
<td>814-332-6860</td>
</tr>
<tr>
<td>USEPA Region 3</td>
<td>215-566-3255</td>
</tr>
<tr>
<td>National Response Center</td>
<td>800-424-8802</td>
</tr>
<tr>
<td>PA Fish and Boat Commission Spill Response Hotline</td>
<td>855-347-4545 (855-FISH-KIL)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spill Response Contractors</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>McCutcheon Enterprises Inc</td>
<td>844-765-0001</td>
</tr>
<tr>
<td></td>
<td>724-568-3623 (24 hour)</td>
</tr>
<tr>
<td>Clean Harbors Environmental</td>
<td>800-645-8265 (24 hour)</td>
</tr>
</tbody>
</table>
APPENDIX B

Action List for Spill Response
ACTION LIST FOR SPILL RESPONSE

1. Ensure the safety of employees in the area. Do not compromise human health and safety. If unsafe conditions exist, move to safety and contact the authorities.

2. Extinguish any source of ignition.

3. Attempt to stop the spill at its source. If the area is safe, attempt to close valves, plug holes, power off pumps, etc.

4. Contain the material in the smallest possible area. Use spill response equipment to contain the spill and prevent it from migrating. Pay specific attention to preventing the spill from reaching surface waters.

5. Identify the spilled material. Review the Safety Data Sheet.

6. Notify the Emergency Coordinator. The Emergency Coordinator will provide specific instructions for response activities and contact spill response contractors, if necessary.

7. Begin the Notification Procedures. An assessment of potential hazards to public health and safety, public welfare, and the environment will performed and the applicable notifications to emergency responders initiated.

8. Recover or Clean Up the Spilled Material. As much material as possible will be recovered and reused where appropriate. Liquids absorbed by solid materials will be shoveled into open top drums. All equipment used in the cleanup will be decontaminated. When drums are filled or the cleanup is finished, the drum lids will be secured and the drums will be appropriately labeled identifying the contents. Mixing of wastes will be avoided. Arrangement for proper disposal of the waste in accordance with applicable federal and state regulations will be made. Recovered wastes will be stored away from the affected area to avoid blocking movement paths of emergency responders and/or cleanup crews.

List of Emergency Coordinators and Internal Contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>24-Hour Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenneth Scavone</td>
<td>Primary Emergency Coordinator</td>
<td>724-971-0788</td>
</tr>
<tr>
<td></td>
<td>Operation Manager</td>
<td></td>
</tr>
<tr>
<td>Henk VanHengel</td>
<td>Secondary Emergency Coordinator</td>
<td>702-328-1199</td>
</tr>
<tr>
<td></td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>Charleen Gemberling</td>
<td>Tertiary Emergency Coordinator</td>
<td>570-533-7019</td>
</tr>
<tr>
<td></td>
<td>Office Manager</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX C

RECORD OF INSPECTIONS

Instructions: This record should be completed **monthly**. Visually inspect each item, placing an ✓ in the appropriate box for each item. If any item needs explanation, do so in the space provided, or attach additional sheets if necessary. Any item that receives “yes” as an answer must be described and addressed immediately.

DATE: ___________________  INSPECTOR NAME: ____________________________________________

COORDINATOR SIGNATURE: __________________________________________________________

LOCATION: _________________________________________________________________________

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulk Storage Tanks, Drums and Other Containers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drip Marks or Other Signs of Leakage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lids and Valves are Properly Secured</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discoloration of Tanks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puddles Containing Spilled or Leaked Material</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrosion, Cracks, Damage, or Deterioration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bolts, Rivets, or Seams Are Damaged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supports Buckled, Eroded, Settled, or Deteriorated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level Indicator(s) Functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm System Functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good Housekeeping Maintained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Portable Containers within Secondary Containment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sumps/Dikes Used as Secondary Containment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cracks or Gaps in Concrete, Masonry, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damage to Geomembrane Layer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discoloration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presence of Spilled or Leaked Material</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Settling or Other Foundation Damage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damage Caused by Vegetation Roots</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulated Precipitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pumps and Piping</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Droplets of Stored Material</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discoloration or Corrosion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence of Seepage From Valves or Seals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections Not Capped or Blank-Flanged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumps and Valves Locked if Not in Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Malfunction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spill Kit &amp; Security</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Equipment Inventory Complete</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fencing, Gates, Locks, Lighting, Alarm Malfunction</td>
<td></td>
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# APPENDIX C

## RECORD OF INSPECTIONS

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<th>Parking Lots and Vehicle Storage</th>
<th>Yes</th>
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<td>Evidence of Leaks or Spills</td>
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<td>Drip Marks or Other Signs of Leakage</td>
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<td>Discoloration or Corrosion of Piping</td>
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<td>Cracks or Gaps in Concrete, Masonry, etc.</td>
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<tr>
<td>Spilled or Leaked Material</td>
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<td>Pollutants Exposed to Stormwater not in Containment</td>
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<td>New Materials with Potential for Stormwater Exposure</td>
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### RECORD OF TESTING AND PREVENTIVE MAINTENANCE

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* Attach copies of official records of tank integrity and pressure tests. Records of certified tank inspections must be kept at the facility for at least three years. Shell testing records shall be kept on file for the life of the tank.
APPENDIX D

Copies of Routine Inspections and Annual Reports
APPENDIX E

Signature Pages and Plan Amendments
**APPENDIX E**

**RECORD OF REVIEW AND PLAN AMENDMENTS**

<table>
<thead>
<tr>
<th>DATE</th>
<th>PLAN AMENDMENT</th>
<th>DESCRIPTION OF AMENDMENT</th>
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9/24/2020

PPC Plan Tables
APPENDIX F

Nuisance Control Plan
NUISANCE CONTROL PLAN

FOR THE:
KENDRA II, LLC
BEAR LAKE DISPOSAL FACILITY
1889 CORNISH HILL ROAD (SR 4004)
BEAR LAKE, PA 16402

PREPARED FOR:
Kendra II, LLC
(Bear Lake Properties, LLC)
5459 State Route 29
Springville, PA 18844

SEPTEMBER 2020
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<th>Page</th>
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<tr>
<td>2.0 PROJECT DESCRIPTION</td>
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<td>4.0 COUNTERMEASURES</td>
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<td>4.7 Nuisance Odors</td>
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1.0 EXECUTIVE SUMMARY

KENDRA II, LLC (Kendra), Bear Lake Properties, LLC (BLP) has developed this Nuisance Control Plan for the Bear Lake Disposal Facility (Facility). BLP operates the USEPA Class II UIC injection well facility at 1889 Cornish Hill Road, Bear Lake, PA for the disposal of oil and gas brine waste liquids.
2.0 PROJECT DESCRIPTION

The Facility operates under the Standard Industrial Classification (SIC) Code of 1389 (Oil & Gas-Other) and provides disposal of saltwater brine from the oil and gas industry. The Facility houses an unloading pad area and transfer pumps, four (4) 400-BBL and four (4) 300-BBL aboveground storage tanks (AST), TSS filtration equipment and injection of filtered liquids. The Facility is operated under a PADEP Waste Transfer Facility Permit #301366 and multiple USEPA UIC permitted injection wells for the processing and disposal of oil and gas liquid wastes generated during the production of oil and natural gas.
3.0 NUISANCE ASSESSMENT

3.1 Nuisance Animals
A daily visual inspection will be performed by the shift foreman. If signs of animal problems are identified, the shift foreman will verbally notify the supervisor, and the appropriate countermeasures will be conducted. Documentation of the daily inspections will be recorded monthly on the Record of Inspections Form, provided in Appendix C. By signing this form monthly, the employee is also acknowledging that brief daily inspections of the noted areas have been completed. All inspection reports will be maintained at the Facility.

