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 certain formations as well as cement 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 minium. 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....

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

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 are 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.

Randall & Valerie Powers
1235 Highland Street Extension
DuBois, PA 15801

December 15, 2012

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

RE: UIC Permit PAS2D020BCLE (Windfall/Zelman 1)

Dear Mr. Platt,

This letter is additional testimony for the Zelman #1 Injection Well proposed for Brady Township, Clearfield County.

We respectfully request you extend the deadline for submitting comments since we need to submit additional information like the Casselberry report concerning abandoned gas wells in the DuBois watershed area along with additional details on the coal mines that we have.

It was stated at the EPA public hearing, "we know this area is already saturated in the Oriskany." This concerns us with the comments by the driller to that this is just a "hole in the ground to pump waste" and a statement to a participant on December 10 from Windfall that, "this is a dice game." My home is feet from the proposed site and our lives depend on our water. We are against anyone gambling our water sources, our homes, our health and our lives.

The Brady Township Engineer, Wilson Fisher, believes an impact study for the National Environmental Policy Act is required to be completed. We are also researching information presented on the mineral rights in the area and what legal implications this proposed disposal injection well will have on our area.

After news coverage by the Pittsburgh Post-Gazette this week that explains additional concerns we want further time and research. When one of your own states concerns with where the waste will go and they are an EPA hydrologist we should all take note.

This week we received a packet on the PA DEP application from Windfall Oil & Gas. We need a meeting with DEP to understand what these implications have on our home and what this information means. Many things don't add up in the packet we received for the PA DEP application. Some things we know are that the coal mines are within 1000 feet.

The items mentioned have an effect on underground sources of water (USDWs). We deserve time to respond to the driller with local information and all the facts are needed before any decision is made. Our future matters and we should be given more time than a few days to think and understand everything we are learning. The PA DEP information states we have fifteen days yet if we lose our water the PA DEP gets forty-five days.

We believe on December 10, 2012 we provided enough facts and testimony to deny this application. Please deny the application now and stop this from going into a residential area.

Sincerely,
Randall & Valerie Powers

Testimony_Powers_follow-up_12.15.2012_final.doc

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 to 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?

Additions to Hearing Testimony.edt

30.This whole well project is a gamble with to 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 individuals 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.

Windfall Oil & Gas Inc

63 Hill Street, Falls Creek Pa 15840 814-771-9686 mhoov16@verizon.net

12/12/12

Mr. Stephen Platt
EPA Region III
1650 Arch Street
Philadelphia, Pa 19103

Re: Underground Injection Control Permit Number PAS2D020BCLE
Public Hearing Testimonial

Dear Mr. Platt,

I, Michael G. Hoover, president of Windfall Oil & Gas would like to enter the following statements into public record for the consideration of the proposed Zelman #1 injection well. Although some of the statements do not fall under the review of the EPA, I feel it is important to correct some of the misstatements and/or misrepresentations that were made at the public hearing made on December 10, 2012 regarding the proposed Zelman#1 well.

Residential Area

Several of the testimonials stated that highland street is a residential area. The project area is not zoned as residential. A review of courthouse records made in 2011 showed there was no zoning ordinance on file for Brady Township, Clearfield County. This was confirmed by telephone conversation with the Brady Township Secretary on July 23, 2012. Additionally, only one residence of Highland Street can be seen from the proposed wellhead at an approximate distance of 1100 feet. The access road will pass between two residences. One being the lessor and the other, a relative, who signed a right of way agreement and therefore we conclude has no objections to the project. Photos of the project area attached. A portion of the access road is used by two residences that live beyond our project area; however we will be making significant improvement to this existing right of way.

Topographic Map

Testimony at the hearing stated that the permit application had omitted the required topographic map. Attachment D-E of the permit application does include a topographic map extending one mile beyond the wellbore in exhibit "1" subtitled location map.

Wellbore Design/Schematic

Testimony was provided at the hearing that the casing design or wellbore schematic was not provided in the permit application. A wellbore schematic was provided in Attachment "M" of the application. The casing and cementing specifications along with setting depths were also provided in Attachment "L". Please note that a change was made to the 8 5/8 casing depth from 1200' to 1000' due to concerns contained within the notice of deficiency from the EPA. This casing depth change was approved by the EPA and discussed with Pennsylvania DEP for compliance with minimum casing depth regulations.

ZELMAN Public Hearing testimonial.docx

Coal Mines
Testimony at the hearing stated that the permit application had omitted the coal map showing locations of mines. Attachment D-E of the permit application provided a map of the location of the Lower Freeport mine at Exhibit #3. Further our geologic study indicated that solid coal will be encountered at the proposed Site. We have subsequently reviewed (7) well records within a radius of 1800 feet from the proposed well and no open mines were encountered during drilling operations. The proposed casing and cementing program as designed and presented in the application had taken this coal seam into consideration with the 375' string of 11 ¾ inch casing.

Monitoring Program
Testimony at the hearing indicated that our proposed monitoring program was inaccurate since we were denied continued access to two of the private water sources that were recommended as monitoring points in the hydrology study. The study is included in attachment D-E. The monitoring program proposed in attachment "P" under 'local water sources' stated that we had been denied continued access and provides our proposed monitoring points.

Faults
Testimony at the hearing discussed the location and transmissive nature of faults. Attachment "G" of the permit application provided a map of the faults of public record, as required. However, as discussed in this attachment, the northern fault is not located as mapped and if it does exist it falls outside the AOR. A tabulation of formation tops from well records included in this section is evidence that the Chert/Oriskany is on the same "block" for a minimum distance of 1750 feet north of the proposed well.

Regarding the southern fault, we agree that fault lies between 1200 and 1450 feet southeast of the proposed well. Well records from wells 37-033-20327 and 37-033-20325 report a subsea depth to the Onondaga at -5579 and -5988 respectively.

However we submit the following evidence of the non-transmissive nature of the fault.
Well permit # 37-033-20327 was completed in September 1960 with a natural flow of 7,312,000 cubic feet per day and a post fracture open flow of 30,370,000 cubic feet per day of gas with a pressure of 3293 psi. Well permit #37-033-20325 was completed in October 1960. No gas was reported and the well was plugged and abandoned.

The fact the Northern well had an extremely prolific open flow with a pressure of 3293 psi and the southern well had no flow is evidence the fault is not transmissive.

Also, note the northern productive well was fractured on 9/27/1960 with reported pressures of 3800 psi at an approximate distance of 250' from the fault line. Since no gas was encountered across the fault line in the southern well subsequent to fracture operations is evidence of a competent boundary.

I hope this information is helpful in your continued review of our proposal.

Yours Truly,

Michael G. Hoover

Windfall/Zelman #1 DIW ~ Permit # PAS2D020BCLE

Deep Mines (Subsurface Mines) in Area of Review

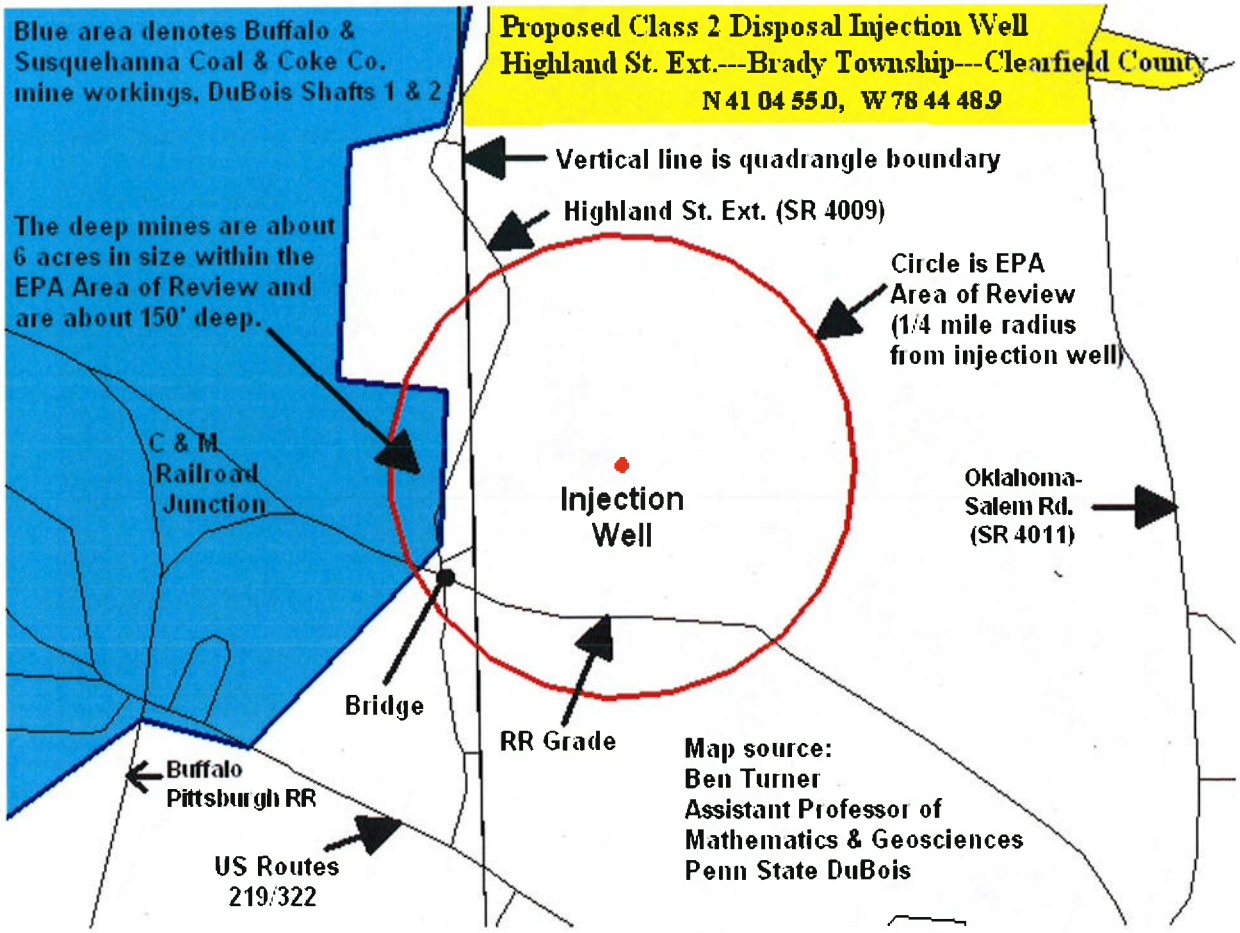
The Windfall permit application is deficient because there is no map included showing the location of subsurface mines within the Area of Review and beyond. There are approximately 6 acres of subsurface mines **within** the western side of the area of review. Maps of these subsurface mines are publicly 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.

