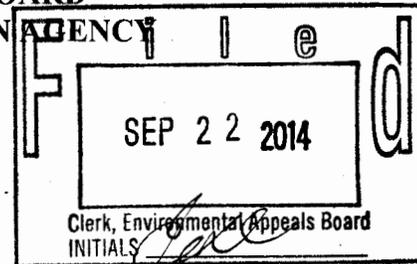


**BEFORE THE ENVIRONMENTAL APPEALS BOARD
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC**



In re:)
)
)
West Bay Exploration Co.) UIC Appeal No. 14-66
)
)
UIC Permit No. MI-075-2D-0010)
)
_____)

ORDER DENYING REVIEW

I. STATEMENT OF THE CASE

Mr. Peter Bormuth petitions for review of U.S. Environmental Protection Agency (“EPA”) Region 5 (“Region”)’s decision to grant an Underground Injection Control (“UIC”) permit (“Permit”) to West Bay Exploration Company (“West Bay”) under Part C of the Safe Drinking Water Act (“SDWA”), 42 U.S.C. §§ 300h - 300h-8. The Permit allows West Bay to construct and operate an injection well for the noncommercial disposal of brine waste water from oil and gas operations. UIC Permit No. MI-075-SD-0010 (“Permit”), at 1 (Apr. 9, 2014) (Administrative Record (“A.R.”) Index No. 171). The well is designated as Haystead #9 SWD (“Haystead”) and will be located in Jackson County, Michigan, near the town of Brooklyn. *Id.* Mr. Bormuth claims that the injection well will threaten underground drinking water supplies and harm two endangered species. However, he has failed to demonstrate that the Region’s decision to grant the permit was based on a clearly erroneous finding of fact or conclusion of law. Accordingly, the Environmental Appeals Board (“Board”) denies the petition for review.

II. STATUTORY AND REGULATORY HISTORY

The UIC permit program was established pursuant to SDWA section 1421, 42 U.S.C. § 300h, and regulations promulgated by EPA at 40 C.F.R. parts 144 through 148, to protect underground sources of drinking water. Under this program, a permit for a proposed injection well may not be granted if the well would “allow[] the movement of fluid containing any contaminant into underground sources of drinking water,” and “the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 C.F.R. part 142 or may otherwise adversely affect health of persons.” 40 C.F.R. § 144.12(a).

III. FACTUAL HISTORY

The Haystead well will be located in a rural part of Jackson County, Michigan. The actual well placement is in an agricultural field approximately 90 feet from an oil production well. U.S. EPA Region 5, Response to Public Comments (“RTC”) at 50 (Apr. 9, 2014) (A.R. 68); West Bay, UIC Permit Application (“Permit Appl.”) at 1, app. 4, fig.3 (April 27, 2011) (A.R. 1). Under the Permit, West Bay may use this well only to inject brine into the Niagaran Group, a collection of rock formations which, at the location of the Haystead well, are present at the depth of 2,870 to 3,100 feet below ground surface. Permit at 1. The deepest underground source of drinking water at this location is the Marshall Sandstone aquifer. U.S. EPA Region 5, Statement of Basis for Issuance of UIC Permit (“Stmt. Basis”) at 1 (March 27, 2013) (A.R. 26). Drilling records indicate that the base of the aquifer in the vicinity of the Haystead well is approximately 217 feet below ground. *Id.*

The Region determined that brine waste water injected into the Niagaran Group would not endanger the Marshall Sandstone aquifer because the brine would be confined by the

“approximately 2,653 feet of rock strata” separating the top of the Niagaran Group from the base of the Marshall Sandstone aquifer.¹ *Id.* at 2; Transcript of EPA Public Hearing (“Transcript”) at 8 (A.R. 65). These rock strata include layers of anhydrite, shale, and salt in the Salina Group, and evaporite and shale layers in other geological groups, particularly a formation known as the Coldwater Shale. RTC at 2. The Salina Group is immediately above the Niagaran at a depth of approximately 2,782 to 2,352 feet. *Id.* at 5. The roughly 2,100 feet between the Salina Group and the Marshall Sandstone aquifer consists mostly of layers of shale and evaporites. *Id.* at 2. Following consultation with the U.S. Fish and Wildlife Service, the Region also determined that construction of the Haystead well would not impact any endangered species. *Id.* at 50. Final determinations on these points were made only after the Region gave public notice of West Bay’s permit application, held a public hearing, and accepted written public comments. *Id.* at 1.

