

Mr. Stephen Platt  
Ground Water & Enforcement Branch  
Office of Drinking Water & Source Water Protection (3WP22)  
1650 Arch Street  
Philadelphia, Pa 19103

From: Randall R, Baird Sr.  
1273 Highland St. EXT  
DuBois, Penna. 15801  
Ph#:814-583-7180

Dear Mr. Platt,

This is my testimony concerning the proposed Zelman#1 injection well to be located off Tower Lane, in Brady Twp., Clearfield Co., Penna. 15801. (Permit App. # PAS2D020BCLE).

Within ½ mile of the proposed injection well are many old gas wells that were previously fracked. These fractures can open to 600ft according to the Oil & Gas industry. That would put some of these fractures inside the quarter mile review area and create a pathway for injected fluids to flow uncontrolled. Five of these old wells are into the same formation as the proposed injection well and only paces from the ¼ mile review area. Two neighbors experience increased turbidity of their well water when maintenance is performed on one of these wells. One of those neighbors has experienced serious health issues including the removal of a cancerous kidney and a husband who died of cancer at a relatively young age. Another well is supposedly plugged but exhibits gas odors in its vicinity. It has been lit and burned off on occasion by the residents. This well is definitely suspect in my opinion. It is open to 1175 ft. and is 52 yrs. old. Yet another of these wells was plugged in 1960. I would seriously question the integrity of this wells casing and cement plug. Unplugged or poorly plugged wells are a serious obstacle to all potential uses of the subsurface. They provide a direct flow path through which saline waters can reach the surface or other shallow aquifers. These waters may also leach into one of the many mine shafts within the review area and travel toward DuBois/DuBois Mall area where they empty into the Sandy Lick Creek, an approved trout fishery. No question, these wells could contribute to the contamination of many water/ecco systems.

As wells age, a deterioration of the mechanical equipment will undoubtedly happen. The bonding of casing to cement and cement to rock breaks down with time or from voids in the cement and/or poor cementing. Small voids are hard to detect yet are detrimental to well operation and the safety of area water aquifers. There is some evidence that a similar deterioration of integrity may take place in fractures or joints within the rock itself where they are subjected to repeated changes in stress. The joints may literally work themselves open.

Prolonged exposure to acid effluents may dissolve cemented casings and certain formations resulting in their collapse or subsequent slumping of superadjacent material

allowing effluent to escape through created portals and infiltrate fresh water aquifers.

Many of the cemented well casings in this area have also been compromised due to their age and the occurrence of an earthquake we experienced here within the last 1 ½ years.

The Caledonia syncline is approx. 2750' from the proposed waste well. Synclines are typically bad places to inject fluids because it tends to travel up the arms of the syncline toward upper strata and to who knows where from there, thus threatening fresh water aquifers. This closest point to the syncline from the proposed well is in a northwesterly direction which is also one of the projected paths of toxic waste for this injection well as per the permit. Toxic waste, in the volumes to be injected, could end up anywhere.

One professor contracted to investigate the earthquakes in Youngstown Ohio, that were caused by the injection of fracking waste, said, "this stuff plumes out for miles".

The periodic operation of a water supply well at a cannery is detectable in a gas storage field 10 miles away. Water flooding injection in one pool is reflected in pressure responses in another pool 12 miles away within a few days. Salt water from a ruptured casing in an oil well is detected in a water well two miles away within 2 months.