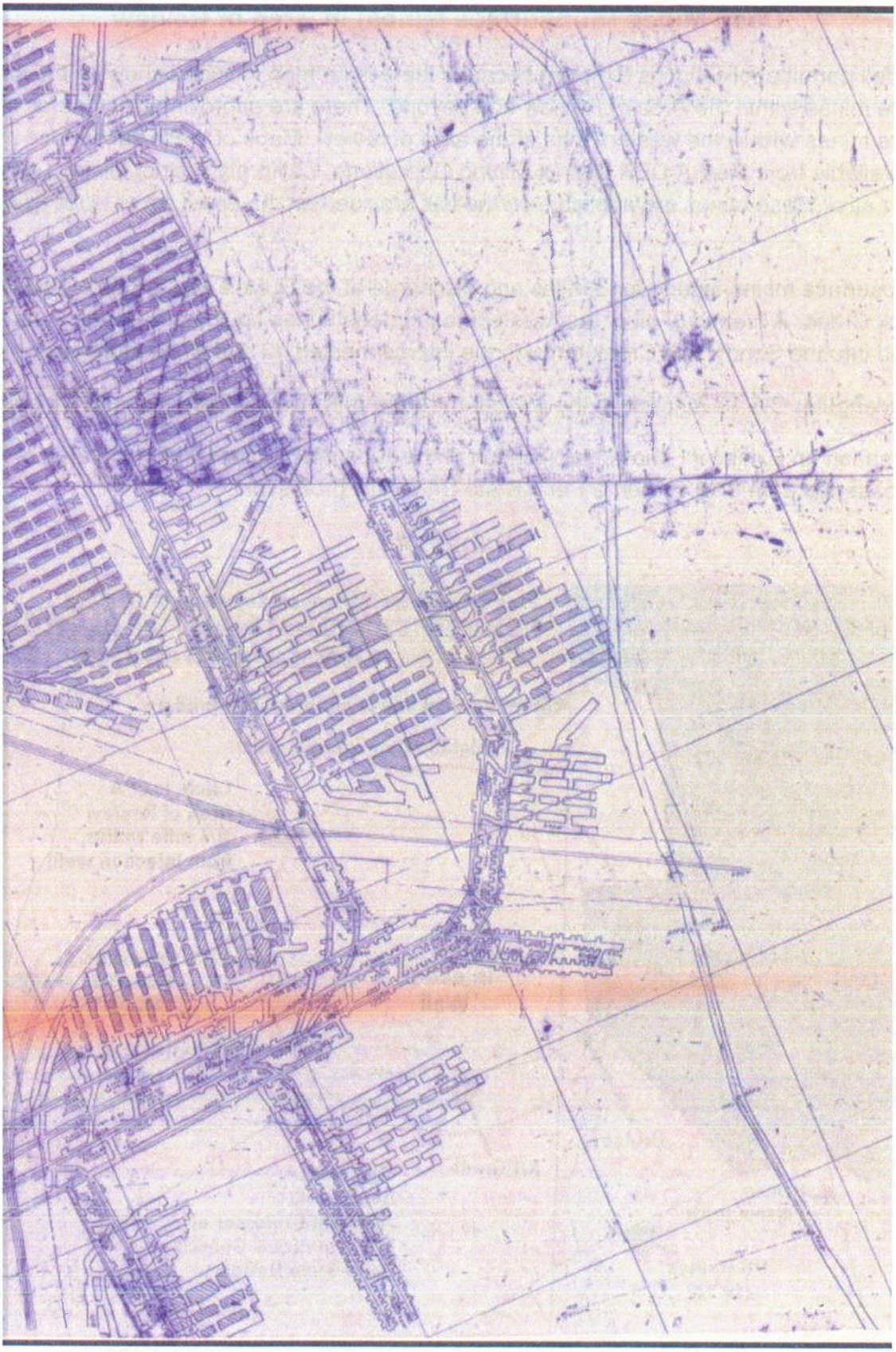
Exhibit #1



Marianne Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

2012-12-27 DeepMines.pdf

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



Marianne Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

CASSELBERRY & ASSOCIATES / GROUNDWATER GEOLOGISTS
801 East Branch Road, State College, PA 16801
Phone: 814-235-2362 Fax: 814-235-2363

June 15, 2010

Herm Suplizio, City Manager
City of DuBois
16 West Scribner Avenue
DuBois, PA 15801

Re: DuBois Reservoir Watershed Study

Herm:

Casselberry & Associates (C&A) has completed the initial phase of our DuBois Reservoir Watershed Study. This work included a hydrogeologic characterization of the drainage basin feeding the Reservoir and an evaluation of the potential risks posed by the development of Marcellus Shale gas wells within the watershed. Our watershed characterization and risk assessment were presented at a June 14, 2010 meeting in DuBois.

At the conclusion of the June 14, 2010 meeting, we discussed having an additional meeting to address questions. To provide interested parties with an opportunity to thoroughly review the results of our work in advance of the next meeting, I have presented an outline of our watershed characterization and risk assessment in the following sections of this letter.

Watershed Characterization

1) The Reservoir watershed is 26.7 square miles in size. The City of DuBois surface ownership within the Reservoir totals 7.0 square miles.

casselberry.pdf

2) The Reservoir has two sources of water; overland runoff and groundwater discharge to stream channels. Overland runoff produces large volumes of water for short periods of time. Groundwater discharge to stream channels is the primary source of inflow to the Reservoir.

3) There are two major stream valleys feeding the Reservoir. Montgomery Run drains the region east and south of the Reservoir, Anderson Creek drains the area north and west of the Reservoir (see the attached Plate 1).

4) The Montgomery Run and Anderson Creek drainages have different geologic characteristics. Anderson Creek is underlain by bedrock belonging primarily to the mid-section of the coal measures (Glenshaw and Allegheny Groups) that is composed of cyclic interbeds of sandstone, shale, limestone, coal and clay (see the attached Plate 2). Montgomery Run is underlain by massive sandstone beds belonging to the base of the coal measures (Pottsville Group) and the top of the underlying Burgoon Formation.

5) Though the bedrock geology of Montgomery Run and Anderson Creek is different, the basic mechanisms for groundwater transport in both watersheds are the same. Groundwater recharge occurs primarily via diffuse infiltration of precipitation in the upland areas and groundwater is discharged directly to the stream channels or at springheads on the valley floors. Fractures provide the primary avenues of groundwater movement in both the upland and valley-floor regions. The bedrock beneath the upland areas has a low fracture density and groundwater flow in this setting is diffuse and relatively slow. The valley-floor regions are underlain by highly-fractured bedrock and groundwater flow in this setting is concentrated and relatively rapid.

6) To characterize the groundwater input to the streams feeding the Reservoir, flows were measured and water samples were taken at 14 stations. To eliminate runoff bias, this work was performed after three days of no precipitation. The location of the sampling stations, and a compilation of the

gaging and water-quality data, is presented on the attached Plates 1 and 2 and Table 1.

7) The stream gaging results show that the Montgomery Run watershed produces significantly more groundwater inflow per unit area than Anderson Creek. The median contribution rate of the Montgomery Run and Anderson Creek stations were 823 and 566 gpm per square mile, respectively. The higher productivity of the Montgomery Run basin is due to the high permeability of the Burgoon Formation strata that are exposed in this stream valley. The Burgoon and underlying Rockwell Formations are the best aquifer units in the DuBois region.

8) The water sampling results indicate differing water chemistry signatures for the Montgomery Run and Anderson Creek basins. The Montgomery Run stations are characterized by dilute acidic waters that reflect transport through siliceous sandstone beds that do not impart a significant amount of dissolved material to the groundwater. The Anderson Run stations exhibit higher pH values and significantly larger amounts of total dissolved solids. The highest total dissolved solids content occurs at stations that are traversed by Route 80 and likely reflect salt loading from deicing compounds.

Evaluation of Risks Associated with the Development of Marcellus Shale Gas Wells

1) There are two, major, potential groundwater and surface-water impacts associated with gas well development. These include accidental surface spills of drilling and hydrofracturing fluids and the creation of subsurface pathways that allow artificial vertical exchange of gas, brine and fresh water at gas wells having improperly designed casing and grouting plans.

2) Both of the above-described impact scenarios can be properly managed by careful siting of the gas well pads, utilizing of casing and grouting plans that

fully respect aquifer conditions, and the use of best management spill prevention and monitoring plans. With these precautions, we believe that controlled development of the Marcellus gas reserve can be executed within the Reservoir watershed without a large risk to the DuBois water resource. However, if DuBois wants to engender no risk, it should not pursue leasing of its property for gas well development.

3) There are a large number of gas wells lying in the Reservoir watershed. PADEP records document 47 gas wells. These wells were drilled in the late 1950's and are concentrated in the areas immediately west of the Reservoir and on the north flank of the Anderson Creek valley (see the attached Plate 3). All but five of the gas wells produce the Oriskany Sandstone, which lies below the Marcellus Shale. The production casings in these deep gas wells typically extend only 15 to 20 feet below the base of the Marcellus Shale. Given the small separation between the base of the Marcellus and the bottom of the Oriskany production casings, we believe that the old deep wells present severe constraints on development of the Marcellus gas reserve. There is essentially no barrier between the Marcellus and these old Oriskany wells. Given the age of the deep wells (greater than 50 years) and questionable plugging practices, there is a high potential for the Oriskany wells to serve as relief points for a Marcellus frac. Therefore, we do not believe Marcellus operations should be pursued on the west side of the Reservoir and on the north flank of the Anderson Creek valley.

4) Groundwater flow in the watershed is concentrated beneath the valley floors. To minimize the potential for impact of the groundwater resources that feed the Reservoir, we strongly recommend prohibiting the development of gas well pads in valley terrain.

5) We believe that controlled development of the Marcellus could be pursued in five upland regions east of the Reservoir (see the attached Plate 4). To

successfully manage drilling and production activities, the following precautions are recommended at these sites:

•Casing and grouting plans that respect the major formation boundaries in the aquifer systems should be employed. This will require setting multiple aquifer protection strings. Isolation strings should be set to the base of the coal measures and then to base of the public drinking water aquifer, which should be demarked at the depth where the total dissolved solids content of the groundwater reaches 500 milligrams per liter (mg/l). Based upon our assessment of available drilling information, we believe this boundary will occur within the mid-section of the Rockwell Formation at a depth ranging from 350 to 700 feet below ground level (bgl) at the five areas recommended for Marcellus development. To provide site-specific information at each proposed pad site, a test well should be installed to precisely document the depth of the base of the coal measures and the depth of the 500 mg/l total dissolved solids boundary.

•The test well installed at each pad site to develop the casing plan should be maintained as a permanent monitoring well to allow on-going water-quality assessment.

•DuBois should develop monitoring wells on the Montgomery Run and Anderson Creek valley floors to document background conditions and to allow on-going water-quality assessment of the aquifers feeding the Reservoir.

•DuBois should hire a professional engineer to develop frac pond and cuttings pit design plans that minimize the potential for a loss of drilling and well stimulation fluids to the subsurface. This plan should include provision for continuous assessment of pond and pit integrity via a leak detection system.

•The size of the frac ponds should be limited to the volume necessary to stimulate a single well.

•DuBois should prohibit the gas well developer from extracting any water resources from its watershed.

•The base of the Marcellus Shale lies at a depth approaching 7000 feet bgl in the Reservoir watershed. The Tully limestone, which lies approximately 600 feet above the base of the Marcellus, is reported to be an effective frac barrier. The gas well records within the Reservoir watershed suggest that the Tully limestone is laterally continuous in the DuBois setting. Therefore, horizontal drilling appears to pose little threat to the aquifer systems feeding the Reservoir. However, to address potential downward frac releases to old Oriskany wells, horizontal drilling within the watershed should be terminated along the eastern shoreline of Reservoir and on the southern bank of Anderson Creek.

•DuBois should consider conditioning a lease agreement to prevent gas well drilling until they have completed the development of a back-up supply source.

•DuBois should condition any lease agreements to allow unrestricted access for their representatives to continuously inspect the gas well operations.

6) Prohibition of drilling on DuBois property would not eliminate potential Marcellus impacts to the Reservoir as the City's surface ownership controls only 24 percent of the watershed. Given the difficulty of trying to control gas well development on the property of others, a strong case can be made that the most effective tool for minimizing potential risks is to develop a plan for controlled development of the Marcellus that could be used as a uniform standard for the entire watershed. The use of a consortium that combines

multiple owners into a single entity has been effectively used to gain higher lease rates and strengthened environmental protections in Marcellus leasing programs.

