BEFORE THE ENVIRONMENTAL APPEALS BOARD
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

In the Matter of:	)	
West Bay Exploration Company,	)	**Appeal No. UIC 15-03**
Traverse City, Michigan,	)	
West Bay #22 SWD,	)	
Permit No. MI-075-2D-0009	)	

RESPONSE TO PETITION FOR REVIEW

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Cases

Statutes

Regulations

TABLE OF ATTACHMENTS

APPENDIX A: CERTIFIED INDEX OF ADMINISTRATIVE RECORD

APPENDIX B: DOCUMENTS IN THE ADMINISTRATIVE RECORD REFERENCED IN THIS RESPONSE TO PETITION FOR REVIEW:

[1] Two maps in Attachment L of this permit application are 11" x 17". To facilitate e-filing and to facilitate copying by all parties during this appeal, Region 5 has reduced these maps in size to 8 ½" x 11" in Attachment B-1.

STATEMENT OF COMPLIANCE WITH WORD LIMITATION

This response brief complies with the 14,000 word limitation found at 40 C.F.R. § 124.19(d)(3). *See* 40 C.F.R. § 124.19(d)(1)(iv).

INTRODUCTION

Pursuant to 40 C.F.R. § 124.19(b), the United States Environmental Protection Agency, Region 5 ("Region 5") hereby responds to Appeal No. UIC 15-03, the Petition for Review ("Petition") by Peter Bormuth ("Petitioner") received by the Environmental Appeals Board ("Board") on December 31, 2015. UIC No. 15-03, Filing #1. The Petition seeks review, pursuant to 40 C.F.R. § 124.19, of a December 8, 2015 permit (Permit No. MI-075-2D-0009, hereafter "Permit") issued by Region 5 pursuant to the Underground Injection Control ("UIC") Program, Part C of the Safe Water Drinking Act ("SDWA"), 42 U.S.C. §§ 300h – 300h-8, and the regulations at 40 C.F.R. Parts 124, 144–148, to the West Bay Exploration Company, Traverse City, Michigan ("Permittee") for a UIC Class II well known as the "West Bay #22 SWD" well ("West Bay #22 well") to be constructed and operated in Jackson County, Michigan.

The Petition repeats identical arguments from Petitioner's unsuccessful 2013 challenge to the West Bay #22 well (EAB Appeal No. UIC 13-01) and from Petitioner's unsuccessful 2014 challenge to a factually-similar Class II UIC well, the Haystead # 9 well (EAB Appeal No. UIC 14-66). Specifically, Petitioner argues that Region 5 clearly erred in finding that the proposed injection would not endanger underground sources of drinking water ("USDW"), pointing to alleged insufficiencies in the upper confining zone for the West Bay #22 well. Petitioner is wrong, for reasons the Board has already recognized in denying Petitioner's identical arguments in UIC 14-66 regarding the factually-similar well.

The Board should deny the Petition for the following reasons. First, Petitioner fails to meet the threshold procedural requirements at 40 C.F.R. §§ 124.13 and 124.19(a)(4)(ii), because Petitioner fails to demonstrate that the issues challenged were raised during the comment period or that Region 5's responses to such issues are clearly erroneous or otherwise warrant review.

Second, Petitioner's arguments lack substantive merit, as Region 5 has provided a well-reasoned and thoroughly-documented explanation for its conclusion that the Permit's upper confining zone and additional confining zones protect USDWs; Petitioner has not provided evidence that the Region's conclusion is clearly erroneous or otherwise warrants review; and the Region is entitled to deference on this technical issue.

STATUTORY AND REGULATORY BACKGROUND

Congress enacted the Safe Drinking Water Act, 42 U.S.C. §§ 300f – 300j-26, as amended ("SDWA"), to safeguard the public's drinking water. Part C of the SDWA provides for the protection of underground drinking water sources through underground injection control ("UIC") programs that regulate the injection of fluids underground. 42 U.S.C. §§ 300h – 300h-8. EPA was directed to promulgate regulations establishing minimum requirements for UIC programs. *Id.* § 300h(b). One such requirement is that any person who intends to operate an underground injection well must obtain a permit. *Id.* § 300h(b)(1)(A). Region 5 has responsibility for administering the UIC permit program in the State of Michigan.[2] 40 C.F.R. § 147.1151.

Any interested person may submit comments on a proposed UIC permit during a public comment period—including a re-opened public comment period or a public hearing—that occurs before EPA issues the final permit decision. *See* 40 C.F.R. §§ 124.11, 124.12, 124.14. Any person who timely provides such comments may then challenge the final UIC permit decision by

[2] The SDWA directed EPA to promulgate regulations establishing minimum requirements for states to administer their own UIC programs, subject to EPA approval. 42 U.S.C. §§ 300h(a), 300h-1(b). If a state did not apply for approval to administer its own UIC program, or applied but did not receive EPA approval, then EPA was required to implement UIC regulations for that state. Id. § 300h-1(c); 40 C.F.R. § 144.1(e). The State of Michigan has not been approved to administer its own UIC permit program. Thus, Region 5 administers Michigan's UIC program. *See* 40 C.F.R. § 147.1151.

filing a petition for review with the Board within the 30 day period after the Regional Administrator serves notice of the issuance of the final UIC permit decision.[3] *Id.* § 124.19(a)(1), (a)(3).

FACTUAL AND PROCEDURAL BACKGROUND

On April 21, 2011, Region 5 received a UIC permit application from the Permittee, dated March 20, 2011, to construct and operate the West Bay 22 well in Jackson County, Michigan for non-commercial disposal of brine from Permittee's production wells. Att. B-1. The application proposed injecting the brine underground for disposal, into an injection zone consisting of the Salina A-1 Evaporite; Cain Formation; and Niagara Group, at depths of 2,662-3,032 feet. *Id.*, Att. G, p. 3 of 8. The application proposed the Salina A-2 Evaporite as an upper confining zone preventing upward spread of the injection fluid, at depths of 2,634-2,662 feet. *Id.*, pp. 2-3 of 8, discussion of Att. G. The application stated that the deepest USDW in the area is the Marshall Sandstone, extending down to a depth of 226 feet. *Id.*, p. 2 of 8, discussion of Att. E.

In January 2012 Region 5 issued a draft permit for the West Bay #22 well, with Permit No. MI-075-2D-0009 ("2012 draft permit"). UIC 13-01; UIC 13-02, Filing #6.4, Att. B-3. A pair of public comment periods for the 2012 draft permit ran for 30 days from January 30, 2012; from April 17, 2012 through June 1, 2012; and included a public hearing on May 23, 2012. UIC 13-01; UIC 13-02, Filing #6.4, Atts. B-4 and B-5. During the second public comment period, Petitioner commented on the 2012 draft permit. UIC 13-01; UIC 13-02, Filing #6.4, Att. B-6. On December 6, 2012, EPA completed a Response to Comments ("RTC") that addressed all

[3]The Administrator delegated her authority to review UIC and other permit decisions to the Board. *See* 40 C.F.R. § 124.2(a); *Greenpeace, Inc. v. EPA*, 43 F.3d 701, 705 n.8 (D.C. Cir. 1995).

public comments regarding the 2012 draft permit. UIC 13-01; UIC 13-02, Filing #6.4, Att. B-7.

On December 10, 2012, Region 5 issued a final permit for the West Bay #22 well dated December 6, 2012, with Permit No. MI-075-2D-0009 and an effective date of January 9, 2013 ("2012 final permit"). UIC 13-01; UIC 13-02, Filing #6.4, Att. B-8. Petitioner and another individual named Sandra Yerman both filed petitions with the Board challenging the 2012 final permit, resulting in Board Appeal Nos. UIC 13-01 (Petitioner's appeal) and UIC 13-02 (Ms. Yerman's appeal). UIC 13-01; UIC 13-02, Filings #1 and #4. In UIC 13-01, Petitioner advanced essentially the same argument that his Petition does now. UIC 13-01; UIC 13-02, Filing #1, pp. 1-7. On April 8, 2013, Region 5 withdrew the 2012 final permit in its entirety, pursuant to 40 C.F.R. § 124.19(j). UIC 13-01; UIC 13-02, Filing #7. On April 16, 2013, the Board accordingly issued an order dismissing Appeal Nos. UIC 13-01 and UIC 13-02 as moot. UIC 13-01; UIC 13-02, Filing #9.