3.2 Nuisance Vectors
A daily visual inspection will be performed by the shift foreman. If signs of vectors are identified, the shift foreman will verbally notify the supervisor, and the appropriate countermeasures will be conducted. Documentation of the daily inspections will be recorded monthly on the Record of Inspections Form, provided in Appendix C. By signing this form monthly, the Employee is also acknowledging that brief daily inspections of the noted areas have been completed. All inspection reports will be maintained at the Facility.

3.3 Nuisance Noise
A daily visual inspection will be performed by the shift foreman. If unusually loud noises are identified or reported by neighboring facilities, the shift foreman will verbally notify the supervisor, and the appropriate countermeasures will be conducted. Documentation of the daily inspections will be recorded monthly on the Record of Inspections Form, provided in Appendix C. By signing this form monthly, the Employee is also acknowledging that brief daily inspections of the noted areas have been completed. All inspection reports will be maintained at the Facility.

3.4 Nuisance Light
The work area is illuminated by several work lights during the evening and night time hours of operation. The Facility is operated 24-hours/7-days per week. Light in operational areas is necessary for visual operations and employee safety. Should any complaints be received about nuisance light, they will be handled by the supervisor on a case-by-case basis.

3.5 Nuisance Dust
Access roads and the unloading/loading areas of the treatment facility are graveled, concreted, or paved; therefore, nuisance dust should not be an issue. Should any complaints be received regarding nuisance dust, the supervisor will handle them on a case-by-case basis.
3.6 Litter
A daily visual inspection will be performed by the shift foreman. If excessive litter is identified or reported by neighboring facilities, the shift foreman will verbally notify the supervisor, and the appropriate countermeasures will be conducted. Documentation of the daily inspections will be recorded monthly on the Record of Inspections Form, provided in Appendix C of the PPC Plan. By signing this form monthly, the Employee is also acknowledging that brief daily inspections of the noted areas have been completed. All inspection reports will be maintained at the Facility.

3.7 Nuisance Odors
Olfactory inspections will be performed daily by the shift foreman, downwind of the Facility. If signs of nuisance odors are identified, the shift foreman will verbally notify the supervisor, and the appropriate countermeasures will be conducted. Documentation of the daily inspections will be recorded monthly on the Record of Inspections Form, provided in Appendix C of the PPC Plan. By signing this form monthly, the employee is acknowledging that the daily inspections of the noted areas have been completed. All inspection reports will be maintained at the Facility.
4.0 COUNTERMEASURES

4.1 Nuisance Animals
If an animal problem is observed or a complaint received by the supervisor, the appropriate countermeasure will be implemented by the supervisor. Depending on the type of animal (e.g., cats, opossum, ground hogs, etc.) and the state rules and regulations regarding the control of these animals, the countermeasure(s) may include, but not be limited to:

- Bait, capture and release in another area;
- Bait, capture and extermination;
- Extermination (by a licensed exterminator);
- Repellants; or
- Process or storage modifications to deter animals (e.g., fences, tarps).

If a farm animal has made its way onto the facility, the appropriate countermeasure(s) may include, but not be limited to:

- Returning the animal to the farm area;
- Notifying the farm owner of the animal so that they may remove it from the facility; or
- Restraining the animal in a safe area until the farm owner can remove it from the facility.

4.2 Nuisance Vectors
If a vector problem is observed or a complaint received by the supervisor, the appropriate countermeasure will be implemented by the supervisor. Depending on the type of vector (e.g. birds, rodents, mosquitoes, etc.) the countermeasure(s) may include, but not be limited to:

- Pesticides;
- Repellants;
- Baits;
- Biological controls;
- Poisons; or
- Process or storage modifications.

Where appropriate, a licensed pesticide applicator or exterminator will be contracted to perform the countermeasure.

4.3 Nuisance Noise
If a noise complaint is observed or a complaint is received by the supervisor, the appropriate countermeasure will be implemented. Countermeasures may include, but are not limited to:

- Walls or sound barriers, which help absorb and block sound;
- Process modifications; or
- Delivery schedule revisions (e.g., reschedule truck deliveries to another time).
4.4 Nuisance Light
If the supervisor receives a complaint regarding nuisance light, the appropriate countermeasure will be implemented by the supervisor. The countermeasure may include, but is not limited to:

- Removing the source of nuisance light;
- Moving the nuisance light source; or
- Substituting a lower wattage bulb.

4.5 Nuisance Dust
If the supervisor receives a complaint regarding nuisance dust, the appropriate countermeasure will be implemented. The countermeasure may include, but is not limited to:

- Using water to spray the unpaved areas during dry weather;
- Using a dust agent on unpaved areas during dry weather; or
- Paving certain areas that are creating a dust nuisance.

4.6 Litter
If a litter problem is observed or a complaint received by the supervisor, the appropriate countermeasure will be implemented by the foreman or supervisor. The countermeasure may include, but is not limited to:

- Assigning an employee to pick up trash;
- Placing a trash receptacle in a problem area; or
- Using a fence or barrier to stop litter from blowing offsite.

4.7 Nuisance Odors
If an odor problem is observed or a complaint received by the supervisor, the appropriate countermeasure will be implemented by the supervisor. Depending on the source of the odor, the countermeasure(s) may include, but not be limited to:

- More frequent waste pickups;
- Installing an odor control system; or
- Other engineering controls deemed appropriate for the source issue.
APPENDIX G

Record of Team Member Training
## RECORD OF EMPLOYEE TRAINING

<table>
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<th>DATE OF TRAINING</th>
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*Topic Areas

A-Good Housekeeping          E-Spill Response          I-All Topics
B-Spill Prevention          F-Reporting Procedures
C-Inspections               G-Stormwater Inspections
D-Preventative Maintenance  H-OSHA Topics
APPENDIX H

Record of Spill History
APPENDIX H

RECORD OF SPILL HISTORY

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<tr>
<th>DATE OF RELEASE</th>
<th>DESCRIPTION OF RELEASE</th>
<th>QUANTITY (GALLONS)</th>
<th>MANAGEMENT SIGNATURE ACKNOWLEDGING RELEASE</th>
<th>REPORTED TO USEPA REGIONAL ADMINISTRATOR OR PADEP (Y/N)</th>
<th>REPORTED TO NATIONAL RESPONSE CENTER (Y/N)</th>
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APPENDIX I

Spill Report Form
APPENDIX I

SPILL REPORT

Reporter’s Name and Date:  

Location of Discharge:  

Date and Time Discharge Occurred:  

Material and Amount Discharged:  

Source of the Release:  

Cause and Circumstances of Release:  

Countermeasures to Contain and Clean-up Discharge:  

Personnel/Agency Contacted Regarding Discharge Procedures:  

Corrective Actions Implemented to Prevent Recurrence of Discharge:  

Discharge Report Sent To:  
EROSION & SEDIMENTATION PLAN
Permanent stabilization is defined as a minimum uniform, perennial 70% vegetative cover or other permanent non-vegetative cover with a density of at least 50% of the cover type. Fill materials shall be free of frozen particles, brush, roots, sod, or other foreign or objectionable materials that would interfere with or prevent the establishment of the permanent vegetative cover.

The contractor is responsible for ensuring that any material brought on site is clean fill. Form FP-001 must be retained by the property owner for the project site.

The contractor shall remove from the site, recycle, or dispose of all building materials and waste in accordance with the Department’s solid waste management program.

Silt sacks to be installed in all existing and proposed inlets that are to receive runoff. Silt sacks are to remain in place until the site has achieved a 70% vegetative cover in each area.

