

Windfall/Zelman #1 DIW ~ Permit # PAS2D020BCLE

Deep Mines (Subsurface Mines) in Area of Review

The Windfall permit application is deficient because there is no map included showing the location of subsurface mines within the Area of Review and beyond. There are approximately 6 acres of subsurface mines **within** the western side of the area of review. Maps of these subsurface mines are publicly available from the PA DEP District Mining Operations, California District Mining Office.

Details for all of these mines are available on the link provided on the email cover letter using Dropbox.

These subsurface mines extend for 3 miles and discharge at the DuBois Mall property and into the Sandy Lick Creek. A breach of oil or gas waste into the deep mines could come to the surface and be discharged into the Sandy Lick Creek through the interconnected #2 and #1 Shaft Mines.

Note the triangular C & M Junction to the west of the Area of Review on both exhibits for bearings.

The information on Exhibit #1 shows the location of the subsurface mines within the area of review and was obtained from Ben Turner, a Penn State University professor.

Exhibit #1

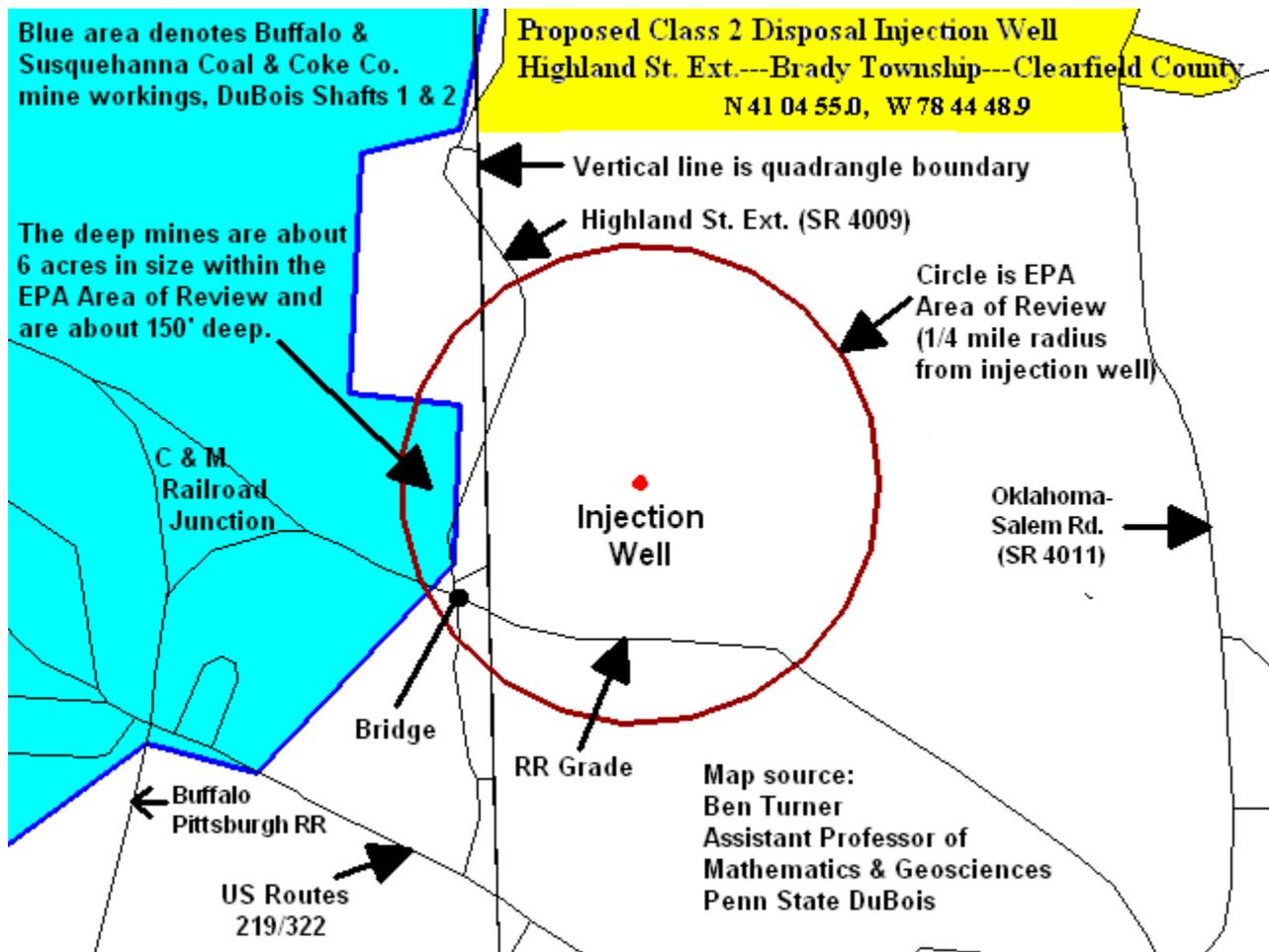
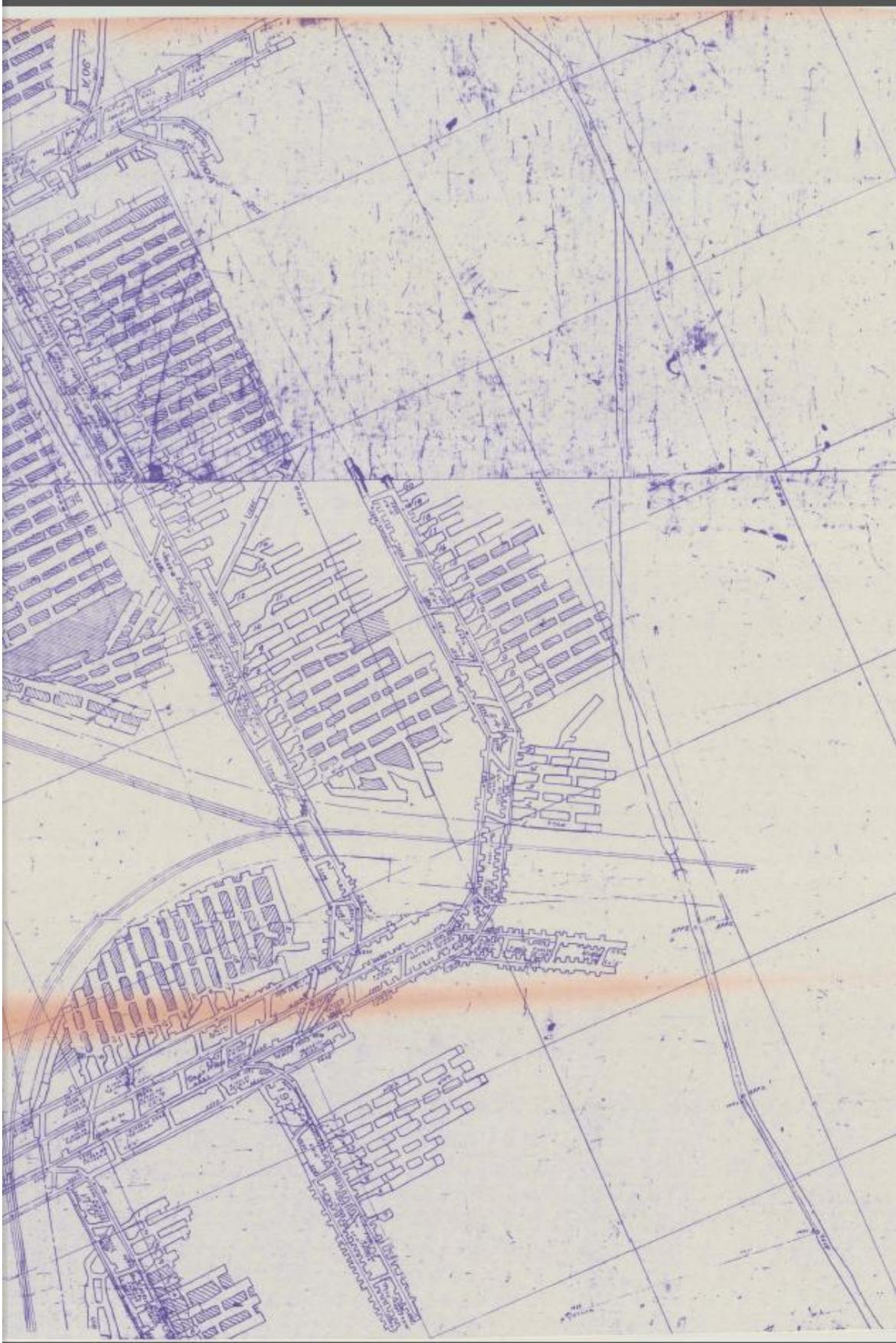


Exhibit #2 ~PA DEP Map of Subsurface Mines within Zelman DIW Area of Review



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Injection Fluid

Comment: The Draft Permit states that *...the permittee shall be restricted to injecting fluids produced solely in association with oil and gas production operations.*

Windfall, in their permit application, states that they intend to add additional fluids to treat the injected fluids. These additional fluids are FE Ox Clear and Alpha 2278W. Windfall says that one is an oxygen scavenging agent and the other is for corrosion control. (See Attachment K below)

Windfall will also add Alpha 3207 after the waste fluids are filtered, which is a corrosion inhibitor, before injecting.