After Petitioner and Ms. Yerman unsuccessfully sought to have the Board reverse its dismissal for mootness, Petitioner sought to overturn the Board's dismissal by filing a "Plaintiff's Complaint" seeking that relief in the U.S. District Court for the District of Columbia. Att. B-2. The District Court received that document on June 25, 2013. But the U.S. District Court for the District of Columbia was an improper venue for Petitioner's appeal. So on November 26, 2013, the District Court transferred Petitioner's federal judicial action to the correct venue: The U.S. Court of Appeals for the Sixth Circuit. Att. B-3.

Petitioner's efforts to overturn the Board's decision continued in the Sixth Circuit with a "Petition for Review" that the Sixth Circuit received on March 5, 2014. Att. B-4. In this filing Petitioner sought a range of relief, including overturning the Board's dismissal of Appeal No. UIC 13-01 for mootness as well as a temporary injunction halting the operation of at least 17

UIC Class II brine injection wells across the State of Michigan. Att. B-4, pp. 29-30. The Sixth Circuit dismissed Petitioner's appeal for lack of standing due to mootness, in an Order dated March 16, 2015. Att. B-5. Petitioner sought a rehearing, which the Sixth Circuit denied in a November 25, 2015 Order. Att. B-6. This order ended Petitioner's federal judicial actions regarding Appeal No. UIC 13-01.

While he was litigating the Board's dismissal of Appeal No. UIC 13-01 in federal court, in May 2014 petitioner filed a petition for review with the Board regarding a final UIC permit that Region 5 had issued for the Haystead #9 well, another of Permittee's Class II brine injection wells. UIC 14-66; UIC 14-67, Filing # 1. The Haystead #9 well has similar facts to the West Bay #22 well. Specifically, the Haystead #9 well:

• is in the same county, Jackson County, Michigan; *see* UIC 14-66; UIC 14-67, Filing #16, Att. 3, Att. B; Filing #16, Att. 20, p. 1.

• has the same injection zone, the Niagara Group, at a depth at the Haystead #9 well location of 2,870-3,100 feet; *see* UIC 14-66; UIC 14-67, Filing #16, Att. 3, p. 3 of 8, discussion of Att. G; Filing #16, Att. 18, pp. 31, 46, 56, 66; Filing #16, Att. 20, p. A-1 of 1

• has the same upper confining zone, the Salina Group, *see* UIC 14-66; UIC 14-67, Filing #16, Att. 18, pp. 30, 33, 46-47, 56-57, 65-66

• was issued on the same basis, that additional impermeable formations above the Salina Group would act as additional confining zones, specifically including the Antrim Shale, Bedford Shale, Bell Shale, Sunbury Shale and Coldwater Shale Formations, *see* UIC 14-66; UIC 14-67, Filing #16, Att. 8, p. 2; Filing #16, Att. 18, pp. 2, 5-7, 31, 47, 56

• must protect the same USDW, the Marshall Sandstone, at a maximum depth at the Haystead #9 location of 217 feet; *see* UIC 14-66; UIC 14-67, Filing #16, Att. 3, p. 2 of 8, discussion of Att. E; Filing #16, Att. 18, pp. 2, 14

Petitioner's appeal of the Haystead #9 well, EAB Appeal No. UIC 14-66, raised identical arguments to those that Petitioner raises in the instant Petition. The Board ruled against Petitioner in UIC 14-66, in part due to Petitioner's failure to provide during the public comment period the documents upon which he based his arguments and in part because his surviving arguments lacked merit. *In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 (EAB Sept. 22, 2014), *Recons. Den. In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 42 (EAB Oct. 21, 2014).

After withdrawing the 2012 final permit, Region 5 prepared a revised draft permit for the West Bay #22 well, based on the original 2011 permit application; information acquired during the public comment periods and during the various appeals relating to the 2012 final permit; and additional information that Region 5 requested from the Permittee beginning in 2013. In October 2014, Region 5 wrote a pair of memorandums to the West Bay #22 well file that documented Region 5's evaluation of 1) geological siting issues, including the appropriateness of the injection and confining zones; and 2) induced seismicity issues in the vicinity of the well site. Atts. B-7, B-15. On or about October 14, 2014, Region 5 notified the public that it had prepared a revised draft permit for the West Bay #22 well, with Permit No. MI-075-2D-0009 ("2014 draft permit"). Att. B-8. The 2014 draft decision authorized injection only into the Niagara Group; used the Salina Group as an upper confining zone; and relied on additional impermeable formations above the Salina Group as additional confining zones, specifically including the

Antrim Shale, Bedford Shale, Bell Shale, Sunbury Shale and Coldwater Shale Formations. Att. B-8, Permit, pp. 1, A-1 of 1; Att. B-7, Statement of Basis, p. 2.

Region 5 held a public comment period for the 2014 draft permit, from October 16, 2014 through November 24, 2014. Att. B-9. This included a public hearing on November 20, 2014. Atts. B-9, B-10. Petitioner attended the public hearing, where he provided oral comments and submitted copies of multiple Wikipedia excerpts, draft reports and scientific articles to Region 5. Att. B-10. Petitioner's comments included the issue that he now raises in the Petition. Att. B-10.

On December 8, 2015, Region 5 issued the Permit, as well as an RTC addressing all public comments regarding the 2014 draft permit. Atts. B-11, B-12. Like the 2014 draft permit, the Permit authorized injection only into the Niagara Group. Att. B-12, pp. 1, A-1 of 1. The Permit decision accepted the Salina Group as the upper confining zone, additionally noting that formations above the Salina Group would act as additional confining zones, specifically including the Antrim Shale, Bedford Shale, Bell Shale, Sunbury Shale and Coldwater Shale Formations. Att. B-11, pp. 3, 9-12.[4] Region 5 found that there were no known faults or fractures in the area of review. Att. B-11, pp. 13-15; Att. B-15.

Region 5 mailed a notice of the final permit; the Permit; and the RTC, to Petitioner and to all other persons who had provided Region 5 with comments or participated in the public hearings, for either the 2012 draft permit or the 2014 draft permit, as well as to State and federal officials. *See* 40 C.F.R. § 124.15(a). The notice of the final permit and the RTC both included detailed information regarding how persons who filed comments on the draft permit or

[4] 40 C.F.R. § 146.3 defines a confining zone as "a geological formation, group of formations, or part of a formation that is capable of limiting fluid movement above an injection zone."

participated in the public hearing may petition the Board to review any condition of the final permit decision. Atts. B-11, B-12.

On December 31, 2015, the Board received the Petition, beginning this Appeal No. UIC 15-03. Pursuant to 40 C.F.R. §§ 124.19(b)(2), 124.20(c), Region 5's response to the Petition is due on or before February 1, 2016.

STANDARD OF REVIEW

The standard of review for appeal of a permit (petition for review) issued under 40 C.F.R. Part 124 is governed by 40 C.F.R. § 124.19. The Board has the discretion either to grant or deny review of a permit decision. *See In re Avenal Power Ctr., LLC*, 15 E.A.D. 384, 394 (EAB 2011) slip op. at 14-15 (EAB Aug. 18, 2011). In considering a petition for review filed under 40 C.F.R. § 124.19, the EAB must first evaluate whether the petitioner has met certain threshold requirements of the applicable regulations such as "timeliness, standing, issue preservation and specificity." 40 C.F.R. § 124.19(a)(2) – (4); *see also In re Seneca Resources Corp.*, UIC Appeal Nos. 14-01 through 14-03, 2014 EPA App. LEXIS 21, *2 (EAB May 29, 2014) (citing *In re Indeck-Elwood, LLC*, 13 E.A.D. 126, 143 (EAB 2006)).[5]

While the Board may relax some of the more technical pleading standards for *pro se* petitioners such as Petitioner, even under this more liberal standard a petitioner must still identify the elements at issue in the permit and articulate how the Region erred or how it exercised its