I have enjoyed the process of studying the DuBois watershed and look forward to attending the upcoming meeting.

Regards,

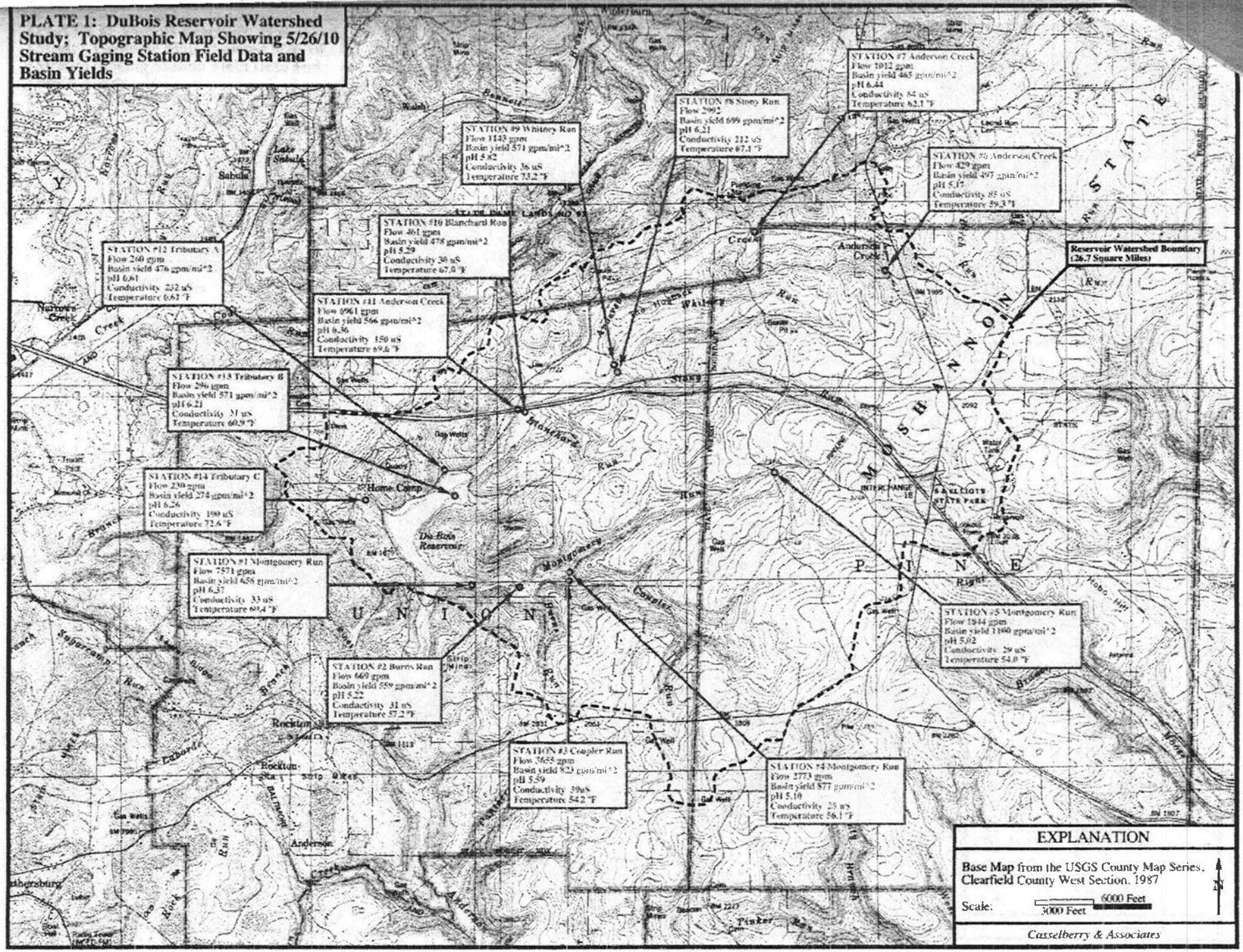
Jim Casselberry

James R. Casselberry, P.G.

Attachments

Sent via electronic mail

PLATE 1: DuBois Reservoir Watershed Study; Topographic Map Showing 5/26/10 Stream Gaging Station Field Data and Basin Yields



EXPLANATION

Base Map from the USGS County Map Series, Clearfield County West Section, 1987

Scale: 6000 Feet / 3000 Feet

N

Casselberry & Associates

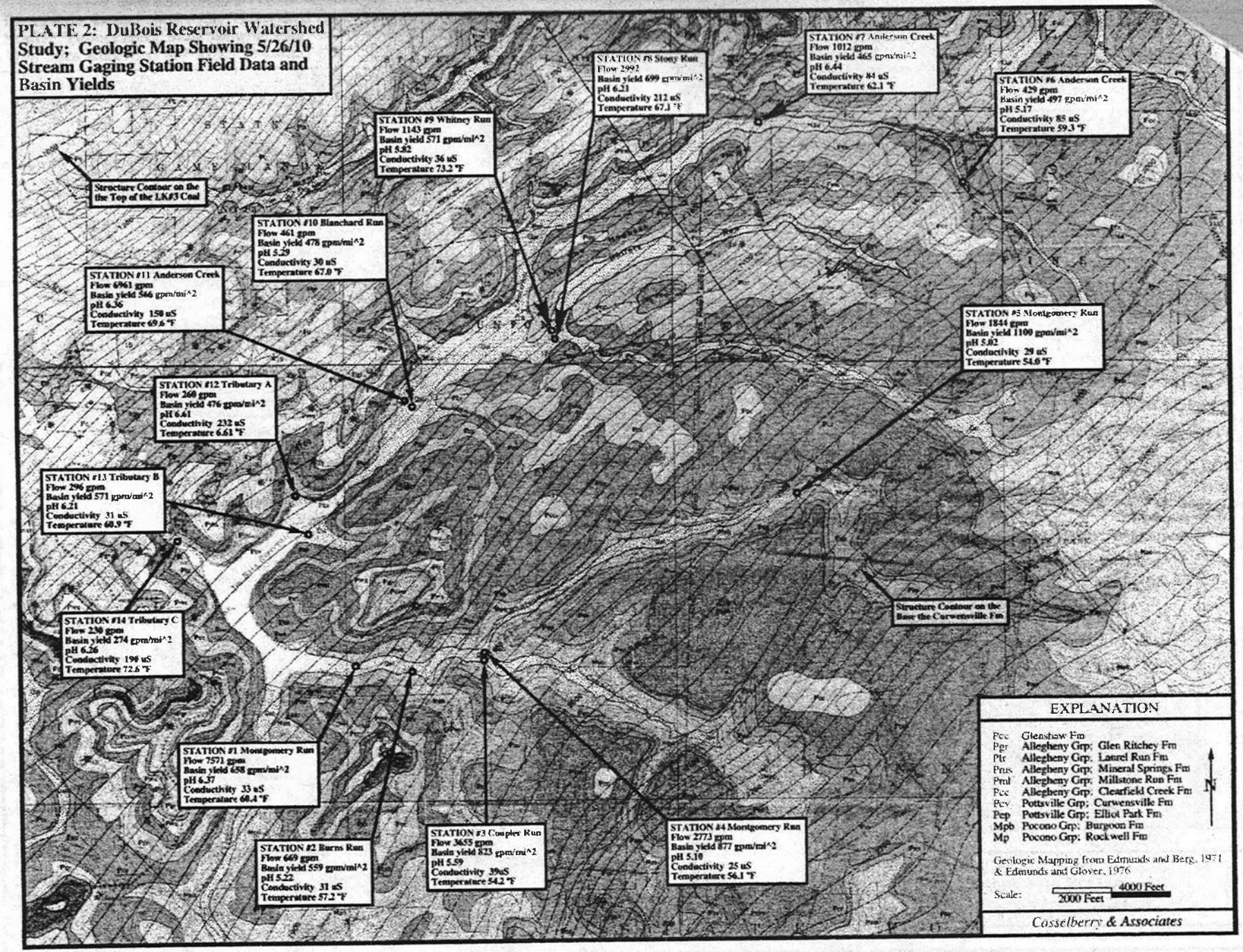


PLATE 2: DuBois Reservoir Watershed Study; Geologic Map Showing 5/26/10 Stream Gaging Station Field Data and Basin Yields
STATION #7 Anderson Creek
Flow 1012 gpm
Basin yield 465 gpm/mi^2
pH 6.44
Conductivity 84 uS
Temperature 62.1 °F
STATION #8 Stony Run
Flow 2992
Basin yield 699 gpm/mi^2
pH 6.21
Conductivity 212 uS
Temperature 67.1 °F
STATION #6 Anderson Creek
Flow 429 gpm
Basin yield 497 gpm/mi^2
pH 5.17
Conductivity 85 uS
Temperature 59.3 °F
STATION #9 Whitney Run
Flow 1143 gpm
Basin yield 571 gpm/mi^2
pH 5.82
Conductivity 36 uS
Temperature 73.2 °F
Structure Contour on the the Top of the LK#3 Coal
STATION #10 Blanchard Run
Flow 461 gpm
Basin yield 478 gpm/mi^2
pH 5.29
Conductivity 30 uS
Temperature 67.0 °F
STATION #11 Anderson Creek
Flow 6961 gpm
Basin yield 566 gpm/mi^2
pH 6.36
Conductivity 158 uS
Temperature 69.6 °F
STATION #5 Montgomery Run
Flow 1844 gpm
Basin yield 1100 gpm/mi^2
pH 5.02
Conductivity 29 uS
Temperature 54.0 °F
STATION #12 Tributary A
Flow 260 gpm
Basin yield 476 gpm/mi^2
pH 6.61
Conductivity 232 uS
Temperature 6.61 °F
STATION #13 Tributary B
Flow 296 gpm
Basin yield 571 gpm/mi^2
pH 6.21
Conductivity 31 uS
Temperature 60.9 °F
Structure Contour on the Base the Curwensville Fm
STATION #14 Tributary C
Flow 230 gpm
Basin yield 274 gpm/mi^2
pH 6.26
Conductivity 198 uS
Temperature 72.6 °F
STATION #1 Montgomery Run
Flow 7571 gpm
Basin yield 658 gpm/mi^2
pH 6.37
Conductivity 33 uS
Temperature 60.4 °F
STATION #2 Burns Run
Flow 669 gpm
Basin yield 559 gpm/mi^2
pH 5.22
Conductivity 31 uS
Temperature 57.2 °F
STATION #3 Cooper Run
Flow 3655 gpm
Basin yield 823 gpm/mi^2
pH 5.59
Conductivity 39uS
Temperature 54.2 °F
STATION #4 Montgomery Run
Flow 2773 gpm
Basin yield 877 gpm/mi^2
pH 5.10
Conductivity 25 uS
Temperature 56.1 °F
EXPLANATION
Pcc Glenshaw Fm
Pgr Allegheny Grp; Glen Ritchey Fm
Plr Allegheny Grp; Laurel Run Fm
Pms Allegheny Grp; Mineral Springs Fm
Pml Allegheny Grp; Millstone Run Fm
Pcc Allegheny Grp; Clearfield Creek Fm
Pcv Pottsville Grp; Curwensville Fm
Pep Pottsville Grp; Elliot Park Fm
Mpb Pocono Grp; Burgoon Fm
Mp Pocono Grp; Rockwell Fm
N
Geologic Mapping from Edmunds and Berg, 1971 & Edmunds and Glover, 1976
Scale: 2000 Feet 4000 Feet
Casselberry & Associates