Since the Draft Permit states that Windfall is only permitted to inject fluids produced solely in association with oil and gas production operations, adding the additional fluids would constitute a violation of the permit.

The following is from the Windfall/Zelman #1 DIW Draft Permit. **See B. 2**

B. Operating Requirements

1. Injection Formation. Injection shall be limited to the Huntersville Chert/Oriskany Formation in the subsurface interval between approximately 7300 feet and 7387 feet.
2. Injection Fluid. The permittee shall not inject any hazardous substances, as defined by 40 CFR 261, nor any other fluid, other than the fluids produced solely in association with oil and gas production operations.

Attachment "K" from permit application

Attachment "K" Injection Procedures Zelman#1 Injection Well

The Following injection procedures will be utilized during the operation of the Zelman#1 Injection Facility:

The produced fluids will be unloaded from vacuum trucks through a discharge manifold into a epoxy lined steel tanks. It will be treated at this point with an oxygen scavenging agent and corrosion control additives; FE Ox Clear and Alpha 2278W.

Then, the fluid will be pulled from these tanks and filtered to 10 microns nominal particle size and discharged into additional epoxy lined steel tanks.

Next the produced fluids will be pulled from the filtered tanks through the high pressure pump, equipped with shut down switches set at 6500 psi bottom-hole pressure being calculated in real time and low side at 200 psi. Corrosion Inhibitor, Alpha 3207, will be added. Specific gravity, rate and volume will be monitored with a dens-o-meter, flowmeter, and totalizer. Bottom-hole pressure will be calculated and monitored in real time Utilizing Meyers Mwell software package.

The produced fluids will be discharged from the pump through a checkvalve at the wellhead down the tubing and into the Chert/ oriskany formation. Surface tubing and tubing annulus pressures will also be recorded with a 2 pen recorder as a back up to the digital data.

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There was human activity which induced seismic events that occurred at the Northstar 1 Class 2 injection well in the Youngstown, OH area.

Before January 2011, Youngstown, Ohio, which is located on the Marcellus Shale, had never experienced an earthquake, at least not since researchers began observations in 1776. However, in December 2010, the Northstar 1 injection well came online to pump wastewater from fracking projects in Pennsylvania into storage deep underground. In the year that followed, seismometers in and around Youngstown recorded 109 earthquakes, the strongest registering a magnitude-3.9 earthquake on Dec. 31, 2011. The well was shut down after the quake.

The map below shows basement faults in the vicinity of the proposed Windfall/Zelman #1 DIW. If the UIC permit is issued, the same fate could happen in Brady Township as happened near Youngstown, Ohio. The UIC permit should be denied.

Structural contour map of basement with major faults, modified from Schumaker, 1996

The proposed Windfall/Zelman #1 injection well is the black dot below the black arrow.