Oil field and ground water experience shows too many examples of far ranging and unpredictable displacement and pressure responses to justify confidence in simplistic calculations based upon idealized conditions. (See Attachment-A)

The earth is not as stable and as unchanging nor is rock as 'solid' as many people believe. Furthermore, our knowledge of the subsurface is often indirect and incomplete. The complexity of the Geology of Pennsylvania creates particular difficulty in developing a truly reliable interpretation of the subsurface without extensive exploratory testing. (See Attach.-B) There has not been extensive testing of this proposed well site or the "Zone of Endangering Influence". Most of the data collected for this permit comes from areas removed from our area and is many years old. There are too many approximations and assumptions on permit referencing geologic formations removed from this area. Among unsuccessful subsurface disposal projects, the lack of adequate geological investigation and supervision has been a major contributing cause. Some projects are doomed from the outset because of a hostile geological environment and others have been costly failures due to incorrect interpretation of the geologic evidence. I believe this would be this companies first attempt at the construction and operation of a disposal well. We don't want to be the guinea pigs for their first experiment. In almost any kind of commercial endeavor there is a reluctance on the part of the people responsible for an operation to report its failure and defects to their superiors. We saw this just several months ago at the Irwin Injection Well in Bell Twp. Clearfield County where they were fined \$160,000 for over pressurizing in order to inject waste.

Also, I feel the area of review should be extended to 2 miles. That would encompass many more residents and water sources that may eventually be affected by leaks, spills, accidents, well failures and leaching toxic waste from this well.

Within Pennsylvania there are no known reservoirs of truly good disposal quality. Pa. has few reservoirs of adequate permeability and porosity for feasible liquid waste disposal projects. Its structural geology is complex, creating difficulties in geological interpretation of the subsurface and producing a profusion of mechanical interpretations in rock continuity-faults, joints, and fractures all leading to a higher likelihood of a well failure with catastrophic results.

Earthquakes are a legitimate concern in and around the proposed waste well site. Faulting is in close proximity and referenced in the permit. It also states that there have been earthquakes in this area of Pa. These faults are inside the ¼ mile review area and pose another threat to well casings, cement and thus, our fresh water aquifers. Determination of the stress condition of deeply buried rock is difficult to define. Fluid pressures of lower magnitude may open pre-existing planes of weakness such as joints, bedding plane fractures and faults. Unanticipated avenues of fluid migration are a very real possibility, states the study on "Subsurface Liquid Waste Disposal & its Feasibility in Pa."

Rock below a few hundred feet of depth is often in a state of horizontal tension which may result in vertical fracturing. Under these conditions of high pressure fracturing, oil field history shows "many" cases where fractures have accidentally been induced into higher or lower water bearing formations. Injection pressure can also cause physical expansion of the rock pore space resulting in fracturing or the opening of existing fractures or the opening of fractures from the aforementioned fracked wells thus creating yet another pathway for contamination to reach our aquifers.

Fractured and solution channels are possible in almost all lithologies. The transmissibility of fractures and solution channels may equal or exceed that of the intrinsic system. Furthermore they are directional both vertically and laterally. These fractures and channels may conduct the injected fluid rapidly and in large volume to a wholly different location than that originally anticipated thus threatening fresh water aquifers.

Absolute impermeability is an uncommon condition. Most so-called impermeable formations have measured permeability. While the thru-put may appear small, it must be remembered that the effective areas involved in disposal include tens to hundreds of acres at a minimum. The petroleum industry provides negative evidence of the rarity of truly impermeable rock units. Exploration reveals geological situations which, from all available evidence, should have provided a trap yet have failed to do so. It is important to recognize that while the net flow direction may be predictable the actual path of fluid flow may be in many directions and follow the path of least resistance. The actual flow pattern therefore depends on the path of greatest permeability and may be more complex than that indicated by generalized flow lines inferred from broadly spaced potentiometric data.

The area of effect of an injection operation is considered to be defined by the extent of

the effluent in its reservoir. While this area may be difficult to define the area of pressure effect is even greater and more difficult to predict.

The long term injection of large volumes of waste must eventually result in the upward displacement of the brine intraformationally or through fractures into the fresh water zone. It is difficult to predict where an injected liquid will be at any given point in time.