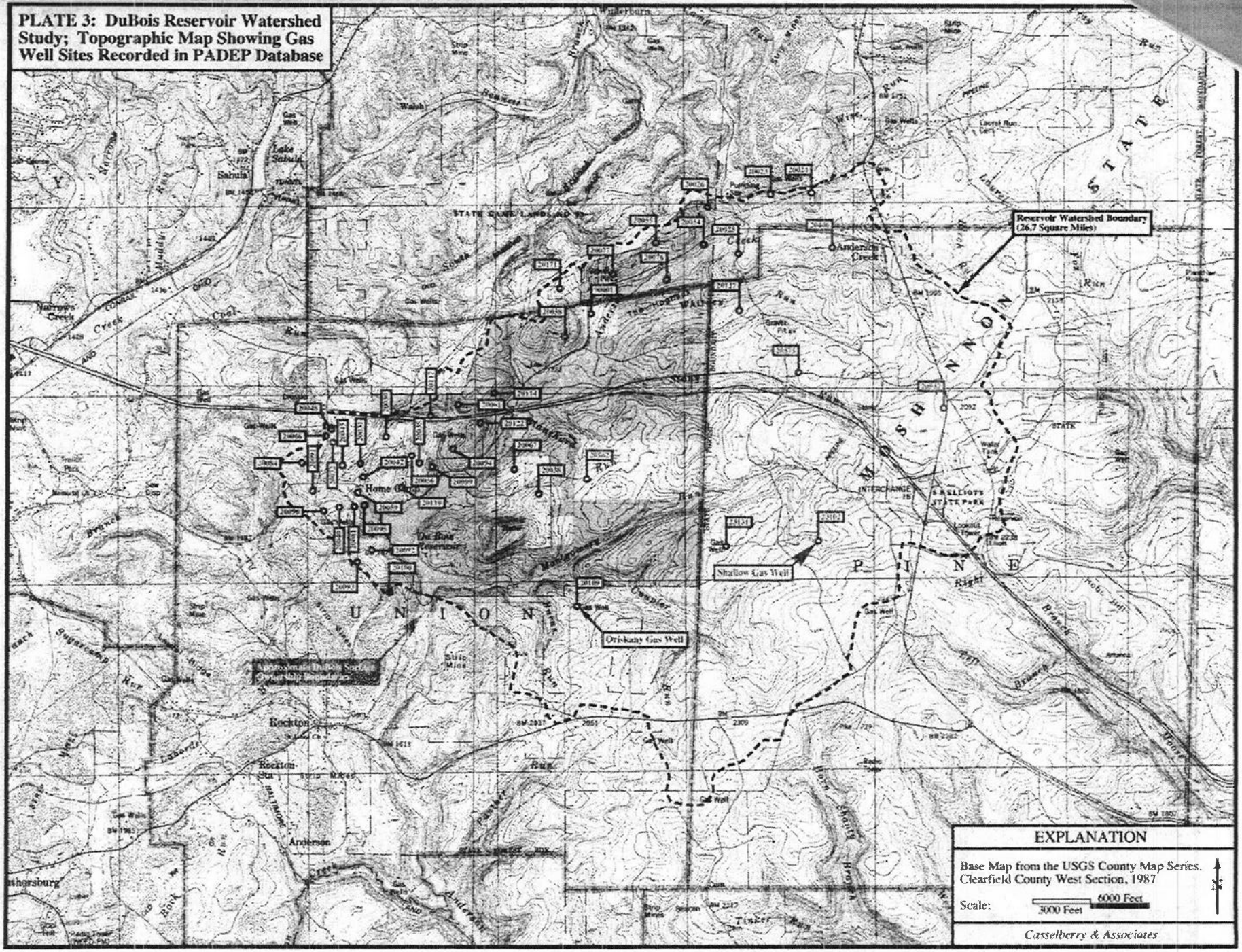


PLATE 3: DuBois Reservoir Watershed Study; Topographic Map Showing Gas Well Sites Recorded in PADEP Database
Reservoir Watershed Boundary (26.7 Square Miles)
Shallow Gas Well
Orr-Kamy Gas Well
EXPLANATION
Base Map from the USGS County Map Series, Clearfield County West Section, 1987
Scale:
3000 Feet
6000 Feet
Casselberry & Associates

PLATE 4: DuBois Reservoir Watershed Study; Topographic Map Showing the Portions of the City of DuBois Property Having Low Environmental Risk For Developing Marcellus Gas Well Pads

EXPLANATION

Base Map from the USGS County Map Series, Clearfield County West Section, 1987

Scale: 3000 Feet / 1500 Feet

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Casselberry & Associates

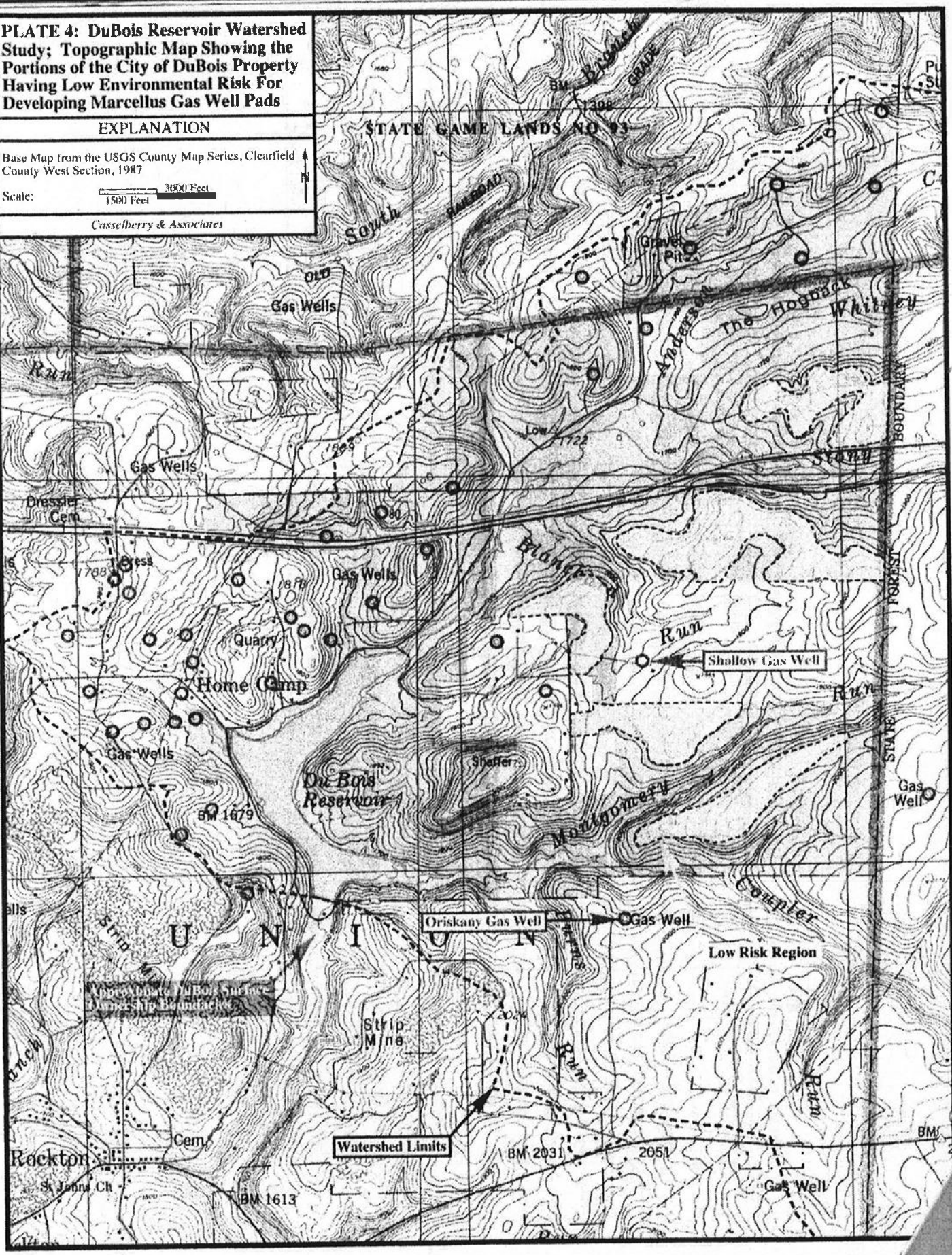


TABLE 1: DuBois Reservoir Watershed Study; Compilation of May 26, 2010 Stream Gaging and Water Sampling Data

Station Identification	Flow (gpm)	Drainage Area (sq. miles)	Yield (gpm per sq. mile)	Field Temp. (°F)	Field Specific Conductance (uS)	Barium (mg/l)	Iron (mg/l)	Manganese (mg/l)	Sodium (mg/l)	Acidity (mg/l)	Alkalinity (mg/l)	pH (standard units)	Total Dissolved Solids (mg/l)	Total Suspended Solids (mg/l)	Sulfate (mg/l	Chloride (mg/l)
#1 Montgomery Run Mouth	7571	11.508	658	60.4	33	0.0486	0.0668	0.0909	2.15	26	<10	6.37	<20	11.0	11.6	<0.5
#2 Burns Run Mouth	669	1.197	559	57.2	31	0.0408	0.0513	0.0806	1.55	10	<10	5.22	<20	11.0	8.91	2.95
#3 Coupler Run Mouth	3655	4.617	877	54.2	39	0.0387	0.0305	0.0849	2.81	-4	<10	5.59	22.0	11.0	10.0	5.16
#4 Mont. Run Above Coupler	2773	3.371	823	56.1	25	0.0457	0.1720	0.0824	0.458	6	<10	5.10	<20	13.0	9.16	0.964
#5 Mont. Run Upstream.	1844	1.676	1100	54.0	29	0.0416	0.0430	0.0820	0.515	6.0	<10	5.02	27.9	11.0	9.50	0.795
#6 Anderson Creek Upstream	429	0.863	497	59.3	85	0.0756	0.0852	0.138	11.0	8.0	<10	5.17	26.1	6.0	10.5	17.9
#7 Anderson Creek Mid.	1012	2.176	465	62.1	84	0.0559	0.1610	0.0466	8.66	-2.0	<10	7.44	50.0	5.0	9.93	16.8
#8 Stony Run Mouth	2992	4.279	699	67.1	212	0.0451	0.233	0.0396	35.2	2.0	10.0	6.21	158.0	8.00	11.1	57.4
#9 Whitney Run Mouth	1143	2.003	571	73.2	36					8.0	<10.0	5.82	<20	14.0	3.12	7.39
#10 Blanchard Run Mouth	461	0.967	478	67.0	30	0.0467	0.182	0.1150	0.387	4.0	<10.0	5.29	22.0	12.0	7.36	0.936
#11 Anderson Creek Mouth	6961	12.305	566	69.6	150	0.0457	0.454	0.0635	19.2	0.0	12.0	6.36	86.1	7.0	10.1	33.3
#12 Tributary A Mouth	260	0.546	476	60.9	232	0.0504	0.246	0.0626	23.2	-28	38.0	6.61	132	<4.0	13.4	46.3
#13 Tributary B Mouth	296	0.518	571	65.5	31	0.0345	0.255	0.0611	0.492	4.0	<10	6.21	<20	14.0	8.9	1.02
#14 Tributary C Mouth	239	0.872	274	72.6	190	0.0464	0.415	0.0861	11.7	-46	54.0	7.26	112	11.0	11.6	20.3

GEOLOGIC REPORT OF THE HAHNE TRACT
CLEARFIELD COUNTY
PENNSYLVANIA

old certificates
two

February 14, 1958

ROBERTS & HESSIN, GEOLOGISTS
COUDERSPORT, PENNSYLVANIA

1958 Study.pdf

GEOLOGIC REPORT OF THE HAHNE TRACT
CLEARFIELD COUNTY
PENNSYLVANIA

INTRODUCTION:

This report regards the Frank Hahne Tract, comprising approximately 767 acres, in Union and Huston Townships, Clearfield County, Pennsylvania. More specifically, the property is located approximately ten miles east of the city of DuBois.