IV. ANALYSIS

In his petition, Mr. Bormuth challenges the technical determinations made by the Region concerning the impact of the Haystead well on underground sources of drinking water and endangered species. As the petitioner, Mr. Bormuth bears the burden of showing the Region’s decision was “based on * * * [a] finding of fact or conclusion of law that is clearly erroneous.” 40 C.F.R. § 124.19(a)(4)(i)(A). On technical or scientific issues such as those raised by Mr. Bormuth, the Board will typically defer to a permit issuer’s technical expertise and experience, as

¹ The Region provided the following background information on the geologic terms “formation” and “group”: “A formation is a rock unit that is distinctive enough in appearance that a geologic mapper can tell it apart from the surrounding rock layers. It must also be thick enough and extensive enough to plot on a map. * * * Formations can be lumped together into larger rock units called groups, and divided into smaller units called members.” RTC at 32 quoting Utah Geologic Survey, *What is a Formation?* <http://geology.utah.gov/surveynotes/gladasked/gladformation.htm> (last visited Sept. 18, 2014).

long as the permit issuer adequately explains its rationale and supports its reasoning in the administrative record. See *In re Dominion Energy Brayton Point, LLC*, 12 E.A.D. 490, 510 (EAB 2006); see also, e.g., *In re Russell City Energy Ctr., LLC*, PSD Appeal Nos. 10-01 to 10-05, slip op. at 88 (EAB Nov. 18, 2010), 15 E.A.D. ___, *petition denied sub nom. Chabot-Las Positas Cmty. Coll. Dist. v. EPA*, No. 10-73870 (9th Cir. May 4, 2012). Accordingly, it is particularly important for petitioners challenging technical determinations to address the Region's rationale for its decision. *In re City of Pittsfield*, NPDES Appeal No. 08-19, at 8 & n.6 (EAB Mar. 4, 2009) (Order Denying Review), *aff'd*, 614 F.3d 7 (1st Cir. 2010); see also, e.g., *In re Town of Westborough*, 10 E.A.D. 297, 311-12 (EAB 2001). It is not sufficient, however, for a petitioner to show merely that there is a "difference of opinion or an alternative theory regarding a technical matter." *Dominion*, 12 E.A.D. at 510. Thus, in challenging technical determinations, a petitioner bears a "particularly heavy burden" to show that the permit issuer has clearly erred. *In re Peabody W. Coal Co.*, 12 E.A.D. 22, 41, 46, 51 (EAB 2005).

A. *Underground Drinking Water Supplies*

1. *Petitioner's Challenge to the Region's No Endangerment Finding*

After reviewing the permit application, all public comments, and the scientific data in the record, the Region concluded that "there should be no impact to the drinking water supplies as a result of injection into [the Haystead] well." RTC at 3. The Region based this conclusion on the following findings:

- (1) **The Niagaran Group will accept the injected fluids.** As the Region explained, the Niagaran Group is a "vast limestone and dolomite rock structure" that "has been documented in the Michigan Hydrologic Atlas (1981) to be permeable and very capable

of accepting fluid.” RTC at 2, 10, 66. These characteristics, the Region concluded, indicate that only relatively low pressure will be required to operate the Haystead #9 SWD well. *Id.* at 10. Nonetheless, the Region noted that the Permit imposes a maximum injection pressure that “prevents formations from fracturing and creating migration pathways,” *id.*, and thus makes it “unlikely that injected fluid will leave the injection zone.” *Id.* at 31.

(2) The Salina Group is impermeable. The Region relied on the Michigan Hydrologic Atlas to support its conclusion that the Salina Group, the rock formation directly above the Niagaran Group, “is an approximately 430 foot thick sequence of carbonate, anhydrite, shale, and salt which will act as a confining layer to prevent flow out of the injection zone.” *Id.* at 2, 66. In fact, as noted by the Region, the Hydrologic Atlas documents at least six rock formations within the Salina Group that are either “impermeable” or have “extremely low permeability.” EPA Region 5 Response to Petition for Review (“Region’s Resp.”) at 17-18. Three examples from the Hydrologic Atlas suffice to demonstrate this:

The A-2 Evaporite is an excellent confining layer. It is the seal over the pinnacle reefs that developed in the shelf facies of the Niagaran and has the properties necessary to confine fluids under Pressure. * * * Porosity. Extremely low. Permeability. Extremely low.