[5] Petitioner meets the 40 C.F.R. § 124.19(a)(2) standing requirements to file a petition for review of the Permit. Anyone who filed comments on the 2014 draft permit during the public comment period, or who participated in the public hearing, is entitled to submit such a petition to the Board. 40 C.F.R. § 124.19(a)(2); *see also In re Beeland Group, LLC*, 14 E.A.D. 189, 195 (EAB Oct. 3, 2008). As set forth in Section I.A of the Argument, below, Petitioner has not cited to where his comments appear in the public record. But upon examining the record, Region 5 determined that Petitioner participated in the November 20, 2014 public hearing. Att. B-9.

discretion in a manner that warrants Board review. 40 C.F.R. § 124.19. *See In re West Bay Exploration Co.,* UIC Appeal Nos. 14-66 and 14-67, 2014 EPA App. LEXIS 25, *2-*3 (EAB July 3, 2014); *In re Seneca Resources Corp.*, 2014 EPA App. LEXIS 21 at *4, n.1 and *5; *In re Envtl. Disposal Sys., Inc.*, 12 E.A.D. 254, 292 n.26 (EAB 2005); *In re Beckman Prod. Servs.*, 5 E.A.D. 10, 19 (EAB 1994); *In re Presidium Energy, LC*, UIC Appeal No. 09-01, 2009 EPA App. LEXIS 36, *7 (EAB July 27, 2009) (citing *In re Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 127 & n.72 (EAB 1999); *See In re Sutter Power Plant,* 8 E.A.D. 680, 687 (EAB 1999); *In re Envotech, L.P.*, 6 E.A.D. 260, 267-69 (EAB 1996).

The Petitioner has the burden of demonstrating that review by the Board is warranted. *In re City of Palmdale,* PSD Appeal No. 11-07, 2012 EPA App. LEXIS 29, *11 (EAB Sep. 17, 2012). To satisfy this burden, petitioners must meet their threshold pleading requirements. *See In re West Bay Exploration Co.,* 2014 EPA App. LEXIS 25 at *2-*3; *In re Seneca Resources Corp.*, 2014 EPA App. LEXIS 21 at *2-*4; *In re Cherry Berry B1-25 SWD,* UIC Appeal No. 09-02, 2010 EPA App. LEXIS 33, *2 (EAB Aug. 13, 2010), (quoting *In re Beeland Group, LLC,* 14 E.A.D. at 194-195). If the EAB finds that a petitioner has failed to meet a threshold pleading requirement, the Board "typically denies or dismisses the petition for review." *In re Seneca Resources Corp.*, 2014 EPA App. LEXIS 21 at *3 (citations omitted). The EAB "has frequently dismissed petitions that failed to meet these standards." *In re Cherry Berry*, 2010 EPA App. LEXIS 33 at *2 (citations omitted).

Should the EAB determine that a petitioner has met its threshold pleading obligations, then the Board determines the appropriate standard of review and decides whether the issues raised in the subject petition have any merit. *See In re Seneca Resources Corp.*, 2014 EPA App. LEXIS 21 at *2. Typically, the EAB declines to review a UIC permit decision unless the

petitioner demonstrates that the permit decision is either: 1) based upon a "clearly erroneous" finding of fact or conclusion of law; or 2) involves an "important policy consideration" or "exercise of discretion" that warrants review by the Board. 40 C.F.R. § 124.19(a)(4); *see also In re Envtl. Disposal Sys.*, 12 E.A.D. at 263 (citations omitted).[6]

The Petitioner must demonstrate that either of the above-listed conditions of 40 C.F.R. § 124.19(a)(4) have been met by: identifying the permit conditions at issue and to be reviewed; showing that the Petitioner commented on the subject condition and the issue was raised during the public comment period; and addressing the Region's response to Petitioner's comments and explaining why such response was inadequate. *In re Presidium Energy*, 2009 EPA App. LEXIS 36 at *5-*6. *See also* the Board's codification of such concepts at 40 C.F.R. §§ 124.19(a)(4)(i), 124.19(a)(4)(ii).

The EAB has in the past also looked to the preamble to 40 C.F.R. Part 124, which says that the Board's review should only be exercised "sparingly" and that "most permit conditions should be finally determined" by the Regions. Consolidated Permit Regulations, 45 Fed. Reg. 33,290, 33,412 (May 19, 1980); *accord In re Scituate Wastewater Treatment Plant*, 12 E.A.D. 707, 717 (EAB 2006); and *In re City of Moscow*, 10 E.A.D. 135, 140-41 (EAB 2001).

Evaluating Petitioner's appeal of the Haystead #9 permit, which raised a technical determination challenge identical to that which Petitioner raises here, the Board expounded on the standard for review of technical determinations:

> 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

[6] Petitioner incorrectly suggests that Region 5 bears a burden of proof on this appeal, to prove that the Permit will not endanger a USDW. UIC 15-03, Filing #1, p. 1. Petitioner misstates the law. As stated above, on appeal Petitioner has the burden of proving that Region 5 made a "clearly erroneous" finding of fact or conclusion of law.

> 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 long as the permit issuer adequately explains its rationale and supports its reasoning in the administrative record. Accordingly, it is particularly important for petitioners challenging technical determinations to address the Region's rationale for its decision. 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." Thus, in challenging technical determinations, a petitioner bears a "particularly heavy burden" to show that the permit issuer has clearly erred. [*In re West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *5-*6 (citations omitted)]

ARGUMENT

1. Petitioner has not satisfied the procedural requirements for obtaining review, and therefore the Board should deny the Petition

Petitioner has not met the procedural requirements at 40 C.F.R. §§ 124.13 and 124.19(a)(4)(ii) for obtaining Board review of the Petition. In addition, the Petitioner has not adequately explained why the Region's response to comments on this issue was clearly erroneous or otherwise requires review. *See In re West Bay Exploration Co.,* 2014 EPA App. LEXIS 25 at *1-*2. Also, the Petition appears to rely on information and to cite supporting material that Petitioner did not provide to EPA during the public comment period as required by 40 C.F.R. § 124.13.

A. Petitioner has not met his burden to demonstrate that his arguments were raised during the public comment period, or cited to where his arguments and supporting documents appear in the administrative record, and therefore the Board should deny the Petition

The Board may relax some of its more technical pleading standards for pro se petitioners such as Petitioner. *Id.,* at *3; *In re Envtl. Disposal Sys.,* 12 E.A.D. at 292, n. 26; *In re Beckman Prod. Servs.*, 5 E.A.D. at 19. Yet as the Board has noted, "it is not incumbent upon the Board to

scour the record to determine whether an issue was properly raised," and thus the Board still imposes a burden on every petitioner to demonstrate in the petition that the issues raised therein were first raised during the public comment period on the draft permit. *In re Presidium Energy*, 2009 EPA App. LEXIS 36 at *3, n.4 (quoting *In re Encogen Cogeneration Facility*, 8 E.A.D. 244, 250 n.10 (EAB 1999)). The Board has stated:

> The requirement that the petitioner must show that an issue was raised during the public comment period in order to preserve it for review on appeal is not an arbitrary hurdle placed in the path of potential petitioners. Rather, the requirement serves an important function related to the efficiency and integrity of the overall administrative permitting scheme. The rule's intent is to ensure that the permitting authority has the first opportunity to address objections, and to give some finality to the permitting process. [*In re Presidium Energy*, 2009 EPA App. LEXIS 36 at at *2, n.3 (citations omitted)]

Promulgated in 2013, the current language of 40 C.F.R. § 124.19(a)(4)(ii) formalizes this requirement by stating that:

> Petitioners must demonstrate, by providing specific citation to the administrative record, including the document name and page number, that each issue being raised in the petition was raised during the public comment period (including any public hearing) as provided in [40 C.F.R.] § 124.13.

Petitioner has failed to demonstrate that his arguments were raised during the public comment period. Petitioner argues what is essentially one issue on appeal. This is the same issue that Petitioner argued in EAB Appeal Nos. UIC 13-01 and UIC 14-66: that Region 5 clearly erred by choosing an upper confining zone that the injection fluid will penetrate and dissolve, before migrating thousands of feet upward to contaminate USDWs. But the Petition nowhere states that Petitioner or anyone else raised this issue during the public comment period. The Petition states that Petitioner submitted public comments, but provides no specific citation to the administrative record for them. UIC 15-03, Filing #1, pp. 1, 4.