The hidden costs of uncontrolled dumping in the subsurface of Pennsylvania may be infinitely higher, not only to society, but directly to the using industries themselves through loss of investment as well as liability for damages. We must recognize the ever present chance that this will have some unforeseen affect upon the surface and shallow subsurface.(See Attachment-C)

The location and access to this well site is enough to throw up a red flag as far as spills, leaks, accidents and well failures are concerned. All of which would present a high risk of contaminating our fresh water aquifers. Bedrock in the area of the well site shows that any spill, leak or accident would create a flow of poison waste toward residences on Highland St. EXT and their water sources. Since I was once in the employ of Schlumberger Well Service I have a fair understanding of industry operations. In my opinion, spills and failures are all to frequent. They can and do, for the most part, go unreported and untested. Drilling is a risk by this industries own admission, so why place this well in a location where the risk for fresh water supply contamination is magnified ten fold when there are so many other remote areas available.

If our water becomes contaminated from this injection well there are no other sources available to us at this time. The "Northwest Clearfield County Region Comprehensive Plan" for Brady Township states, "No significant expansion of the water system is recommended at this time". The Brady Twp. Water authority says that they are running at or close to their capacity. I don't want a water buffalo in my yard nor can I live here if that becomes a reality. I want the water I have now and have an inalienable right to under the Pa. Constitution, Article 1, Section 27. No one should have the stress and worry that the water they drink, on a daily basis, may have toxins in it that could cause serious illnesses or worse. I have a son at home who has a serious neurological disorder. Many of the chemicals that we know are in frack fluid are highly toxic neurological agents. Obviously, the last thing my son needs is to come into contact with any of these toxins either in the water or the air.

As is demonstrated here, there are many and varied ways this injection well can send highly toxic and sometimes radioactive waste into our aquifers through this geological location of Pa. Protection comes before the fact and I sincerely hope that we warrant that protection.

There are many more concerns with this well and well site which I know the EPA does not address due to regulatory issues. Therefore there is no discussion of them here.

References: Pa. Dept. of Environmental Resources publication, "Subsurface Liquid

Waste Disposal and its Feasibility in Pa.”, “The New York Times”, “U.S.G.S.”, “The Wall Street Journal”, C.H.E.J. “Center for Health Environment and Justice”, “D.C.N.R.”, “DuBois Courier Express”, “Ohio Dept. of Natural Resources”, “Community Environmental Legal Defense Fund”, “D.E.P.”, “E.P.A.”, “Zelman#1 Well Permit”, others....

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UIC Application and Permit Questions:

1. This is a commercial well yet Attachment “P” states their monitoring program would test well “Mechanical Integrity” every 5 years. This is in error since commercial wells require testing every 2 years.
2. In the “Statement of Basis”, there is a statement that, “No wells were found which penetrate the injection zone within the ¼ mile area of review”. There are several within paces of the ¼ mile review area that do penetrate the injection zone and are very suspect as mentioned in my “Hearing Testimony”. It is hard to believe that this toxic fluid will stop its migration within the “area of review”, a few feet short of all of these suspect wells. Could the driller explain how this might be accomplished?
3. In the “Statement of Basis”, under “Injection and Confining Zones”, he states that the immediate adjacent zone to the injection zone is “approximately 50 feet of limestone”. Why are there so many “assumptions” and “approximations” involved in this process? Does this person know that he is dealing with many peoples water and ultimately their lives? Or does he even care??
4. Under the “Statement of Basis”, “Seismic Review”, it says that the faults referred to are “approximately” at 16,000 feet. Because they are not exposed at the surface it is inferred, which means that he “deduced” or “guesses” from geophysical imagery, that these faults will not interfere with his proposed project. Then he goes on to say “if these faults exist” which in my mind says he doesn't know for sure what he is talking about. My question is, if there are indeed faults in this area and there have been earthquakes recorded in this vicinity, one of which I felt not more than 1½ years ago, then why would an injection well be permitted in this area at all?
5. Under the same section, “Statement of Basis”, it is stated that gas production between the fault lines has been productive but outside the faults non-productive. This would indicate that the faults are not transmissive to gas migration is yet another “assumption” on his part. Are there faults or are there not would be my question to him? And how and why would a fault confine liquid waste just because it is assumed to have confined gas migration? Would not a fault act as a fluid channel and distribute liquid waste to other paths of least resistance as well as lubricate the fault and increase the risk of quakes?
6. “Statement of Basis”, Geologic and Seismic Review”, “the permit does not allow the