* * *

The B-salt and the B-Unit are excellent confining layers. The thick salt section in the central part of the basin would be most effective,

but the presence of either salt or anhydrite should indicate that the member is an aquiclude.^[2]

* * *

The C-Shale is a plastic shale and should not maintain open fractures at depth. Thus, it is considered to be an excellent confining layer. * * * Porosity. Effective porosity is essentially zero. * * * Permeability. Essentially impermeable.^[3]

Dep't of Geology, W. Mich. Univ., *Michigan Hydrologic Atlas, Part I (Hydrology for Underground Injection Control in Michigan)* ("Hydrologic Atlas") at II-46, II-49, II-51 (1981) (A.R. 28).

(3) Impermeable shales separate the Salina Group from Underground Drinking

Water Supplies. The Region also noted that the underground drinking water supplies in the Marshall Sandstone are protected not only by the Salina Group but also by many impermeable layers of shale and evaporites in the over two thousand feet between the top of the Salina Group and the base of the Marshall Sandstone aquifer. Region's Resp. at 22; RTC at 2. According to the Region, these layers include the Antrim Formation, the Bedford Shale, the Bell Shale, the Sunbury Shale, and the Coldwater Shale. RTC at 2, 68. The Region laid special emphasis on the Coldwater Shale layer that is present at the site of the Haystead well at a depth of approximately 217 to 1,200 feet below ground

² An aquiclude is "a geologic formation or stratum that confines water in an adjacent aquifer." Webster's Third New Int'l Dictionary 108 (1993).

³ The Region also cites the following additional rock layers in the Salina Group: the A-1 Evaporite, the D-unit salts, and the shales and anhydrite beds in the E-Unit. The Hydrologic Atlas describes these layers as having low or zero permeability. *Hydrologic Atlas* at II-43, II-51, II-55.

level. *Id.* The thickness of this impermeable layer is documented by drilling records from the immediate vicinity of the Haystead well. Region's Resp. at 22; RTC at 2, 68.

(4) **Seismic data show no faults or fractures.** After reviewing seismic data and geophysical profiles submitted by West Bay, the Region concluded that there are no fractures or faults present within the vicinity of the Haystead well in the Niagaran Group injection zone, RTC at 9, the Salina Group, *id.* at 66, or the Coldwater Shale, *id.* at 17.

(5) **The steel well casings will be cemented to prevent movement of fluids.** The Permit requires that the Haystead well consist of three steel casing strings set to 350, 930, and 2,780 feet. Permit at 15, B-2 of 2. Each casing, the Region explained, will be encased in cement "to preclude the movement of fluids into and between [underground sources of drinking water] due to injection operations." RTC at 66.

Mr. Bormuth has a far different view of the risk posed to underground sources of drinking water by injection of brine at the Haystead well. He disputes the Region's conclusion that the injected brine will be confined to the Niagaran Group by the Salina Group and the other rock strata overlying the injection zone. Mr. Bormuth's theory runs as follows: first, the injected brine will convert the anhydrite in the Salina Group into gypsum, and this conversion process will cause the converted anhydrite to swell and fracture. Petition for Review, Appeal No. UIC 14-66 ("Pet."), at 2; Transcript at 39-41. Then, the brine will saturate the Salina Group and dissolve the salt layers in the Group. Petitioner Peter Bormuth's Reply to EPA response to Petition for Review UIC 14-66 ("Reply") at 4-5. Finally, with the layers of the Salina Group fractured or dissolved, the brine will be forced upward by "a known vertical component to the Michigan hydraulic gradient * * * through pre-existing fractures in the overburden rock

formation” until it reaches the near surface aquifers. Pet. at 7. Mr. Bormuth’s petition is replete with citations to scientific articles, which he claims substantiate his thesis. Mr. Bormuth labels the Region’s conclusion that the injected waste will be confined to the Niagaran Group as “a joke and contrary to all known scientific theory and current technological practices.”⁴ Reply at 5.

The Region characterizes Mr. Bormuth’s scientific arguments as an “extrapolat[ion of] various arguments from different unrelated publications to loosely frame an argument based on conjecture.” Region’s Resp. at 9. The Region does not disagree that anhydrite can be converted to gypsum by exposure to water. But, according to the Region, anhydrite conversion occurs only near the surface and would not happen at the depth of the Salina Group. *Id.* at 23. The Region also stresses that there are many impermeable rock layers between the Salina Group and the Marshall Sandstone aquifer. *Id.* at 21-22. Finally, the Region faults Mr. Bormuth for relying almost entirely on information and articles not cited or provided to the Region during the public comment period. *Id.* at 10.