Additionally, Petitioner's argument relies extensively on scientific documents. For either two or at most six of these documents, Petitioner states that he cited these documents in his public comments and that he provided copies of them to Region 5 at the November 2014 public hearing. UIC 15-03, Filing #1, p. 4.[7] But Petitioner fails to make specific citation to the administrative record, to show either that he cited these documents during the public comment period or provided them to Region 5. And the Petition goes on to cite additional scientific documents for Petitioner's argument, without making specific citation to the administrative record either for 1) where Petitioner cited these documents during the public comment period; or 2) where these documents themselves appear in the administrative record. UIC 15-03, Filing #1, pp. 4-7, 9-10.

As this Response sets forth further below, Petitioner's failure to cite to the administrative record regarding these documents can be explained by the fact that he cites a number of these documents for the first time in the Petition and that he has declined to produce them even now. This is similar to Petitioner's conduct in his Haystead #9 permit appeal, UIC 14-66. Petitioner has failed to meet his obligations under 40 C.F.R. § 124.19(a)(4)(ii). Despite Petitioner's *pro se* status, federal regulations regarding issue presentation apply to Petitioner as they apply to any other petitioner. Accordingly the Board should deny the Petition on this procedural ground.

B. Petitioner has not cited relevant comments and Region 5 responses, or explained why Region 5's responses to his comments are clearly erroneous, and therefore the Board should deny the Petition

Petitioner must properly support his argument as to why Region 5 erred in finding that the geologic siting of the West Bay 22 well was suitable. *See In re West Bay Exploration Co.,*

[7] The Petition is ambiguous regarding whether it references two or six articles as having been provided to Region 5 at the November 2014 public hearing. UIC 15-03, Filing #1, p. 4.

2014 EPA App. LEXIS 25 at *2-*3. He must show how Region 5's prior explanation of the suitability of injection and confining zones is clearly erroneous. *See In re Seneca Resources Corp.*, 2014 EPA App. LEXIS 21 at *2-*4; *In re Envtl. Disposal Sys.*, 12 E.A.D. at 292; *In re Beckman Prod. Servs.*, 5 E.A.D. at 19; *In re Presidium Energy*, 2009 EPA App. LEXIS 36 at *7; *In re Envotech*, 6 E.A.D. at 267-69. But he must also explain why Region 5's responses to his comments are clearly erroneous or otherwise warrant review. *In re City of Palmdale*, 2012 EPA App. LEXIS 29 at *12; *see In re Core Energy, LLC*, UIC Appeal No. 07-02, 2008 EPA App. LEXIS 2, *3 (EAB Jan. 15, 2008). A petitioner may not simply repeat objections made during the comment period but "must demonstrate why the [permit issuer's] response to these objections (the [permit issuer's] basis for its decision) is clearly erroneous or otherwise warrants review." *In re Newmont Nev. Energy Inv., LLC*, 12 E.A.D. 429, 472 (EAB 2005) (quoting *In re Steel Dynamics Inc.*, 9 E.A.D. 740, 744 (EAB 2001)).

Promulgated in 2013, the current language of 40 C.F.R. § 124.19(a)(4) and its subsections formalize these requirements by requiring that:

> The petition must demonstrate that each challenge to the permit decision is based on:
>
> (A) A finding of fact or conclusion of law that is clearly erroneous, . . .
>
> . . . Additionally, if the petition raises an issue that the Regional Administrator addressed in the response to comments document issued pursuant to [40 C.F.R.] §124.17, then petitioner must provide a citation to the relevant comment and response and explain why the Regional Administrator's response to the comment was clearly erroneous or otherwise warrants review.

Petitioner never provides a single citation to the comments and responses relevant to the Petition's arguments. The Petition mentions Region 5's RTC in this matter only generally.

Accordingly Petitioner cannot and his arguments do not adequately explain how relevant portions of the Region 5 RTC are clearly erroneous or otherwise warrant review.

The RTC in fact addresses geologic siting and Petitioner's own comments at great length. Att. B-11, pp. 2-4, 9-12; see also Section 2 of this Argument, below. And as the RTC explains, Petitioner's arguments fail to properly consider the site's geologic characteristics such as depth, pressure, formation thickness and specific rock type. But instead of addressing or even citing Region 5's detailed responses on this issue, Petitioner comports himself as he did in EAB Appeal Nos. UIC 13-01 and UIC 14-66: from unrelated publications, Petitioner strings together multiple conjectural theories regarding how the injection fluid could dissolve a portion of the confining zone and then somehow migrate vertically through thousands of feet of rock to contaminate a USDW. Both case law and the regulations cited above require more. Accordingly, because Petitioner has not provided citation to relevant comments and responses and because he has not explained why Region 5's RTC is clearly erroneous, the Board should deny the Petition.

2. Region 5 did not clearly err in determining the upper confining zone for the Permit and therefore the Board should deny the Petition

The issue that Petitioner presents on appeal is without merit. Misrepresenting or misinterpreting a variety of Wikipedia excerpts, draft reports and scientific publications unrelated to underground injection disposal, Petitioner argues that Region 5 clearly erred by establishing the Salina Group as the upper confining zone for the West Bay 22 well and by relying on additional impermeable formations above the Salina Group as additional confining zones.[8] More broadly, Petitioner argues that the West Bay #22 well's injection fluid will

[8] Except where Region 5 notes otherwise in this Response to Petition for Review, Petitioner did submit to Region 5 during the public comment period the various Wikipedia excerpts, draft reports and scientific articles that the Petition cites.

penetrate or dissolve a portion of the Salina Group and then somehow migrate upward past the remainder of the Salina Group and past additional impermeable formations acting as additional confining zones, to finally contaminate a USDW.

Petitioner's argument is without merit for multiple reasons:

1) Accepted by the injection zone formations, the injection fluid will almost certainly remain in the injection zone.

2) Injection fluid will almost certainly not migrate upward.

3) Any injection fluid contacting the upper confining zone will not through conversion to gypsum negate the protectiveness of a portion of the upper confining zone.

4) Even if the Board accepts Petitioner's arguments regarding upward migration and gypsum conversion at depths over 2,500 feet, the remainder of the Salina Group would still confine the injection fluid and the injection fluid would not through dissolving salt crystal formations negate the protectiveness of a portion of the upper confining zone.

5) Even if the Board accepts Petitioner's arguments regarding upward migration, gypsum conversion and dissolving salt crystal formations at depth, the other formations comprising the Salina Group would still contain the injection fluid.

6) Even if the Board accepts Petitioner's arguments that the injection fluid would migrate upward and somehow penetrate the entire upper confining zone, formations above the upper confining zone would act as additional confining zones and prevent the injection fluid from reaching a USDW.

A. The injection zone will accept and will almost certainly contain the injection fluid

Petitioner's argument first fails because Region 5 did not clearly err in determining that the injection zone will accept the injection fluid. This means that the injection zone will almost

certainly contain the injection fluid. As Region 5 stated in its October 2014 memorandum regarding geologic siting, the injection zone consists of dolotomized skeletal limestone and carbonate reef complexes that constitute "very porous and permeable formations" and so "will be capable of accepting the injection fluid." Att. B-7, p. 1. The RTC likewise states that:

> The Niagaran, or Niagaran Group, is a vast limestone and dolomite rock structure underlying Michigan and parts of Illinois, Indiana, Ohio, and New York. The Michigan Hydrogeologic Atlas describes the Niagaran rock group as generally very porous and permeable, and readily accepting a wide range of fluids. [Att. B-11, p. 2]

A group of formations like the Niagaran Group "accepting" the injection fluid means that the injection fluid settles into pore cavities and other empty spaces in the formations. If the injection fluid settles into the formations in the immediate vicinity of the well, then the injection fluid will almost certainly not migrate beyond those formations. It should spread predominantly outward horizontally across the permeable formations, settling into available space there. Region 5 modeled the spread of West Bay #22 injection fluid and determined that after 20 years of continuous injection, the injection fluid would migrate between 68 and 835 feet horizontally. Att. B-16; UIC 13-01; UIC 13-02, Filing #6.4, Att. B-7, p. 16. Even if the injection fluid spreads upward and not horizontally or downward within the injection zone, it should not rise over 100 feet to contact the upper confining zone.