Areas to be filled are to be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots and other objectionable material.

All graded areas shall be permanently stabilized immediately upon reaching finished grade. Cut slopes in competent bedrock and rock fills need to be stabilized in accordance with the approved vegetative stabilization specifications. No more than 15,000 square feet of disturbed area shall reach final grade before initiating stabilization of the site.

For areas to be permanently seeded, pulverized limestone shall be worked into the soil at a rate of 6 tons per acre. A 10-lbs/1000 s.y. (20%) application of lime and fertilizer not to be applied in wetland areas. 38-0-0 Urea-Form Fertilizer.

Construction wastes include, but are not limited to, excess soil materials, building materials, erosion and sedimentation control waste materials. Construction wastes shall be removed from the site and recycled or disposed of in accordance with the Department’s solid waste management program.

Sediment control BMPs must be maintained properly. Maintenance must include inspections of all erosion and sediment BMPs after each runoff event to ensure proper function.

If any erosion and sediment control BMPs fail to perform as expected, replacement BMPs, or modifications of those installed will be required. Wherever possible, recycling of excess materials is preferred, rather than disposal.

Vegetation and fauna shall be re-vegetated in the aftermath of construction operations to minimize the impact on the environment. Wherever possible, native plantings shall be used for species diversity.

All construction sites shall be kept clean, free of litter, and comply with the standards of this plan.

Areas to be filled are to be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots and other objectionable material.

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Vegetation and fauna shall be re-vegetated in the aftermath of construction operations to minimize the impact on the environment. Wherever possible, native plantings shall be used for species diversity.

All construction sites shall be kept clean, free of litter, and comply with the standards of this plan.
TOWN OF CLYMER

Bear Lake Properties, LLC.

SOILS LEGEND:

VeB: Venango Silt Loam 0 to 8 percent slopes
VeC: Venango Silt Loam 8 to 15 percent slopes
CpB: Cornish Hill Road

STATE OF NEW YORK
STATE OF PENNSYLVANIA
COLUMBUS TOWNSHIP

LOT 1

Lot 2

30.33 Acres

34.32 Acres

2621.09'

lowland wooded and brush area

STATE OF PENNSYLVANIA
COLUMBUS TOWNSHIP

PROPOSED FACILITY UPGRADES

Chippewa Silt Loam 0 to 8 percent slopes
Venango Silt Loam 8 to 15 percent slopes

NORTH

1 ½ story

Bittinger # 2

Provisional

(Date)

Sewickley, PA 15143

Prepared For:

THE

Civil Engineering    Land Development    Structure Design

AND

COMPANY

APPROXIMATE

NO GRUBBING IS TO OCCUR OUTSIDE OF THE LIMIT OF DISTURBANCE SHOWN

LIMIT OF DISTURBANCE/NPDES

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GEOLOGICAL REPORT
Geologic Description of the Bear Lake Area and the Proposed Bittinger #3 and Smith-Ras Unit #1 Saltwater Disposal (SWD) wells

The Bittinger #3 and Smith-Ras Unit #1 are offset wells of one and other, approximately 2,000' well to well. As such, this geologic section is written for both wells, as the general geology of the wells are similar. Both wells have a proposed disposal interval in the Silurian Medina (Grimsby) Sandstone and Whirlpool Sandstone (roughly 4250' to 4425', below ground surface). As needed, specific figures will be used and provided for either well.

Included as figures at the end of this report are maps for both the Bittinger #3 and Smith-Ras Unit #1. Both wells have a map of oil and natural gas wells (within the mile-wide buffer) and of water wells (within the quarter-mile wide buffer). These figures are from the EPA permit application prepared by Tetra Tech, February 2015.

Shallow Geologic Characterization


Beneath the glacial deposits are the uppermost bedrock deposits in the area. The uppermost bedrock is the Devonian Venango Formation. The Venango Formation consists of interbedded sandstones, conglomerates, siltstones, and shales. The Venango Formation could be utilized as an aquifer in the Bear Lake area. Beneath the Venango Formation is the Devonian Chadakoin Formation, which consists of fine-grained clastics, marine siltstones and shales.
The glacial sediments and the Devonian Venango Formation are typically the "underground source of drinking water" in the Bear Lake area. In the Bittinger #3 (123-33945) well, fresh water was reported at a depth of 60' below ground surface (bgs) in Unconsolidated Gravel (Glacial Deposits). In the Smith-Ras Unit #1 (123-34843) well, fresh water was reported at a depth of 105' (bgs) in Unconsolidated Gravel (Glacial Deposits).

As discussed in the EPA permit application prepared by Tetra Tech, February 2015, a conservative depth estimate of 300' bgs for the underground source of drinking water was proposed. Water well logs indicate that freshwater is typically encountered in the +/- 120' bgs of glacial, unconsolidated sediments. Freshwater may also be found in the uppermost Venango Formation, although some indications are the porous portions of the Venango Formation, at continued depth, would include saline water, as is often in association with oil, within reservoirs of the Venango Formation.

Deep, Subsurface Geologic Characterization

Structurally, the Bittinger #3 and Smith-Ras Unit #1 wells are in the Appalachian Plateau Physiographic Province. Structural geologic maps are included with this report (see Attachments). The structural contour maps are on the top of the driller's termed Packer Shell (Irondequoit Limestone) and the top of the Queenston Formation. These two formations are above and below the Medina (Grimsby) and Whirlpool Sandstones, the proposed disposal intervals. General strike across the area is northeast – southwest. The structural geologic maps depict a consistent and gentle dip to the southeast. Mapping shows no existence of faults cutting through the Silurian section in the area of the Bear Lake properties.

Stratigraphically, the disposal wells are planned in the Silurian Medina and Whirlpool Sandstones, as are the current SWD wells in the Bear Lake area. Included within the attachments of this report are contour isopach maps of footage greater or equal to 8.0% log depicted porosity. The Medina Sandstone is interpreted as a braided, fluvial-deltaic channel system. Porous reservoir tends to be discontinuous and has a general northwest to southeast trend, perpendicular to regional strike. The Whirlpool Sandstone is interpreted as a shore-face sandstone, with a very consistent Northeast to southwest trend, parallel to regional strike.

Cross-sections are included within the attachments depicting the interval between the Packer Shell (Irondequoit Formation) and the Queenston Shale. The cross-sections' datum is the top of the Packer Shell. The cross-sections depict the consistency of the Medina and Whirlpool Sandstones (the disposal interval) across the Bear Lake area.
Confining intervals are those formations that are deemed to be significantly impermeable to not allow upward migration of fluids from depth. As seen in Table 1, above, numerous intervals can be considered confining intervals. The Devonian Shales (greater than 2,500’ in the Bear Lake area) is predominately impermeable shale. The Silurian Salina Salt Formation is located throughout much of the Appalachian Basin, including Columbus Township, Warren County, Pennsylvania. In the Bear Lake area, the Salina interval is approximately 200’ in thickness and lies approximately 650’ above the top of the Medina Sandstone. The Salina Formation is a series of interbedded salt (halite), anhydrite, gypsum and dolostones. The Salina Formation tends not to be significantly fractured (due to the flowing nature of the salt) and considered an important confining layer. The Lockport Dolomite (Dolostone) is also considered a confining layer and is approximately 150’ to 200’ in thickness. The Lockport Dolomite lies approximately 360’ above the Medina Sandstone.