2. Discussion

The Region concluded that “2,653 feet of rock strata” protect the Marshall Sandstone aquifer from brine injected to the Niagaran Group. Stmt. Basis at 2; Transcript at 8; RTC at 2. Yet, Mr. Bormuth focuses his challenge to the Haystead well on a relatively thin layer of those

⁴ Mr. Bormuth also alleges that the Region’s approval of the West Bay permit was motivated by “Christians in the EPA who deliberately want to destroy the Great Lakes watershed and aquifers,” Reply at 9, and that the Board is prejudiced against him because of his religious beliefs, *id.* (“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.”). Because Mr. Bormuth offers not a scintilla of evidence to substantiate these allegations, the Board summarily rejects them.

strata – the anhydrite in the Salina Group. Our discussion of Mr. Bormuth’s challenge looks first at the non-anhydrite strata and then turns to the anhydrite in the Salina Group.

a. Rock Layers Other Than Anhydrite

Mr. Bormuth devotes little attention to the Region’s conclusion that the Marshall Sandstone aquifer is protected from the injected brine by multiple impermeable rock layers, not just the anhydrite in the Salina Group. As explained below, the Board concludes that Mr. Bormuth has not shown that the Region clearly erred in its determination that several other rock layers – principally, the Coldwater Shale – form an impermeable barrier protecting the Marshall Sandstone aquifer.

In his public comments and his petition, Mr. Bormuth relies on a recently published stratigraphic map to argue that the Coldwater Shale will not protect the Marshall Sandstone aquifer from brine injected into the Niagaran Formation.⁵ E-mail from Peter Bormuth to Timothy Elkins, U.S. EPA (Apr. 30, 2013, 10:21 pm) (A.R. 54); Pet. at 6-7. He claims that this map shows that the Coldwater Shale is only 250 feet thick – not almost 1,000 feet as the Region concluded. He further argues that both this map and the stratigraphic map the Region relied on show that the Coldwater Shale is layered with sandstone and is therefore permeable. Pet. at 6-7. Mr. Bormuth ignores, however, that the Region’s conclusions regarding the Coldwater Shale are

⁵ Mr. Bormuth principally insists that no substantive rebuttal is needed to the Region’s reliance on the Coldwater Shale because the Region allegedly has not formally designated the Coldwater Shale as the “confining zone” for brine injected to the Niagaran Group. Pet. at 6. However, Mr. Bormuth acknowledged in comments filed during the public comment period that he was aware of the Region’s reliance on the Coldwater Shale as the “ultimate confining zone protecting” underground drinking water supplies. E-mail from Peter Bormuth to Timothy Elkins, U.S. EPA (Apr. 30, 2013, 10:21 pm) (A.R. 54). Thus, Mr. Bormuth is in no position to claim he did not have a full opportunity to contest the Region’s reliance on the Coldwater Shale.

based primarily on drilling records from two wells immediately adjacent to the Haystead wellsite not general stratigraphic maps. RTC at 7. The records from these wells show the Coldwater Shale to be nearly 1,000 feet thick and free of sandstone. *Id.*

Mr. Bormuth also advances a new argument in his Petition as to why the Coldwater Shale is not impermeable. He claims that the Region has ignored “a known vertical component to the Michigan hydraulic gradient which will move the injected brine upward naturally through pre-existing fractures in the overburden rock formations.” Pet. at 7. This claim, however, was not presented to the Region during the public comment period. The Board will not consider issues raised for the first time on appeal.⁶ 40 C.F.R. § 124.19(a)(4)(ii); *Westborough*, 10 E.A.D. at 304, 308-09; *In re W. Bay Exploration Co.*, UIC Appeal No. 14-67, at 7-8 (July 3, 2014) (Order Denying Review) (dismissing claim by another petitioner challenging the permit for the Haystead well for failure to specifically raise the claim during the public comment period).