Class II UIC wells require an upper confining zone as a precaution. 40 C.F.R. § 146.22(a). But any discussion of injection fluid spreading beyond an injection zone must begin with discussing the injection zone itself. The injection zone for the West Bay #22 well is a permeable injection zone that will readily allow the injection fluid to spread throughout it. For this conclusion, both the October 2014 memorandum and the RTC cite scientific authority such as the Michigan Hydrogeological Atlas. Att. B-13, p. II-41.

Petitioner does not debate Region 5's determination that the injection zone will accept the injection fluid as intended. On this ground alone, the Board may rule that Petitioner has failed to carry his burden of showing that Region 5 clearly erred in selecting its upper confining zones.

B. The injection fluid will almost certainly not rise upward, let alone far enough to contact the upper confining zone

A cornerstone of Petitioner's argument is that the injection fluid will naturally rise upward. UIC 15-03, Filing #1, pp. 9-10. Petitioner is wrong, as there is no such proven phenomenon at the West Bay #22 well location. And the Permit conservatively limits injection pressure, to prevent fracturing the upper confining zone. Att. B-12, p. A-1, of 1, note *. A limit on injection pressure helps prevent an injection from pushing injection fluid out of the injection zone.

Region 5 cannot say with certainty that upward migration will not occur, so an upper confining zone and additional confining zones underlie the Permit. But the injection fluid, heavier than water, may also migrate downward, or more likely simply spread horizontally through the permeable and porous structures of injection zone. Att. B-12, p. A-1 of 1, note *. Upward migration is only one of several possibilities upon injection.

To support his argument that upward migration must occur, Petitioner cites two scientific articles. The first article is T.R. Weaver et al., *Recent cross-formational fluid flow and mixing in the shallow Michigan Basin*, Geological Society of America Bulletin 107[9] (June 1995). UIC 15-03, Filing #22. This article studies an area of southwestern Ontario, Canada. The article posits

[9] Petitioner cites this document as coming from Volume 107, though the document itself contains insufficient information to confirm this. With that caveat, for the sake of convenience Region 5 will cite this document as Petitioner does.

that in prehistoric times either during or after deglaciation, saline fluids may have migrated up through the loosened geologic material into oil-bearing formations above what is today the upper confining zone. The article also discusses a past upward hydraulic gradient in the study area in Canada, but only in formations above the upper confining zone. UIC 15-03, Filing # 22, p. 705. The article states that when oil exploration occurred in that shallow study area in the late 1800s, the upward gradient in those formations ended and became a downward gradient which persists today. UIC 15-03, Filing # 22, p. 705.

The Weaver article does not discuss the same area as the West Bay #22 well; does not claim to assess current hydraulic gradients anywhere at the depth of the injection zone; and to the extent that it provides any analogy suggests that above the upper confining zone there currently exists a downward gradient due to past oil exploration and extraction.

Petitioner also cites an alleged article, Long et al., *Stable-isotope geochemistry of saline near-surface groundwater: east-central Michigan Basin*, Geological Society of America Bulletin 100, 1988. Petitioner did not cite or provide this document to Region 5 during the public comment period, failing to meet the requirements of 40 C.F.R. § 124.13. Nor does Petitioner produce it even now, as an attachment to the Petition. As Region 5 is hearing about this article for the first time during this appeal and still does not have this article before it, it is not properly before the Board and the Board should accordingly not consider it.

The Board has previously warned Petitioner about and sanctioned Petitioner for presenting authority for the first time on appeal, when Petitioner in 2014 presented his identical technical challenge to a factually-similar well. In denying Petitioner's petition regarding the Haystead #9 permit in UIC 14-66, the Board refused to consider articles and arguments not presented to Region 5 during the public comment period because they were not properly before

the Board. *In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *20-*21. In doing so, the Board noted that:

> . . . 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, 2013 EPA App. LEXIS 39 at *24 (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, 2010 EPA App. LEXIS 45 at *73 n.35, *94 n.46 (EAB Nov. 18, 2010). [*In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *20-*21.]

The Board should likewise decline to consider authorities that Petitioner introduces for the first time in the Petition, particularly authorities that Petitioner still has not put before Region 5 and the Board even as attachments to the Petition.

As more general support for his "upward gradient" argument, Petitioner cites three additional articles. The first, Nathaniel Warner et al., *Geochemical evidence for possible natural migration of Marcellus Formation brine to shallow aquifers in Pennsylvania*, Proceedings of the National Academy of Sciences Vol. 109 No. 30 (July 24, 2012), discusses the effects of hydraulic fracturing (also known as "fracking") in Appalachia. UIC 15-03, Filing # 21. The second and third articles are EPA Pub. 600/R-00/000, *DRAFT Investigation of Ground Water Contamination near Pavillion, Wyoming* (December 2011) and Congressional Research Service Pub. 7-5700, *The EPA Draft Report of Groundwater Contamination near Pavillion, Wyoming: Main Findings and Stakeholder Responses* (January 25, 2012). UIC 15-03, Filings #5, #6. These articles are or discuss a draft EPA report regarding the effects of hydraulic fracturing in Wyoming. Thus, two of these articles do not even relate to a final document. All of these articles discuss a different mechanical process – hydraulic fracturing -- designed to produce different effects than underground injection of wastewater for disposal; and relate to a different

region of the United States, with different geographical features. They are all therefore inapposite. As one among many distinctions Region 5 notes that while hydraulic fracturing involves high-pressure injection designed to fracture formations, the Permit limits injection pressure specifically to prevent formation fracturing. Att. B-12, p. A-1 of 1, note *.

Petitioner also sets forth a collection of purported facts, which he assembles into calculations that he states prove his argument. UIC 15-03, Filing #1, p. 10. Petitioner twice states that he based his calculations upon alleged data from "The Michigan State University Earth Sciences Department". UIC 15-03, Filing #1, p. 10. Petitioner neither cited nor provided any documentation of either this alleged data, or any of these purported facts and calculations, to Region 5 during the public comment period, failing to meet the requirements of 40 C.F.R. § 124.13. Nor does Petitioner produce this alleged data even now, as an attachment to the Petition. As Region 5 is hearing about this alleged data and seeing these calculations for the first time during this appeal, they are not properly before the Board and the Board should accordingly not consider them. *In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *20-*21.

Should the Board nonetheless wish to evaluate Petitioner's purported calculations, they have no scientific value. They appear to mischaracterize hydrogeology, for example ignoring the suppressive effects of thousands of feet of overburden on mineral reactions and formation expansion. Region 5 has been unable to associate Petitioner's jumble of facts with any valid hydrogeological conclusions. Additionally, the Board already evaluated and dismissed these same purported facts and calculations, in Petitioner's Haystead #9 permit appeal. *In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *25-*26. The Board should do so again here, even should it choose to reconsider their substantive value.

Therefore, with only one article addressing matters geographically close to Michigan and even that article failing to find an upward gradient at any depth today in its study area, Petitioner has failed to prove that an upward gradient exists at the West Bay #22 well site or that the well's injection fluid will migrate upward. At best there is disagreement, which the Board should resolve in favor of the Region's technical expertise and basis, as well-documented in the record. *In re West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *5-*6. Upward migration of the West Bay #22 well's injection fluid remains an unknown, with horizontal or downward migration much more plausible.

C. The injection fluid will not compromise the upper confining zone by converting anhydrite in some of the zone's formations into gypsum

The Petition repeats Petitioner's argument from the 2012 public comment period, the 2014 public comment period, and Petitioner's Haystead #9 well petition to the Board in UIC 14-66: that the injection fluid upon migrating upward will convert anhydrite formations in the Salina Group into gypsum, where they will expand and through pressure shatter the entire Salina Group throughout its hundreds of feet of thickness. Region 5 addressed this issue at length in the RTC, noting for example that one of the anhydrite layers, the A-1 Evaporite, is considered by sources such as the Michigan Hydrogeological Atlas to be "essentially impermeable and an excellent confining layer." Att. B-11, pp. 3, 10; see also Att. B-13, pp. II-43. EPA also stated:

> Generally massive anhydrite, including layers such as the Salina A-2 Evaporite (a common formation in the Salina Group), is impermeable. In geology, the term *massive* means homogeneous and crystalline. Anhydrite layers, such as the Salina A-2 Evaporite, are well-documented in the Michigan Hydrogeologic Atlas as geologic barriers to fluid flow. Specifically the Michigan Hydrogeologic Atlas describes the Salina Group as "essentially an aquiclude". Additionally, the Salina A-2 Evaporite is described as often found as a cap rock or salt dome, trapping oil or natural gas in subsurface reservoirs.