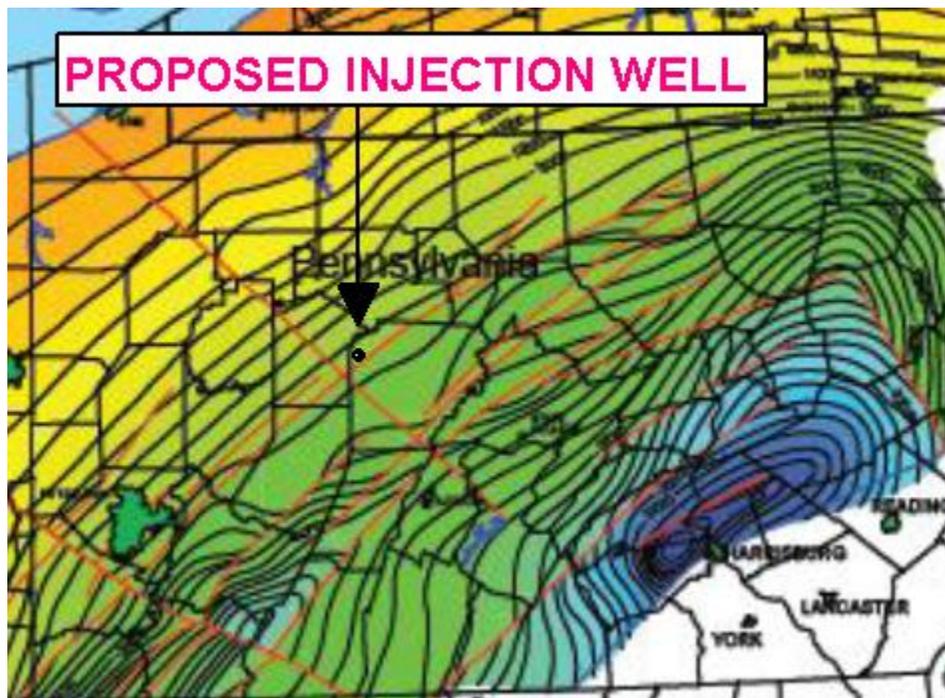


Figure 1. Structural contour map of basement with major faults, modified from Schumaker, 1996