Additionally, Mr. Bormuth fails to adequately contest the Region’s reliance on shale and salt layers in the Salina Group to demonstrate that the injected brine would not escape the injection zone. Transcript at 8; RTC at 2. Mr. Bormuth either ignores the existence of these

⁶ In addition, Mr. Bormuth presents no evidence to support his claim of pre-existing fractures in the rock formations between the Salina Group and the Marshall Sandstone. As noted above, the Region relied on seismic data and geophysical profiles to conclude no such fractures exist.

formations (the shale layer)⁷ or makes untimely arguments concerning their permeability (the salt layers).⁸

b. *Anhydrite in the Salina Group*

Mr. Bormuth's argument that the Haystead well will endanger underground aquifers is based mainly on his theory that the injected brine will convert the anhydrite layers in the Salina Group to gypsum, resulting in the breach of these layers. To support this theory, Mr. Bormuth cites a long list of scientific articles and submits copies of the articles to the Board. However, Mr. Bormuth has not preserved some aspects of this argument for review because he failed to cite or provide some of these articles to the Region during the public comment period.

In his testimony at the public hearing, Mr. Bormuth took a very different approach than in his petition.⁹ Although he outlined the basics of his anhydrite conversion theory, he did not present the list of citations and copies of the cited articles that were included in his petition to the Board. Transcript at 39-41. Instead, his testimony is filled with claims such as “[l]aboratory

⁷ Mr. Bormuth's petition and reply brief repeatedly describe the composition of the Salina Group but omit mention of its shale layer on each occasion. Pet. at 3, 6; Reply at 5.

⁸ In his reply brief, Mr. Bormuth now claims for the first time that the salt layers in the Salina group “will dissolve in solution upon receiving the injected fluid.” Reply at 4; see *In re BP Cherry Point*, 12 E.A.D. 209, 216 n.18 (EAB 2005) (rejecting new argument in reply brief as untimely).

⁹ In addition to his testimony, Mr. Bormuth filed three separate written comments during the public comment period on discrete subjects. See E-mail from Peter Bormuth to Anna Miller and Timothy Elkins, U.S. EPA (Apr. 16, 2013, 8:58 pm) (A.R. 52) (expressing displeasure with EPA and suggesting a different injection zone 1500 feet lower); E-mail from Peter Bormuth to Timothy Elkins, U.S. EPA (Apr. 30, 2013, 10:21 pm) (A.R. 54) (questioning the thickness and impermeability of the Coldwater Shale); E-mail from Peter Bormuth to Timothy Elkins, U.S. EPA (May 2, 2013, 9:08 pm) (A.R. 58) (asking Region to consider the earthquake risk to the Haystead well).

experiments show,” “many researchers are reporting,” and “[o]ther studies show.” *Id.* In effect, Mr. Bormuth is attempting to use this appeal to bypass the Region, the permit issuing authority here. He has saved the full elaboration of his argument and the supporting scientific articles for presentation to the Board in his permit appeal. Allowing this tactic would turn the administrative permit process on its head. *In re BP Cherry Point*, 12 E.A.D. 209, 219-20 (EAB 2005) (holding that resolving newly-raised issues on appeal would be “contrary to the expectation that ‘most permit conditions should be finally determined at the [permit authority] level’” (quoting *In re Knauf Fiber Glass, GMBH*, 8 E.A.D. 121, 127 (EAB 1999))). The Region, not the Board, has the technical expertise to grapple with complex scientific questions, such as the geologic argument Mr. Bormuth presents, as a first line decision-maker. *E.g. W. Bay Exploration*, UIC Appeal No. 14-67 at 4. The Board’s role is not to make initial scientific findings but to review the Region’s decisions to determine if the Region has based its conclusions on clearly erroneous conclusions of fact or law. 40 C.F.R. § 124.19(a)(4)(ii).

Consistent with this division of responsibilities, EPA permit regulations require that any person who believes that a permit condition is inappropriate to raise “all reasonably ascertainable issues and * * * all reasonably available arguments supporting [petitioner’s] position” to the permitting authority during the comment period on the draft permit. *Id.* § 124.13. Moreover, these regulations specifically require that “[c]ommenters shall make supporting materials not already included in the administrative record available to EPA as directed by the Regional Administrator.” *Id.* The Board’s regulations require exhaustion of issues before the permit issuer prior to Board review. *Id.* § 124.19(a)(4)(ii); *see Westborough*, 10 E.A.D. at 304, 308-09. Based on these regulations, the Board has frequently barred petitioners from relying on

documents on appeal that could have been, but were not, submitted to the permit issuer during the comment period. *See, e.g., In re Chevron Michigan, LLC*, UIC Appeal No. 13-03, at 16 (EAB Nov. 7, 2013) (Order Denying Review) (declining to consider article on appeal because, although article was published prior to comment period, it was not raised during the comment period); *In re Russell City Energy Ctr., LLC*, PSD Appeal Nos. 10-01 through 10-05, slip op. at 45 n.35, 57 n.46 (EAB Nov. 18, 2010).

