BEFORE THE ENVIRONMENTAL APPEALS BOARD

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C.

In the Matter of:	)	
West Bay Exploration Co. of	)	**Permit Appeal No. UIC 14-66**
Traverse City, Michigan	)	
Haystead #9 SWD	)	
Permit No. MI-075-2D-0010	)	
Jackson County, Michigan	)	

PETITIONER PETER BORMUTH'S REPLY TO EPA RESPONSE TO PETITION FOR REVIEW UIC 14-66

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STATEMENT OF COMPLAINCE WITH WORD LIMITATION

I hereby certify that this rely brief contains 2,913 words according to the Microsoft Word program used to compose it.

PETITIONER PETER BORMUTH'S REPLY TO EPA RESPONSE TO PETITION FOR REVIEW UIC 14-66

LEGAL ARGUMENT

1. Petitioner met procedural requirement under 40 CFR § 124.19(a)(4)(ii).

The Petitioner notes that he filed his Petition for Review on the basis of two issues of material fact and provided the EPA with extensive citations and numerous scientific studies to document his arguments. Petitioner notes that he clearly cited the EPA Response to Comments document issued April 9, 2014. Petition 14-66 cited page 2 of the Response to Comment document dated April 9, 2014 where the EPA states that the Salina Group, a sequence of carbonate, anhydrite and salt layers, will act as a confining layer to prevent flow out of the injection zone. The Petitioner contended that this statement is an erroneous finding of fact which contradicts the known scientific data. The Petitioner cited EPA Response #2 (p.5,6), Response #4 (p.8), Response #14 (p.40) & Response #28 (p.68). Apparently EPA counsel believes the Petitioner was required to copy the full EPA responses into his Petition. The Petitioner believes it is sufficient to cite the Response under 40 CFR § 124.19(a)(4)(ii).

2. Petitioner met procedural requirement under 40 C.F.R. 124.13.

EPA Counsel also faults the Petitioner for not providing the EPA the scientific studies he cited in his public comments during the public comment period, but the Petitioner notes that he cited these studies by reference in oral comments at the Public Hearing on April 30, 2013 and offered to provide Permit Writer Timothy Elkins with the studies. 40 C.F.R. § 124.13 specifically states: *"Commenters shall make supporting materials not already included in the administrative*

record available to EPA as directed by the Regional Administrator." The EPA never responded to the Petitioner's offer so the Petitioner included the documents when he filed his Petition for Review 14-66. As the Region admits, the EPA was familiar with many of these studies from Petitioner's prior appeal before this Board (UIC 13-01) so perhaps that is why the EPA did not request them. Petitioner now finds his Petition under attack for the failure of the Regional Administrator to act in accordance with 40 C.F.R. 124.13.

3. Geological siting

Contrary to the EPA's assertion, the Petitioner took into account site specific characteristics in his argument. The Petitioner cited site specific temperature (85 degrees at 3000 feet); the specific pressure gradient in the Michigan Basin (0.43 lb/ft, thus the ambient pressure is roughly 1290 psi (87.8 atm)); the injection rate allowed by the permit (737 psi); the ability of pressure to move fluid (one atmosphere 101 kPa or 14.7 psi will lift/move water by 34 feet. West Bay's permit allows them to inject at 737 psi so they could conceivably move/lift fluid 1700 feet); the potential pressure created by the swelling of the Salina A-2 Evaporite formation upon contact with the injected fluid (which could range from 1.7 up to 4.7 MPa); and obviously the site specific upper confining zone which includes anhydrite and salt layers.

The Petitioner's entire argument is reflective of the fact that Region 5's previous responses have been inadequate. The Petitioner has read through the available scientific record and builds a coherent & well documented argument.

The Petitioner first cited laboratory studies to demonstrate the chemical mechanism through which the anhydrite to gypsum conversion process takes place. The Region dismisses these

studies because they do not evaluate the conversion under the precise depth, temperature and pressure conditions at the site but the Petitioner just uses these studies to establish the mechanism of anhydrite/gypsum conversion. And the Region erroneously claims that these studies deal with concrete.