> EPA Region 5 has permitted many wells across Michigan with the same injection and confining zones as the West Bay #22 well. The Michigan Hydrogeologic Atlas describes each of the above-mentioned formations as well as the rest of the Salina group as excellent confining layers, due to their low permeability and porosity. The behavior of a rock layer depends on many factors, such as its thickness, flexibility, and chemical composition, as well as the pressure it is under. Individual factors are not a sole determining factor of a rock group's suitability as a confining zone. Based on technical studies of the geology of Michigan, such as the Hydrogeologic Atlas of Michigan, EPA has determined the Salina Group, including anhydrite layers (e.g., Salina A-2 & A-1 Evaporite), is a suitable confining zone. [Att. B-11, p. 10 (citations omitted); see also Att. B-13, pp. II-42-58.]

Addressing the scientific articles the Petitioner cited in support of his argument, Region 5 stated:

> The commenter cited several sources for anhydrite information in the comment, but these sources do not support findings that the Salina Group is a poor confining zone or that operation of the West Bay #22 well would dissolve anhydrite layers to create a pathway into a USDW. The research cited by the commenter concerns mineral reactions in situations that are not analogous or relevant to the Salina Group below the West Bay #22 well site. For example, the commenter mentions research experiments that investigate chemical reactions at surface conditions or evaluate anhydrite as it is used in cement and concrete. These experiments relate to the formational origin of evaporite minerals, not their behavior at depth with respect to fluids. Such work has little or no relevance to gauging the behavior of the anhydrite layers at approximately 2,600 feet below the surface, where the pressure and temperature regime is much different and influences mineral reactions and rock behavior. Other articles submitted provide information about whether gypsum or anhydrite is the preferred depositional mineral phase in present-day environments, as a way of investigating whether gypsum in the rock column was formed from anhydrite or deposited as gypsum. The processes investigated here are the original anhydrite beds, and therefore is not an investigation on how rock will behave at depth. This information does not give EPA cause to believe that the geologic siting of West Bay #22 is inappropriate. [Att. B-11, pp. 10-11]

Petitioner's explanation for why this response is inadequate is to simply repeat his past arguments. UIC 15-03, Filing #1, pp. 3-6. But as Region 5 noted in the RTC, Petitioner cites scientific articles addressing different and inapposite contexts. Anhydrite can convert to gypsum under certain conditions. But at the depth of the upper confining zone thousands of feet below

the earth's surface, massive anhydrite formations serve as excellent confining zones and will not convert wholesale as Petitioner claims.

To support his argument, Petitioner selectively and misleadingly quotes F. Rauh & K. Thuro, *Investigations on the swelling behavior of pure anhydrites*, Engineering Geology, Technishe Universitat Munchen (no date cited)[10], as stating that all anhydrite converts to gypsum. The full quotation in the article actually states that "under humid atmospheric conditions", natural anhydrite will dissolve or convert to gypsum. UIC 15-03, Filing #16, p. 1. Petitioner's citation thus actually concerns anhydrite exposed to a surface environment. The cited quotation says nothing about conversion at depth and is inapposite here.

For the proposition that anhydrite "readily" converts to gypsum in contact with water, or that substances in the injection fluid will accelerate this conversion, Petitioner also cites Lawrence Hardie, *The gypsum-anhydrite equilibrium at one atmosphere pressure*, Am. Mineralogist Vol. 52 (January-February 1967); E-An Zen, *Solubility Measurements in the System $CaSO_4$-NaCl-H_2O at 35°, 50°, and 70°C and one atmosphere Pressure*, [no publication cited] (U.S.G.S. [no date cited])[11]; R.F. Conley & W.M. Bundy, *Mechanism of gypsification*, in *Geochimica et Cosmochimica Acta*, Vol. 15, pp. 57-72 (Pergamon Press 1958); and N.B. Singh, *The Activation Effect of K_2SO_4 on the Hydration of Gypsum Anhydrite, $CaSO_4$(II)*, J. Am. Ceramic Soc. 88, pp. 196-201 (2005). UIC 15-03, Filings #3, #8, #18, #24. These articles all discuss laboratory experiments involving anhydrite formation and dissolution under surface

[10] The article as submitted by Petitioner during the public comment period contains insufficient information on its face to verify the citation; with that caveat, for the sake of convenience Region 5 will cite this document as Petitioner does.

[11] The Zen article as submitted by Petitioner during the public comment period contains insufficient information on its face to verify the citation; with that caveat, for the sake of convenience Region 5 will cite this document as Petitioner does.

conditions. The Hardie and Conley articles investigate how present-day gypsum formations may have formed in prehistoric times. None of these articles purport to address anhydrite conversion at depth, or under greater-than-surface pressure.

Petitioner also cites Alexander Klimchouk, *The Dissolution and conversion of gypsum and anhydrite*, Int. J. Speleology 25 (3-4) (1996). UIC 15-03, Filing # 11. This article relates to karst landscapes and hydrogeologic processes there. Karsts are surface and aquifer environments not extending to depths approaching the upper confining zone. Accordingly, this article is likewise inapposite, concerned with mineral reactions in a different type of hydrogeologic environment, and one close to or comprising the earth's surface.

Respondent also cites two purported articles, which he cites as Korzhinsky, *ESSAY ON METASOMATIC PROCESSES,* D.S. AN SSR Publ. Moscow (1953) and as Manikhin, *ON THE QUESTION OF SOLUBILITY OF CALCIUM SULFATE UNDER HIGH PRESSURES*, V.I. Geokhimicheskie Materialy, Vol. 34, pp. 193-196 (no date cited). Petitioner did not cite or provide these documents to Region 5 during the public comment period, failing to meet the requirements of 40 C.F.R. § 124.13. Nor does Petitioner produce them even now, as attachments to the Petition. As Region 5 is hearing about these articles for the first time during this appeal and still does not have these articles before it, they are not properly before the Board and the Board should accordingly not consider them. *In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *20-*21.

Petitioner also cites three articles that the Board already evaluated in the Haystead #9 appeal for their ability to support the same argument that the Petitioner advances here. The Board found these articles inapposite then and should do so here again, as relevant facts are identical in this appeal. These articles are 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); and 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). UIC 15-03, Filings #10, #14 and #17. Evaluating these articles, the Board found that none of them addressed the conversion of anhydrite at depth in detail. *In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *23-*25. The Board found that the above-cited article by R.C. Murray made one brief reference to anhydrite conversion at depth, but provided insufficient detail to evaluate it:

> 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. [Murray, *supra,*] at 513 fig. 1. This single reference in the Murray article to gypsification of anhydrite at depth of 3,500 feet is a slender reed upon which to construct the elaborate argument made by Mr. Bormuth. [*In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *23-*24]

The Board also found the above-cited Sass & Burbaum article to be inapposite, as it concerned much shallower conversion of anhydrite in a fact situation very different from the underground injection contemplated in the Haystead #9 permit. *In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *24-*25. The Haystead #9 well and the West Bay #22 well share the same construction requirements under UIC regulations and will inject into the same injection zone, the Niagara Group. Accordingly, the Board's analysis of the Sass & Burbaum article in UIC 14-66 applies equally to this appeal, which raises identical arguments regarding the suitability of certain Salina Group formations as a confining layer to prevent upward migration of injection fluids. All three articles are inapposite.

Petitioner also misleadingly cites F.G. Bell et al., *A review of the engineering behavior of soils and rocks with respect to groundwater*, Groundwater in Engineering Geology, pp. 1-23 (1986), for the proposition that anhydrite conversion will occur at depth. Att. B-14. The Bell article discusses various ways that groundwater impacts soils and minerals. Petitioner's misleading quote comes from a section of the article that only discusses anhydrite conversion near the earth's surface, for example in caverns or under dams. *Id.*, at 20-21. The article nowhere claims that anhydrite conversion occurs at great depth and in fact elsewhere states that anhydrite conversion has been observed as deep as 152 m, or about 498 feet. *Id.*, at 6. Thus, this article if anything disproves Petitioner's argument that conversion will occur at depths of over 2,600 feet.