As per the PA Bureau of Topographic and Geologic Survey Open-File Report 05-01.0 "Precambrian Basement Map of the Appalachian Basin and Piedmont Province in Pennsylvania" (http://elibrary.dcnr.pa.gov/GetDocument?docId=1751399&DocName=OFGG05-01_BasementDepth-GeospatialDB_Pa) the depth to basement in the site vicinity is estimated at approximately 2,500 meters (or 8,200 feet) below sea level. The base of the Medina Group at the Bear Lake area is approximately 2,800 ft. below sea level, or approximately a mile above Pre-Cambrian basement. Between the Pre-Cambrian Basement and the disposal interval lies the Ordovician Shales (Queenston, Lorraine and Utica Shales) and the Cambrian-Ordovician Carbonates.

No subsurface coal mines or natural gas storage facilities exist near the Bear Lake properties.
Table II: Casing and Cement program in subject wells

<table>
<thead>
<tr>
<th></th>
<th>Bittinger #3</th>
<th>Smith-Ras Unit #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 3/8” csg.</td>
<td>38’</td>
<td>None reported</td>
</tr>
<tr>
<td>Cement</td>
<td>driven</td>
<td></td>
</tr>
<tr>
<td>8 5/8” csg.</td>
<td>205’</td>
<td>406’</td>
</tr>
<tr>
<td>Cement</td>
<td>200 sacks</td>
<td>150 sacks</td>
</tr>
<tr>
<td>4 1/2” csg.</td>
<td>4508’</td>
<td>4493’</td>
</tr>
<tr>
<td>Cement</td>
<td>225 sacks</td>
<td>75 sacks cement/150 sacks gel</td>
</tr>
<tr>
<td>Perforations</td>
<td>4,321’ – 4,334’</td>
<td>4269’ – 4383’</td>
</tr>
</tbody>
</table>

Table II, above, is a summary of the casing and cementing programs, as report, when the Bittinger #3 and the Smith-Ras Unit #1 were initially drilled in 1984. Completion reports for both wells are included as attachments to this report.

Seismicity in and around the Bear Lake Properties

Seismicity across Pennsylvania tends to be of minimal impacts. Much of the seismicity in the states has occurred in the southeast (related to thin skin tectonics and the continued “push” from sea-floor spreading) or in northwestern most Pennsylvania (related to isostatic rebound from past glaciation). Past seismic activity can be viewed on the PA Bureau of Topographic and Geologic Survey Map 69 (Earthquake Epicenters in and Near Pennsylvania, compiled by R.T. Faill, 2004, http://elibrary.dcnr.pa.gov/GetDocument?docId=1751247&DocName=Map69_EQCatalog-Epicenter Pa). The only reported earthquake epicenter in Warren County occurred on 07/08/1995. It was registered as a 2.4 magnitude earthquake.

Induced seismicity is not expected in the Bear Lake area. The area is seismically inactive (as discussed in the paragraph above). Within the area, no faulting is mapped through the disposal interval or the formations above (Packer Shell/Irondequoit Formation) or below the disposal interval (Queenston Formation). Also, no significant faulting is mapped on PA Geologic Survey’s Map 69, near the Bear Lake facility, through Warren County. Lastly, the operator already has an induced seismicity monitoring system in place at the Bear Lake facility.

Attachments to this Report
1. Geophysical Logs for the Bittinger #3 and Smith-Ras Unit #1
2. Completion Reports for the Bittinger #3 and Smith-Ras Unit #1
3. Isopach mapping of the Bear Lake Area of the Medina Sandstone and Whirlpool Sandstone
4. Structural Mapping on the Packer Shell (Irondequoit Limestone) and the Queenston Formation)
5. Cross-section of the Medina and Whirlpool formation through the Bear Lake Area
DISCLAIMER

This document includes forward-looking statements as well as historical information. Forward-looking statements include but are not limited to statements relating to geological and seismic data interpretations, prospect reserve estimates and prospect risk. Although BGC believes that its expectations reflected in these forward-looking statements are reasonable, such statements involve risks and uncertainties, and no assurance can be given that actual results will be consistent with these forward-looking statements. Investment in oil and gas exploration is high risk by its very nature. Important factors that could cause actual results to differ from these forward-looking statements include, but are not limited to: erroneous interpretations of the seismic and geological data; the inability to acquire leases on identified prospects; mechanical problems while drilling and producing wells which prevent completion of a well or result in plugging of a well; dry holes; less reserves than originally estimated due to poor sand development or drainage by offsetting wells; non-commercial wells; and the variations in future gas pricing. BGC cannot and has not beyond normal due diligence care standards confirmed the accuracy and completeness of all the information we have reviewed during this consulting engagement. Data for this review has been provided by Kendra II, LLC., its clients or is publicly available and BGC, Inc. cannot be held responsible for errors in this provided data. Further, we express no opinion regarding any legal or securities issues. BGC shall assume no liability whatsoever for the use or reliance there upon by Kendra II, LLC., their clients, and/or their investors, of information, opinions and interpretations provided by BGC. BGC reserves the right to adjust these findings and interpretations with the discovery of relevant data or future production data.
Mapping of the Bittinger #3 and Smith-Ras Unit #1
Respectfully submitted by:
Dan A. Billman, P.G., C.P.G.

Kendra II
Cross Section NW - SE
Columbus Twp., Warren Co., PA
Date: 12/27/2010
Basement depth is approximately 7,545' (2,300 meters) below sea level beneath the Bear Lake Properties, based on PA Geologic Survey Report OFGG 05-01.0, "Precambrian Basement Map of the Appalachian Basin and Piedmont Province in Pennsylvania." The depth of the base of the injection interval is approx. 4,400' (approx. 2,815' below seal level). Therefore, the interval between the injection formations and the basement is approx. 4,730' (~ 0.9 miles).

Bear Lake Area Dip Cross-Section (NW to SE), Silurian Salina Salt through total depth of the wells, in the Queenston Formation (below the injection interval).
Datum: Irondequoit (Packer Shell)
Medina (Grimsby) Sandstone
Whirlpool Sandstone
Queenston Shale
Rochester Shale
Lockport Dolomite

Bear Lake Area Dip Cross-Section (SW-NE), Silurian Salina Salt through total depth of the wells, in the Queenston Formation (below the injection interval).

Basement depth approximately 7,545’ (2,300 meters) below sea level beneath the Bear Lake Properties, based on PA Geologic Survey Report OFGG 05-01.0, “Precambrian Basement Map of the Appalachian Basin and Piedmont Province in Pennsylvania.” The depth of the base of the injection interval is approx. 4,400’ (approx. 2,815’ below sea level). Therefore, the interval between the injection formations and the basement is approx. 4,730’ (~ 0.9 miles).
Discussion of the Cross-sections

Included with this discussion are cross-sections, one trending in a strike direction (southwest to northeast) and one trending in a dip direction (northwest to southeast) through the Bear Lake properties area. The cross-sections are stratigraphic, and the datum is the Irondequoit Dolomite (driller’s Packer Shell), above the Medina Sandstone. The cross-sections depict the rock units from just above the Silurian Salina Salt Formation to the total depth of each well, which is the Ordovician Queenston Shale, just below the Whirlpool Sandstone. In the area of the Bear Lake properties, no wells penetrate the Precambrian Basement. Based on PA Geologic Survey publication, OFGG 05-01.0, “Precambrian Basement Map of the Appalachian Basin and Piedmont Provence in Pennsylvania”, published in 2005, the basement depth around the Bear Lake properties is approximately 2,300 meters (~ 7,546 feet) below seal level. The depth of the base of the injection intervals (the Medina and Whirlpool Sandstones) are roughly 4,400 feet below the surface, or roughly 2,815 feet below sea level. Therefore, the distance between the base of the injection interval and Basement is approximately 4,750 feet (approximately 0.9 miles between the base of the Precambrian Basement).

