Attachment B-10

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County of Jackson - Michigan

Class II Permit Action
West Bay #22

Public Hearing

November 20, 2014

STATE OF MICHIGAN
IN THE COUNTY OF JACKSON

CLASS II PERMIT ACTION
WEST BAY #22

PUBLIC HEARING
November 20, 2014
Columbia Elementary School
Brooklyn, Michigan
Steve Jann, EPA Hearing Officer

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APPEARANCES

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tell them where not to put it. And if there's a better spot for this to be, we would like it to go in that spot if it has to be here. That's all.

MR. CASSELL: Okay. Thank you. Our last marked speaker here on our list is Peter Bormuth. You have ten minutes.

MR. BORMUTH: I'd like to introduce these 23 scientific studies, newspaper articles, or other permits that the EPA has issued as references to my public comments.

I want to say that this well is going to contaminate our underground source of drinking water. I want to say that my first reference is Bell; Cripps; Culshaw, Groundwater in Engineering Geology, and it shows the reliance of Region 5 on the hydrologic atlas of Michigan is misplaced since permeability estimates cannot be applied to rocks that can hydrate in salt, which are susceptible to solution.

It also shows that massive anhydrite, which the EPA claims to be impermeable, "can be dissolved to produce uncontrollable runaway situations in which seepage flows increase at a rapidly accelerating manner. The study claims that the solution rate of gypsum and anhydrite is principally controlled by the area of their surface in contact with the water and the

flow velocity associated with the unit area of the material. This anhydrite cap is not going to stop the upward migration of this solution, it's going to convert to gypsum after it expands absorbing the hydration of water, and it's going to migrate upwards because Michigan has a vertical flow.

The second reference is Conley and Bundy and it's the mechanism of gypsification. It shows that the hydration process of anhydrite to gypsum is accelerated in the presence of certain salts like those contained in the brine that West Bay will be injecting in the Salina formation and the Niagaran formation.

Reference number 3 is EPA draft investigation on groundwater contamination near Pavilion, Wyoming, and it concludes the constituents associated with hydraulic fracturing released in the Wind River drinking water aquifer at depths above the current production zone. This proves that the EPA knows that injected fluids can migrate upwards and that they have previously made mistakes with regard to impermeability of rock formations when issuing permits.

Reference number four is the EPA draft report on on Pavilion which found the best explanation for data of the deep monitoring wells is that the constituents associated with hydraulic fracturing have

been released in the Wind River drinking water aquifer at depths above the current production zone.

Reference number 5 is interesting. It's EPA Permit MI-163-3G-A002 for the Sunoco Inkster facility issued on June 14, 2006. This permit authorized dissolution of F salt layers in the Niagaran group for the purpose of creating a gas storage cavern. The EPA permitted this. They know that the Niagaran and Salina will dissolve in solution. They previously issued permits that prove this.

Reference number six is Hardie, The American Mineralogist. It references that gypsum is replacing hydrated depths as great a 3500 feet. Here we're only talking about 2600 feet and gives formula for the chemical reactions.

Reference number seven is James and Edworthy. It gives formula for the dissolution of soluble rocks.

Reference number eight is Jaworski, Advances in Crystallization Processes. It states that the hydration of anhydrite can occur very quickly within a few years or even within one year and describes hydration process in some detail.

Reference number nine is Klimchouk, and it's the dissolution conversion of gypsum anhydrite. It shows that solubility anhydrate increases sharply with

pressure. Each point 01 PA increase in pressure results any a three to five times increase in the solubility in this cap you're telling us is impermeable.

Reference number ten is Kreitler, the Hydrogeology of Sedimentary Basins. The study primarily deals with Texas. It draws some significant conclusions about hydraulic properties of sedimentary basins and suggests that the cross-formational flow of flow through low permeability rocks must be considered as an essential element in describing fluid flow in our sedimentary basins.

Reference number 11 is Middleton: What Lies Beneath. It details the complaint of the Texas Railroad Commission of groundwater contamination in Texas because of oil waste injection wells.

Reference number 12 is Murray. The origin and diagenesis of gypsum and anhydrite. Notes while conversion anhydrite usually takes place near the surface it has been observed in depths as deep as 3500 feet in formation.