The Petitioner then cited studies showing that massive underground anhydrite formations undergo this transformation. The Region has consistently claimed that massive anhydrite will not undergo the transformation witnessed in the laboratory. The Petitioner cites studies proving the Region's claim is erroneous. The Region dismisses the *Sass & Burbaum* article (attachment #19) because the geology of the site differs, the anhydrite was only 200 feet below the surface, and the introduction of water took place through geothermal boreholes and not through waste injection. But the article proves that massive anhydrite will undergo this common chemical transformation upon exposure to water. The Petitioner then introduces the *Murray* article (attachment #16) which reports an example of the process taking place at a depth of 3500 feet. The Region dismisses this article because it primarily deals with diagenesis. But *Murray's* article documents that massive anhydrite converted to gypsum at a depth of 3500 feet. This is 400 feet deeper than the site specific characteristics of the West Bay well.

The Region also chooses to ignore the additional studies showing conversion at depths, such as the *Bell, Cripps & Culshaw* study (attachment #4) which found that "massive anhydrite can be dissolved to produce uncontrollable runaway situations in which seepage flow rates increase in a rapidly accelerating manner. Even small fissures in massive anhydrite can prove dangerous....Within about 13 years the flow rate increases to a runaway situation." The study also concluded that "Salt is even more soluble than gypsum and the evidence of slumping,

brecciation and collapse structures in rocks which overlie saliferous strata bear witness to the fact that salt has gone into solution in past geological times." Region 5 ignores the *Steiner* article (attachment #21) which shows that anhydrite bearing rock 1000 meters deep in tunnels will undergo this transformation to gypsum upon exposure to water and threaten the engineering integrity of the structure. These articles prove that massive buried anhydrite will undergo this common and well known chemical transformation to gypsum upon exposure to water.

The Petitioner then cited studies showing that this process is accelerated by two independent factors: pressure and the sodium content of the injected fluid. *Klimchouk* (attachment #13) citing *Manikhin* documented that the solubility of anhydrite increases sharply with the increase in pressure: each 0.01Pa increase in pressure results in a 3 to 5 times increase in solubility. Steiner (attachment #12) and *Sass & Burbaum* (attachment #19) confirm this data. Region 5 just chooses to ignore this aspect of the Petitioners argument.

The scientific literature (*Conley & Bundy*, attachment #10; *Hardie*, attachment #11; *Singh*, attachment #24) also demonstrates that certain salts activate rather than inhibit the hydration of anhydrite and thus promote the conversion of anhydrite to gypsum. In laboratory studies sodium was one of the best activators were found to be sodium. Anhydrite reacts very rapidly with concentrated Na2SO4 solutions to form Ca-Na double sulfates. These double-salts are unstable in dilute solutions and decompose to gypsum. The EPA provides no evidence to refute this well established chemical process.

Contrary to the EPA's glib assertions, every one of the anhydrite or salt bearing layers the EPA cites will dissolve in solution upon receiving the injected fluid. The EPA is well aware that

