

EXHIBIT 1  
AREA OF REVIEW FOR  
BITTINGER #1



21335 Signal Hill Plaza, Suite 100, Sterling, VA 20164 703-444-7000 703-444-1685 (FAX)

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## TECHNICAL MEMORANDUM

**TO:** Dale Skoff, Tetra Tech NUS

**FROM:** Jeffrey Benegar

**DATE:** October 4, 2010

**RE:** Area of Review/Zone of Endangerment Analysis for Bittinger #1 and #4 Well – Bear Lake Properties

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### EXECUTIVE SUMMARY

This technical memorandum (TM) summarizes the analytical modeling we have performed for the area of review/zone of endangerment analysis for the potential brine disposal injection wells, Bittinger #1 and #4, located in Columbus Township, Warren County, Pennsylvania. 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:

$\Delta p = 162.6 Q\mu / kh * [(\log(kt / \Phi\mu Cr^2) - 3.23)]$  where:

$\Delta p$  = pressure change (psi) at radius, r and time, t

Q = injection rate (barrels/day)

$\mu$  = 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) ( $\text{psi}^{-1}$ )

r = radial distance from wellbore to point of investigation (feet)

$\Phi$  = average formation porosity (decimal)

### PARAMETERS USED IN THE ANALYSIS

The following parameters were used in the zone of endangerment analysis. There are several parameters that are unknown, including injection rate and formation permeability. For injection rate, we used the average and maximum rates expected. For permeability, we estimated a value considered representative of the average of the upper and lower range of values for this parameter.

#### Bittinger #1 Medina Group Well

Q = 1000 (average rate) or 2000 (maximum rate) barrels/day

t = 10 years = 87,600 hours

$\mu$  = 1 centipoise

k = 100 md

h = 30 feet

C =  $3.0\text{e-}06$   $\text{psi}^{-1}$

$\Phi$  = 0.08

Specific gravity of injectate = 1.218

Surface elevation = 1518 feet

Depth to injection formation = 4210 feet

Base of lowest most USDW = 1218 feet in elevation (depth of 300 feet below surface)

Initial pressure at top of injection formation = 128 psi

#### Bittinger #4 Medina Group Well

Q = 1000 (average rate) or 2000 (maximum rate) barrels/day

t = 10 years = 87,600 hours

$\mu$  = 1 centipoise

k = 100 md

h = 30 feet

C =  $3.0\text{e-}06$   $\text{psi}^{-1}$

$\Phi$  = 0.08

Specific gravity of injectate = 1.218

Surface elevation = 1561 feet

Depth to injection formation = 4285 feet

Base of lowest most USDW = 1261 feet in elevation (depth of 300 feet below surface)  
 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 the Bittering #1 and #4 wells is approximately ¼ mile. The Matthews and Russell equation was used to calculate the increase in pressure in the formation with only one of these wells injecting. The results are shown in Table 1 for the two scenarios simulated. This increase in pressure was added to the values of delta p and the existing pressure in the injection formation to obtain the total pressure in the formation when both wells are injecting.

Table 1. Increase in pressure in formation due to both Bittering wells injecting.

Scenario	Increase in pressure (psi)
Q = 1000 bpd, k = 100 md	222
Q = 2000 bpd, k = 100 md	443

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 Bittering wells for the two scenarios simulated (e.g., 2 unknowns: 2 injection rates and 1 permeability value). 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 increase in head in the formation due to injection will remain below the elevation of the lowest most USDW assuming even worst-case conditions (maximum injection rate of 2000 bpd).

As indicated above, certain input parameters (e.g., permeability) were approximated due to lack of site-specific data. In order to validate the findings of the analysis presented above, Bear Lake Properties plans to monitor fluid levels in the monitoring wells designated below on a semiannual basis. The proposed monitoring wells were all completed in the Medina Group rocks, as were the two proposed injection wells.

Injection Well	Monitoring Well	Approximate Distance and Direction From Injection Well
Bittering #1	Bittering #4 (unless injection also being performed in Bittering #4)	0.25 mi to the south
	R. Trisket 2	0.34 mi to the west
	Smith/Ras Unit 1	0.29 mi to the east
Bittering #4	Bittering #1 (unless injection also being performed in Bittering #1)	0.25 mi to the north
	R. Trisket 1	0.33 mi to the west
	Joseph Bittering 2	0.37 mi to the southeast

Should fluid levels in any of the monitoring wells rise to within 100 ft of the lowest most USDW (indicated above), then injection would cease, EPA notified and steps taken to adjust the injection rate to prevent fluid levels from rising to within 100 ft of the lowest most USDW in any of the monitoring wells.

### **CONCLUSIONS**

Our analysis of the area of review/zone of endangerment for the Bittinger #1 and #4 wells injecting together is based on a methodology typically used by US EPA. Based on the results, we believe the wells are excellent candidates for use as brine disposal wells. The analysis indicates that the increase in head in the formation due to injection will remain below the elevation of the lowest most USDW. The standard fixed radius of ¼ mile can be used for the area of review/zone of endangerment for the Bittinger #1 and #4 wells. As indicated above, Bear Lake Properties plans to perform monitoring of nearby wells to validate the results of this analysis.

### **REFERENCES**

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**FIGURES**

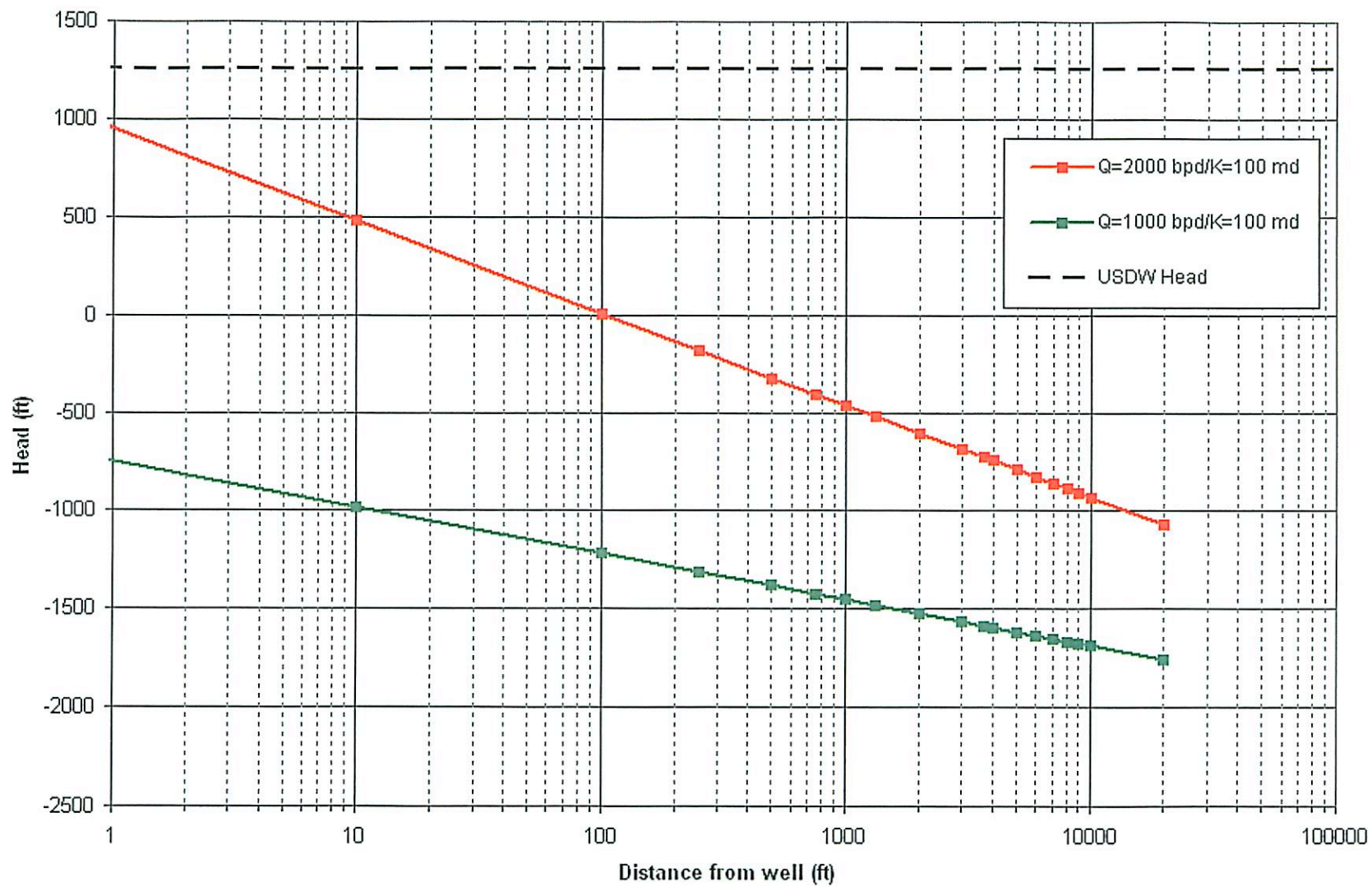


Figure 1. Feet of head of injection formation and USDW vs. distance from the well for Bittering #1 and #4 well when both wells are injecting.