Reference number 13 is Myers, Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers. It shows that brines existing more then 1000 meters above their sources has moved upwards, and

shows that the injection of pressure can cause contaminants to reach overlying formation by simple displacement of fluids from the shale into the over burden, and it claims that injective transport will manifest if there's a significant proponent to the regional hydraulic gradient as there is here in Michigan.

Reference number 14 is Rauh, Investigations on the Swelling Behavior of Pure Anhydrites. It gives rates of dissolution for different anhydrites taken from European formation.

Reference number 15, is Sass and Burbaum. It's the Damage to the Historic Town of Staufen, Germany caused by geothermal drillings. Basically it shows the introduction of water to an anhydrite formation for bore hole heat exchange installation caused surface upheaval because of resulting anhydrite swell. The depth of anhydrite was less than 200 meters in this study.

Reference number 16 is Singh, documented effects of sodium on the hydration of anhydrite increases the reaction.

Reference number 17, Steiner, International Journal of Rock Mechanics concludes that in situ swelling pressures in anhydrite shales indicate maximum

values of 2.5 MPA and mean values of 1.6 and 2.0 MPA.

Reference number 18 Suthersan, Hydraulic and Pneumatic Fracturing. It just describes the effect of injected pressure on rocks and nooks that rock fracturing begins a pressures less than a hundred PCI. You're injecting pressure at 683 PCI or something like that.

Reference number 19 is Warner and Jackson. It's the migration of Marcellus formation brine to shallow aquifers in Pennsylvania. It describes upward cross-formational flow of Marcellus formation brine into shallow aquifers in Pennsylvania.

Reference number 20 is we Weaver, Frape, Cherry, recent cross-formational flow and mixing in the shallow Michigan basin. This study documents upward migration if saline fluids in the overlying glacier sediments during the historic period since petroleum production began. Basically we're talking about fracturing intensification and increased permeability of the near surface layers above a thousand feet because of the isotonic rebound following glaciers. The study area was on the edge of the Michigan basin and Ontario, but the authors note a correlation with the Detroit River Group in Central Michigan.

Reference number 21 is Wikipedia: It's just

a definition of anhydrite. It states the accepted scientific conclusion taught in geology classes, anhydrite converts to gypsum upon exposure to water. You're injecting water.

Reference number 22 is Wikipedia: Benzene, Ethylbenzene, Toluene, Xylene, Naphthalene, and Polycyclic Aromatic Hydrocarbons. I took this list of chemical constituents in the EPA website, and I looked up the health effects. They're toxic. Most of them cause cancer.

Reference number 23 is Zen, Solubility Measurements in the System at 35, 50 and 70 degrees and one atmosphere pressure. It just gives the formula for the conversion of anhydrite and gypsum and notes that anhydrite converts under conditions where it was previously presumed to be stable.

I also want to say that I've been before the Environmental Appeals Board on two separate occasions and you people have done everything possible to ignore this argument. In the first case of West Bay #22 number one you basically accepted a petition that was filed by another person that was filed 42 days after the deadline in order to bail you out so you didn't have to deal with my argument.

In the last petition before the Appeals Board

West Bay #9, you refused to consider my scientific documentation because I offered it to you at the hearing and you told me you didn't need it because you had it from the previous hearing. And then the EAB ruled that I couldn't introduce those studies. You people know that you're going to destroy the groundwater of this county and of the Southern Michigan basin. You've issued permits for gas storage caverns that are going to basically dissolve the same layers you're talking about here that are going to be the layers that prevent upward migration. I have studies coming from Germany. I apologize I couldn't introduce them. I will make a motion to supplement. They prove that in Germany a company has created a horizontal gas storage cavern at 800 meters in anhydrite and salt layers just like you're talking about here, the Niagaran layers that you say are going to prevent the upward migration. You people are liars.

MR. JANN: Let's do a time check, Steve.

MR. CASSELL: Times up.

MR. JANN: Times up for the moment. Let me just ask if anyone who did not speak before wants to say something, or if somebody who spoke earlier wants to expand on their comments. And if not, let me actually see a show of hands on that point first. Yes.

this area. The size of the problem that would happen if there's a remote chance of contamination is too large in scale there. There's got to be other places that if they actually do have to dump this stuff, as you indicated earlier, there has to be another site. You know, we can't have like BP oil spill like in the Gulf of Mexico happen here because it would destroy this entire region. Even if it was a point one percent chance, it's still too high, and you can't guarantee zero percent.

MR. JANN: Let me see here. Scanning across this gentleman wants to speak, and then Mr. Bormuth, if you have more comments to share we welcome those.