the Petitioner's scientific argument is not an untested hypothesis but an established scientific fact upon which an engineering technology has been developed over the last 40 years in the related field of gas storage. Engineers have created caverns in large domal structures (salt) since the 1960's. Today advances in technology allow caverns to be shaped into extensive horizontal strata of salt and anhydrite, typically at depths ranging between 600 and 7000 feet. The EPA has documentation of this process in their files. Fresh or low-salinity water is pumped down into the formation through a borehole (leaching string) and waste brine is returned through the withdrawal/production string to progressively dissolve the salt in a controlled manner. Roughly eight to ten volumes of water are required to dissolve one volume of salt. Construction time to construct a cave with a volume of about 400000 m3 is approximately 20 months. The only significant difference between this construction technique and the waste injection process is that the injected water is removed. The engineering firm controls the size of the cavity which will be formed as the anhydrite or salt layers dissolve, instead of creating a runaway situation such as described by the *Bell, Cripps & Culshaw* study (attachment #4), which is what the EPA is permitting. As *Jawarski* noted in her paper (see attachment #12), the gypsification of massive anhydrite when exposed to water under natural conditions can occur very quickly: within few years (*Farnsworth*, 1925) or even within one year (*Moiola & Glover*, 1965). These waste injection wells will probably operate for 20 years. The Salina A-2 Evaporate layer, the Salina A-1 Evaporate layer, the B-Salt and B-Unit layers, the D-Unit layer, and the E-Unit layer can all be expected to dissolve or partially dissolve in solution. The EPA's assertion that these layers will confine the injected fluid is a joke and contrary to all known scientific theory and current technological practices. This strata would hold oil or natural gas but these

layers will dissolve in solution upon exposure to water injected under pressure. The EPA is deliberately and maliciously putting southern Michigan's underground aquifers at risk.

Finally, the Petitioner alerted the EPA that fluid has migrated through strata previously thought to be impermeable (see *Warner, Jackson, Darrah, Osborn, Downb, Zhaob, White, & Vengosh*, Attachment #22; *Myers,* Attachment #17; see also EPA DRAFT REPORT OF GROUNDWATER CONTAMINATION NEAR PAVILLION, WYOMING, Attachment #8) and that this process can be expected to take place in the Michigan Basin (see *Weaver, Frape, Cherry,* Attachment #23). The *Weaver* paper determined that the geochemical data supported a model involving cross-formational fluid flow from depth occurring vertically on the scale of several hundred meters since glaciation. The Petitioner previously determined that an injection rate of 737psi would conceivably move/lift fluid 1700 feet and that such a vertical lifting would endanger his underground source of drinking water.

In a step by step process, documented by scientific studies and technical facts, the Petitioner has proven that the anhydrite and salt layers which the EPA cites as confining layers for this permit will dissolve in solution. The Petitioner has also shown a high likelihood that the injected fluid containing toxic substances will then migrate vertically. The EAB must apply the "preponderance of the evidence" standard established by 40 C.F.R. § 22.24(b). *See In re The Bullen Cos.*, 9 E.A.D. 620, 632 (EAB 2001). The Board cannot defer to the Region's scientific determination because the EPA's position is clearly inaccurate and unsupported by the known scientific data. The EPA's response to the Petitioner's argument is erroneous and warrants Board review.

4. Other wells permitted at similar strata

The Petitioner has identified 17 wells permitted at similar strata in the lower Michigan basin: WI Permit #30108, #30248, #30123, #36867, #31503, #36958, #30229, #40099 in Calhoun County, Michigan; WI Permit #36629, #42486, #37378 in Macomb County, Michigan; WI Permit #23252, #23701, #23011, #22661 in Saint Clair County, Michigan; and WI Permit #25224, and #20452 in Allegan County, Michigan.

These 17 wells are operating in violation of 40 C.F.R. § 144.12(a) and the Safe Drinking Water Act, Part C, § 1421(a)(3)(C). The EAB has previously ruled that: *"In reviewing an underground injection well permit application, the Region has a regulatory obligation to consider whether geological conditions may allow the movement of any contaminant to underground sources of drinking water." In re Stonehaven Energy Management*, UTC Appeal No. 12-02 LLC Permit No. PAS2DOIOBVEN (EAB March 28, 2013). The Petitioner claims the Board should exercise its discretion to review an important policy matter; ie whether these wells constitute a danger to our Michigan aquifers (see 40 C.F.R. § 124.19(a)(4); see also *In re City of Attleboro*, NPDES Appeal No. 08-08, slip op. at 10 (Sept. 15, 2009). There is a statutory requirement that the EPA review the Petitioner's geological argument that anhydrite and salt will dissolve when exposed to a continuous supply of water.