The purpose of this geologic report is to determine the advisability of drilling additional wells on the subject tract. Our decisions have been determined as the result of surface and sub-surface geologic work, and the productive abilities of completed wells on and in the proximity of the Hahne Tract.

GEOGRAPHY:

The acreage to be discussed lies along Anderson Creek which flows in a southwesterly direction into

the DuBois Reservoir, located two miles to the southwest of the Hahne Tract. A maximum of approximately 300 feet of relief is exhibited in the area.

STRATIGRAPHY:

The major strata with which to be concerned are the chert zone of the Onondaga formation and the underlying Oriskany sandstone. Both the Onondaga and the Oriskany are of the lower Devonian system and have to date been the largest producers of natural gas in the Appalachian Basin. Regionally, as well as locally, both of these formations are known to be present and productive over this sector of the basin.

Twelve miles to the northeast of the subject area is the Benezette structure on which the Driftwood-Benezette Field has been developed. This field has, to date, proved to be the largest producing natural gas field in Pennsylvania. Production has been from the Oriskany sandstone and an estimated 250 billion cubic feet of gas are expected to be produced.

GEOLOGIC STRUCTURE:

Regional

Practically all of the state of Pennsylvania is envolved in making up a portion of the massive Appalachian Geosyncline. Throughout this great basin is a system of folds or anticlines. In Pennsylvania, the regional plunge of these folds, or anticlines, is in general, to the southwest. In the vicinity of the Allegheny front, the eastern side of the basin, the folding has become quite extensive and the steepness of the flanks much greater as compared to those anticlinal structures or folds lying further to the west. In general, these folds are asymetrical, that is to say, their eastern flanks are slightly steeper than their western flanks. Faulting, or shearing of the formations is quite extensive along the front, with a gradual reduction of the number of faults present in those structures further west.

A few of the major anticlinal structures extend for a distance of 150 to 200 miles in a general northeast direction from central Pennsylvania into New York State. Other major structures, for example the Chestnut Ridge Anticline, extend from West Virginia far up into central

Pennsylvania. However, this enlongated structure is slightly broken up in its continuity with portions of the structure lying en echelon to the main fold.

Local:

It is on one of these major folds or anticlines on which is located the Hahne Tract. This structure is the Chestnut Ridge Anticline, and the area along this structure to which this report pertains is the Luthersburg-Homecamp Natural Gas Field. Since natural gas was first discovered in commercial quantities in 1955, approximately 180 wells have been drilled in this field.

Consequently, the geology of the area can be determined reasonably accurately because of both surface and subsurface control.

The accumulation of natural gas in the Oriskany sandstone along the northwestern flank of the Chestnut Ridge Anticline is by virtue of structural and/or stratigraphic conditions. The first test wells for the structure were placed along the crest of the antiline. There was very little evidence of Oriskany sandstone in any of those

completed wells. Additional wells were then drilled northwest of the axis, or down flank, and sandstone conditions improved to the point where commercial production was obtained. Oriskany sandstone has been encountered in the completed wells within and in the proximity of the Hahne Tract. The limits of Oriskany deposition to the southeast or up-structure have yet to be determined.

The field is divided into seperated producing segments by northeast-southwest trending faults. Generally, there is little or no migration of gas across these fault zones.

Prior to proceeding with the following discussion, a definition of the term "fault" is in order - which is a rupture along which opposite walls have moved past each other.

Across the northern portion of the Hahne Tract (see map) exists a postulated northeast-southwest trending fault or disturbance area. Evidence of this is found in completed wells to the northeast and southwest of the subject tract.

The major fault (see map) in the field was first

discovered in the Luthersburg area. As drilling continued to the northeast, it was again encountered in the Homecamp area. From this point northeastward its exact position is questionable, but it is assumed to pass between the northwestern corner of the Hahne acreage and Deemer's recently completed well, Baker #3. It is a reverse, high angle fault with the up-thrown side to the northwest and the down-thrown side to the southeast. The Oriskany structure is 400 feet higher on the northwest side of this fault than it is on the southeast side.

PRESENT AND POSSIBLE DEVELOPMENT DRILLING:

To determine the advisability of drilling additional wells on the Hahne tract, it is necessary to study the relationship of the present development to the geology of the area and to the position of offsetting wells on adjoining tracts.

It is probable that the Hahne tract is divided into two seperated producing areas by the aforementioned fault which passes thru the tract.

The area northwest of this fault is sufficiently

developed with the presently drilled producing wells. This area is the most promising portion of the Hahne tract.

Southeast of the fault only one well has been drilled on the Hahne tract. The production history of this well is discouraging and indicates that this well is producing from a rather limited reservoir. It seems doubtful that any other wells drilled in this portion of the Hahne tract would be attractive to an operator from an economic viewpoint since it is apparent that the southeast limit of production from the Oriskany passes thru the tract.

One potential location in this area would be south of the Vasbinder tract. This location would be classified as a semi-wildcat test. If this test were drilled the Hahne tract could be considered to be adequately tested and developed.

ROBERTS & HESSIN, GEOLOGISTS

Carl H. Roberts

By Carl H. Roberts

February 14, 1958

CARL H. ROBERTS

THOMAS D. HESSIN

ROBERTS & HESSIN

GEOLOGISTS

Box 312 Coudersport, Pa.

February 25, 1958

GEOLOGICAL MEMORANDUM

Hahne Tract

Since the completion of our initial geologic report on February 14th at which time possible development drilling was recommended, a conference was held in the offices of the DuBois Brewing Company to discuss the above mentioned report. At this conference, additional maps were requested and an indication as to our proposed location on the Hahne Tract.

We are enclosing two maps of the area showing the location of the drilled wells within and in the proximity of the Hahne Tract. These wells are indicated as commercially productive or to the contrary, and are numbered with information regarding each of these wells on accompanying sheets.

We also indicate the positions of postulated faults, - the major field fault passing to the northwest of the subject tract, and a probable minor fault passing through the Hahne Tract.

As per our previous recommendations we are indicating the proposed location to be drilled on the Hahne Tract. After the completed drilling of this proposed location and/or the completion of offset wells to the Hahne Tract, further drilling may be recommended.

ROBERTS & HESSIN, GEOLOGISTS

Well No.	Property	Operator	Oriskany	Remarks
1	Hahne	Swan-Finch	-5390'	1,100 M.c.f. b/f, 1,650 M.c.f. a/f
2	"	" "	-5450'	3,600 M.c.f. b/f
3	"	Rockton"	-5437'	465 M.c.f. b/f, 3,716 M.c.f. a/f
4	"	Swan-Finch	-5450'	No gas b/f, 1,500 M.c.f. a/f
5	"	" "	-5522'	660 M.c.f. b/f, 4,000 M.c.f. a/f
6	Vasbinder	Keta	-5520'	150 M.c.f. b/f, 600 M.c.f. a/f
7	Green Glen	Mfg. Lt. & Ht.*	-5768'	Sw, P & A
8	Gordon #3	NYS Nat.**	-5417'	400 M.c.f. b/f, 7000 M.c.f. a/f
9	Pudlo	Keta	-5370'	200 M.c.f. b/f, 3,100 M.c.f. a/f
10	Gordon #2	NYS Nat.	-5309'	400 M.c.f. b/f, 4,000 M.c.f. a/f
11	Gordon #1	NYS Nat.	-5498'	1750 M.c.f. a/f
12	Tract 63 #2	NYS Nat.	-5425'	300 M.c.f. b/f, 4,000 M.c.f. a/f
13	Tract 63 #3	NYS Nat.	-5290'	600 M.c.f. b/f, 4,800 M.c.f. a/f
14	Tract 63 #4	NYS Nat.	-5288'	700 M.c.f. b/f, 4,000 M.c.f. a/f
15	Baker #5	Deemer	not Reached recorded	Drilling
16	Baker #3	Deemer	-5701'	1,300 M.c.f. b/f, 15,000 M.c.f. a/f
17	Baker #1	Deemer	-5545'	8,000 M.c.f. a/f
18	Tract 63 #5	NYS Nat.	-5226'	15 M.c.f. b/f, 380 M.c.f. a/f

* Manufacturers Light & Heat

** New York State Natural Gas Corp.

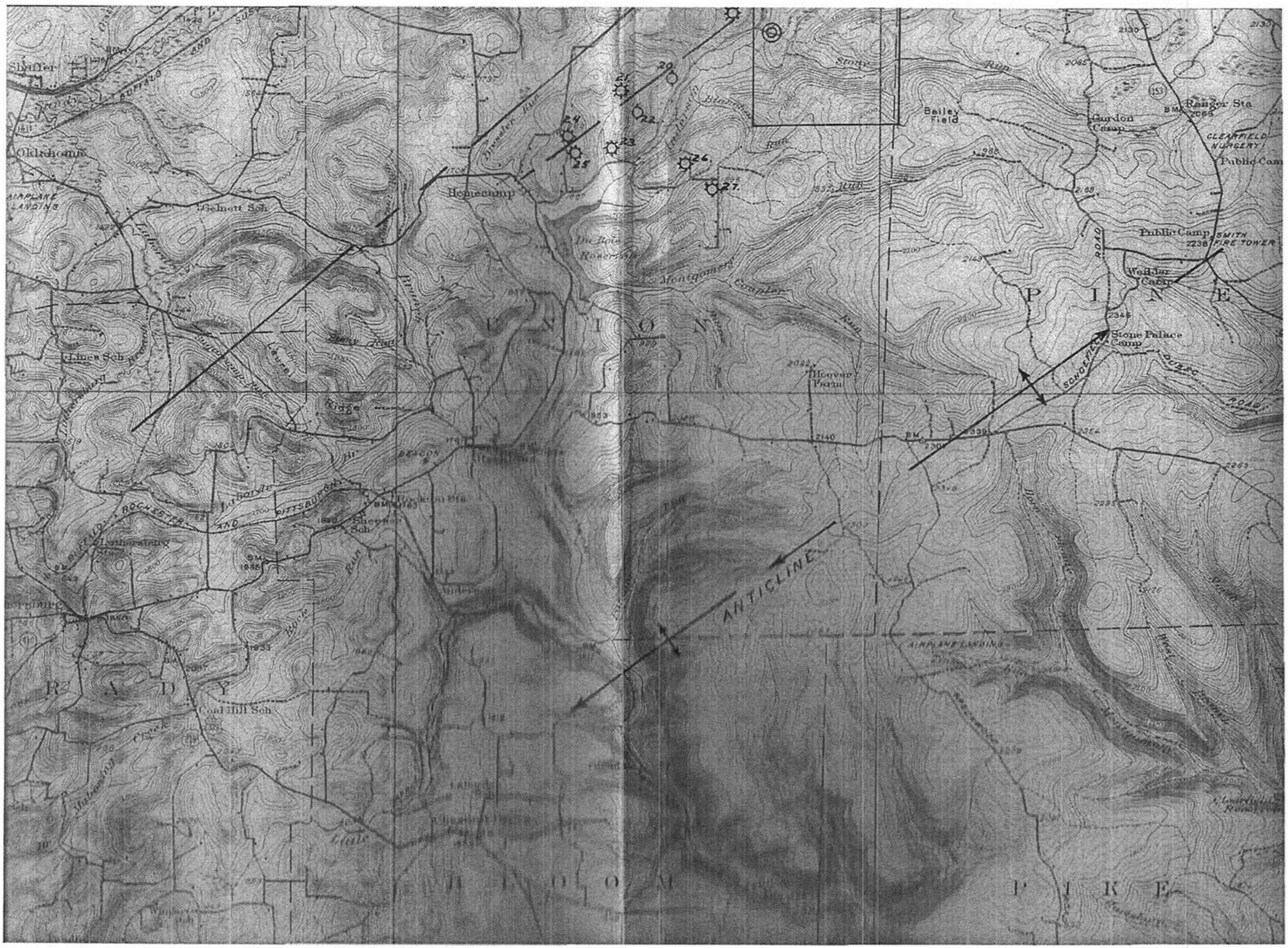
Well No.	Property	Operator	Oriskany	Remarks
19	Sure Shot #1	UNG ***	-5489'	250 M.c.f. b/f, 3,700 M.c.f. a/f,
20	Sure Shot #4	UNG	not reached	Results not known
21	Sure Shot #2	UNG	-5588	550 M.c.f. b/f, 4,800 M.c.f. a/f
22	Green Glen	Fairman	not reached	Drilling
23	Sure Shot #3	UNG	-5484'	380 M.c.f. b/f, 2,000 M.c.f. a/f
24	Holley	Mfg. Lt. & Ht.	-5676'	1,300 M.c.f. b/f, 5,000 M.c.f. a/f
25	Bailey	Brunt	-5521'	484 M.c.f. b/f, 3,000 M.c.f. a/f
26	Shaw	Mfg. Lt. & Ht.	-5269'	500 M.c.f. b/f, 3,700 M.c.f. a/f
27	Brooker	Hogue	-5266'	Show of gas a/f
28	Tract 63 #1	NYS Nat.	-5420'	600 M.c.f. b/f, 7,000 M.c.f. a/f