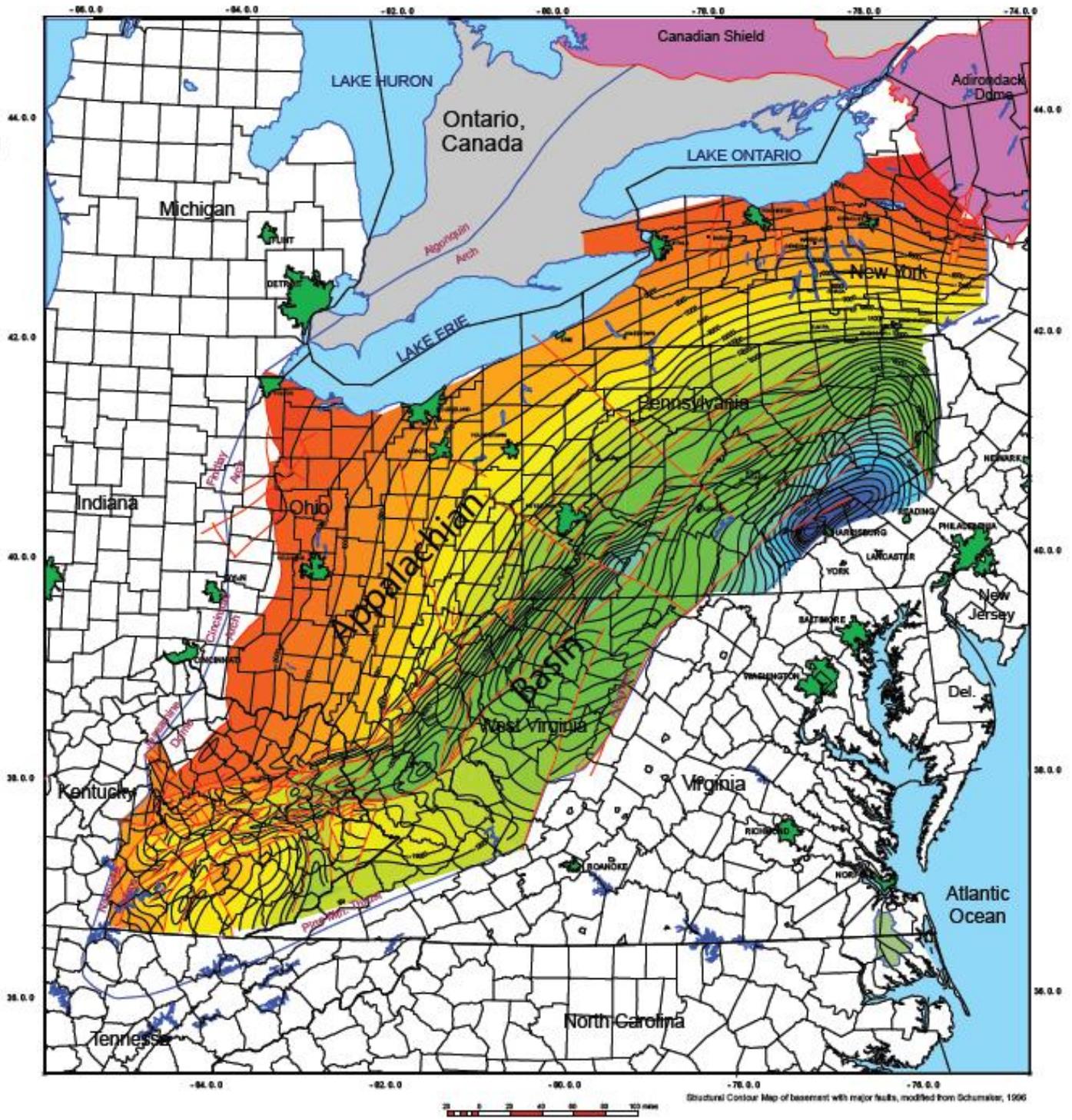


Figure 1. Structural contour map of basement with major faults, modified from Schumaker, 1996

USDW Replacement or Remediation

Comment: Owners of water wells within the actual Zone of Endangering Influence (ZEI) have no assurance that their water supply will be replaced or remediated if their water wells are contaminated by the construction, operation or plugging and abandonment of the DIW.

It could take many years for brine or frack flowback from the Zelman disposal injection well to work its way through the strata to possibly contaminate USDWs.

1. Is the PA DEP or US EPA responsible to enforce the replacement or remediation of ground water which is used in drinking water wells if it becomes contaminated from toxic fluids?
2. Will the drinking water be replaced or remediated for an indefinite period of time?
3. Will the drinking water be replaced or remediated for an indefinite period of time at no cost to the water well user?
4. Who will be financially responsible to replace or remediate drinking water if Windfall Oil & Gas or any subcontractors who work for Windfall Oil & Gas go bankrupt?
5. Will the water well owner need to hire an attorney and go to court in order to be made whole?

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From the Supplement to the Statement of Basis:

The Huntersville Chert/Oriskany formation, the intended injection zone, has been a prolific producer of natural gas in this area since the late 1950s/early 1960s. The removal of both natural gas and brine from this formation has lowered the formation's pore pressure and has created available pore space (storage capacity) making this reservoir a good candidate for the disposal of fluids. Sites such as depleted oil and gas reservoirs can make excellent disposal zones, because

There is not much available pore space in the intended injection zone due to gas production. A relatively small amount of brine has been removed compared to the 30,000 bbls per month that could be permitted to be injected. The natural gas that has been produced was in solution under high pressure in the existing brine fluids. When a gas well was drilled and the underground pressure was released, the gas came out of solution, but the total volume of fluid decreased insignificantly. Therefore, there is very little newly available pore space due to gas production for the injected fluids to go into. The waste water would have to make room for itself by displacing native fluids.

An analogy would be opening a can of beer. When the pressure in the beer can is released, the carbon dioxide dissolved in the beer is released. The beer will go flat, but its volume in the can is virtually the same, even though a significant amount of carbon dioxide gas has escaped.

Therefore, there is little or no available pore space for the injection of waste fluids into the proposed Windfall DIW, since the pore space is already filled with brine. Brine pressure on faults will be increased because of the injected waste water. The pore pressure in the injection zone is going to increase because the waste water has to make room for itself by pushing away the existing fluids. Since liquids have a very low compressibility, any nearby faults will be hydraulically linked to the injection well pressure. Thereby, fluid pressure on the faults will increase, possibly inducing earthquakes.

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Maps of Well/Area and Area of Review

Comment: There is no single topographic map extending one mile beyond the Zelman property boundaries and no indication that there are subsurface mines within the Area of Review. Therefore, the application is deficient.

The directions for Attachment B are as follows:

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...Within the Area of Review, the map must show the following:...mines (surface and subsurface)... ONLY information of public record is required to be included in this map.

I went to the DuBois Public Library and examined the permit application. I did not find a single topographic map extending one mile beyond the property boundaries.