Petitioner also cites W. Steiner, *Swelling Rock in Tunnels; Rock Characterization, Effect of Horizontal Stresses and Construction Procedures*, Int'l. J. Rock Mechanics and Mining Sci. & Geomechanics Abstracts Vol. 30, No. 4, pp. 361-380 (1993). UIC 15-03, Filing # 19. This article addresses anhydrite conversion and swelling in railroad tunnels. It thus addresses anhydrite conversion at surface atmospheric pressures and exposure to a surface environment, not anhydrite conversion at depth where temperature and pressure are different. It is inapposite.[12]

[12] Regarding swelling due to anhydrite conversion, Petitioner also quotes a "private communication" from a Dr. Timothy Bechtel, PhD P.G. UIC 15-03, Filing #1, p. 10. Petitioner neither cited nor provided this communication to Region 5 during the public comment period, failing to meet the requirements of 40 C.F.R. § 124.13. Nor does Petitioner produce this communication now, as an attachment to the Petition. As Region 5 is hearing about this document and seeing it for the first time during this appeal, it is not properly before the Board and the Board should accordingly not consider it. *In re: West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *20-*21. Region 5 additionally notes that while the context of the quote is unclear, it appears to only reference anhydrite swelling at or near the surface.

Petitioner claims to prove that Region 5's reliance upon the Michigan Hydrogeological Atlas is misplaced. The Atlas speaks for itself.

The Michigan Hydrogeological Atlas was a unique undertaking by the Departments of Geology and Geography at Western Michigan University. Att. B-13, pp. I-2-3. Its goal was to combine in one document all known information regarding Michigan's hydrogeology, both published and hitherto-unpublished material from a multitude of city, county, state and federal agencies. Att. B-13, p. I-1-2. The Atlas makes extensive use of maps, created for the Atlas to express its combined information. Att. B-13. Among other things, the Atlas tells which formations underlie a location; how thick they may be; and their hydrogeological significance, for example their ability to serve as injection or confining zones. Att. B-13.

Region 5 based the Permit upon multiple sources of information, for example drilling records for wells within ½ mile of the proposed West Bay #22 well that show the depths of formations appearing in the Michigan Hydrogeological Atlas at those locations. Att. B-7, drilling record attachments. But the Atlas interprets the significance of those formations and groups of formations. And as scientific and industry professionals do in dealing with hydrogeology in Michigan, Region 5 reasonably relied in part upon the Atlas' interpretations in determining the suitability of formations and groups as injection or confining zones. Thus, where Petitioner attacks Region 5's conclusion that a confining zone group is impermeable, he is attacking the accumulated knowledge of Michigan's public agencies, as well as the conclusions of multiple professors of Western Michigan University's Departments of Geology and Geography, as well as the Chairman of that Geology Department. Att. B-13, p. I-3.

And when attacking, Petitioner is shooting blanks. Despite Petitioner's multitude of citations, he ends up as he did in his previous appeal in UIC 14-66. He has only one brief

reference to anhydrite conversion at depth, in one article, with inadequate context to extrapolate therefrom to any Permit condition. Petitioner has failed by far to meet his burden that Region 5 clearly erred in establishing even the anhydrite formations in the Salina Group as an upper confining zone, let alone the entire Salina Group and multiple impermeable formations above it. At most, there is only continued disagreement between Petitioner and Region 5 on anhydrite conversion at depth and that is inadequate to carry Petitioner's burden. *In re West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *5-*6. The Board should accordingly deny the Petition.

D. The injection fluid will not compromise the upper confining zone by dissolving salt in some of the zone's formations

Even should the Board find that the injection fluid will migrate upward out of the injection zone in large volume and convert the massive anhydrite formations of the Salina Group into gypsum, impermeable salt formations within the Salina Group will still contain the injection fluid. As noted in Section 3.C, above, Region 5 identified the entire Salina Group as the upper confining zone. The Salina Group includes not only massive anhydrite, but also formations of salts and shales.[13] Att. B-11, pp. 3, 9. The RTC noted that "formations in [the Salina] group contain thick salts, which make them "essentially an aquiclude", or a structure preventing the passage of water" and that "the Salina A-2 Evaporite is described as often found as a cap rock or salt dome, trapping oil or natural gas in subsurface reservoirs." Att. B-11, p. 10; see also Att. B-13, pp. II-43-57. The RTC also noted that based on drilling records for nearby wells, "the Salina Group's composition [around the West Bay #22 well site] is consistent with its description in the

[13] Misleadingly, Petitioner omits throughout his brief any mention of shale formations when discussing the contents of the Salina Group. See also affirmative omission at UIC 15-03, Filing #1, p. 3.

Michigan Hydrogeological Atlas." Att. B-11, p. 11; see also Att. B-7, drilling record attachments.

Using the same sources as he does in his argument about anhydrite conversion in Section 3.C, above, Petitioner simply repeats his argument that the salt formations of the Salina Group that have persisted across geologic time and already contain fluids in places will dissolve upon contact with the injection fluid. As noted in Section 3.C, above, Petitioner's argument fails because all of his sources address surface or near-surface activity and are inapposite. Additionally, Region 5 buttressed its technical judgement with the Michigan Hydrogeological Atlas, a compendium of established knowledge regarding Michigan hydrogeology.

Petitioner argues that a Class III solution mining permit that Region 5 issued for Salina Group salt caverns in the Detroit, Michigan area proves that any contact with water at depth will dissolve salt formations. Petitioner is mistaken, as solution mining is a different process, using a different fluid.

The permit at issue, No. MI-163-3G-A002, appears at UIC 15-03, Filing # 7. It permits a natural gas terminal to engage in solution mining, a specialized process specifically designed to mine salt through careful application and pumping of fresh water into and out of existing salt caverns. UIC 15-03, Filing #7, p. D-3 of 5. As p. D-3 of 5 of the permit sets forth, these salt caverns normally contain brines (similar to the West Bay #22 well's injection fluid) and contrary to Petitioner's argument do not dissolve in contact with that brine. To dissolve the cavern's salt walls and thus enlarge the caverns, large quantities of fresh water and application of solution mining technology and expertise is necessary. If anything, Permit No. MI-163-3G-A002 indicates that brines at depth will not dissolve salt formations.

Because Petitioner has not shown that Region 5 clearly erred in relying upon the salt formations of the Salina Group to contain the injection fluid, even if the Board accepts Petitioner's other arguments it should deny the Petition on this ground.

E. Shale formations in the Salina Group will contain the injection fluid

Even should the Board find that the injection fluid will migrate upward out of the injection zone in large volume; convert the massive anhydrite formations of the Salina Group into gypsum; and dissolve the salt formations of the Salina Group, impermeable shale formations within the Salina Group will still contain the injection fluid. As noted in Section 3.C, above, Region 5 selected the entire Salina Group as the upper confining zone for the Permit. The Salina Group includes not only massive anhydrite and salt formations, but also shale formations.[14] Att. B-11, pp. 3, 9. The RTC noted that the shale formations are also excellent confining layers, due to low permeability and porosity. Att. B-11, p. 3. The RTC also noted that based on drilling records for nearby wells, "the Salina Group's composition [around the West Bay #22 well site] is consistent with its description in the Michigan Hydrogeological Atlas." Att. B-11, p. 11; see also Att. B-7, drilling record attachments.

Petitioner does not contest that the shale formations and layers of the Salina Group will contain the injection fluid. In fact, the Petition assiduously avoids mentioning or acknowledging shale in the Salina Group at all. Accordingly, Petitioner has not shown disagreement with Region 5 on this point, let alone that Region 5 clearly erred in relying upon the shale formations and layers of the Salina Group to contain the injection fluid. Therefore, even if the Board accepts Petitioner's other arguments, it should deny the Petition on this ground.

[14] Misleadingly, Petitioner omits throughout his brief any mention of shale formations when discussing the contents of the Salina Group. See also affirmative omission at UIC 15-03, Filing #1, p. 3.