Giving Mr. Bormuth the benefit of the doubt, in light of his lack of legal counsel,¹⁰ the Board finds that three of the articles cited in the Petition were at least marginally referenced in his public comments: articles by Joanna Jaworska, R.C. Murray, and Ingo Sass and Ulrich Burbaum.¹¹ *See* Transcript at 39. The record indicates that the Region understood Mr. Bormuth to be relying on these articles; the Region addressed them at least generally in the Response to Comments document. RTC at 67-68. The Board therefore will consider each of these articles to be included by reference in the record of this case. The Board will not review the other articles cited in Mr. Bormuth's Petition as they were not raised to the Region's attention during the public comment period and are thus not properly before the Board.¹²

¹⁰ *See In re Sutter Power Plant*, 8 E.A.D. 680, 687 (1998) (noting that the Board broadly construes arguments from petitioners unrepresented by legal counsel to ensure that "public participation be meaningful and not unduly hampered by process restrictions").

¹¹ Joanna Jaworska, *Crystallization, Alternation and Recrystallization of Sulphates*, in *Advances in Crystallization Processes* (Itzhak Mastai ed., 2012); R.C. Murray, *Origin and Diagenesis of Gypsum and Anhydrite*, 34(3) *J. of Sedimentary Petrology* 512 (1964); Ingo Sass & Ulrich Burbaum, *Damage to the Historic Town of Staufen (Germany) Caused by Geothermal Drillings Through Anhydrite Formations*, 39(2) *Acta Carsologica* 233 (2010).

¹² Mr. Bormuth does not dispute that he did not submit these studies during the public comment period. He seeks to excuse this omission by claiming that he offered to provide the scientific articles to the Region's permit writer, Mr. Timothy Elkins, but received no response.

In any event, the Board finds that the Jaworska, Murray, and Sass and Burbaum articles do not meaningfully support Mr. Bormuth's theory that anhydrite layers at the depth of the Salina Group would be breached by injected brine. The Jaworksa and Murray articles generally discuss a geological cycle whereby buried gypsum may be replaced by anhydrite, and, in turn, the anhydrite may be re-converted to gypsum if the overburden is removed. *See* Jaworska, *supra* note 11, at 468; Murray, *supra* note 11, at 522. The Jaworska article, however, does not discuss in detail whether gypsification of anhydrite can occur at a depth of more than 2,600 below the surface (the situation presented in this case), and Mr. Bormuth does not cite it for that purpose. Reply at 5; Transcript at 39. The Murray article does suggest this possibility, but only briefly. Murray writes:

Although the transition [from anhydrite to gypsum] commonly takes place within a few hundred feet of the present surface, the replacment of anhydrite by gypsum has been observed as deep as 3500 feet in the Permian San Andrea Formation, Dune field, Crane County, Texas.

Murray, *supra* note 11, at 512. Murray, however, provides no other details about this discovery. The article contains no information on the thickness of the converted anhydrite or the causative factors in the anhydrite conversion. Further, the article provides no documentation of the discovery other than a photograph. *Id.* at 513 fig.1. This single reference in the Murray article to

Reply at 1-2. However, the public notice initiating this Permit proceeding clearly established how members of the public were to submit comments. U.S. EPA, Region 5, New Disposal Well Permit Near Brooklyn, Michigan (April 2013) (A.R. 99) (specifying that comments may be submitted "in writing at the public hearing and during the public comment period via standard mail or email, or orally during the formal public meeting"). Offering to submit the articles to the Region did not meet the terms specified by the Region and does not comply with the requirements of 40 C.F.R. § 124.13.

gypsification of anhydrite at depth of 3,500 feet is a slender reed upon which to construct the elaborate argument made by Mr. Bormuth.

The Sass and Burbaum article also addresses a situation that is not analogous to the Haystead well. Sass and Burbaum discuss an incident in Staufen, Germany involving subsurface conversion of anhydrite to gypsum that resulted in the swelling and fracturing of the anhydrite. Sass & Burbaum, *supra* note 11, at 234. But the circumstances in the city of Staufen are far different than the situation at the Haystead well. In Staufen, borehole heat exchange wells were drilled through a near-surface anhydrite layer into a confined artesian (i.e. pressurized) aquifer. *Id.* at 238-39. Improper sealing of the boreholes led to groundwater infiltration of the holes and the subsequent swelling and fracturing of the anhydrite. *Id.* These wells were drilled to depths of between 105 and 140 meters (approximately 345 to 460 feet) and the anhydrite layer began about 60 meters (197 feet) underground. *Id.* In contrast, the Haystead well will be drilled into a formation that will readily accept fluids, the well must meet rigorous construction requirements to prevent fluid infiltration of the borehole, and the anhydrite layer is greater than 2,350 feet underground.