**AREA OF REVIEW**  
**WELLS WITHIN 0.25 MILES**





EXHIBIT 2  
AREA OF REVIEW FOR  
BITTINGER #4



21335 Signal Hill Plaza, Suite 100, Sterling, VA 20164 703-444-7000 703-444-1685 (FAX)

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## TECHNICAL MEMORANDUM

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Q = 1000 (average rate) or 2000 (maximum rate) barrels/day

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k = 100 md

h = 30 feet

C =  $3.0\text{e-}06$   $\text{psi}^{-1}$

$\Phi$  = 0.08

Specific gravity of injectate = 1.218

Surface elevation = 1561 feet

Depth to injection formation = 4285 feet

Base of lowest most USDW = 1261 feet in elevation (depth of 300 feet below surface)  
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Should fluid levels in any of the monitoring wells rise to within 100 ft of the lowest most USDW (indicated above), then injection would cease, EPA notified and steps taken to adjust the injection rate to prevent fluid levels from rising to within 100 ft of the lowest most USDW in any of the monitoring wells.

### **CONCLUSIONS**

Our analysis of the area of review/zone of endangerment for the Bittinger #1 and #4 wells injecting together is based on a methodology typically used by US EPA. Based on the results, we believe the wells are excellent candidates for use as brine disposal wells. The analysis indicates that the increase in head in the formation due to injection will remain below the elevation of the lowest most USDW. The standard fixed radius of ¼ mile can be used for the area of review/zone of endangerment for the Bittinger #1 and #4 wells. As indicated above, Bear Lake Properties plans to perform monitoring of nearby wells to validate the results of this analysis.

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**FIGURES**

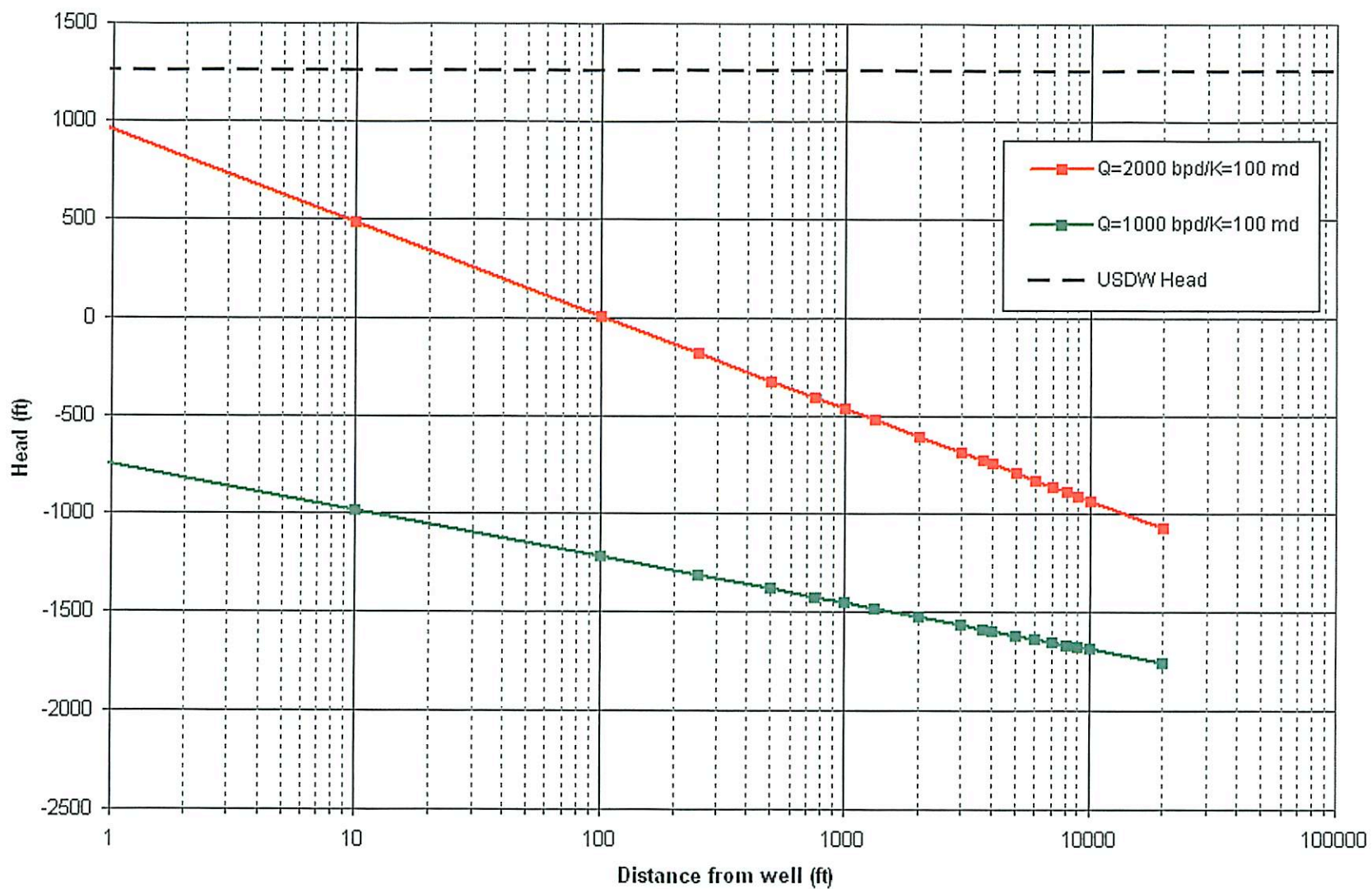


Figure 1. Feet of head of injection formation and USDW vs. distance from the well for Bittering #1 and #4 well when both wells are injecting.





**AREA OF REVIEW**  
**WELLS WITHIN 0.25 MILES**





EXHIBIT 3  
EPA RESPONSE TO  
COMMENT



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

**Responsiveness Summary to Public Comment  
For  
The Issuance of Underground Injection Control (UIC) Permits  
For  
Bear Lake Properties, LLC**

On January 10, 2011, the U.S. Environmental Protection Agency (EPA) Region III issued a public notice requesting comment and the opportunity for a public hearing for the proposed issuance of two Underground Injection Control (UIC) permits, PAS2D215BWAR and PAS2D216BWAR, for Bear Lake Properties, LLC. EPA received numerous requests to hold this hearing, but the hearing, scheduled for February 23, 2011, was postponed since EPA was unable to arrange for stenographic support in time for the hearing. EPA subsequently issued another public notice rescheduling the public hearing for March 23, 2011. On March 23, 2011, EPA held a public hearing at the Columbus Township Social Hall in Columbus, Pennsylvania. Over 200 people attended this public hearing and EPA received oral comments from 19 people in attendance at the hearing. EPA also extended the public comment period until March 30, 2011, during the hearing, inviting any additional written comments.

The responsiveness summary which follows provides answers to questions raised from over 350 people who either sent written public comment to the attention of EPA Region III, or who provided comments at the hearing. EPA wishes to thank the commenters for their informative and thoughtful comments and to thank the people from Columbus Township who assisted EPA in hosting the public hearing.