Also, based on PA Geologic Survey publication, OFGG 05-01.0, “Precambrian Basement Map of the Appalachian Basin and Piedmont Provence in Pennsylvania”, published in 2005, northwestern Warren County, Pennsylvania is void of major, mapped basement structures. The area beneath and around the Bear Lakes Properties, as it pertains to the Precambrian Basement, appears structurally quiet with basement dipping to the southeast.

Discussion of Section 4: Drowning out stratum in neighboring wells.

In the area of the Bear Lake Properties, the producing formations include the Silurian Medina and Whirlpool Sandstones. No other formations are known to be producing in the immediate area of the Bear Lake Properties.

Based on the structural geologic mapping included in the initial submission, it has been shown that the regional geologic dip, in the Bear Lake disposal area, is from the northwest to the southeast. The wells immediately south to southeast of the Bear Lakes Properties disposal wells are on the Reed lease. The Reed #1 (123-33829), Reed #2 (123-33646), Reed #3 (123-32210) and Reed #4 (123-35728) are all owned by Bear Lake Properties LLC (also the owner of the SWD wells) and all four Reed wells are currently shut in.

It is possible to have a certain amount of the disposal water moving in a more east and/west direction based on the isopach mapping of the Whirlpool and Medina Sandstones (mapping included in the initial submission). Immediately west of the Bear Lake disposal wells is the Trisket lease. The Trisket #1 (123-39273) and Trisket #2 (123-40751) are owned by Bear Lakes Energy (the previous owner of the Bear Lake Properties) and are currently shut in. East of the Bear Lake disposal wells are the Wright and Craker properties. Both wells are owned by Bear Lakes Energy (the previous owner of the Bear Lake Properties). The Wright #1 (123-39213) and Craker #1 (123-37903) are also shut in.
GEOPHYSICAL LOGS
PROPOSED INJECTION RATE, BOTTOMHOLE PRESSURE & FRACTURE GRADIENT
Proposed Injection Rate, Bottomhole Pressure, & Fracture Gradient for
Bear Lake Properties Bittinger #3 Well
Warren County, PA

1) Maximum Injection Pressure (MIP) Calculation for Bittinger # 3 Well
   MIP = [FG - (.433XSG)] X D
   FG = 0.934
   SG = 1.218 (brine)

   Depth:
   Medina Top 4260

<table>
<thead>
<tr>
<th>Hydrostatic Factor (psi/ft)</th>
<th>SG</th>
<th>D( ft)</th>
<th>Fracture Gradient (psi/ft)</th>
<th>MIP (Surface)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.433</td>
<td>1.218</td>
<td>4260</td>
<td>0.934</td>
<td>1732</td>
</tr>
</tbody>
</table>

2) Bottomhole Injection Pressure Maximum of 4074 psi.
SEISMIC MONITORING AND MITIGATION PLAN (JANUARY 2021)
Seismic Monitoring and Mitigation Plan

for

Bear Lake Properties
C/O Kendra II, LLC
5459 State Rt 29
Springville, PA 18844

Commercial Class II Underground Injection Facility

Columbus Township, Warren County, PA

January 21, 2021

Prepared for

Bear Lake Properties, LLC

and

Pennsylvania Department of Environmental Protection

Prepared by

GeoEnergy Monitoring Systems, Inc.
PO Box 4994
White Rock, NM 87547
**Background**

This document is a Seismic Monitoring and Mitigation Plan designed specifically to satisfy permit requirements for continuous seismic monitoring at the Bear Lake Properties, LLC (“Bear Lake” Commercial Injection Facility located in Columbus Township, Warren County, PA (Figure 1). The Bear Lake Properties facility is located in northern Warren County, PA and consists of five Class II-D salt water disposal wells permitted under U.S. EPA Region 3 and Pennsylvania DEP UIC program (Figure 1). The wells are located within a legacy natural gas field, Columbus Field. The facility presently has three active injection wells, Bittinger #1, Bittinger #2 and Bittinger #4.

Two additional wells, Bittinger #3 and Smith-Ras #1, are also permitted and authorized to be converted to injection wells, and will be included within the active injection system pending development of final well conversion plans and EPA/PA DEP workover approvals.

This Seismic Monitoring and Mitigation Plan covers all five injection wells at the Bear Lakes facility.

The following table summarizes Bear Lake well permits and their status.

<table>
<thead>
<tr>
<th>Well Name/Facility</th>
<th>API No.</th>
<th>US EPA Permit No.</th>
<th>PA DEP Site ID</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bittinger #1</td>
<td>123-33914</td>
<td>PAS2D216BWAR</td>
<td>220609</td>
<td>Active</td>
</tr>
<tr>
<td>Bittinger #4</td>
<td>123-39874</td>
<td>PAS2D215BWAR</td>
<td>226570</td>
<td>Active</td>
</tr>
<tr>
<td>Bittinger #2</td>
<td>123-33944</td>
<td>PAS2D217BWAR</td>
<td>220639</td>
<td>Active</td>
</tr>
<tr>
<td>Bittinger #3</td>
<td>123-33945</td>
<td>PAS2D218BWAR</td>
<td>220640</td>
<td>Pending Conversion</td>
</tr>
<tr>
<td>Smith-Ras #1</td>
<td>123-34843</td>
<td>PAS2D219BWAR</td>
<td>222425</td>
<td>Pending Conversion</td>
</tr>
<tr>
<td>Residual Waste Transfer Facility &amp; Truck Offload Area</td>
<td>--</td>
<td>--</td>
<td>301366</td>
<td>Operating</td>
</tr>
</tbody>
</table>

**Purpose of Monitoring**

The purpose of this monitoring effort is to provide a continuous record of any seismic and earthquake events, with detection and notification of specific naturally occurring and man-made...
seismic occurrences or events at the Bear Lakes facility and vicinity. The specific sources of seismic events can include the following:

- Tectonic derived earthquakes, activity
- Mine blasts (quarries, coal, stone, etc.)
- Induced seismicity (from hydraulic fracturing, and injection well activity)

All seismic events of magnitude 1.0 or greater occurring within 10 kilometers (6.21 miles) of the facility, and earthquakes of magnitude 1.5 and above, located within 20 kilometers (12.42 miles) of each well will be recorded and reported to Bear Lakes (Figure 2). The detection levels shown on Figure 2 will cover the entire facility.

**Installation of System**

GeoEnergy Monitoring Systems, Inc. (GeoEMS) of Los Alamos, NM installed two seismometer stations on the Bear Lake site on September 21, 2017. This installation consisted of two stations, a primary station (Station PBL2) whose data is transmitted to Incorporated Research Institutions for Seismology (IRIS; [https://www.iris.edu/hq/](https://www.iris.edu/hq/)), and shared with Pennsylvania Seismic Network (PASEIS) via Penn State University, and an auxiliary station (Station PBL1) as back-up (Figure 3). Station PBL2 was chosen as the primary station because of quieter ambient noise levels vs. Station PBL1 which is situated near the Waste Transfer area of the facility (Figure 3).

**Primary Station PBL2** is located approximately 530 m (~1,739 feet) east of the Bittinger #2 injection well near the truck offload area (Figure 3). Lat/Lon: 41.9981-79.5288 Elevation: 506 m.

**Auxiliary Station PBL1** is located near the Bittinger #2 injection well, on the northeast corner of the Waste Transfer Facility (Figure 3). Lat/Lon: 41.9976 -79.5350 Elevation: 495 m.