Mr. Bormuth attempts to buttress his argument for the conversion of the anhydrite layers in the Salina Group with a flurry of facts, figures, and calculations on temperature, solubility, and pressure. See Transcript at 39-41; Pet. at 3-5; Reply at 4-5. Mr. Bormuth fails to explain, however, how these calculations demonstrate that anhydrite will be converted to gypsum at the depth of the Salina Group.¹³ In sum, the only evidence that he provides to support his theory is

¹³ For example, at the public hearing, Mr. Bormuth stated that (1) “[e]ach 0.01 [pascal] increase in pressure results in 3 to 5 times increase in solubility” of anhydrite; (2) overburden pressure on the Salina Group anhydrite is “roughly 1,290 [pounds per square inch];” (3) the

the Murray article's brief mention of a single unexplained incident of anhydrite conversion at the depth of 3,500 feet. This marginal evidentiary showing falls well short of demonstrating the Region clearly erred in its technical evaluation of Mr. Bormuth's anhydrite conversion argument for the Haystead well situation.

4. *Conclusion on Petitioner's Groundwater Endangerment Argument*

The Board concludes that Mr. Bormuth has failed to demonstrate that the Region made a clear error of fact or law in finding that the Haystead well does not present an endangerment to underground supplies of drinking water. The Region is entitled to deference on this technical issue and has provided a well-reasoned and thoroughly-documented explanation for its conclusion that the Marshall Sandstone aquifer is protected from contamination by 2,653 feet of rock strata. In his petition, Mr. Bormuth attempts to shift the focus to a relatively narrow segment of these rock strata, the anhydrite layers in the Salina Group, and argues that these rock layers will be breached by the injected brine. As discussed above, however, the Board has determined that the evidence that Mr. Bormuth has submitted to substantiate this claim is marginal at best. Mr. Bormuth presents an even less convincing case that the other rock strata relied upon by the Region will not confine the injected brine. He ignores findings by the Region that are inconvenient to his argument, and he failed to timely raise or adequately support several claims critical to his position. For these reasons, the Board defers to the Region's technical judgment that the Haystead well will not endanger the Marshall Sandstone aquifer.

swelling of hydrated anhydrite will create "pressures of 1.7 to 4.7 [megapascals];" and (4) "[s]alinic pressures as high as 10,000 [pounds per square inch], 70 [megapascals]" have been reported in anhydrite deposits in Texas. Transcript at 40. Based on these abstract calculations, he jumped immediately to the conclusion that "[t]his pressure will rapidly cause a conversion and breaching of the anhydrite cap." *Id.*

B. *Endangered Species*

Mr. Bormuth next challenges the Region's compliance with the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531-1544. Section 144.4 of Title 40 of the Code of Federal Regulations directs that the ESA "may apply to issuance of permits under the [UIC] rules," and that, if it does apply, "its procedures must be followed." 40 C.F.R. § 144.4. ESA section 7 requires all federal agencies to ensure, through consultation with the Secretary of the Interior, that their actions are "not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification" of a species' critical habitat. ESA § 7(a)(2), 16 U.S.C. § 1536(a)(2). A federal agency considering taking an action is required to determine whether a proposed action "may affect," directly or indirectly, species listed as endangered or threatened or designated critical habitat. 50 C.F.R. § 402.14(a). If this determination is in the affirmative, then formal consultation on the action is required with the U.S. Fish and Wildlife Service. However, if an agency determines, on the basis of a biological assessment prepared under 40 C.F.R. § 402.12 or an informal consultation with the U.S. Fish and Wildlife Service, that the proposed action is not likely to adversely affect a listed species or critical habitat, no formal consultation is required and no further action is required under the ESA. 50 C.F.R. §§ 402.13(a), .14(a).