**1) EPA's jurisdiction and authority**

Many people raised concerns which the EPA UIC program does not have the regulatory jurisdiction to address. These included the potential for increased truck traffic, the potential for damage to the roads, increased noise, protection of wildlife, the protection of worker safety and the operator's development of health and safety plans and storm water management plans, among others. When making the decision whether to issue UIC permits for Bear Lake Properties, EPA's jurisdiction rests solely in determining whether the proposed injection operation will safely protect underground sources of drinking water (USDWs) (i.e., aquifer systems containing less than 10,000 milligrams per liter total dissolved solids). Although these other concerns may be relevant, they cannot be addressed within a UIC permit. The public would need to seek assistance through local Columbus Township or Warren County ordinances for traffic, road and noise concerns and state or federal agencies for concerns regarding wildlife protection, storm water management or health and safety.

It is important to note that every UIC permit, that EPA Region III issues, contains several conditions that require the permittee to meet all other local, state or federal laws that are in place. Part I. A. of the proposed permit contains a clause that states, " Issuance of this permit does not convey property rights or mineral rights of any sort of any exclusive privilege; nor does it



authorize any injury to persons or property, an invasion of other property rights or any infringement of State or local law or regulations". In addition, Part I. D. 12 of the proposed permit indicates, "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". Therefore, EPA's UIC permit is only one of several authorizations that a permittee may be required to obtain before they are allowed to commence operation.

**2) EPA should require the operator to find another location for disposal**

Similar to the response above, EPA does not have the jurisdiction, to direct an operator to a particular geographic location. The location chosen by an operator is based on many factors: economics, property ownership, geologic suitability, etc. It is EPA's responsibility to review each UIC permit application it receives and make a determination as to whether USDWs will be protected from the proposed operation, not to identify suitable injection sites.

**3) Other possible disposal alternatives and other technologies available for the treatment of produced fluid**

EPA acknowledges that there are other alternatives for the disposal of produced fluid from oil and gas development as well as wastewater treatment technologies available for the treatment of produced fluid. Even though other disposal alternatives may exist and wastewater treatment technologies are available, the UIC program must determine whether underground injection can be implemented in a manner protective of USDWs. If underground injection is done in accordance with the UIC program requirements, it is one of the best alternatives available for the disposal of fluids produced in association with oil and gas production activities. EPA cannot deny an operator a UIC permit because other disposal alternatives or treatment technologies exist.

**4) Is this proposed injection activity in an earthquake prone area?**

EPA has no evidence the location proposed for this injection operation is located in an earthquake prone area. Evidence indicates that there are no deep-seated transmissive faults that intersect the proposed injection zone or that could be influenced by the proposed injection operation in the future. It is important to keep in mind that the reservoir proposed for injection, the Medina Formation, produced, and continues to produce, natural gas. Over the past three decades, natural gas has been removed from the pore space within this reservoir, depleting the formation of much of the natural gas it contained as well as reducing the formation's reservoir pressure. Earthquakes can occur when a geologic formation becomes under-pressurized (i.e., through geologic formation collapse causing the structure of the formation to shift) or when it becomes over-pressurized. The Medina Formation in this location is presently under-pressurized from decades of natural gas production and there has been no evidence of earthquakes due to the removal of this natural gas. In addition, the proposed injection operation will not over-pressurize the formation. Because of the removal of millions of cubic feet of natural gas, pore space has been created to accept the injection of fluid. The permits would also be conditioned to prevent the over-pressurization, or fracturing, of the formation.



### **5) Are the fluids being injected toxic, hazardous and/or radioactive?**

Individual constituents within the fluid produced from an oil or gas production reservoir, or from the return flow of fluid used in a hydraulic fracturing process, can be determined to be toxic, hazardous or radioactive. However, these fluids when produced in association with oil and gas production are exempt from the hazardous waste regulation by Congress and are not classified as hazardous under the Resource Conservation and Recovery Act. Therefore, the UIC program does not regulate fluids produced in association with oil and gas production activities as hazardous waste. Disposal of these fluids is permissible down a Class II brine disposal injection well. Commenters raised the issue that the disposal of these fluids underground is not safe. However, a counterpoint to this comment, made by another commenter, indicated that the injection of these fluids deep underground is safer than allowing them to be discharged into a stream or a river or allowing them to overflow or seep into the ground from above-ground containment pits.

One of the major reasons behind the development of the UIC regulations was to provide a regulated alternative whereby oil and gas related fluids could be safely managed. Hazardous waste produced by the petrochemical industry, as well as other industries, has been safely injected underground since the UIC regulations went into effect in the early 1980's. These fluids are injected down Class I hazardous waste injection wells below the lowermost USDW. The mandate of the UIC program is to protect USDWs from the subsurface emplacement of fluids. This has been accomplished through strict well construction criteria, the testing and inspection of injection well operations, monitoring and reporting requirements, and plugging and abandonment requirements. As mentioned in an earlier response, the UIC program provides one of the safest methods for the disposal of any kind of fluid as long as it is done under the requirements imposed by the UIC regulations.

### **6) Abandoned wells may pose a risk to drinking water supplies**

It is a fact that abandoned wells can pose a risk to USDWs by providing a conduit for the migration of fluid out of an injection zone. There are several requirements that the UIC regulations, as well as a UIC permit, impose on an operator to ensure that abandoned wells will not pose a risk to USDWs. The operator is required to conduct a review within a specified area around his proposed operation to determine whether any abandoned wells exist within that disposal area which could pose a threat to USDWs. The area of review can be a fixed radius of no less than one-quarter mile around an injection well or facility boundary (i.e., for an area permit) or may be a calculated "zone of endangering influence". The zone of endangering influence calculation is based on geologic parameters found in the injection zone, such as permeability, porosity, etc. and proposed operational conditions, such as injection volumes, rates, length of injection, etc. The operator must review all information of public record to determine whether any abandoned wells or other potential conduits exist within the area of review or zone of endangering influence, that penetrate the proposed injection zone, in this case, the Medina Formation. If abandoned wells are found to exist, then corrective action, in the form of plugging and abandonment of those wells, must be taken.

Bear Lake Properties chose to calculate the zone of endangering influence based on the simultaneous operation of both of the proposed injection wells. EPA conducted its own zone of endangering influence calculation to verify the calculation submitted by Bear Lake Properties and found the calculation acceptable. The only wells found that penetrate the Medina Formation, within the calculated zone of endangering influence, are production wells owned by Bear Lake Properties.



During the public hearing, commenters indicated to EPA that they did not think that all abandoned wells near the proposed injection site had been documented. It was unclear whether these wells might exist within the zone of endangering influence, outside of this area, or might be wells that do not penetrate the injection zone. EPA requested that Bear Lake Properties conduct another survey of the area surrounding the proposed injection operation, using information provided at the public hearing, to determine whether other abandoned wells did, in fact, exist. Public records, obtained by EPA subsequent to the public hearing, indicated no record of wells being drilled in the area of the proposed injection operation prior to the wells that are present today. The additional information and maps, submitted to EPA, provided information on all of the gas wells that are located within a two mile radius of the injection well site. This map confirmed the information submitted by Bear Lake Properties, that only gas production wells owned by Bear Lake Properties exist within the zone of endangering influence. The additional survey conducted by Bear Lake Properties indicated that only the Bittinger #1 and Bittinger #4 are contained within the area of review.

EPA has also required in the proposed permits monitoring of the fluid level in the injection zone during injection operations to ensure that pressure created by the injection operation will not cause migration of fluid up abandoned wells that could exist. By monitoring fluid level, and making sure that it remains safely below the lowermost USDW, then even if an abandoned well were to exist (i.e., a well that might have been drilled in the past without having information of public record), the monitoring would detect and prevent fluid migration into the lowermost USDW. EPA Region III has a permit condition in the proposed Bear Lake Properties permits that requires the fluid level to be monitored during the injection operation. Until the Bittinger #1 or the Bittinger #4 are placed into operation, they will be used to monitor the fluid level or formation pressure during injection to determine reservoir response and ensure protection of USDWs. The R. Trisket 2, located 0.34 miles to the west of Bittinger #1 and the Smith/Raz Unit 1, located 0.40 miles to the east of Bittinger #1 will also be used as monitoring wells during the Bittinger #1's operation. During Bittinger #4's operation, the R. Trisket 1, located 0.33 miles to the west of Bittinger #4 and the Joseph Bittinger 2, located 0.37 miles to the east of Bittinger #4 will also be used as monitoring wells.