The two-station approach is employed to:

1) reduce false detections,
2) provide verification to aid in defining the location of small events and,
3) provide backup hardware redundancy for Station PBL1.
The auxiliary sensor will be deployed at a separate location from the main sensor, far enough away that it can be used to reduce false detections. The system is configured the same as the primary station, but will not be transmitting data to IRIS. GeoEMS stations also record continuously on an SD card in the units.

**Monitoring Equipment**

The installed equipment is from GeoSpace, LP, a seismic monitoring equipment manufacturer in Houston, TX, which provides instruments for real-time data acquisition of seismic events. The GeoSpace, LP GS-11D is a high output, rotating coil geophone designed and built to withstand the shocks of rough handling. The precision springs of this field-proven geophone are computer designed and matched to optimize performance specifications under even the most extreme conditions. The natural frequency is 4.5 Hz, with standard coil resistance of 4000 ohms. The PC-21 Land Case is used with the GS-11D geophone. An example station configuration is shown in Figure 4. Appendix A provides a detailed specification sheet for the equipment used.

**Operations**

The seismic monitoring equipment from GeoSpace, LP has been integrated into the Bear Lake operations program with regular daily confirmation of recording and transmission of data to IRIS and PASEIS networks. Bear Lake operations personnel have been trained by GeoEMS to troubleshoot minor items, and to clean and check the equipment, mitigating any weather derived effects or other problems that may arise.

**Monitoring**

The procedure for seismic monitoring of the Bear Lake facility consists of GeoEMS and Bear Lake personnel reviewing all anomalies, annotating data and reporting any unexpected occurrences. If significant events or anomalies are identified or recorded, evaluation and interpretation of the data will be made by GeoEMS personnel in concert with Bear Lake personnel.
Seismic data is stored digitally on flash memory in the instrument, and PBL2 data also transferred via website digitally to IRIS and PASEIS, and downloadable as well. Additionally, data will be recorded at the other Station PBL1, as part of the redundancy aspect of the system.

**Special Permit Conditions** *(Permit conditions are shown in Bold)*

Bear Lakes will work with GeoEMS to insure that all aspects of the PA-DEP Seismic Monitoring and Mitigation Plan Special Permit Conditions are implemented, as follows:

1. **Installation of a seismometer that, at minimum, includes the following:** One 3-component velocity sensor (X, Y, Z axes), high-frequency seismometer. (e) All seismometers shall be installed in accordance with the manufacturer’s instructions prior to operation of the disposal well.

   The primary and auxiliary seismic stations PBL2 and PBL1 were installed at the Bear Lake facility on September 21, 2017 by GeoEMS. Each station consists of a 3-component high-frequency seismometer. The seismometers were installed in accordance with the manufacturer’s instructions. Installation requires a separate bubble level to be placed on top of the geophone for proper leveling per manufacturer’s instructions. Should circumstances require the subsequent incorporation of four-station network, GeoEMS will provide Bear Lakes with three additional seismic stations that can be rapidly deployed at predetermined locations around the Bear Lake facility.

2. **A description of and specification sheet for the seismometer installed at the disposal well site.**

   The seismometer is a 3-component, 4.5 Hz GS-11D manufactured by GeoSpace, LP of Houston, TX. The instrument specification and response data sheets are provided in Appendix A.

3. **The installation of a recorder that, at a minimum, continuously records 100 samples per second using a data logger with 24-bit digitizer and Global Positioning System (GPS) timing, in accordance with the manufacturer’s instructions prior to operation of the disposal well.**

   The stations will be at different areas of the Bear Lakes facility. A 24-bit digitizer is used for sampling at a frequency rate of 125 samples per second with GPS timing.

4. **A description of and specification sheet for the seismic recorder installed at the disposal well site.**

   The station consists of a ground-mounted protective external housing placed for the electronics and battery, a sensor buried 12 inches deep approximately 10 feet from the housing, and a 5-foot
antenna mast. Sensors include Geo Space GS-11D 3C seismometers (See system diagram in Figure 5 and the system specification sheet in Appendix B). The system also records continuous data on-site using standard flash data storage drives.

(5) A description of the protocol for operating and completing calibration of the seismometer and seismic recorder installed at the disposal well site demonstrating that it conforms with the standards employed by the Pennsylvania State Seismic Network (PASEIS) and the manufacturer’s instructions.

Metadata are available for the equipment, including instrument response through the IRIS MetaData Aggregator.

(6) A description of the routine maintenance and service checks that will be implemented to monitor the operability or running condition of the seismometer and seismic recorder installed at the disposal well site. The description should detail how the checks satisfy the manufacturer’s instructions.

Daily State-of-Health (SOH) of the system is monitored by examination of seismograms and from SOH on-board diagnostics such as internal temperature and battery voltage. No routine maintenance is required or planned except for visual inspection, but if there appear to be SOH problems, Bear Lakes on-site personnel are trained to perform maintenance tasks. Bear Lakes personnel will perform maintenance and service checks, as required, under the guidance of GeoEMS.

(7) Verification that tectonic seismic event data will be captured at the disposal well electronically and in a manner that is suitable for tectonic seismic event recordation and analysis.

Baseline data collection shows successful installation and recording of data. These same units have been deployed at numerous injection sites nationwide and have recorded potential Injection-Induced Seismic Events with high fidelity. On August 25, there was a M 2.0 earthquake located about 50 miles southwest of Bear Lakes. Figure 6 shows a seismogram at PBL2 from the event. GeoEMS also analyzed and reported on very small perforation shots in the Bittinger #2 well recorded at PBL1 in December 2018.

(8) Verification that seismic data will be provided to the Incorporated Research Institutions for Seismology (IRIS) Network in real time and that the continuous, real time data conforms to the data format required by IRIS for archiving under PASEIS’ network code (PE) and open distribution. If data transmission is interrupted, notification will be provided to the Department verbally within 24 hours and in writing within seven (7) days.

The output from the IRIS MetaData Aggregator for GeoEMS station PBL2 is shown in Figure 7, providing verification that seismic data is being provided to IRIS as part of PASEIS network code (PE). Bear Lakes will notify PADEP verbally within 24 hours and in writing within seven
(7) days if data transmission from both on-site stations are interrupted for 72 hours. If data transmission is interrupted for a significant period of time, Bear Lakes personnel can still acquire continuous recording of data from the on-board flash drive. Note that minor data interruptions are almost a daily occurrence for many IRIS stations and those will not be reported to PADEP. The IRIS Buffer of Uniform Data (BUD) Monitor can be used to examine data and feed latency times (http://ds.iris.edu/bud Stuff/dmc/bud_monitor.ALL.html) for all stations of the PE network.

(9) A description of measures that will be taken to install the seismometer in a manner that will minimize interference from background sources and allow for optimal Seismic Event identification and location (epicenter and hypocenter). This shall include a plan view map of proposed seismometer location(s).

The seismometer locations were chosen through coordination of GeoEMS and Bear Lake personnel in order to minimize interference and surface noise sources. Figure 3 shows a Google Earth plan view map of the seismometer locations.

(10) Contact information for the responsible person in charge of conduction seismic monitoring activities at the disposal well site.

Bear Lake personnel responsible for seismic monitoring activities on-site is John McCollums: johnm@kendra2.com, 724-971-0788).

GeoEMS personnel responsible for the seismometer and instruments are Stephen P. Jarpe (jarpe@pobox.com, 928-899-1875) and Steven R. Taylor (srt-rmg@comcast.net, 505-412-2841), either of which may be contacted for detailed information on the equipment.