Based on an ecological assessment submitted by West Bay, the Region identified two listed endangered species, the Indiana bat and Mitchell's satyr butterfly, and two candidates for listing, the eastern massasauga (a rattlesnake) and the Poweshiek skipperling (a butterfly), that may be found in Jackson County. RTC at 49-50; Westshore Consulting, *Additional Information Requested for the Haystead SWD #9 Injection Well, Permit Application #MI-075-2D-0010*

(“Westshore Rpt.”) at 1 (March 19, 2012) (A.R. 13). However, the Region concluded that the Haystead well would have no impact on these species because it “will not affect [their] habitat.” RTC at 50. The identified habitat for the four species are upland woods, riparian woods or woodlots located close to rivers or streams; and wetlands, wet praires, or fen wetlands. Westshore Rept. at 2. The Haystead well is proposed to be in constructed in an “open upland plowed agricultural field.” *Id.* Records indicate that this location has historically been in agricultural use. RTC at 50. The proposed well will be close to two oil production wells (90 feet to the closest) and will require only minor clearing and leveling of a relatively small area of a plowed field (85 x 220 feet). *Id.* No access roads will be required and construction is planned for prior to the summer migration period for the Indiana bat. *Id.* Based on these facts, the Region found that no impact would occur on any of the four species, and the U.S. Fish and Wildlife Service, following an informal consultation, concurred in writing.¹⁴ RTC at 50; Letter from Scott Hicks, Field Supervisor, U.S. Fish and Wildlife Service, to Rebecca L. Harvey, U.S. EPA, Region 5 (Sept. 4, 2013) (A.R. 82).

Mr. Bormuth argues that the Indiana bat and the eastern massauga rattlesnake will be impacted by the Haystead well. Noting that a marsh, a river, and a creek are relatively close to the well site (within 100 to 1,500 feet), Mr. Bormuth argues that these bats and rattlesnakes will be present at the construction site. Pet. at 9, fig. 2. He claims that spills of toxic chemicals are

¹⁴ The U.S. Fish and Wildlife Service opined that nearby groundwater-dependent wetlands could be impacted if the injection well leaked and contaminated local aquifers. U.S. Letter from Scott Hicks, Field Supervisor, U.S. Fish and Wildlife Service, to Rebecca L. Harvey, U.S. EPA, Region 5, at 2 (Sept. 4, 2013) (A.R. 82). As discussed above, the Board has concluded that the Region reasonably determined that the Haystead well will not endanger groundwater.

frequent at injection wells and that insects are likely to be contaminated by these spills and later consumed by bats.

The Board defers to the Region and to the U.S. Fish and Wildlife Service on this technical question. The issue is not whether the two endangered species could be present at the site but whether they will be directly or indirectly impacted or affected. At most, Mr. Bormuth alleges an indirect impact on the endangered species. ESA regulations require that for an indirect effect to be cognizable it must be “reasonably certain to occur.” 50 C.F.R. § 402.02. To demonstrate an effect on the Indiana bat, Mr. Bormuth piles speculation (injectate will be spilled) upon speculation (insects will be contaminated) upon speculation (bats will consume contaminated insects in sufficient quantities to receive a toxic dose). As to the eastern massauga rattlesnake, Mr. Bormuth advances no reason, other than its possible presence in the area, as to why it would be impacted. Speculation does not meet Mr. Bormuth’s heavy burden of showing the Region clearly erred in resolving this technical question. Accordingly, the Board denies Mr. Bormuth’s endangered species claim.¹⁵

¹⁵ The Region also argues, among other things, that Mr. Bormuth’s endangered species claim should be denied because surface activities at the well site, such as spills, are outside the scope of UIC permit review. Region’s Resp. at 27. The Board, however, is uncertain precisely what the legal basis is for the Region’s contention, as the Region cites only to a Board decision not involving an ESA claim. *Id.* (citing *In re Presidium Energy, LC*, UIC Appeal No. 09-01 (EAB July 27, 2009) (Order Denying Review)).

V. CONCLUSION

For the foregoing reasons, the Board denies Mr. Bormuth's Petition.

So ordered.

Dated:

September 22, 2014

ENVIRONMENTAL APPEALS BOARD¹⁶

By: *Kathie A. Stein for Catherine R. McCabe*

Catherine R. McCabe
Environmental Appeals Judge

¹⁶ The three-member panel deciding this matter is composed of Leslye M. Fraser, Catherine R. McCabe, and Kathie A. Stein.

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **Order Denying Review** in the matter of West Bay Exploration Co., UIC Appeal No. 14-66 were sent to the following persons in the manner indicated:

By U.S. First Class Mail:

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Dated: SEP 22 2014



Annette Duncan
Secretary