#### **7) Bear Lake Properties did not survey drinking water wells in New York State**

Written comments received by EPA as well as public testimony provided at the public hearing expressed concern that Bear Lake Properties did not adequately survey drinking water wells located in New York State. Subsequent to the public hearing, EPA requested that Bear Lake Properties conduct another survey of drinking water wells located within one mile of the proposed injection well facility. This one mile survey did include properties located in New York State. The revised survey map Bear Lake Properties provided to EPA, with GPS latitude/longitude locations, identified 10 private drinking water wells located in New York State, within one mile of the Bittinger #4 well, the closest well to the New York/Pennsylvania state line.

#### **8) Bear Lake Properties' well construction standards and mechanical integrity testing are not adequate**

Many comments that EPA received indicated that the proposed injection wells were not constructed properly and that well testing requirements contained within the draft permits were also inadequate.

The comments received provided a review of the Pennsylvania Department of





Environmental Protection's (PADEP) well casing standards (PADEP Chapter 78 regulations on production wells) and compared those to the proposed construction of the Bittering #1 and Bittering #4 wells under the UIC program requirements. Examples of some of the issues provided to EPA included, "gas migration stems from inadequate cement, cementing procedures", "the operator shall install casing that can withstand the effects of tension and prevent leaks...", "used casing may be approved for use as surface casing, intermediate or production casing but must be pressure tested..."

The Bittering #1 and Bittering #4 proposed UIC permits both require that surface casing be set 50 feet below the lowermost USDW (Note: The UIC program defines a USDW as any aquifer system having less than 10,000 mg/l total dissolved solids (TDS), that is currently used, or could be used in the future. This definition is more stringent than the PADEP definition that requires protection of the "deepest fresh water"). The surface casing must also be cemented to the surface. The lowermost USDW has been identified at a depth of 300 feet and the Bittering #1 and Bittering #4 wells have surface casing set at 401 feet and 506 feet, respectively. This is well below the "fresh water" that would be protected under the PADEP requirements. In addition, the proposed permits require production casing (also referred to as long string casing) to be set through, or above, the injection zone, located at approximately 4300 feet, and cemented back at least 100 feet above the injection zone. Injection tubing and packer is then set inside the production casing and injection occurs through the tubing and packer. This construction provides three layers of protection for the USDWs. PADEP requirements do not require the additional two layers of protection.

Prior to the operation of the wells, EPA requires that the wells be tested for mechanical integrity. Cementing records and logs are required to show that each well has adequate cement to prevent fluid migration out of the injection zone and an internal pressure test is required to ensure that the casing, tubing and packer will not leak during the well's operation. The internal pressure test requires the annulus of the well (the space between the production casing and the tubing and packer) to be pressure tested to ten percent above the permitted maximum injection pressure and held for at least 30 minutes, with no more than a five percent loss in pressure allowed.

The UIC program in EPA Region III has been utilizing the construction and testing standards discussed above for brine disposal injection wells in Pennsylvania since it started implementing the UIC program in June, 1985. PADEP does not have these requirements for mechanical integrity testing or logging. EPA finds that these requirements have effectively protected USDWs from the subsurface injection of fluids.

#### **9) Mechanical integrity tests must be conducted quarterly**

Many comments indicated that mechanical integrity of the injection wells should be done on a quarterly basis. The comments were based on a review of PADEP's Chapter 78 regulations, specifically Section 78.88 which is entitled, "Mechanical integrity of operating wells". This section of the PADEP regulation refers more to the frequency of well inspections and is not the same as the mechanical integrity testing requirements imposed by EPA. Section 78.88 indicates, "...that the operator shall inspect each operating well at least quarterly". It then goes into some detail about what must be inspected.

There is a significant difference between the inspection of a well and the mechanical integrity testing of an injection well. As stated in the previous comment, EPA requires that every injection well be tested before it operates to make sure that the casing, tubing and packer placed in the well do not leak. The proposed UIC permits for the Bittering #1 and Bittering #4 wells also require that the wells be tested for mechanical integrity every two years. In between the

testing, the wells are continuously monitored for injection pressure, annular pressure and injection volume to ensure that the wells maintain mechanical integrity continuously and operate in accordance with their permit conditions. Should a problem occur during the operation of either well, each well is designed with an automatic pressure shut-down device that will discontinue operation of the well. The continuous monitoring of the wells, as well as the presence of company employees on site, ensures that the wells operate in a safe and protective manner. EPA will also be conducting periodic routine compliance inspections between mechanical integrity testing cycles to verify all operating and recording devices are operational.

**10) Bear Lake Properties has not demonstrated financial resources should a well failure occur.**

Under the UIC regulations, owners and operators of injection wells are required to demonstrate financial responsibility in order to properly plug and abandon the injection well when the operation ceases and the well is no longer used for injection. Bear Lake Properties has submitted a \$60,000 letter of credit and standby trust agreement (\$30,000 for each injection well) for the plugging and abandonment of the Bittinger #1 and Bittinger #4 wells. This submission was reviewed and approved by EPA Region III.

Although a separate issue from the financial responsibility required as part of the UIC permit, EPA also has emergency authorities in place under the Safe Drinking Water Act (SDWA) if endangerment to USDWs should result from injection activities. Section 1431 under the SDWA allows EPA to take an action against an owner or operator if the potential for endangerment exists. This action can include a requirement that the owner or operator provide alternative drinking water to a citizen affected by the endangerment as well as require the remediation of any aquifer system affected by the injection operation.

**11) Wastewater entering the facility for injection should be more fully characterized.**

EPA believes that the conditions in Part II, C.3. and C.4., within the permit, are sufficient to adequately characterize and monitor the wastewater for injection purposes. If this wastewater were to be disposed in a different manner (i.e., disposed directly into the environment by stream discharge) then a more extensive characterization would be necessary. However, this wastewater will be injected almost one mile beneath the earth's surface into an environment similar in nature to where the wastewater was generated.

EPA has also added a new condition to the final permit. The condition, found in Part II, C.5., requires that, "The permittee to maintain a record of every load of brine received. The record shall include the hauler's name, the operator(s) name and location from whom the load was obtained, the volume of the load and whether the load of fluid delivered was a split load. If the load was a split load, each operator's name and location shall be listed and, if possible, the volumes of fluid received from each operator documented."

**12) The UIC permits are issued for a five year period. What happens after that, can the operator just walk away?**

The UIC permits would be in effect for five years from the date of issuance. After five years, the operator may apply to EPA Region III for permit reissuance. EPA will make a determination as to whether the permits should be reissued at that time. If a determination is made to reissue the permits, EPA would public notice the permit reissuance and offer an opportunity for a public hearing. If the operator determines that they no longer wish to operate the injection wells, the



wells must be plugged and abandoned in accordance with the UIC permit requirements and abide by all other closure requirements that have been imposed by local or state jurisdictions. The owner's financial responsibility is not released by EPA until the wells are properly plugged and abandoned.

### **Federal Underground Injection Control Program Permit Appeals Procedures**

The provisions governing procedures for the appeal of an EPA permitting decision are defined at 40 CFR Part 124.19. The appeals process allows for a written petition of appeal from any person who commented on the draft permit, either in writing during the comment period or orally at the public hearing. Persons who have not previously been involved in the comment period are limited in their appeal rights to those points which have been changed between the draft and final permits. Appeals may be made by citizens, groups, organizations, governments and the permittee within this procedural framework.

A petition for appeal must be filed within thirty (30) days of the date of the accompanying announcement of EPA's permit decision. Such written requests are to be addressed to EPA at the address listed below with a copy sent to EPA Region III.

The Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue Northwest  
Washington, DC 20004

The petition should specify the reasons supporting the appeal of the permit and a demonstration that the petitioner had raised the issue previously during the comment period or at the hearing. If the appeal is based on a change between the draft and final permit conditions, it should be so stated explicitly. The petitioner must also state whether, in his or her opinion, the permit decision or the permit's conditions appealed are objectionable because of:

1. Factual or legal error, or
2. The incorporation of a policy consideration which the Administrator should, at his or her discretion review.