5. Endangered species.

When fulfilling its responsibilities under the Endangered Species Act (16 U.S.C. § 1531) the EPA **must evaluate whether any EPA-authorized activity will impact endangered species in any way.** Once again the Petitioner has cited scientific documents showing that both the Indiana bat (see Attachment #5, Attachment #6, & Attachment #15) and the Massasauga

Rattlesnake (see Attachment #9) will be found on this property and will be adversely impacted by this permit. Surface activities with regard to endangered species must be considered by the EPA. The Region's assertion that the UIC permitting program does not have to consider surface impacts to endangered species is contrary to the ESA.

In Response #28 (p. 68) the EPA stated that "the well site or 'action area' is located entirely within a plowed field." The diagram West Bay filed with their permit application shows the Raisin River is approximately 1500' from the well site. It shows the C/L creek to be approximately 900' from the well site. It shows wooded marsh to be approximately 900' from the well site. And it shows marsh covering almost half of the 1320' diameter circle and one finger of marsh within 100' of the well pad (E-W ¼ line Sec 9, T4S, R2E). For the EPA to claim that the Indian bat will not be found on this property is absurd. This is prime Indiana bat habitat. The photos taken at the site have been manipulated by using a lens which extends the field of view. The marsh, woodlands and creek are much closer to the well site than they appear.

The Petitioner acknowledges that the USFWS signed off on this project, even though their own published documents suggest that the property is likely habitat for both the Indiana bat and the Massasauga Rattlesnake. Because their September 4, 2014 letter contradicts the USFWS published scientific data on these endangered species, the Petitioner respectfully requests Board review. The Petitioner further observes that the USFWS specifically noted that there are several sensitive and vulnerable wetland communities that will be impacted by this project should injectate migrate upwards through the scientific process documented by the Petitioner.

CONCLUSION

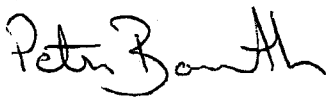
In his Petition (UIC 14-66) the Petitioner met the threshold requirements of 40 C.F.R. 124.13 & 40 CFR § 124.19(a)(4)(ii). The Petition raised two well documented arguments of material fact which demand review under the preponderance of evidence standard. The EPA acknowledged that the arguments had been raised during the public comment period and the Petitioner has clearly demonstrated that the EPA's response to his geological argument was erroneous. Additionally, the fact that other wells are permitted to this strata dictates that the Board should exercise its discretion to review an important policy matter that effects the entire southern Michigan Basin.

The institutional arrogance of the EPA in permitting injection wells at inappropriate geological strata in spite of the overwhelming scientific evidence that the proposed confining layers composed of anhydrite and salt will dissolve in solution is astonishing to the Petitioner. The EPA has had two years to review this evidence. The Petitioner concludes that there are Christians in the EPA who deliberately want to destroy the Great Lakes watershed and aquifers.

The assumption seems to be that it is safe to ignore science because the Petitioner is proceeding pro se while the Petitioner's hatred of the evil scum Jesus myth will insure that any judicial officer selected to review this case will prejudicially rule against him. Despite all the recent setbacks, the Petitioner still has faith in our Courts. As a Pagan Druid he will continue to litigate to protect the common blessing that is our ground and surface water. There are impartial secular jurists on the Federal bench who determine cases based on statute and a

preponderance of evidence and not with an intent to establish the evil polluting Christian religion. The EPA/EAB better pray that the Petitioner does not draw one.

Respectfully submitted,



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July 16, 2014

CERTIFICATE OF SERVICE

I, Peter Bormuth, do hereby certify that on July 16, 2014, I did send a copy of petitioner's Reply to EPA Response to John P. Steketee, U.S. EPA, 77 West Jackson Blvd (C-14J), Chicago, IL 60604-3590 by regular mail.

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