*** United Natural Gas

LEGEND

- Natural gas producing well
- Non-productive salt water well
- Show of natural gas (less than 500 M.c.f. daily)
- Drilling Well
- Proposed location
- Postulated Fault
- Anticlinal Axis & Direction of Plunge
- Synclinal Axis
- Hahne Tract

Goes with quadrangal Map of 1940 concerning gas wells on or near Hahne tract



ANTICLINE
Bailey Field
Stone Palace Camp
Public Camp
Ranger Sta
CLEARFIELD NURSERY
SMITH FIRE TOWER
Hoover Farm
Coal Hill Sch.
Oklahoma
Shaffer
AIRPLANE LANDING
P I N E
U N I O N
P I K E


GICAL SURVEY
PENFIELD
HORTON
BOONE
Pine Grove Sch
Hickory Sch
Free Methodist Ch
Penfield
Mt Pleasant Sch
Winterburn
Gobbler Knob
Laurel Sch
Laurel Bend Camp
Woodward Dam Camp
Anderson Creek
Pine Sch
SYNCLINE
SANDY
Sabula
Narrows Creek
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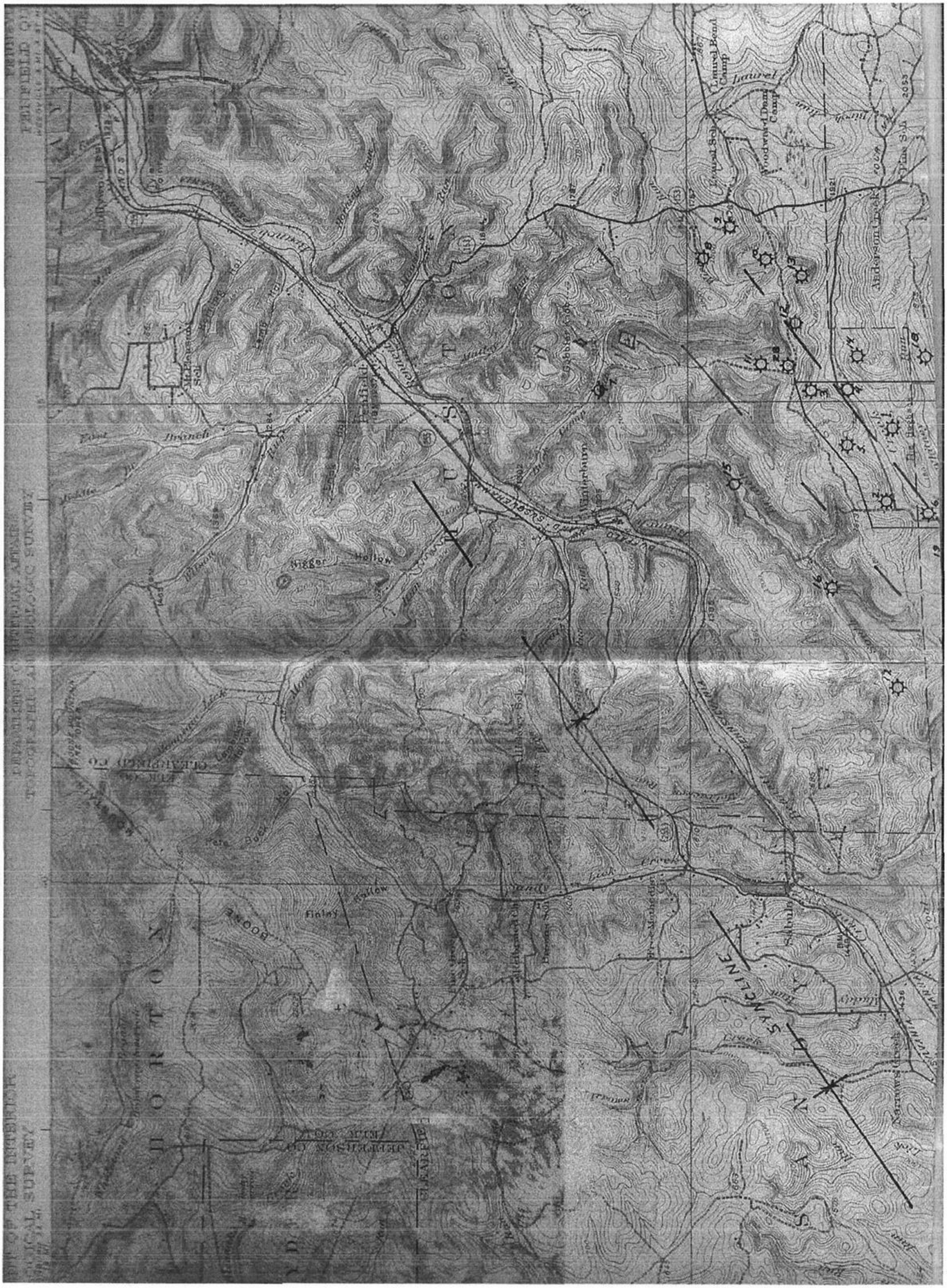
DEPARTMENT OF THE INTERIOR
JEFFERSON CO
ELK CO
CLEARFIELD CO
HORTON
BOONE
SYNCLINE
Winterburn
Anderson Creek

Recommendations for Seismic Testing

From: **Jim Casselberry** (jrcasseljr@aol.com)
Sent: Tue 12/20/11 3:57 PM
To: Herm Supilizio (hermsuplizio@hotmail.com)

Herm:

Per your request, I have developed recommended conditions for allowing seismic testing on the City's property.

These are as follows:

1) The seismic testing company must develop two maps showing all of the water resources on the City property. Resources to include the City's surface-water reservoir, and all water wells, springs, perennial streams and wetlands. The resource inventory shall be presented on both a USGS base map and a digital orthophoto base map. The seismic lines and all of the borehole locations shall be shown on both maps. The City shall be presented with the maps for review at least one month in advance of any testing to allow verification of the water resource features. Any unmapped features noted by the City shall be inventoried by the seismic testing company and added to the base maps.

2) Following review of the water resource inventory mapping by the City, the seismic testing company shall collect water samples from each inventoried water feature lying within a 1000 feet of the seismic lines. These samples shall be analyzed by a certified laboratory for the following parameters; pH, alkalinity, total dissolved solids, iron, manganese, sulfate, sodium, chloride, specific conductance, nitrate and BTEX. The lab testing results shall be provided to the City prior to the any drilling or testing activities.

3) The depths of the boreholes used for the seismic testing shall not exceed a depth of 30 feet below ground level. These boreholes shall be abandoned by backfilling their entire length with bentonite rock chips. All debris associated with the seismic testing shall be completely removed from the City property at the conclusion of the testing.

4) Following the completion of the seismic testing, the seismic testing company shall collect an additional round of water samples from each water feature lying within a 1000 feet of the seismic lines.

5) The seismic testing company shall analyze the seismic testing results to locate all of the metallic pipelines and gas wells on the City property. The pipeline and wellhead locations shall be shown on both USGS and digital orthophoto base maps.

6) The seismic testing company shall give the City at least a week prior notification of each phase of their work. Work phases requiring a week advance notification include: initiation of the water resource inventory, initiation of borehole drilling, placement of the seismic testing equipment and detonation of any explosives.

Let me know if you have any water resource concerns that are not addressed by my recommendations.

Regards,

Jim Casselberry

recommendations.pdf

Windfall/Zelman #1 DIW ~ Permit # PAS2D020BCLE

Well Drilling Specifications Overseen Jointly by EPA and PA DEP

Comment: The EPA should defer to the PA DEP for their specifications for certain aspects of how the DIW is to be constructed and the DEP should jointly participate with the EPA in enforcing those specifications.

A Disposal Injection Well is defined as a "well" by the Pennsylvania Consolidated Statutes Title 58 Oil and Gas:

§ 3203. Definitions

"Well." A bore hole drilled or being drilled for the purpose of or to be used for producing, extracting or injecting gas, petroleum or another liquid related to oil or gas production or storage, including brine disposal, but excluding a bore hole drilled to produce potable water.

All wells drilled in PA need a DEP permit per PA Statute:

§ 3211. Well permits.

(a) **Permit required.--**No person shall drill or alter a well, except for alterations which satisfy the requirements of subsection (j), without having first obtained a well permit under subsections (b), (c), (d) and (e)

In addition, Title 40 of the PA Code, Chapter 78 states the following:

§ 78.11. Permit requirements.

(a) No person may drill or alter a well unless that person has first obtained a permit from the Department.

(b) No person may operate a well unless one of the following conditions has been met:

(1) The person has obtained a permit under the act.

Richard L. Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

Well Drilling Specifications Overseen Jointly by EPA and PA DEP.pdf

The operator must have a well control and disposal Plan.

§ 78.55. Control and disposal plan.

(a) Prior to generation of waste, the well operator shall prepare and implement a plan under § 91.34 (relating to activities utilizing pollutants) for the control and disposal of fluids, residual waste and drill cuttings, including tophole water, brines, drilling fluids, additives, drilling muds, stimulation fluids, well servicing fluids, oil, production fluids and drill cuttings from the drilling, alteration, production, plugging or other activity associated with oil and gas wells.

The PA Code gives the well operator the following responsibility regarding water supplies:

§ 78.51. Protection of water supplies.

(a) A well operator who affects a public or private water supply by pollution or diminution shall restore or replace the affected supply with an alternate source of water adequate in quantity and quality for the purposes served by the supply as determined by the Department.