Within a reasonable time of receipt of the Appeals Petition, the Administrator will either grant or deny the appeal.

Denials are considered final agency action, upon which the permit becomes effective, and the Agency will so notify the petitioner. The petitioner may, thereafter, challenge the permit decision in Federal District Court.

If granted, EPA must so notify the public in accordance with the notification requirements of 40 CFR 124.10. The public notice shall set forth a timetable by which the person(s) making an appeal and EPA, as the permitting authority, must submit written briefs and shall also specify that any interested party may submit an amicus brief within these deadlines.

When a petition for appeal is granted, the permit conditions appealed are not deemed to be in effect and if these permit conditions are essential to the operation, the activity may not commence. Individually contested permit conditions are also stayed (not in effect) but other permit conditions are still in effect if they are legally severable from the contested condition.

The EPA Administrator will decide the appeal on the basis of the written briefs and the



total administrative record of the permit action. If the Administrator decides the appeal on its merits, he or she will direct the Region III office to implement his or her decision by permit issuance, modification or denial. The Administrator may order all or part of the permit decision back to the EPA Region III office for reconsideration. In either case, a final agency decision has occurred when the permit is issued, modified or denied and an Agency decision is announced. After this time, all administrative appeals have been exhausted, and any further challenges to the permit decision must be made to Federal District Court.





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

**Responsiveness Summary to Public Comment  
For  
The Issuance of Underground Injection Control (UIC) Permits  
For  
Bear Lake Properties, LLC**

On January 10, 2011, the U.S. Environmental Protection Agency (EPA) Region III issued a public notice requesting comment and the opportunity for a public hearing for the proposed issuance of two Underground Injection Control (UIC) permits, PAS2D215BWAR and PAS2D216BWAR, for Bear Lake Properties, LLC. EPA received numerous requests to hold this hearing, but the hearing, scheduled for February 23, 2011, was postponed since EPA was unable to arrange for stenographic support in time for the hearing. EPA subsequently issued another public notice rescheduling the public hearing for March 23, 2011. On March 23, 2011, EPA held a public hearing at the Columbus Township Social Hall in Columbus, Pennsylvania. Over 200 people attended this public hearing and EPA received oral comments from 19 people in attendance at the hearing. EPA also extended the public comment period until March 30, 2011, during the hearing, inviting any additional written comments.

The responsiveness summary which follows provides answers to questions raised from over 350 people who either sent written public comment to the attention of EPA Region III, or who provided comments at the hearing. EPA wishes to thank the commenters for their informative and thoughtful comments and to thank the people from Columbus Township who assisted EPA in hosting the public hearing.

**1) EPA's jurisdiction and authority**

Many people raised concerns which the EPA UIC program does not have the regulatory jurisdiction to address. These included the potential for increased truck traffic, the potential for damage to the roads, increased noise, protection of wildlife, the protection of worker safety and the operator's development of health and safety plans and storm water management plans, among others. When making the decision whether to issue UIC permits for Bear Lake Properties, EPA's jurisdiction rests solely in determining whether the proposed injection operation will safely protect underground sources of drinking water (USDWs) (i.e., aquifer systems containing less than 10,000 milligrams per liter total dissolved solids). Although these other concerns may be relevant, they cannot be addressed within a UIC permit. The public would need to seek assistance through local Columbus Township or Warren County ordinances for traffic, road and noise concerns and state or federal agencies for concerns regarding wildlife protection, storm water management or health and safety.

It is important to note that every UIC permit, that EPA Region III issues, contains several conditions that require the permittee to meet all other local, state or federal laws that are in place. Part I. A. of the proposed permit contains a clause that states, " Issuance of this permit does not convey property rights or mineral rights of any sort of any exclusive privilege; nor does it





authorize any injury to persons or property, an invasion of other property rights or any infringement of State or local law or regulations". In addition, Part I. D. 12 of the proposed permit indicates, "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". Therefore, EPA's UIC permit is only one of several authorizations that a permittee may be required to obtain before they are allowed to commence operation.

**2) EPA should require the operator to find another location for disposal**

Similar to the response above, EPA does not have the jurisdiction, to direct an operator to a particular geographic location. The location chosen by an operator is based on many factors: economics, property ownership, geologic suitability, etc. It is EPA's responsibility to review each UIC permit application it receives and make a determination as to whether USDWs will be protected from the proposed operation, not to identify suitable injection sites.

**3) Other possible disposal alternatives and other technologies available for the treatment of produced fluid**

EPA acknowledges that there are other alternatives for the disposal of produced fluid from oil and gas development as well as wastewater treatment technologies available for the treatment of produced fluid. Even though other disposal alternatives may exist and wastewater treatment technologies are available, the UIC program must determine whether underground injection can be implemented in a manner protective of USDWs. If underground injection is done in accordance with the UIC program requirements, it is one of the best alternatives available for the disposal of fluids produced in association with oil and gas production activities. EPA cannot deny an operator a UIC permit because other disposal alternatives or treatment technologies exist.

**4) Is this proposed injection activity in an earthquake prone area?**

EPA has no evidence the location proposed for this injection operation is located in an earthquake prone area. Evidence indicates that there are no deep-seated transmissive faults that intersect the proposed injection zone or that could be influenced by the proposed injection operation in the future. It is important to keep in mind that the reservoir proposed for injection, the Medina Formation, produced, and continues to produce, natural gas. Over the past three decades, natural gas has been removed from the pore space within this reservoir, depleting the formation of much of the natural gas it contained as well as reducing the formation's reservoir pressure. Earthquakes can occur when a geologic formation becomes under-pressurized (i.e., through geologic formation collapse causing the structure of the formation to shift) or when it becomes over-pressurized. The Medina Formation in this location is presently under-pressurized from decades of natural gas production and there has been no evidence of earthquakes due to the removal of this natural gas. In addition, the proposed injection operation will not over-pressurize the formation. Because of the removal of millions of cubic feet of natural gas, pore space has been created to accept the injection of fluid. The permits would also be conditioned to prevent the over-pressurization, or fracturing, of the formation.



### **5) Are the fluids being injected toxic, hazardous and/or radioactive?**

Individual constituents within the fluid produced from an oil or gas production reservoir, or from the return flow of fluid used in a hydraulic fracturing process, can be determined to be toxic, hazardous or radioactive. However, these fluids when produced in association with oil and gas production are exempt from the hazardous waste regulation by Congress and are not classified as hazardous under the Resource Conservation and Recovery Act. Therefore, the UIC program does not regulate fluids produced in association with oil and gas production activities as hazardous waste. Disposal of these fluids is permissible down a Class II brine disposal injection well. Commenters raised the issue that the disposal of these fluids underground is not safe. However, a counterpoint to this comment, made by another commenter, indicated that the injection of these fluids deep underground is safer than allowing them to be discharged into a stream or a river or allowing them to overflow or seep into the ground from above-ground containment pits.

One of the major reasons behind the development of the UIC regulations was to provide a regulated alternative whereby oil and gas related fluids could be safely managed. Hazardous waste produced by the petrochemical industry, as well as other industries, has been safely injected underground since the UIC regulations went into effect in the early 1980's. These fluids are injected down Class I hazardous waste injection wells below the lowermost USDW. The mandate of the UIC program is to protect USDWs from the subsurface emplacement of fluids. This has been accomplished through strict well construction criteria, the testing and inspection of injection well operations, monitoring and reporting requirements, and plugging and abandonment requirements. As mentioned in an earlier response, the UIC program provides one of the safest methods for the disposal of any kind of fluid as long as it is done under the requirements imposed by the UIC regulations.

### **6) Abandoned wells may pose a risk to drinking water supplies**

It is a fact that abandoned wells can pose a risk to USDWs by providing a conduit for the migration of fluid out of an injection zone. There are several requirements that the UIC regulations, as well as a UIC permit, impose on an operator to ensure that abandoned wells will not pose a risk to USDWs. The operator is required to conduct a review within a specified area around his proposed operation to determine whether any abandoned wells exist within that disposal area which could pose a threat to USDWs. The area of review can be a fixed radius of no less than one-quarter mile around an injection well or facility boundary (i.e., for an area permit) or may be a calculated "zone of endangering influence". The zone of endangering influence calculation is based on geologic parameters found in the injection zone, such as permeability, porosity, etc. and proposed operational conditions, such as injection volumes, rates, length of injection, etc. The operator must review all information of public record to determine whether any abandoned wells or other potential conduits exist within the area of review or zone of endangering influence, that penetrate the proposed injection zone, in this case, the Medina Formation. If abandoned wells are found to exist, then corrective action, in the form of plugging and abandonment of those wells, must be taken.