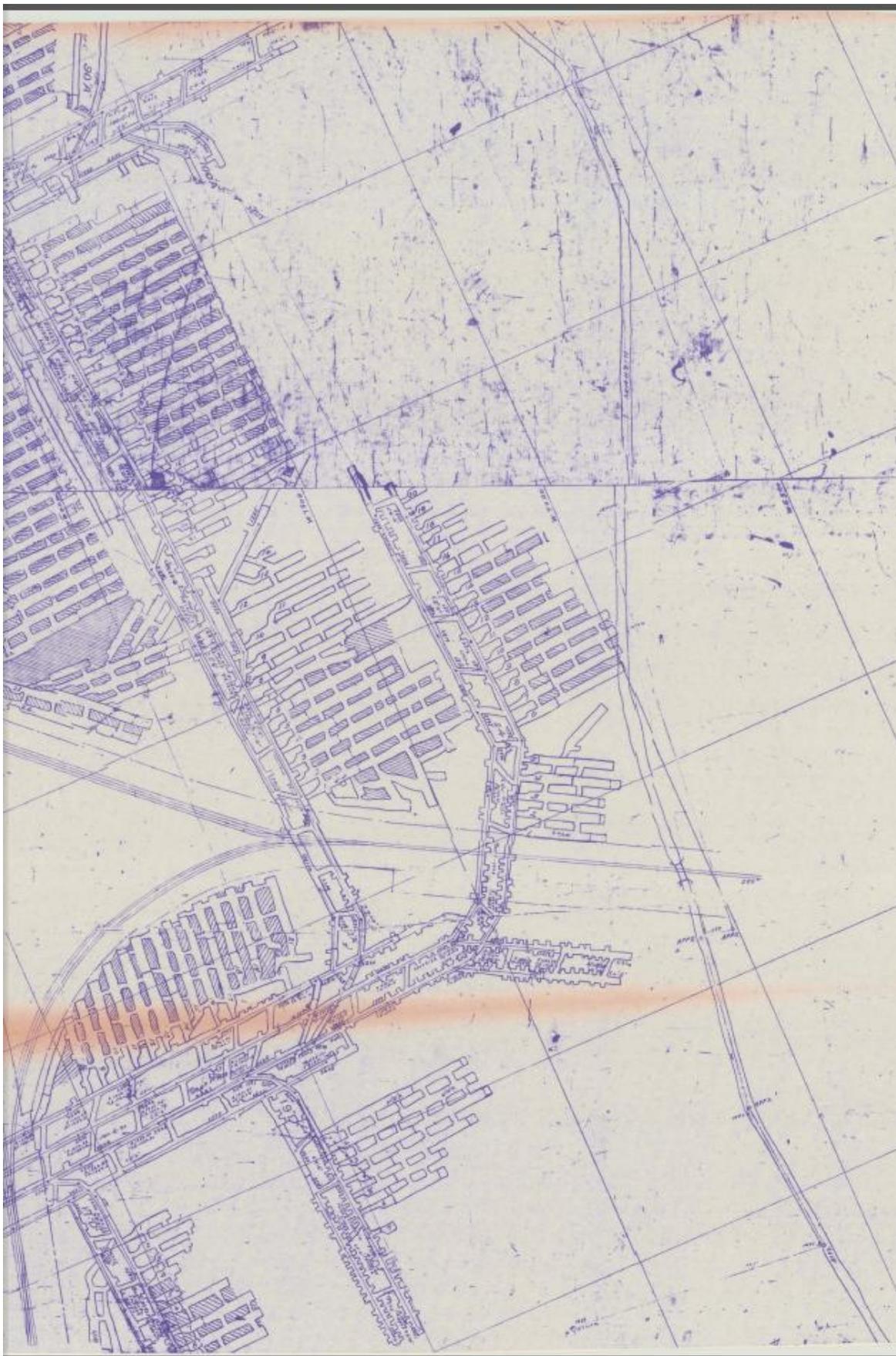
Furthermore, there are approximately 6 acres of subsurface mines within the western side of the area of review. Nowhere in the permit application materials is the presence of these mines shown on a map or even mentioned.

Maps of these subsurface mines are publicly available from the PA DEP District Mining Operations, California District Mining Office (see attachment #1).