If a person has his water supply contaminated from the drilling of a brine disposal well as opposed to an oil or gas well, the PA DEP is not obligated to take enforcement action according to 25 PA Code 78.51:

(b) A landowner, water purveyor or affected person suffering pollution or diminution of a water supply as a result of drilling, altering or operating an oil or gas well may so notify the Department and request that an investigation be conducted.

Richard L. Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

However, the regulation in 25 PA Coce 78.81 obligates the driller to the following:

§ 78.81. General provisions.

(a) The operator shall conduct casing and cementing activities under this section and § § 78.82—78.87 or an approved alternate method under § 78.75 (relating to alternative methods). The operator shall case and cement a well to accomplish the following:

(1) Allow effective control of the well at all times.

(2) Prevent the migration of gas or other fluids into sources of fresh groundwater.

(3) Prevent pollution or diminution of fresh groundwater.

(4) Prevent the migration of gas or other fluids into coal seams.

(b) The operator shall drill through fresh groundwater zones with diligence and as efficiently as practical to minimize drilling disturbance and commingling of groundwaters

Sections 78.82 to 78.87 have to do with the following:

78.82. Use of conductor pipe.
78.83. Surface and coal protective casing and cementing procedures.
78.83a. Casing and cementing plan.
78.83b. Casing and cementing—lost circulation.
78.83c. Intermediate and production casing.
78.84. Casing standards.
78.85. Cement standards.
78.86. Defective casing or cementing.
78.87. Gas storage reservoir protective casing and cementing procedures.

Each of these regulations refers to a "well" and is not limited to a "conventional" or "unconventional" well.

Especially noteworthy is § 78.83(c) which has the purpose of protecting aquifers when they are penetrated by the "well".

§ 78.83(c) …The surface hole shall be drilled using air, freshwater, or freshwater-based drilling fluid. Prior to cementing, the wellbore shall be conditioned to ensure an adequate cement bond between the casing and the formation. The surface casing seat shall be set in consolidated rock….

The PA DEP has overseen the drilling of many thousands of "wells", "conventional wells", and "unconventional wells" over decades. They have recently updated their regulations to prevent the repetition of episodes of drinking water contamination.

The EPA should therefore defer to the PA DEP for their specifications as to how the DIW is to be constructed. Also, the PA DEP should jointly participate with the EPA in enforcing those specifications.

Richard L. Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

Windfall/Zelman #1 DIW ~ Permit # PAS2D020BCLE

Injection Fluid Confinement

Comment: "Confinement of the injection fluid and existing formation fluids" (from the EPA Statement of Basis) is not necessarily desirable in the case of the Zelman DIW. Also, the depth of the top of the Oriskany Sandstone at the Potter #1 (20235-P) gas well is a concern because it is 412 feet deeper than it is at the Potter #2 (20327) gas well on the other side of a fault about 1200 ft. away. The Atkinson water well may be above the crest of a small anticline and therefore susceptible to methane contamination.

The Statement of Basis for the Zelman#1 DIW states the following in the section dealing with Geologic and Seismic Review:

Historic gas production results in the vicinity of the injection well site have shown that nearby faults appear to act as a geologic trap for gas production. Gas wells have been productive between the fault lines but non-productive outside these fault lines. This would indicate that the faults are not transmissive to gas migration and would also indicate good confinement of injection fluid and existing formation fluids as well.

The theoretically perfect disposal injection well for gas well wastewater would be drilled into a reservoir which is infinite in its horizontal extent and isotropic. That way the injection pressure is dissipated in as short a distance as possible. The flow of injected fluid and the existing fluids which must be displaced would be radially away from the injection well since it would not encounter any obstacles which influence the flow pattern and pressure distribution. Confinement of the injected fluid is not desirable in this case because it is a liquid and is not nearly as compressible as natural gas being pumped into a storage reservoir.

Examination of the well records (Exhibit #1) of the five deep gas wells just outside the Area of Review shows a productive gas well (permit #20333) outside of the faults in addition to the gas well (permit #20327) between the fault lines. Refer to the Statement of Basis above.

It would seem more accurate to postulate that gas wells drilled on the uplifted side of the faults have been more productive since the deformation of the strata has resulted in the formation of traps where natural gas accumulated in a gaseous state, as opposed to remaining in solution with the brine which fills the other pores of the Huntersville Chert/Oriskany Sandstone.

Richard L. Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

Injection Fluid Confinement.pdf

Furthermore, if the top of the Onondaga Limestone is referenced to sea level, there is a 412 ft. difference (Exhibit #1) between the Potter #1 and Potter #2 gas wells. Somehow this caused the Potter #1 gas well to be a dry hole. Since the fault is between these gas wells, it seems that the Onondaga confining layer is not intact and continuous within the Area of Review. This means that fluids injected into the injection zone may end up entering into rock strata located above the Onondaga confining layer if these fluids pass through the fault.

The Atkinson water well (RMS 8-9-19) is located 895 ft. from the proposed DIW and on the uplifted side of the northernmost fault within the Area of Review. This water well could possibly be directly above the crest of a small anticline (see Exhibit #2) created near the fault. The well water was tested for methane (not by Windfall) and was shown to have <.30 mg/L on 11/13/11. Therefore there must be a pathway for methane to get into the aquifer. Where the methane originated is unknown (shallow gas or deep gas).

Methane concentrations in water of as little as 1 milligram per liter (mg/L) can lead to explosive levels if the gas is allowed to accumulate in a poorly ventilated confined space. When the injection pump at the proposed DIW is turned on, existing formation fluids containing dissolved methane may be forced up the small anticline and if the injection pump is turned off at a later time releasing the pressure, there may be an escape of methane out of solution. Since methane gas has far less density than brine at the same pressure, it may be able to travel into the aquifer and increase the level of methane in the well water above a safe level.

Richard L. Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

Exhibit #1

Summary of Information from Well Records of Gas Wells That Have Been Drilled in the Vicinity of the Proposed Zelman #1 DIW and from Zelman Wellbore Schematic

Permit #/ Well Name	Date drilling completed	Date plugged	Elevation (ft above sea level)	Top of Onondaga Limestone (ft below sea level)	Actual thickness of confining zone (ft)	Actual thickness of injection zone (ft)	Side of Fault
20333 DuBois Deposit National Bank or Ginter	12/23/60	——	1642	5606	18	77	U
20326-P Potter #1 (plugged)	9/26/60	10/13/60 (dry hole)	1627	5990	18	—	D
20327 Potter #2	9/29/60	—	1641	5578	14	84	D
20336 Chapman	1/13/61	—	1544	5651	18	69	U
20341-P Carlson (plugged)	11/26/60	8/8/79	1644	5637	15	69	D
Zelman #1 Disposal Injection Well	Proposed	—	1697	5595	14	81	—

Richard L. Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

Exhibit #2

Description	**English:** Dividing fault between Appalachian Mountains and Allegheny Plateau. A major geologic fault (directly behind small trees) can be seen in a new roadcut about 10 miles north of en:Williamsport, Pennsylvania on new Route 15. The fault is just about at the line that divides the folded en:Appalachian Mountains and the merely uplifted en:dissected plateau of the en:Allegheny Plateau. On the left hand (south side) is metamorphic rock. On the right hand is en:sedimentary rock, which, as one continues northward becomes mostly horizontal. Image copyleft: Image taken by me, released under GFDL, Pollinator 06:08, Dec 25, 2004 (UTC)
Date	2004-12-25 (original upload date)
Source	Transfered from en.wikipedia
Author	Pollinator at en.wikipedia
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Richard L. Atkinson ~ 221 Deer Lane, DuBois, PA 15801 marianne5@windstream.net

Mr. Stephen Platt
Ground Water and 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,

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.

Added, Added Testimony.odt

Randall & Valerie Powers
1235 Highland Street Extension
DuBois, PA 15801

nber 15, 2012

Stephen Platt, EPA Region III
)und Water & Enforcement Branch
fice of Drinking Water & Source Water Protection (3WP22)
650 Arch Street
Philadelphia, PA, 19103

RE: UIC Permit PAS2D020BCLE (Windfall/Zelman 1)

Dear Mr. Platt,

This letter is additional testimony for the Zelman #1 Injection Well proposed for Brady Township, Clearfield County.

We respectfully request you extend the deadline for submitting comments since we need to submit additional information like the Casselberry report concerning abandoned gas wells in the DuBois watershed area along with additional details on the coal mines that we have.

It was stated at the EPA public hearing, "we know this area is already saturated in the Oriskany." This concerns us with the comments by the driller to that this is just a "hole in the ground to pump waste" and a statement to a participant on December 10 from Windfall that, "this is a dice game." My home is feet from the proposed site and our lives depend on our water. We are against anyone gambling our water sources, our homes, our health and our lives.

The Brady Township Engineer, Wilson Fisher, believes an impact study for the National Environmental Policy Act is required to be completed. We are also researching information presented on the mineral rights in the area and what legal implications this proposed disposal injection well will have on our area.

After news coverage by the Pittsburgh Post-Gazette this week that explains additional concerns we want further time and research. When one of your own states concerns with where the waste will go and they are an EPA hydrologist we should all take note.

This week we received a packet on the PA DEP application from Windfall Oil & Gas. We need a meeting with DEP to understand what these implications have on our home and what this information means. Many things don't add up in the packet we received for the PA DEP application. Some things we know are that the coal mines are within 1000 feet.

The items mentioned have an effect on underground sources of water (USDWs). We deserve time to respond to the driller with local information and all the facts are needed before any decision is made. Our future matters and we should be given more time than a few days to think and understand everything we are learning. The PA DEP information states we have fifteen days yet if we lose our water the PA DEP gets forty-five days.

We believe on December 10, 2012 we provided enough facts and testimony to deny this application. Please deny the application now and stop this from going into a residential area.

Sincerely,
Randall & Valerie Powers

Testimony_Powers_follow-up-12_15_2012a Final.doc

Zimmerman & Associates

Environmental Litigation, Mediation, Enforcement & Compliance, Counseling

December 31, 2012

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

Re: Comments regarding Draft UIC Class IID Permit
Number PAS2D020BCLE (Windfall Oil and Gas Inc.)

Dear Mr. Platt:

On behalf of Damascus Citizens for Sustainability, Inc. (DCS), and NYH2O, Inc.(NYH2O), I am submitting the following comments on the Draft Class IID UIC Permit for Windfall Oil and Gas Inc. that is proposed to be located in Brady Township in Clearfield County, PA. DCS and NYH2O are both nonprofit citizen groups concerned about the environmental impacts associated with unconventional oil & gas development using high volume hydraulic fracturing in horizontal wells. These concerns extend to and encompass the management of wastewaters from these production processes including disposal of these wastewaters through underground injection.

We have a number of specific comments about the proposed draft UIC permit referenced above. First, the Statement of Basis for this draft permit indicates that published literature indicates that there may be faults within one quarter mile of the proposed well site, but noted that there is no record of seismic activity related to these faults. EPA should require the permit applicant to conduct seismic investigation and mapping of the faults within at least one mile and such greater distance as the seismic investigation may indicate to be relevant for potential migration pathways. The proposed injection pressure for this UIC well is over 6000 pounds per square inch. There is considerable information in the public literature that may indicated that hydraulic fracturing, using pressures similar to those that will be allowed in this case, has caused seismic activity and earthquakes in other oil and gas production areas of the country, including areas of northeastern Ohio that are also part of the Marcellus and Utica shales areas that are the production area that will produce the wastewaters for injection in this well. It is essential to fully understand the geology surrounding the injection well site before construction and operation of this well begins.