Bear Lake Properties chose to calculate the zone of endangering influence based on the simultaneous operation of both of the proposed injection wells. EPA conducted its own zone of endangering influence calculation to verify the calculation submitted by Bear Lake Properties and found the calculation acceptable. The only wells found that penetrate the Medina Formation, within the calculated zone of endangering influence, are production wells owned by Bear Lake Properties.



During the public hearing, commenters indicated to EPA that they did not think that all abandoned wells near the proposed injection site had been documented. It was unclear whether these wells might exist within the zone of endangering influence, outside of this area, or might be wells that do not penetrate the injection zone. EPA requested that Bear Lake Properties conduct another survey of the area surrounding the proposed injection operation, using information provided at the public hearing, to determine whether other abandoned wells did, in fact, exist. Public records, obtained by EPA subsequent to the public hearing, indicated no record of wells being drilled in the area of the proposed injection operation prior to the wells that are present today. The additional information and maps, submitted to EPA, provided information on all of the gas wells that are located within a two mile radius of the injection well site. This map confirmed the information submitted by Bear Lake Properties, that only gas production wells owned by Bear Lake Properties exist within the zone of endangering influence. The additional survey conducted by Bear Lake Properties indicated that only the Bittinger #1 and Bittinger #4 are contained within the area of review.

EPA has also required in the proposed permits monitoring of the fluid level in the injection zone during injection operations to ensure that pressure created by the injection operation will not cause migration of fluid up abandoned wells that could exist. By monitoring fluid level, and making sure that it remains safely below the lowermost USDW, then even if an abandoned well were to exist ( i.e., a well that might have been drilled in the past without having information of public record), the monitoring would detect and prevent fluid migration into the lowermost USDW. EPA Region III has a permit condition in the proposed Bear Lake Properties permits that requires the fluid level to be monitored during the injection operation. Until the Bittinger #1 or the Bittinger #4 are placed into operation, they will be used to monitor the fluid level or formation pressure during injection to determine reservoir response and ensure protection of USDWs. The R. Trisket 2, located 0.34 miles to the west of Bittinger #1 and the Smith/Raz Unit 1, located 0.40 miles to the east of Bittinger #1 will also be used as monitoring wells during the Bittinger #1's operation. During Bittinger #4's operation, the R. Trisket 1, located 0.33 miles to the west of Bittinger #4 and the Joseph Bittinger 2, located 0.37 miles to the east of Bittinger #4 will also be used as monitoring wells.

#### **7) Bear Lake Properties did not survey drinking water wells in New York State**

Written comments received by EPA as well as public testimony provided at the public hearing expressed concern that Bear Lake Properties did not adequately survey drinking water wells located in New York State. Subsequent to the public hearing, EPA requested that Bear Lake Properties conduct another survey of drinking water wells located within one mile of the proposed injection well facility. This one mile survey did include properties located in New York State. The revised survey map Bear Lake Properties provided to EPA, with GPS latitude/longitude locations, identified 10 private drinking water wells located in New York State, within one mile of the Bittinger #4 well, the closest well to the New York/Pennsylvania state line.

#### **8) Bear Lake Properties' well construction standards and mechanical integrity testing are not adequate**

Many comments that EPA received indicated that the proposed injection wells were not constructed properly and that well testing requirements contained within the draft permits were also inadequate.

The comments received provided a review of the Pennsylvania Department of



Environmental Protection's (PADEP) well casing standards (PADEP Chapter 78 regulations on production wells) and compared those to the proposed construction of the Bittinger #1 and Bittinger #4 wells under the UIC program requirements. Examples of some of the issues provided to EPA included, "gas migration stems from inadequate cement, cementing procedures", "the operator shall install casing that can withstand the effects of tension and prevent leaks...", "used casing may be approved for use as surface casing, intermediate or production casing but must be pressure tested..."

The Bittinger #1 and Bittinger #4 proposed UIC permits both require that surface casing be set 50 feet below the lowermost USDW (Note: The UIC program defines a USDW as any aquifer system having less than 10,000 mg/l total dissolved solids (TDS), that is currently used, or could be used in the future. This definition is more stringent than the PADEP definition that requires protection of the "deepest fresh water"). The surface casing must also be cemented to the surface. The lowermost USDW has been identified at a depth of 300 feet and the Bittinger #1 and Bittinger #4 wells have surface casing set at 401 feet and 506 feet, respectively. This is well below the "fresh water" that would be protected under the PADEP requirements. In addition, the proposed permits require production casing (also referred to as long string casing) to be set through, or above, the injection zone, located at approximately 4300 feet, and cemented back at least 100 feet above the injection zone. Injection tubing and packer is then set inside the production casing and injection occurs through the tubing and packer. This construction provides three layers of protection for the USDWs. PADEP requirements do not require the additional two layers of protection.

Prior to the operation of the wells, EPA requires that the wells be tested for mechanical integrity. Cementing records and logs are required to show that each well has adequate cement to prevent fluid migration out of the injection zone and an internal pressure test is required to ensure that the casing, tubing and packer will not leak during the well's operation. The internal pressure test requires the annulus of the well (the space between the production casing and the tubing and packer) to be pressure tested to ten percent above the permitted maximum injection pressure and held for at least 30 minutes, with no more than a five percent loss in pressure allowed.

The UIC program in EPA Region III has been utilizing the construction and testing standards discussed above for brine disposal injection wells in Pennsylvania since it started implementing the UIC program in June, 1985. PADEP does not have these requirements for mechanical integrity testing or logging. EPA finds that these requirements have effectively protected USDWs from the subsurface injection of fluids.

#### **9) Mechanical integrity tests must be conducted quarterly**

Many comments indicated that mechanical integrity of the injection wells should be done on a quarterly basis. The comments were based on a review of PADEP's Chapter 78 regulations, specifically Section 78.88 which is entitled, "Mechanical integrity of operating wells". This section of the PADEP regulation refers more to the frequency of well inspections and is not the same as the mechanical integrity testing requirements imposed by EPA. Section 78.88 indicates, "...that the operator shall inspect each operating well at least quarterly". It then goes into some detail about what must be inspected.

There is a significant difference between the inspection of a well and the mechanical integrity testing of an injection well. As stated in the previous comment, EPA requires that every injection well be tested before it operates to make sure that the casing, tubing and packer placed in the well do not leak. The proposed UIC permits for the Bittinger #1 and Bittinger #4 wells also require that the wells be tested for mechanical integrity every two years. In between the

testing, the wells are continuously monitored for injection pressure, annular pressure and injection volume to ensure that the wells maintain mechanical integrity continuously and operate in accordance with their permit conditions. Should a problem occur during the operation of either well, each well is designed with an automatic pressure shut-down device that will discontinue operation of the well. The continuous monitoring of the wells, as well as the presence of company employees on site, ensures that the wells operate in a safe and protective manner. EPA will also be conducting periodic routine compliance inspections between mechanical integrity testing cycles to verify all operating and recording devices are operational.

**10) Bear Lake Properties has not demonstrated financial resources should a well failure occur.**

Under the UIC regulations, owners and operators of injection wells are required to demonstrate financial responsibility in order to properly plug and abandon the injection well when the operation ceases and the well is no longer used for injection. Bear Lake Properties has submitted a \$60,000 letter of credit and standby trust agreement (\$30,000 for each injection well) for the plugging and abandonment of the Bittering #1 and Bittering #4 wells. This submission was reviewed and approved by EPA Region III.

Although a separate issue from the financial responsibility required as part of the UIC permit, EPA also has emergency authorities in place under the Safe Drinking Water Act (SDWA) if endangerment to USDWs should result from injection activities. Section 1431 under the SDWA allows EPA to take an action against an owner or operator if the potential for endangerment exists. This action can include a requirement that the owner or operator provide alternative drinking water to a citizen affected by the endangerment as well as require the remediation of any aquifer system affected by the injection operation.