(11) If the one sensor option is chosen, a tectonic seismic event contingency plan that includes monitoring, reporting and mitigation provisions consistent with the following:

a. Contingent upon analyst review, immediate electronic notification to the Department and the Department of Conservation and Natural Resources’ Bureau of Topographic and Geologic Survey (BTGS) of detection of any measurable event, within six (6) miles measured radially from the disposal well.

b. Notification within 10 minutes via email to the Department and 1 hour via telephone to the Department’s statewide toll-free number in the case of seismic activity reference in a. above. Within 24 hours the operator will provide this data including filtering/processing of raw seismic data to identify and remove non-tectonic events (e.g. mine blasts or system noise).

c. Should an Injection-Induced Seismic Event occur (i.e. not a surface-related event or system noise), the Operator will reduce the well’s operation injection rates. Reduction of the disposal well’s operating injection rates in use at the time of the Injection-Induced Seismic Event by 50% within 48 hours of the occurrence of 3 or more consecutive Injection-Induced Seismic Events greater than 1.0 and less than 2.0 local magnitude
(ML) over a seven (7) day period occurring within three (3) miles measured radially from the disposal well. The seven (7) day period is defined as starting with the occurrence of any Injection-Induced Seismic Event of local magnitude 1.0 or greater. Reduced operating injection rates shall be maintained until the Department provides written notice addressing injection rates.

d. Termination of all injection activities within 48 hours of the occurrence of an Injection-Induced Seismic Event of local magnitude 2.0 or greater within three (3) miles measured radially from the disposal well until receipt of a written notice from the Department addressing continued well usage and operating conditions. The assessment of continued usage will include, but not limited to, the following criteria:

GeoEMS, together with Bear Lakes, will insure that all aspects of the Seismic Monitoring and Mitigation Plan conform to Special Permit Conditions of PA-DEP. All actions for Item (11) will be followed by Bear Lakes based on communication and input from GeoEMS. GeoEMS will monitor Station PBL2 on a daily basis. Additionally, on a daily basis, GeoEMS will perform single-station reporting statistics as shown in Figure 8 and include the number of events recorded per day, cumulative number of events, and magnitude and slant (radial) distance from station. GeoEMS will monitor seismicity in the vicinity of Bear Lake facility on a daily basis and, upon analyst review, will notify Bear Lakes immediately if notable trends or changes in micro-seismicity occur. Direct notification to PA-DEP will occur pending confirmation of event(s).

(13) Provisions for submitting an updated Seismic Monitoring and Mitigation Plan

This Seismic Monitoring and Mitigation Plan meets the requirements of the PADEP Special Permit Conditions. Should conditions in the field alter or change any parameter or monitoring approach, a revised updated Plan will be submitted to PADEP.

(14) Upon commencement of disposal activities at the disposal well, the permittee shall record tectonic seismic event data electronically for review at the request of the Department. Tectonic seismic event records must be maintained for one (1) year.

Data archival of all Station recorded monitoring data will be permanently maintained by Bear Lake, LLC, GeoEMS, IRIS and PASEIS.

(15) The permittee shall maintain all calibration, maintenance and repair records for the seismometer for at least (5) years.

Bear Lake, LLC and GeoEMS will maintain these calibration, maintenance, test, and repair records for the seismometer and provide them to PA-DEP or IRIS and PASEIS upon request.

16) The permittee shall maintain all calibration, maintenance and repair records for the seismic recorder for at least five (5) years.
Bear Lake, LLC and GeoEMS will maintain these calibration, maintenance, test and repair records for the seismic recorder at least five (5) years and provide them to PA-DEP or IRIS and PASEIS upon request.

FIGURES

Figure 1. Aerial photograph showing Bear Lake Properties, LLC injection wells.
Figure 2. Seismic station PBL2 as magenta push pin near Bittinger #2 injection well. Green circle of radius 10 km and red circle of radius 20 km indicate epicentral detection limits for ML 1.0 and ML 1.5 events. Also shown as yellow pushpins are regional stations that can be used to perform locations of ML>2 events.
Figure 3. Primary Seismic Station PBL2 and auxiliary station PBL1 locations relative to Bear Lake Properties, LLC Bittinger #2 injection well, Waste Transfer Facility and truck offload area.
Figure 4. Primary station PBL2 located at Bear Lake Properties, LLC truck offload facility.
Figure 5. Seismic Monitoring system diagram.

Figure 6. PBL2 seismogram from M2.0 earthquake occurring on August 25 that was located approximately 50 miles southwest of Bear Lakes.
Channel summary (1 time span)

Information limited to 2017/09/29 00:00:00 to 2019/12/31 23:59:59 - Clear timewindow

<table>
<thead>
<tr>
<th>Network</th>
<th>PE = Penn State Network = PE Network Map = DO1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station</td>
<td>PBL2 = Bear Lake Properties offload facility = GeoEnergy Monitoring Systems = PBL2 Station Map</td>
</tr>
<tr>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>Channel</td>
<td>ELZ = RESP = SAC PZs = XML</td>
</tr>
<tr>
<td>Latitude</td>
<td>41.998100</td>
</tr>
<tr>
<td>Longitude</td>
<td>-79.528808</td>
</tr>
<tr>
<td>Elevation (m)</td>
<td>506</td>
</tr>
<tr>
<td>Depth (m)</td>
<td>0 :: (Local depth or overburden)</td>
</tr>
<tr>
<td>Azimuth</td>
<td>0 :: (SEED convention: Clockwise from north, Z=0, reversed=0)</td>
</tr>
<tr>
<td>Dip</td>
<td>90 :: (SEED convention: From horizontal, Z=90, reversed=90)</td>
</tr>
<tr>
<td>Start</td>
<td>2017/09/29 (272) 00:00:00</td>
</tr>
<tr>
<td>End</td>
<td>2019/12/31 (365) 23:59:59</td>
</tr>
<tr>
<td>Sample Rate (Hz)</td>
<td>125.00</td>
</tr>
<tr>
<td>Max Drift (s)</td>
<td>0.0000 :: (Seconds per sample)</td>
</tr>
<tr>
<td>Instrument</td>
<td>GS-11D, 4.5 Hz, 96.4 V/m/s, Rs=4000 Ohms, Rn=56160</td>
</tr>
<tr>
<td>Units</td>
<td>Instrument: M/S (Velocity in Meters Per Second)</td>
</tr>
<tr>
<td></td>
<td>Response: M/S (Velocity in Meters Per Second)</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>6.738850e+09 @ 1000e+01 Hz (SEED Stage 0)</td>
</tr>
<tr>
<td>Optional Comment</td>
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</tr>
<tr>
<td>MetaData Load</td>
<td>2017/10/06 (279) 08:25:02</td>
</tr>
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</table>

No data available in real-time systems for 2017/09/29 00:00:00 - 2019/12/31 23:59:59

No data available in archive for 2017/09/29 00:06:00 - 2019/12/31 23:59:59

Frequency and phase response plot (RESP SAC PZs XML):

Figure 7. GeoEMS station PBL2 IRIS MetaData Aggregator Listing
Figure 8. Example of single station reporting statistics.
APPENDICES

Appendix A. Specification Sheet and Response Diagram for GS-11D Seismometer

Geophones GS-11D
February 7, 2012 By

GS-11D
Rotating Coil Geophone

- Field proven design
- Shock resistant, rotating dual coil construction
- Gold plated contacts for positive electrical connection
- Precision springs, computer designed and matched
- Full one year warranty

The GS-11D is a high output, rotating coil geophone designed and built to withstand the shocks of rough handling. The precision springs of this field proven geophone are computer designed and matched to optimize performance specifications even under the most extreme conditions.

Gold plated contacts assure positive electrical connections. The Geo Space manufacturing process includes checking all geophone operating parameters with the ATS, an automated computerized test system.