13508 Maidstone Lane, Potomac, MD 20854 (240) 912- 6685 (office); (301) 963-9664 (fax)

Our second concern is closely related to the first point noted above. The draft permit requires an area of review for abandoned wells of one quarter mile. This radius of investigation and remediation is too small. It should be at least one mile and such greater distance as may be affected by other oil and gas development activity. The wells that will generate the wastewaters at issue here will be horizontal high volume, high pressure wells with the horizontal portion of these wells extending a mile or more from the drill site. The U.S. Geologic Survey ("A Regional Perspective of the Devonian Shale and Ordovichian Utica Shale Total Petroleum Systems of the Appalachian Basin," Ryder et al., Sept. 2011). has determined that in the Devonian and Ordovichian shales of the Appalachian Basin (including the Marcellus and Utica shales) that chemical constituents may migrate horizontally for several miles and vertically up to several thousand feet from the fracture zone. Linkage of migration pathways between abandoned wells, production wells and underground injection wells is a likely scenario that should be investigated on a site specific basis before a UIC well site is permitted.

Our third concern is that the monitoring requirements of the draft permit should be modified to require much more frequent testing of fluids to be injected. This permit is for a commercial disposal system that will accept wastewaters from a variety of wells and sources. Consequently, monitoring should be performed on every new batch of wastewater to be received for injection into the proposed disposal well. This is the only way the operator and EPA will have the information necessary to assure continued compliance with the permit requirements. The provision of the draft permit for annual monitoring is wholly insufficient. Over the course of a year the sources of wastewaters for disposal in this well could change many times with some wastewaters being one time shipments and others being limited to a few weeks or months. There is no way EPA can be assured that the chemical constituents in the wastewater will be acceptable without individual testing of each load of wastewater received.

Fourth, the list of parameters for monitoring should be expanded to include radium, radon, uranium, thorium, gross alpha and gross beta in order to have a complete picture of radioactivity that may be part of the wastewaters injected into this well. The New York State Department of Environmental Conservation draft Supplemental Generic Environmental Impact Statement provides radioactivity test results on produced wastewaters from a number of oil and gas wells (see Appendix XIII to the draft SGEIS, available on the NYSDEC website). The radioactivity levels in these produced wastewaters were tens of thousands of times the EPA maximum contaminant levels for radioactivity for drinking water supplies.

Fifth, all monitoring data should be publicly available and not subject to any claim of business confidentiality by the operator. Such a requirement should be added to the list of

confidentiality claims that EPA will deny outright. The public has a right to know what materials are being disposed in underground injection wells.

Sixth, the proposed permit provides that certain casing and cementing of the injection well is required. However, the proposed construction requirements for cementing leave a gap from 5000 feet to 1000 feet below the surface with no cement. This provides a potential pathway for migration of materials that can easily be eliminated, and should be, by cementing this 4000 foot gap.

Our final concern is that the draft permit requires mechanical integrity testing only once every two years. Other testing and reporting is done far more frequently and at least every year. Mechanical integrity should also be tested and reported at least on an annual basis.

We appreciate this opportunity to provide comments on this draft permit. If you have any questions concerning these comments, please contact me at your convenience at (240) 912-6685 or by email at jjzimmerman@comcast.net.

Sincerely,

/s/ J.J. Zimmerman

Jeff Zimmerman

cc: Damascus Citizens for Sustainability
NYH2O

James E. Rosenberg
555 Davidson Road
Grindstone, PA 15442
jr@amanue.com
December 31, 2012

U.S. Environmental Protection Agency, Region 3
Water Protection Division
Office of Drinking Water and Source Water Protection
Ground Water & Enforcement Branch (3WP22)
1650 Arch Street
Philadelphia, Pennsylvania 19103
platt.steve@epa.gov

I object to the issuance of Underground Injection Control (UIC) permit PAS2D020BCLE to Windfall Oil and Gas Inc. by the Environmental Protection Agency (EPA) for the Zelman #1 well, on the following grounds:

1. The documents pertaining to permit PAS2D020BCLE have not been published in electronic form, causing undue burden on those citizens who wish to comment.

In particular, there is no docket on this matter at regulations.gov. In order to view the documents, EPA is apparently insisting that citizens travel in person to either the EPA Region 3 office, or the Dubois Public Library. This is unacceptable. This matter is of wide interest, both throughout the region, and in the Commonwealth of Pennsylvania as a whole. The citizenry is entitled to electronic access to these documents.

2. EPA has failed to publish in a form accessible to the public a proper Categorical Exclusion Determination document under the terms of the National Environmental Policy Act (NEPA).

This facility, the Zelman #1 Well, should be subject to the terms of NEPA, unless it is deemed to merit a Categorical Exclusion. In that case, EPA must publish notice of the Categorical Exclusion Document in the Federal Register. That has evidently not taken place. If there is no categorical exclusion, then no permit should be issued until completion of a proper Environmental Impact Statement (EIS) under the terms of NEPA, in which case notice of the EIS must itself be published in the Federal Register. In either case, granting the permit before any publication in the Federal Register is unacceptable. In either case, a docket must be established for this matter, which has not taken place.

3. EPA has failed to acknowledge that the theoretical mechanism whereby injection wells can cause earthquakes has been accepted and widely understood by geologists for decades.

See for instance:

Craig Nicholson and Robert L. Wesson, "Earthquake Hazard Associated With Deep Well Injection- A Report to the U.S. Environmental Protection Agency" U.S. Geological Survey Bulletin 1951, United States Government Printing Office, 1990, http://pubs.usgs.gov/bul/1951/report.pdf:

> "Within the United States, injection of fluid into deep wells has triggered documented earthquakes in Colorado, Texas, New York, New Mexico, Nebraska, and Ohio and possibly in Oklahoma, Louisiana, and Mississippi. Investigations of these cases have led to some understanding of the probable physical mechanism of the triggering and of the criteria for predicting whether future earthquakes will be triggered, based on the local state of stress in the Earth's crust, the injection pressure, and the physical and the hydrological properties of the rocks into which the fluid is being injected."

Injection_Well
PAS2D020BCLE.pdf

EPA has failed to acknowledge to the public that it has taken into account these issues, and can provide assurance that the conditions long since described in the scientific literature will not prevail at Zelman #1.

I should mention that I have a personal connection to this issue. Having grown up in Denver, Colorado, I personally felt one of these earthquakes, associated with wastewater injection from the Rocky Mountain Arsenal:

> "The Rocky Mountain Arsenal case is considered to be the classic example of earthquakes induced by deep well injection. Before this episode, the seismic hazard associated with deep well injection had not been appreciated fully. At the Rocky Mountain Arsenal, injection into the 3,700-meter (m)-deep disposal well began in 1962 and was quickly followed by a series of small earthquakes, many of which were felt in the greater Denver area (fig. 1A). It was not until 1966, however, that a correlation was noticed between the frequency of earthquakes and the volume of fluid injected (fig. 2). Pumping ceased in late 1966 specifically because of the possible hazard associated with the induced earthquakes; afterward, earthquakes near the bottom of the well stopped. Over the next 2 years (yr), however, earthquakes continued to occur up to 6 km away from the well as the anomalous pressure front, which had been established around the well during injection, continued to migrate outward from the injection point. The largest earthquakes in the sequence (M 5.0-5.5) occurred in 1967 (fig. 1B), long after injection had stopped and well away from the point of fluid injection itself." (Nicholson and Wesson, *op cit*, p. 5).

4. EPA has failed to acknowledge that earthquake faults are frequently unmapped and often remain undiscovered until an earthquake has already occurred.

The geological literature regarding earthquakes on unmapped faults is extensive. If there is no mapped fault in the vicinity of the Zelman #1 Well, that does not mean that the possibility of earthquake from this facility can be precluded. In particular, EPA has offered the public no documents whatsoever that would indicate this issue has been addressed.

5. EPA has failed to acknowledge that actual association of earthquakes with oil & gas wastewater injection wells has occurred recently.

Here is just a sampling of recent coverage on this issue:

Cliff Frohlich, "Two-year survey comparing earthquake activity and injection-well locations in the Barnett Shale, Texas", *Proceedings of the National Academy of Sciences of the United States of America*, vol. 109 no. 35, 13934–13938, abstract http://www.pnas.org/content/109/35/13934.

Don Hopey, "Ohio closes wastewater disposal wells after earthquakes", *Pittsburgh Post-Gazette*, May 9, 2012, http://www.post-gazette.com/stories/local/region/ohio-closes-wastewater-disposal-wells-after-earthquakes-215992/

Joe Romm, "Shale Shocked: Studies Tie Rise Of Significant Earthquakes In U.S. Midcontinent To Wastewater Injection", http://thinkprogress.org/climate/2012/12/04/1273461/shale-shocked-studies-rise-significant-earthquakes-wastewater-injection/?mobile=nc

Katie M Keranen, Heather M Savage, Geoffrey A Abers and, Elizabeth S Cochran, "Fluid injection triggering of 2011 earthquake sequence in Oklahoma", American Geophysical Union, Fall Meeting, December 2012, abstract:

> Significant earthquakes are increasingly occurring within the United States midcontinent, with nine having moment-magnitude (Mw) ≥4.0 and five with Mw≥5.0 in 2011 alone. In parallel, wastewater injection into deep sedimentary formations has increased as unconventional oil and gas resources are developed. Injected fluids may lower normal stress on existing fault planes, and the correlation between injection wells and earthquake locations led to speculation that many

2011 earthquakes were triggered by injection. The largest earthquake potentially related to injection (Mw5.7) struck in November 2011 in central Oklahoma. Here we use aftershocks to document the fault patterns responsible for the M5.7 earthquake and a prolific sequence of related events, and use the timing and spatial correlation of the earthquakes with injection wells and subsurface structures to show that the earthquakes were likely triggered by fluid injection. The aftershock sequence details rupture along three distinct fault planes, the first of which reaches within 250 meters of active injection wells and within 1 km of the surface. This earthquake sequence began where fluids are injected at low pressure into a depleted oil reservoir bound by faults that effectively seal fluid flow. Injection into sealed compartments allows reservoir pressure to increase gradually over time, suggesting that reservoir volume, in this case, controls the triggering timescale. This process allows multi-year lags between the commencement of fluid injection and triggered earthquakes.

6. Granting of this permit is premature, pending the outcome of EPA's ongoing study of the environmental implications of oil & gas wastewater injection.

At http://water.epa.gov/scitech/wastetech/guide/shale.cfm, EPA announces:

EPA Initiates Rulemaking to Set Discharge Standards for Wastewater from Shale Gas Extraction:

> "Shale gas wastewater contains high concentrations of total dissolved solids (salts). Shale gas wastewaters also contain various organic chemicals, inorganic chemicals, metals, and naturally occurring radioactive materials (NORM).
>
> Currently, wastewaters associated with shale gas extraction are prohibited from being directly discharged to waterways and other waters of the U.S. In order to meet this prohibition, some of the shale gas wastewater is reused or re-injected, but a significant amount still requires disposal. Some operators reinject the wastewater into disposal wells. Other shale gas wastewater is transported to public and private treatment plants, which may not be equipped to treat this type of wastewater, resulting in the discharge of pollutants to rivers, lakes or streams where they can impact drinking water or aquatic life."
>
> This rule would add a pretreatment standard to the existing regulation pertaining to oil and gas extraction.

EPA has an obligation to the public to ***withhold*** permit PAS2D020BCLE until the studies required for this rulemaking are complete, and the public has been allowed to comment on them.

In sum: the issues regarding permit PAS2D020BCLE are so numerous and so serious, and the documents supplied by EPA to the public that indicate the issues have been addressed are so meager, ***this permit must be withdrawn*** until much more serious consideration can be given.

Thank you for your attention.

Respectfully submitted,

James E. Rosenberg