MR. BANCROFT: To get the oil they have to drill the oil wells. They can't get the well without drilling the oil well. They don't have to have an injection well. It's for their profitability and their convenience to put it here. They can ship it. So this is not something they have to have. Before they had to have the oil well to get the oil.

MR. CASSELL: Is there anyone else who had anything?

MR. JANN: Okay. So we have about 13 minutes. Mr. Bormuth, you want to share some more.

MR. BORMUTH: Yes. I want to point out once

again that in EPA permits for the Sunoco Inkster facility and another permit that were issued here in the Michigan basin that. Permit was MI-163-3G-A002 basically showed that the EPA knows that these confining layers of anhydrite and the layers in the Niagaran formation, they know that they are going to dissolve in solution. They've issued other permits allowing a company to do that, and that permit gives basically the formulas for it and a timeframe for it. I want you to know that. These people are guilty of gross negligence and willful and wanton misconduct in permitting these wells. They know that that cap is not going to succeed in stopping the upward migration of this fluid because the scientific data shows that anhydrite will convert to gypsum and that gypsum and these salt layers are dissolvable in solution. I want you to know that.

These people are not protecting your interest like they're supposed to under the Clean Water Act and the other regulations which they are supposed to enforce. They are going to allow this to the convenience of the oil company because they had previously permitted these wells. There are 17 other wells in the southern Michigan basin that are also at the same level, that are also going to end up

destroying our groundwater and potentially our surface water as well. This is a serious issue that the EPA has continually refused to address in my attempts to get them to address it in front of the Environmental Appeals Board. And I want you to know that this is a major injustice to the people of Michigan and I feel that there are Christians in the EPA who are deliberately trying to destroy Michigan's groundwater. Thank you.

MR. JANN: Thank you. A new gentleman joined us. Do you care to make a comment for the record or are you here to listen?

MR. KELLUM: Well I don't know what's been said before I got here. I'm not prepared to make an exhaustive comment, but one of my concerns is that --

MR. JAN: If you do want to make a comment, I'd advise you to do that. Could you say your name for us?

MR. KELLUM: My name is Bob Kellum.

MR. CASSELL: Can you spell your last name.

MR. KELLUM: K-E-L-L-U-M.

MR. CASSELL: Thank you.

MR. KELLUM: One of my understandings is that with the creation of a groundwater injection well or an injection well is that it would take traffic, tanker

MR. JANN: Mr. Bormuth?

MR. BORMUTH: I just wanted to reiterate what this gentleman said about the Indiana bat. I personally observed them in the area. Kurta has issued numerous studies. He's a professor at Eastern Michigan University on the behavior and habitat of the Indiana bat and the Indiana bat is known to utilize this habitat. They fly along the tree lines. They don't necessarily go over the open fields to protect themselves against owls and other things, but they will utilize this area, and they will be exposed to these chemicals. If there are any spills at this facility, and if insects, you know, fly down to that spill water and absorb it and the bats later on eat the insects. So I'd like to speak also for the Indiana bat. This is a creature that is on the endangered species list. This is a creature that is suffering currently from a disease, the white mouth, foamy mouth disease, and this is a creature that may not longer be with us here on the planet. And while this well, of course, is, you know, a moderate or insignificant damage to that creature, it should be spoken for and it should be considered by the EPA. You have of a statutory requirement, I believe, under the Endangered Species Act to consider any endangered species in the vicinity

of a well. Thank you.

MR. JANN: Thank you.

MR. BANCROFT: I've got something else to add.

MR. JANN: Okay.

MR. BANCROFT: Got something else to add.

MR. JANN: Okay.

MR. BANCROFT: Might help you, okay? It's not just a complaint. I saw some -- a map at one time recently that showed the recharge, had pixels for the recharge of the aquifer out here, and this area basically right where all these wells are right where your injection or the injection well might go it's like 80%, it's this dark red pixels where the recharge of this aquifer takes place right here, okay? Not in Clinton or Monroe, but here. So this water coming in here that benefits the whole region, large region, its source is here. And people that live quite a ways from here that depend on it really are depending on us to take care of it, to be good stewards of this water, and that's in my mind.

MR. JANN: Okay. Shall I saw thank you? Appreciate everybody coming out tonight, especially with the snow and the cold weather. And as I mentioned at the beginning, our comment period extends until the