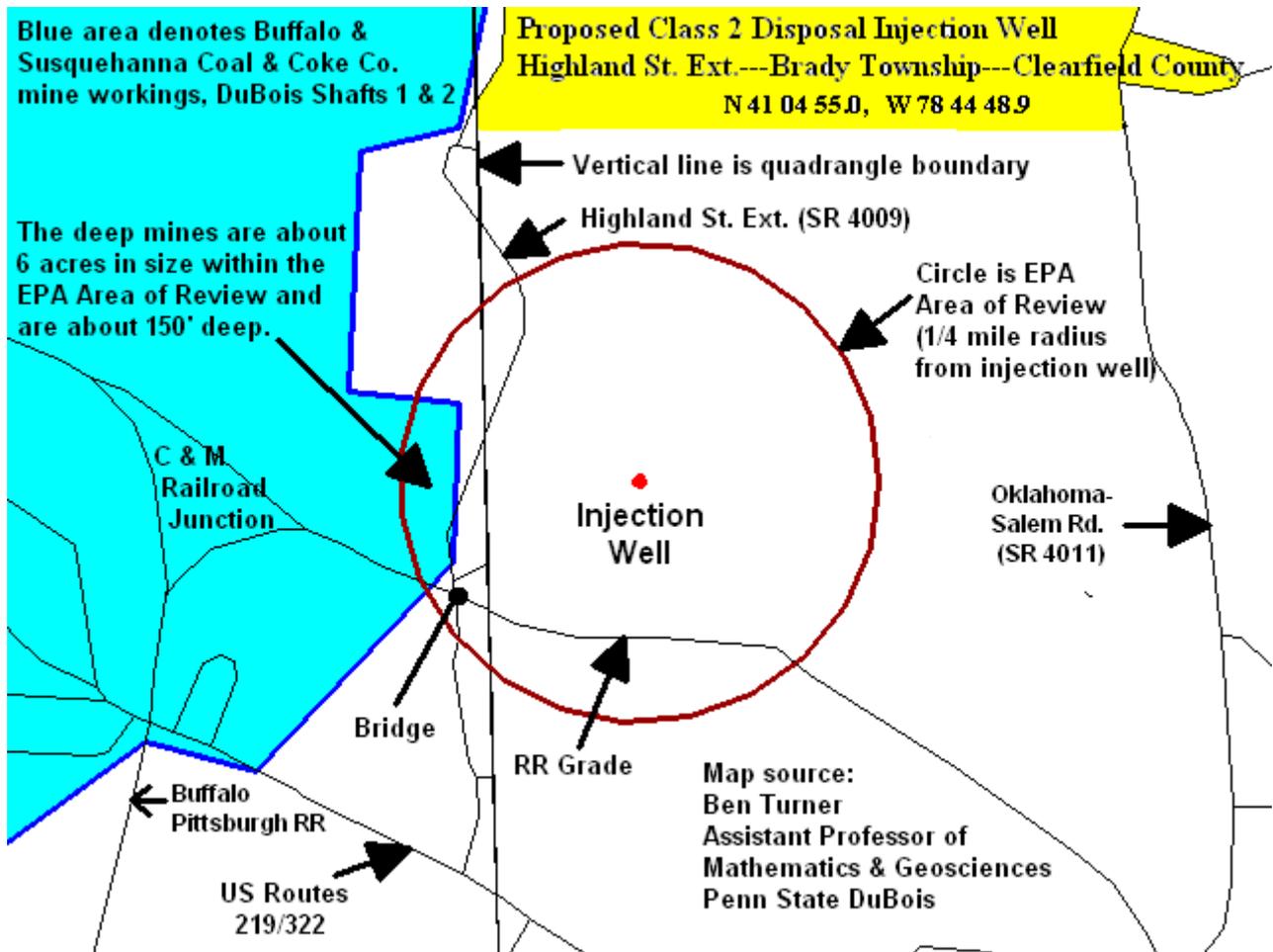
The information on attachment #2 was obtained from Ben Turner, a Penn State University professor and shows the location of the subsurface mines within the area of review.

These subsurface mines are continuous for several miles out to the DuBois Mall where ground water from them is discharged into the Sandy Lick Creek.

Attachment #1 ~ PA DEP map of subsurface mines within Zelman DIW Area of Review



Attachment #2



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Fractures of Confining Zone in Area of Review

Comment: There are 2 deep conventional gas wells that are JUST outside the Area of Review, which go into the Oriskany formation, which is **also** the injection formation. Both of these deep gas wells have been fracked. The **Draft Permit** for the Zelman injection well states the following: **...the injection well shall inject only into a formation that is free of known open faults and fractures within the Area of Review.**

How can we know that the fractures from fracking these gas wells do not compromise the confining layer and thereby violate the DIW construction requirements? These fractures could provide a conduit for toxic injected fluid to work its way into USDWs. (Underground Sources of Drinking Water)

The **Draft Permit** for the Zelman injection well states the following:

PART III

A. Construction Requirements

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

The Potter #2 gas well goes into the Oriskany Sandstone and was fracked on Sept 27, 1960 and is 60 feet outside Area of Review to the **south**

Gas well depth:

See well records.