**11) Wastewater entering the facility for injection should be more fully characterized.**

EPA believes that the conditions in Part II, C.3. and C.4., within the permit, are sufficient to adequately characterize and monitor the wastewater for injection purposes. If this wastewater were to be disposed in a different manner (i.e., disposed directly into the environment by stream discharge) then a more extensive characterization would be necessary. However, this wastewater will be injected almost one mile beneath the earth's surface into an environment similar in nature to where the wastewater was generated.

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**12) The UIC permits are issued for a five year period. What happens after that, can the operator just walk away?**

The UIC permits would be in effect for five years from the date of issuance. After five years, the operator may apply to EPA Region III for permit reissuance. EPA will make a determination as to whether the permits should be reissued at that time. If a determination is made to reissue the permits, EPA would public notice the permit reissuance and offer an opportunity for a public hearing. If the operator determines that they no longer wish to operate the injection wells, the





wells must be plugged and abandoned in accordance with the UIC permit requirements and abide by all other closure requirements that have been imposed by local or state jurisdictions. The owner's financial responsibility is not released by EPA until the wells are properly plugged and abandoned.

### **Federal Underground Injection Control Program Permit Appeals Procedures**

The provisions governing procedures for the appeal of an EPA permitting decision are defined at 40 CFR Part 124.19. The appeals process allows for a written petition of appeal from any person who commented on the draft permit, either in writing during the comment period or orally at the public hearing. Persons who have not previously been involved in the comment period are limited in their appeal rights to those points which have been changed between the draft and final permits. Appeals may be made by citizens, groups, organizations, governments and the permittee within this procedural framework.

A petition for appeal must be filed within thirty (30) days of the date of the accompanying announcement of EPA's permit decision. Such written requests are to be addressed to EPA at the address listed below with a copy sent to EPA Region III.

The Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue Northwest  
Washington, DC 20004

The petition should specify the reasons supporting the appeal of the permit and a demonstration that the petitioner had raised the issue previously during the comment period or at the hearing. If the appeal is based on a change between the draft and final permit conditions, it should be so stated explicitly. The petitioner must also state whether, in his or her opinion, the permit decision or the permit's conditions appealed are objectionable because of:

1. Factual or legal error, or
2. The incorporation of a policy consideration which the Administrator should, at his or her discretion review.

Within a reasonable time of receipt of the Appeals Petition, the Administrator will either grant or deny the appeal.

Denials are considered final agency action, upon which the permit becomes effective, and the Agency will so notify the petitioner. The petitioner may, thereafter, challenge the permit decision in Federal District Court.

If granted, EPA must so notify the public in accordance with the notification requirements of 40 CFR 124.10. The public notice shall set forth a timetable by which the person(s) making an appeal and EPA, as the permitting authority, must submit written briefs and shall also specify that any interested party may submit an amicus brief within these deadlines.

When a petition for appeal is granted, the permit conditions appealed are not deemed to be in effect and if these permit conditions are essential to the operation, the activity may not commence. Individually contested permit conditions are also stayed (not in effect) but other permit conditions are still in effect if they are legally severable from the contested condition.

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total administrative record of the permit action. If the Administrator decides the appeal on its merits, he or she will direct the Region III office to implement his or her decision by permit issuance, modification or denial. The Administrator may order all or part of the permit decision back to the EPA Region III office for reconsideration. In either case, a final agency decision has occurred when the permit is issued, modified or denied and an Agency decision is announced. After this time, all administrative appeals have been exhausted, and any further challenges to the permit decision must be made to Federal District Court.



EXHIBIT 4  
PEIFFER COMMENTS

**Sent via e-Mail To: StephenPlatt - platt.steve@epa.gov From: Bill Peiffer - oldstonefly@gmail.com**

Re: Public Comment on EPA UIC Permit Nos.: PAS2D215BWAR and PAS2D216BWAR  
Bear Lakes Properties, LLC - Public Hearing held on March 23, 2011 at Columbus Township  
Social Hall, Columbus, PA

Dear Steve,

I am writing to express my opposition to EPA approval of the above UIC permits. Please note my concerns are based on comments made during the above hearing (which I attended) by contractor/employees of Bear Lake Properties LLC and Lion Energy LLC, as well as, by elected officials of Warren County PA, members of the Brokenstraw Watershed Council, members of local Fire Departments, local property owners, the Allegheny Defense Project, the Pennsylvania Chapter of the Sierra Club, and others. Comments made by nearly all of the abovementioned individuals revealed to me the proposed injection wells represent a compelling danger to local groundwater resources, as well as, an immediate threat to the quality of life in this area.

My objections are based on the following considerations:

**1) Notice to neighboring residents and well owners in the State of New York was not given**

*Note one of the wells to be permitted is between 75 and 200 feet of the PA-NY State line*

I have been told that none of the following received notice of the current US EPA injection well hearing held in Columbus, PA:

a. Nearby Chautauqua County, NY landowners (Town of Clymer and Town of Harmony, Chautauqua County, NY)

- Given the proximity of NY residents (both permanent and seasonal) with water wells in the Town of Clymer and Town of Harmony, Chautauqua County, NY, notice of the hearing should have been given to these individuals – it wasn't. Hence, I feel the intent of the EPA's notice requirements was violated.

b. Nearby Chautauqua County, NY owners/operators of existing oil and/or gas wells\* (Town of Clymer and Town of Harmony, Chautauqua County, NY)

\*Whether „active and producing“, „abandoned/unplugged“, „gas wells producing oil“, etc.

- Given the location of the current wells to be permitted and the activities proposed thereon it is hard to believe nearby gas and oil wells in Chautauqua County, New York (a total of ten permitted, active, and producing gas wells were spotted within one mile of the Bittering No. 4 site on the NY DEC's Environmental Navigator website) would not be in some way be impacted. Since the depth of all these NY wells is very near the injection depth of the proposed PA injection wells, I believe the quantity and/or quality of currently produced oil and gas in those NY wells may be impacted. I am not aware that any owner/operators of NY State oil and or gas wells received notice of the hearing. Owner/operators of NY wells should have received notice. Again, I feel the intent of EPA's notice requirements was violated.

c. EPA Region 2

- The border between EPA Region 2 and EPA Region 3 is the NY-PA State line so it would appear EPA Region 2 should have in some way been involved with the current matter. I have not spoken with anyone in NY State who was contacted by anyone in EPA Region 2.

d. New York State DEC (Region 9)

- PA DEP jurisdiction ends at the PA-NY State line at which point NY DEC jurisdiction takes over. Note that NY State has different procedures and rules for permitting injection wells than PA does (NY allows for public comment at the local level – PA does not). Although the proposed PA injection wells may well impact wells in NY (whether these wells are producing, abandoned, unplugged, have expired permits, etc.), I have not heard that NY DEC is in any way involved with issues related to the current matter. I feel the EPA and PA DEP should have the burden to notify the NY DEC of current proposals.

I agree with comments made by the Allegheny Defense Project and the Pennsylvania Sierra Club that EPA's Public Notice has been inadequate and the period for public comment should be extended another 90 days.

**2) The overall well condition including casing and grout (cement) integrity, as well as, the depth and condition of the surface and intermediate casing of the proposed injection wells is in question. Can the same be said of nearby wells in Pennsylvania and in New York?**

I am not a petroleum engineer or a geologist, but living in NW PA's "snowbelt" nearly all of my life I am very much aware of the corrosive effect salt has on steel. Hence, it's impossible for me to believe none of the wells in the Bear Lake, PA/Clymer, NY area don't have some sort of pre-existing condition(s) (pitted production casing, construction defects, sub-standard surface casing, bad cement jobs, unreported/currently unknown multiple-stage perforation zones for previous frac jobs, a wide range of pressure variations at well-head, etc.) which could lead to well failure and/or subsequent migration of waste fluids into groundwater. Comparing the depths and target formation of neighboring wells in NY (4384'-4632'/Medina) and PA (presumed to be similar) with those of the proposed injection wells and taking into consideration the possibility of pre-existing conditions in all of these wells, I feel EPA approval of the above UIC permits is nothing short of an horrific accident waiting for a time to happen.