injection zone to be fractured or fractures in the injection zone to be expanded". How can this possibly be monitored when it is known that even low pressures can propagate existing fractures? (Reference the Feasibility Study)

7. "Basis", "Injection Fluids", since this is a commercial well and has not been constructed yet, how can they have determined the specific gravity of the injection fluids that is needed for pressure calculations when this fluid is not present yet and can be coming from anywhere?
8. What if the permittee goes bankrupt before plugging and abandonment?
9. What will the operators source of power to run this operation be? Will there be back-up power for this operation? Our Penelec Electric power in this area goes out at least 3 times per month or more, at all times of the year.
10. Who will inform local residents of spills, accidents, well failures and water contamination?
11. Since HazMat has to respond to the spilling, leaking or accidents involving this toxic waste, will a HazMat unit be relocated closer to us since it would take an hour or more for one to respond to our location?
12. Who oversees the "Mechanical Integrity Testing"? This man has a brother who works for DEP and we understand he does some sort of well testing. Would this not be a "conflict of interest" should he be involved with this well in any way?
13. Under the "Permit", "Construction Requirements", the injection well shall inject only into a confining zone that is free of "known" open faults or fractures within the review area. Don't we "know" that there are open faults in the review area per the permit data? How about the "unknown faults and fractures"? (Ref. Feasibility Study)
14. Under the "Permit", "Casing and Cementing". Cemented casing is a huge concern to me since I have personally witnessed its failure. From 3/4" thickness on some to 1 3/4" on other strings and everything in between. Scary to me because this is not a perfect science. Casing is not set perfectly center well bore, therefore cementing is at best imperfect, with some sides of the casing receiving little to no cement. I personally believe that the cementing of this injection well leaves a lot to be desired, and creates a high risk for failure of this project given the geology of our area.
15. "Response to Notice of Deficiencies". Attachment B. Please find attached list of landowners along with a map of their location. There is no map.
16. Under "Hydrogeologic Settings-Attachment B. It states the Caledonia syncline is about 5000 feet from the proposed well site. It is not. According to their map it is

about 2750 feet from the proposed well to the axis of the Caledonia syncline and in a direction estimated to be the flow direction of the injected toxic waste.

17. Under "Hydrogeologic Settings". It states, "No apparent surface or deep mining has occurred on or directly adjacent to the Zelman tract". This is not true. Deep mining has occurred adjacent to if not under part of the Zelman tract. Old mine maps of this area show mining activity in that location and continuing to the DuBois Mall area.
18. Under "Hydrogeologic Settings". Here again we are reminded that there are indeed subsurface faults present throughout the surrounding area. I would have to ask why we are considering putting an injection well here when the permit states they cannot inject into an area with faults?
19. Under "Underground Sources of Drinking Water", Attachment D. There findings show a directional flow of groundwater due to topographic & structural features to be toward the west and northwest. This is directly toward the bulk of the residents located in the village of Highland St. EXT. Should there be a spill, leak or accident the residents will be directly in harms way. Why is this ok?
20. I would like the driller/operator to present a comprehensive plan that would explain exactly how he is going to supply us with water when he contaminates ours. (Cost and time frame included) We cannot go without water for "any" length of time due to circumstances beyond our control. (Family illness)
21. The average water well depth in this area is much deeper than the 73 feet stated in the permit. My well is 200' and many of my neighbors are also this deep or deeper. His information is from 1979 and many things have changed in this neighborhood since then.
22. Under "Background Water Sampling". It states that "Numerous private water supplies are located in the immediate study area of the proposed injection well. These supplies are all down hill of the proposed facility and would receive recharge from infiltrating surface waters in the project area. That means that anything on the ground at the proposed well site would end up in our drinking water. Truck & auto traffic depositing oils, greases, gases, antifreeze and diesel fuel, which contains benzene, will eventually end up in our fresh water supplies. (Wells and springs) This is all in addition to what the proposed well may deposit into our water. One only needs to go look at the nearest truck yard that has been in existence for a period of time. Observe what is on the ground there. This well is going to have, possibly, hundreds of vehicles in and out of it on a daily basis.
23. Under "Background Water Sampling". They talk about the water quality being great in our neighborhood. Then they go on to say, "However, existing iron and manganese concentrations are above established EPA Secondary drinking water limits, established for these parameters, for aesthetic reasons. What does this mambo