Top of Oriskany = 7288 feet

Bottom of Oriskany = 7317 feet

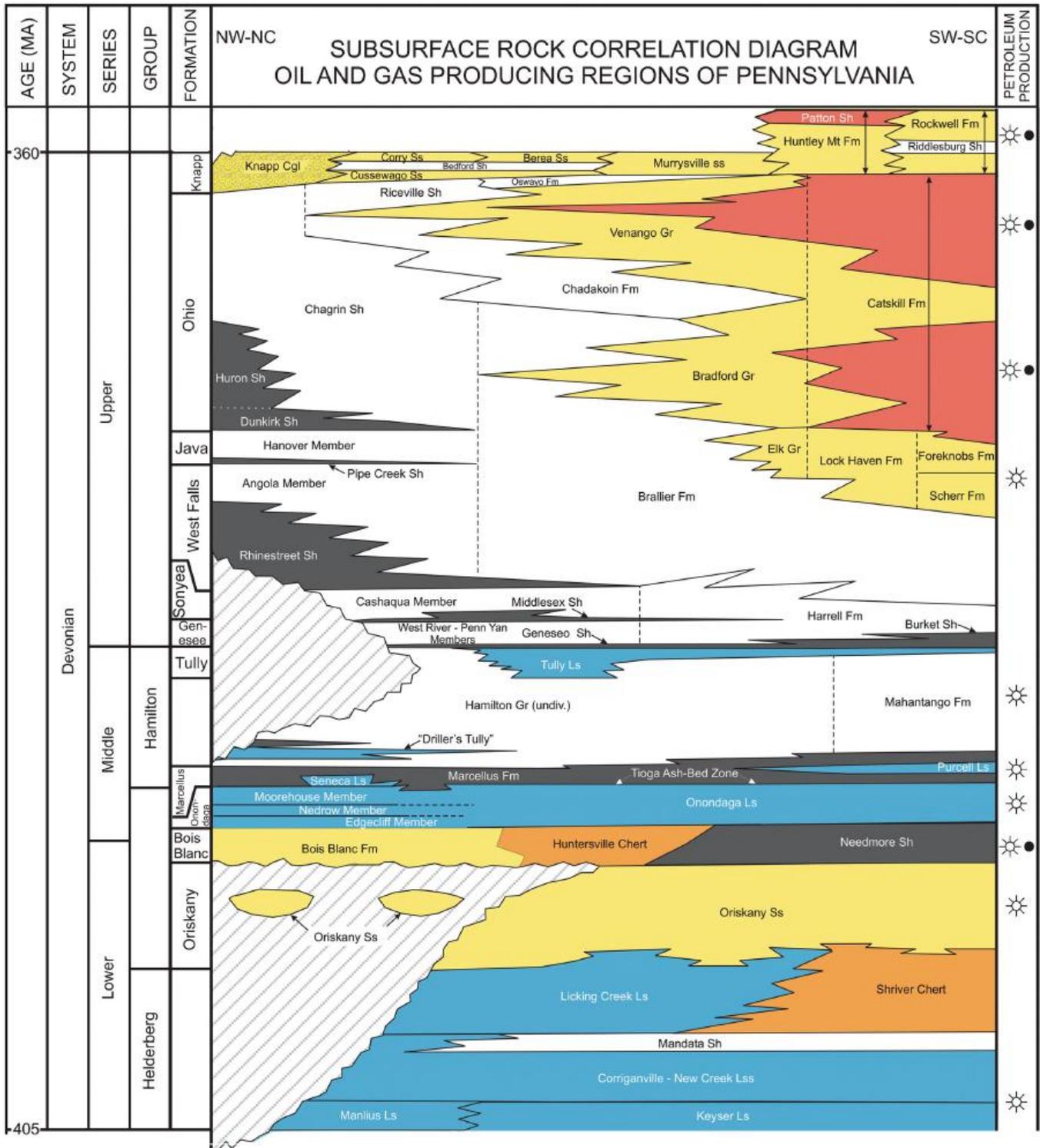
Ginter/Deposit Bank gas well goes into the Oriskany Sandstone and was fracked on December 22, 1960 and is 161 feet outside Area of Review to the **north**

Gas well depth:

Top of Oriskany = 7314 feet

Bottom of Oriskany = 7343 feet

From PA Geologic Survey



LEGEND ☀ Natural gas ● Oil

<http://www.dcnr.state.pa.us/topogeo/drc/correlationchart.pdf>

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil and Gas Management Program
WELL LOCATION PLAT

DEP USE ONLY	DEP Application Tracking #	G:
	Permit #	C:
	Project #	