Natural frequencies are 4.5, 8.10 and 14 Hz, with standard coil resistance of 380 ohms. The PC-21 Land Case is used with the GS-11D geophone.

Cases Available
PC-21 Land Case

Spec Sheet:
GS-11D Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>4.5 ± .75 Hz</th>
<th>8 ± .75 Hz</th>
<th>10 ± .75 Hz</th>
<th>14 ± .75 Hz</th>
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<tbody>
<tr>
<td>Natural Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil Resistance @ 25°C ± 5%</td>
<td></td>
<td>360 Ohms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrinsic Voltage Sensitivity with 380 Ohm Coil ± 10%</td>
<td></td>
<td>.81 V/in/sec (.32 V/cm/sec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normalized Transduction Constant (V/in/sec)</td>
<td></td>
<td>.042 (sq.root of Rs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open Circuit Damping</td>
<td>.34 ± 20%</td>
<td>.39 ± 10%</td>
<td>.32 ± 10%</td>
<td>.23 ± 10%</td>
</tr>
<tr>
<td>Damping Constant with 380 Ohm Coil</td>
<td>762</td>
<td>602</td>
<td>482</td>
<td>344</td>
</tr>
<tr>
<td>Optional Coil Resistances ± 5%</td>
<td></td>
<td>55,160 Ohms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moving Mass ± 5%</td>
<td>23.6 g</td>
<td>16.8 g</td>
<td>16.8 g</td>
<td>16.8 g</td>
</tr>
<tr>
<td>Typical Case to Coil Motion P-P</td>
<td>.07 in (.18 cm)</td>
<td>.07 in (.18 cm)</td>
<td>.07 in (.18 cm)</td>
<td>.07 in (.18 cm)</td>
</tr>
<tr>
<td>Harmonic Distortion with Driving Velocity of 0.7 in/sec (1.8 cm/sec) P-P</td>
<td>N/S</td>
<td>0.2% or less</td>
<td>@ 12 Hz @ 12 Hz @ 12 Hz</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height (less terminals*)</td>
<td>1.32 in (3.35 cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>1.25 in (3.18 cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>3.9 oz (111 g)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Specifications are subject to change without notice.
GS-11D Seismic Detector Response Curve
Output vs. Frequency Chart (GS-11D @ 4.5 Hz @ 380 Ohms)

<table>
<thead>
<tr>
<th>SHUNT DAMPING</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A  OPEN</td>
<td>34%</td>
</tr>
<tr>
<td>B  4420Ω</td>
<td>50%</td>
</tr>
<tr>
<td>C  1740Ω</td>
<td>70%</td>
</tr>
</tbody>
</table>

Geo Space, LP
HOUSTON, TEXAS, U.S.A.

SEISMIC DETECTOR RESPONSE CURVE
OUTPUT VS FREQUENCY

TYPE: GS-11D DETECTOR, MODEL VERT
NATURAL UNDAMPED FREQ: 4.25 Hz
D.C. RESISTANCE: 390 Ω AT 25°C
INTRINSIC SENSITIVITY: 0.810 V/IN/SEC
OPEN CIRCUIT DAMPING: 34.0 % OF CRITICAL

SHT 3 OF 3 S 93849
Appendix B. Specification Sheet for GeoEMS Seismic Recording System

Specifications

Mechanical
Size: 30x20x18 cm Base unit, NEMA 4X watertight enclosure.
Weight: 5 kg Includes sensors. Battery: 12 kg, solar panel: 5 kg

Power
Input Voltage: 10 to 16 VDC System includes 35 amp-hour sealed lead acid battery.
Charging: 100 watt solar panel Solar panel and brackets for T-post mounting included.
Power: 2.8 watts 230 mA @ 12V

Communications
CDMA or GSM Cellular Other options available: Orbcorn low-bandwidth satellite, wired ethernet, local low-power radio.

Sensors
3-component, 4.5 Hz, Oyo GS-11D Mounted inside enclosure.

Data Conversion
Type: Delta-sigma, 24 bit Synchronous sampling for all channels
Channels: 3 or 6 Analog inputs
Gain: x10, x20, x40, x80 Gain is fixed at time of shipment.
Input full scale: 1.2V / gain
Noise: At 150 sps and x10 gain, 1uV RMS Gain and sample rate dependent
Sample Rates: 10 to 500 sps
Accelerometer: MEMS, ±2g full scale, 14-bit resolution

Time Base
Type: GPS GPS receiver is integrated into system electronics. GPS antenna is external.
Accuracy with continuous GPS: 1 msec

Recording
Continuous and event-detected Event data is transmitted within minutes of detection, continuous data is stored on USB flash memory.
GeoEnergy Monitoring Systems, Inc. (GeoEMS) installed two stations on the Bear Lake Properties, LLC injection site on Thursday September 21, 2017. This installation consisted of two stations, one primary station (Station PBL2) whose data is transmitted to Incorporated Research Institutions for Seismology (IRIS; https://www.iris.edu/hq/), and shared with Pennsylvania Seismic Network (PASEIS) via Penn State University and an auxiliary station (Station PBL1) as back-up mode (Figure 1).

**Station PBL2:** Lat/Lon: 41.9981 -79.5288  Elevation: 506 m;
Primary Station PBL2 is located approximately 530 m (~1,739 feet) east of the Bittinger #2 injection well near the truck offload area (Figure 3).

**Station PBL1:** Lat/Lon: 41.9976 -79.5350  Elevation: 495 m;
Auxiliary Station PBL1 is located near the Bittinger #2 injection well, on the northeast corner of the Waste Transfer Facility (Figure 4).

**Figure 2** shows a Google Earth map showing PBL2 where green circle (10 km radius) and red circle (20 km radius) show estimated ML 1.0 and 1.5 detection radius, respectively from the station. The detection levels shown on Figure 2 for the system will cover the entire facility, including the additional permitted Bittinger #3 and the Smith Ras #1 gas wells to-be-converted to injection wells, and the other offset gas wells adjacent to the property. Also shown in Figure 2 as yellow pushpins are regional stations that can be used to perform locations of ML>2 events. **Figure 5** shows monthly recording statistics for PBL1. **Figure 6** shows monthly recording statistics for PBL2.

PBL2 was down from August 9 to 19, 2020. Monitoring during that time was covered by auxiliary station PBL1. A replacement electronics box was sent to John McCollums who successfully replaced it on August 19.

On August 25, there was a M 2.0 earthquake located about 50 miles southwest of Bear Lakes. **Figure 7** shows a seismogram at PBL2 from the event.

No seismicity was detected during the month in the vicinity of Bear Lake wells.
Figure 1. Primary Seismic Station PBL2 and auxiliary station PBL1 locations relative to Bear Lake Properties, LLC Bittinger #2 injection well, Waste Transfer Facility and truck offload area.
Figure 2. Seismic station PBL2 as magenta push pin near Bittinger #2 injection well. Green circle of radius 10 km and red circle of radius 20 km indicate epicentral detection limits for ML 1.0 and ML 1.5 events. Also shown as yellow pushpins are regional stations that can be used to perform locations of ML>2 events.
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Figure 3. Primary station PBL2 located at Bear Lake Properties, LLC truck offload facility.
Figure 4. Auxiliary station PBL1 at Bear Lake Properties, LLC Bittinger #2 injection well.
Figure 5. Data coverage and detection threshold plot for the current reporting period for PBL1.
Figure 6. Data coverage and detection threshold plot for the current reporting period for PBL2.

Figure 7. PBL2 seismogram from M2.0 earthquake occurring on August 25 that was located approximately 50 miles southwest of Bear Lakes.