jumbo mean?

24. Under "Background Water Sampling". Why will they not test for "oil and grease" in their monitoring program during & after construction at the locations specified?
25. Under "General Description". It states they are drilling a gas well in Brady Twp., Clearfield County. Is this correct?
26. Under "Attachment P, "Mechanical Integrity. It states that mechanical integrity will be tested in the "fifth" and "tenth" years. This is in error. It should be tested every two years because this will be classified a commercial well should it be constructed.
27. One other issue I would like to question in the permit is: I see that the Pa Game Commission, Pa Fish and Boat Commission, Pa. DCNR, and the US Fish and Wildlife all have to sign off that there is no impact to threatened or endangered species. My question then, is who's responsible for doing an impact study on the people, and the residents in the area of the proposed toxic well site?

Thank you very much for the opportunity to demonstrate why this injection well should not be located in this densely populated , high risk area of our Beautiful State.

Sincerely,  
Randall R. Baird Sr.

Mr. Stephen Platt  
Ground Water & Enforcement Branch  
Office of Drinking Water and Source Water Protection (3WP22)  
1650 Arch Street  
Philadelphia, Pa. 19103

From: Randall R Baird Sr.  
1273 Highland St. EXT  
DuBois, Penna. 15801

Dear Mr. Platt,

I am writing you to ask if the date for public comment for the proposed injection well in Brady Twp., Clearfield Co. Pa., (Draft Permit #PAS2D020BCLE), could possibly be extended. In light of some new information that was presented to us, we would like to have more time to investigate it fully before submitting it to the EPA for consideration in our case.

Also, please find additional concerns that I would like added to the testimony I submitted on 12/10/2012 at the Public Hearing in Brady Twp. Thank you very much.

UIC Application and Permit Questions and Other Concerns:

28. Fluid pressures effects could migrate downward from the injection horizon towards potential earthquake producing structures in the basement. The cause of many of the earthquakes in the Eastern U.S. is still poorly understood and understudied. Since we are aware that there are faults within the review area that are both basement related and in other subsurface structure, wouldn't this, in effect, be a double threat to the wells construction as well as to our aquifers?

29. The dangers of radiation in the frack fluid is ever present and highly hazardous yet is rarely mentioned. Radium 226, 228 and Gross Alpha are and can be in concentrations that should make this toxic slurry a "hazardous waste" and not a "residual waste" without considering the chemical content. Studies done by the New York Times indicate levels of radium to be from 20 times to 1500 times greater than Federal Drinking Water Standards allow, with Gross Alpha levels much higher than that. These levels were found in flowback from wells located in Bradford County Pa. thru the DuBois Area and continuing to Washington Pa. I believe workers that are being exposed to this waste in any way, do not realize and are not being told of the long term effects of this exposure. Unfortunately, when they realize what is really happening it will then be too late.

If this effluent were to leak, spill, or migrate to any of the known surface/subsurface features present in our areas geology, could it not render the entire Village of Highland

Street Ext. a toxic waste zone that would be totally uninhabitable and much like the Love Canal catastrophe that happened in New York State some years ago?