I would request the period for public comment be extended another 90 days in order to possibly give an *independent consultant* time to evaluate design/construction features of both wells, review the depth and integrity of surface/intermediate casing and cement, grade the type(s) of steel used in all casings, review past and present well logs and down-hole geology, perform state-of-the-art integrity testing on the wells themselves, evaluate and test existing levels and depth of groundwater, determine injection capacities, etc. Given the proposed use of these wells (and their potential for catastrophic failure), I have a hard time believing the dutiful and conscientious folks at the PA DEP have the resources to perform a comprehensive evaluation of all of the above.



3) **A smattering of local history, why the “out-of-sight...out-of-mind” philosophy doesn’t cut it, and why old well locations and local geology are so important.**

Over the past 150 years or so many parts of this area (northwestern Pennsylvania and western New York) experienced boom-bust periods of oil and gas activity (as well as, inevitable swings in population). Noteworthy in these parts are the facts that – 1) the first gas well was *dug* about 45 miles to the north of the proposed permit sites around 1825 in Fredonia, NY, and 2) the first oil well was *spudded* about 35 miles to the south in 1859 in Titusville, PA. I suppose in a way only some of us from in and around the oil and gas patch can understand - we’re kind of proud of all this. From those days to the present fortune hunters, speculators, and property owners quite possibly spudded or drilled thousands of unreported (and secretive) oil, gas, salt, etc. wells. Unfortunately, the location of many of these wells in NW PA and western NY is not known. Stories in and around our local oil/gas patches of drill strings flying into the air as nearby wells were hydraulically fractured and of water wells going dry because of distant drilling activities have been heard or experienced first-hand by many of us. If nothing else these stories give testament to the hazards inherent in the oil and gas industry and the vagaries of geology (our local geology has been compared to a brick of Swiss cheese, which is probably more than most of us care or need to know). However, the current permitting proposal does not address the extraction of oil or of gas from out of the earth – it addresses the injection of waste materials (in liquid form) into the earth. It’s important to make a distinction here between extraction and injection. Back in the day there weren’t any permits or inspections (barring what the owner/operators did on their own), or any of those pesky environmental rules or safeguards. Owner/operators made money primarily by putting oil in the barrel and gas in the pipeline. Spillage or waste at the wellhead or at the pipeline cut into profits, but since waste generated isn’t a part of cash flow, folks generally opted for the most cost-effective and practical solution (today, we call some of those solutions pollution). The solution often involved dumping well tailings or brine into unproductive wells, nearby pits, marshy areas, ditches, creeks, or nearby rivers. The historical waste stream from oil & gas well operations (prior to the 1980’s and today’s Marcellus play) *generally* consisted of solids (drill cuttings/well tailings) and a salty brine/chemical blend of liquids. Federal legislation enacted in the mid-1970’s put a chill on the “dilution is the solution” cure for many kinds of wastes, however, it’s important to note that the waste stream(s) generated today by deep, horizontal Marcellus gas well drilling activities contain a much different chemistry than does the brine coming out of those oil wells down in Grand Valley. Marcellus waste fluids (and other deep well wastes) are highly toxic (before and after drilling) and often radioactive (after drilling). You don’t have to pick up a newspaper, read a magazine, surf the internet, or turn on the TV to learn more about this - just talk to a few people who live next doors to this kind of activity (deep, horizontal Marcellus shale drilling) - bear in mind it’s the waste (not the gas) from these areas that’s headed here. One of the problems with all this waste here in PA is there’s such a huge volume of it that we just don’t have a way to safely treat or dispose of it, which is where <drum roll> injection wells come in. I suppose if they were just going to inject brine and wastes from our local oil and gas wells I could live with this whole business, but this isn’t the case - the waste stream that will be injected into these wells will be: 1) Completely undocumented (which is to say there won’t be a paper trail of what and how much of it came from where, and what’s in it - toxic sludge, radioactive materials, or medical wastes? Who knows? Out-of-sight/out-of-mind seems to be the operative rule of law here), 2.) Untraceable (in the event some of these toxic liquids do find their way into our pristine groundwater or local water wells, or heaven forbid – an oil or gas well in the area - it will be completely untraceable (there are no State or Federal requirements to add trace materials to any of this liquid waste, which also means if the City of Corry’s tests for total dissolved solids (TDS) suddenly goes off the chart we’ll only have ourselves to blame), and 3.) The largest volume of waste fluids injected into these wells will likely be recycled frac fluids and other drilling wastes from far away Marcellus wells; the volume of waste from nearby oil and gas wells here in NW PA and western NY will no doubt be miniscule (I say this looking at the Baker-

Hughes rig count here in PA, the new conservation ethos in Harrisburg (“drill-baby-drill”), and projections for the number of Marcellus shale wells over the next ten years). At this point in time it appears the EPA and the PA DEP view injection wells as some sort of panacea to the issue of Marcellus drilling wastes. To this I would respectfully submit that these folks should seriously entertain the possibility of permitting of a few Class IID injection wells (Marcellus wastes only!) in and around the cities of Harrisburg, Philadelphia, and Washington - if for no other reason than you just can’t drink the water in those places anyhow (believe me - it just tastes terrible). The State of Ohio taxes out-of-state drilling wastes (they have a large number of waste injection wells over there) and is currently considering raising the out-of-state rate to 20 cents a barrel, but I digress...such a tax in PA might have a chilling effect on job creation around here. Bear in mind the brine solutions our Townships use for dust control - are not recycled frac fluids or Marcellus well wastes. The waste for the Bear Lake injection wells is going to come from places where the Marcellus shale formation is thicker and the gas volumes more profitable namely - the northeastern, northcentral, and southwestern parts of PA, central New York (their moratorium on horizontal drilling will likely expire this July), West Virginia, and very possibly other parts of the country. Since I’m not aware of any exhaustive, in-depth historical and/or physical search for wells dug, spudded, or drilled in the area of the proposed injection wells (just west of the Borough of Bear Lake, PA), but am aware that some of the well data supplied by the applicant was compiled back in 1968 - I’m completely flummoxed. Then, there’s that business we heard about at the hearing of a “non-permeable salt layer” which is supposed to contain those thousands and thousands of barrels of frac fluids and drilling waste from distant Marcellus wells . . . all of which is going to be injected into our “brick of Swiss cheese” geology at very high pressure. Since production in several of the wells in close proximity to the proposed injection wells has fallen off considerably over the past few years, I think we can all see what’s coming next. Sorry, but there’s just something really, really wrong here.

#### 4) **Finally, the importance of the Brokenstraw watershed to us locals**

The Brokenstraw watershed comprises a land area of about 500 square miles and extends from Pennsylvania into New York; then back again into Pennsylvania. Its primary origin is within the bounds of PA State Game Lands 197 in a valuable and sensitive wetlands recharge area known as the Tamarack Swamp (note that both proposed injection wells are located in very close proximity to this resource). The watershed terminates east of Irvine, PA near the Buckaloons Recreation Area where the Brokenstraw Creek flows into the Allegheny River. Since the source of drinking water for my community (City of Corry, PA - municipal water supply) and thousands of others comes directly from groundwater sources which are a part of the upper Brokenstraw watershed, any contamination of this water resource simply cannot be tolerated. Any deterioration or degradation of water quality in this area would have devastating and far-reaching impacts on the quality of life for everyone who lives and works in this area (both in Pennsylvania and in New York). To that end I cite Article 1 Section 27 of the Constitution of the Commonwealth of Pennsylvania (Natural Resources and the Public Estate):

*The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.*

## Closing:

Personally, I not only support rules and laws that protect and preserve our natural environment, but also responsible oil and gas drilling. Problem is I don't see any good coming out of these proposed injection wells for my family, our drinking water, our community, the trout, the turkeys and deer, the kindred souls I meet in nearby fields and streams, or anybody who lives and works around here. The only folks who stand to make a buck out of all this will be the lawyers peddling class action lawsuits, the salesmen hawking expensive water purification systems, the vendors selling bottled water (the big 5-gallon carboys), and a few investors who will no doubt be safely ensconced out-of-country when something goes wrong . . . and when that does happen – we all know who's going to pick up the tab.

Regards,

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