30. This whole well project is a gamble with too many lives at stake. The complacency and total disregard for the residents of this area shown by Mr. Hoover's testimony at the hearing, only confirmed what the residents know and fear about this individual's work ethic in the drilling industry. He is not, nor has he ever been a resident of this community as he stated. He lives 12-15 miles from the proposed well site. His statement at the hearing that this well is simple, "We bring trucks in, we load them into tanks filled with the fluid and pump it down the hole", is not only scary but also shows he does not grasp the critical, crucial issues involving the construction or operation of a disposal well or its impact on the local residents, nor does he care. He's a gambling man like a lot of drillers. He plays cards several nights a week at a local bar in the town near his home, not that there is anything wrong with that, but he did tell an Elk County resident that he thought the Brady Twp. well was a "roll of the dice". That is an indication to us that he has no clue about the geology of our area and that his application is based on total assumption. We, in The Village of Highland Street EXT, do not want someone "gambling" with our water, our lives, our children's lives, our property values or our quality of life. You may be asking what all this has to do with our aquifers, but we strongly feel this has everything to do with them. In this situation, complacency and negligence can destroy our water, as well as our lives, just as quickly as all other factors mentioned.

31. Shouldn't the "National Environmental Policy Act", (NEPA), come into play for this proposed well? We are still investigating this Act via a local attorney but feel it may apply since it involves Federal Agency's that issue permits. It states, "In some circumstances an Agency may wish to undertake the construction of an EIS, (Environmental Impact Statement), without the initial drafting of the environmental assessment". "This will take place under circumstances in which the Agency believes that the action will undoubtedly have adverse effects on the environment or is considered environmentally controversial". We feel that both of these may apply. We are still studying this particular Act and would appreciate having more time for its research, along with research on other uncovered issues.

32. The day following the hearing, (12/11), we received a registered envelope from Mr. Hoover with a copy of his DEP permit application enclosed. (Great timing and display of his arrogance) We are now awaiting his third copy of said Application due to the errors found on the first two copies. My question is, doesn't he have to obtain an EPA Permit for the proposed well before he can apply for a DEP Permit? Maybe his brother is helping him with this since he works for DEP.

Thank you again for your consideration and the review of these most important issues facing the residents of Brady and Sandy Townships and the Municipality of DuBois, Pa.

Sincerely,  
Randall R. Baird Sr.

Mr. Stephen Platt  
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FROM:Randall R. Baird Sr  
1273 Highland St. EXT  
DuBois, Penna. 15801

Dear Mr. Platt,

Please find here more concerns that I have about the proposed Zelman #1 injection well draft permit #PAS2D020BCLE. I would appreciate having these added to my Hearing Testimony which I submitted on 12/10/2012 in Brady Twp. Thank you.

33.In the permit it states that the driller will be disposing of the toxic drill cuttings from this well "on site" if this well is indeed permitted. This would also be unacceptable since the permit states that the well site is the recharge zone for most of the wells in the Village of Highland Street Extension. The excavation of this site alone will compromise our water supplies and degrade the quality of our water.

34.In the permit there is also talk about the casings and the protection afforded by them. The first two strings of 8' and 170' do nothing as far as protecting our aquifers. My well is 200' deep and the proposed well head is 27' above my water well head. That would leave the second string 57' short of the bottom of my well and lower most aquifer. But my biggest concern with this is not the number of strings or their depths. It is the grouting of the casing and the number of fractures in the ground in the injection zone that will allow this toxin to escape to areas of unknown possibilities.

35.We would like to request that an EIS, (Environment Impact Study), be completed concerning this well, well site, and its obvious negative impact on so many people and their water supplies as well as a host of other real life issues and concerns.

Thank you for your indulgence and consideration on the many threats to our fresh water supplies and ultimately to our well being and the quality of our lives.

Sincerely,  
Randall R Baird Sr.