F. Impermeable formations above the Salina Group will contain the injection fluid

Even should the Board find that the injection fluid will migrate upward out of the injection zone in large volume; convert the massive anhydrite formations of the Salina Group into gypsum; dissolve the salt formations of the Salina Group; and somehow penetrate the impermeable shale formations within the Salina Group, impermeable formations above the Salina Group will still contain the injection fluid. Region 5 identified the Salina Group as the upper confining zone for the Permit and also relied on impermeable formations above the Salina Group to act as additional confining zones[15]:

> In addition, many of the rock layers between the confining zone and the base of the lowermost USDW are impermeable shales and evaporites. These impermeable formations will also prevent injection fluid from moving upward and entering the USDWs, thus acting as additional confining zones. Shale formations acting as additional confining layers above the actual confining zone include the Antrim [Shale] Formation, Bedford Shale Formation, Bell Shale Formation, Sunbury Shale Formation, and Coldwater Shale Formation. Formation and drilling records for nearby wells, including wells MDEQ #60096, #60011 and #60010, indicate that the Coldwater Shale is nearly 1000 feet thick, and is present below the lowest USDW (i.e. Marshall Sandstone) from approximately 217 to 1,200 feet below ground surface . . .
>
> . . . In addition, many of the rock layers between the confining zone and the base of the lowermost USDW are impermeable shales and evaporites. These impermeable formations will also prevent injection fluid from moving upward and entering the USDW. These shale formations acting as additional confining layers above the actual confining zone include the Antrim [Shale] Formation, Bedford Shale Formation, Bell Shale Formation, Sunbury Shale Formation, and

[15] Petitioner argues at p. 8 of the Petition that the Permit is not "accurate" if Region 5 relies on formations above the upper confining zone to act as additional confining zones. Petitioner cites no authority for his assertion and Region 5 is aware of none. Petitioner is simply wrong. UIC Class II permits do not state upper confining zones, which instead underlie a permit and are part of EPA's analysis in deciding whether to issue a permit. In deciding whether to issue a permit, EPA considers the entirety of site geography in determining whether the injection would endanger USDWs.

> Coldwater Shale Formation. These formations are well documented in the Stratigraphic Nomenclature for Michigan and the Michigan Hydrogeologic Atlas.
>
> [Att. B-11, pp. 3, 10 (citations omitted); *see also* Att. B-7, drilling record attachments]

Petitioner argues that Region 5's reliance upon these formations is incorrect, because the upward-migrating fluid will pass through these formations via "pre-existing fractures." UIC 15-03, p. 9. Petitioner is mistaken, as no such fractures are known to exist in these formations. To support his assertion, Petitioner cites two articles. As discussed at Section 3.B, above, one article that Petitioner cites (Long et al.) is not properly before the Board and in fact has never been presented to the Board or Region 5 at all, while the other (T.R. Weaver et al.) actually addresses groundwater migration that occurred either during or after deglaciation in prehistoric times. UIC 15-03, Filing #22, p. 705. The Weaver article also studies an area of southwestern Ontario, Canada, the extreme eastern edge of the Michigan Basin where geography appears to differ and to which some of the shale formations underlying the Permit may not even extend. UIC 15-03, Filing #22, p. 698; Att. B-13, p. II-78, 79, 81, 82, 85, 89, 90, 92, 93.

All told, the Weaver article does not negate the longstanding professional knowledge of present-day Michigan hydrogeology that the Michigan Hydrogeological Atlas represents. The Atlas states that the formations in dispute are impermeable, because they are well known through experience to be impermeable and not full of "fractures". Att. B-13, pp. II-76-80 (the Traverse Group, which contains the Bell Shale Formation); II-80-83 (Antrim Shale Formation); II-83, 85-86 (Bedford Shale Formation); II-86, 89-91 (Sunbury Shale Formation); and II-91-92 (Coldwater Shale Formation). Along these lines, Region 5 also searched for seismic issues in evaluating the West Bay #22 well permit application and published a memorandum to the file on that subject in October 2014. Att. B-15. This report evaluated multiple sources of information and found no

known fractures or faults in the vicinity of the West Bay #22 well. Att. B-15. Region 5 also discussed its findings of no known fractures or faults in the RTC at length. Att. B-11, pp. 13-15.

Petitioner also argues that the Coldwater Shale formation is only 250 feet thick and porous at the well site, instead of 1,000 feet as Region 5 claims. Petitioner bases his argument on a recent succession map, which is a general map. Region 5 bases its statement on drilling records for three different wells within ½ mile of the West Bay #22 well site, all of which show the Coldwater Shale Formation to be approximately 1,000 feet thick in that location. Att. B-7, drilling record attachments. As the Board noted in rejecting Petitioner's identical argument in UIC 14-66, Petitioner ignores the ground truth of these drilling records and his argument fails. *In re West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *13-*15. And even if Petitioner were correct, his argument cannot carry the day because he does not contest the thickness of the other four impermeable formations above the Salina Group, upon which Region 5 also relies.

Because Petitioner has not shown that Region 5 clearly erred in relying upon impermeable formations above the Salina Group to contain the injection fluid, even if the Board accepts Petitioner's other arguments it should deny the Petition on this ground. At most, there is only continued disagreement between Petitioner and Region 5 on the impermeability of these formations and that is inadequate to carry Petitioner's burden. *Id.*, at *5-*6. The Board should accordingly deny the Petition.

CONCLUSION

In ruling against Petitioner in UIC 14-66, the Board held:

> 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. [*In re West Bay Exploration Co.*, 2014 EPA App. LEXIS 35 at *26-*27]

In this matter the Board could easily issue the same ruling, substituting the West Bay #22 well for the Haystead #9 well. In this matter Petitioner has simply repeated his arguments from UIC 14-66, with the same flaws and misrepresentations, applying them to a new but factually-similar well. Petitioner's challenge to the Permit fails to meet the threshold procedural standards of 40 C.F.R. §§ 124.13 and 124.19(a)(4)(ii) and in any event has no merit. On procedural grounds or on any one of six substantive points, the Board may deny the Petition. The Region therefore respectfully requests that the Board deny the Petition for Review.

Respectfully submitted,

Dated: February 1, 2016

Kris P. Vezner
Associate Regional Counsel

U.S. EPA, Region 5
77 W. Jackson Blvd. (C-14J)
Chicago, IL 60604

Tel: (312) 886-6827
Fax: (312) 697-2019
Email: vezner.kris@epa.gov

BEFORE THE ENVIRONMENTAL APPEALS BOARD
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

In the Matter of:	)	
West Bay Exploration Company,	)	**Appeal No. UIC 15-03**
Traverse City, Michigan,	)	
West Bay #22 SWD,	)	
Permit No. MI-075-2D-0009	)	

CERTIFICATE OF SERVICE

I hereby certify that the original of this **RESPONSE TO PETITION FOR REVIEW** in the matter **WEST BAY EXPLORATION COMPANY OF TRAVERSE CITY, MICHIGAN, WEST BAY #22 SWD, PERMIT NO. MI-075-2D-0009, JACKSON COUNTY, MICHIGAN, EAB Appeal No. UIC 15-03,** and all associated attachments, were filed electronically with the Board. In addition, one identical paper copy of all of the attachments to this Response to Petition for Review was sent to the Board, via Express Mail, to the following address:

Clerk of the Board
U.S. Environmental Protection Agency
Environmental Appeals Board
1201 Constitution Avenue, NW
WJC East Building, Room 3334
Washington, DC 20004

Further, I hereby certify that one copy of the **RESPONSE TO PETITION FOR REVIEW** in the matter **WEST BAY EXPLORATION COMPANY OF TRAVERSE CITY, MICHIGAN, WEST BAY #22 SWD, PERMIT NO. MI-075-2D-0009, JACKSON COUNTY, MICHIGAN, EAB Appeal No. UIC 15-03,** and all associated attachments, was sent to the Petitioner and Permitee, via express mail, to the following addresses:

Peter Bormuth
142 West Pearl Street
Jackson, Michigan 49201

and

Timothy Brock
West Bay Exploration Company
13685 South West Bay Shore Drive, Suite 200
Traverse City, Michigan 49684

Robert Hartzer

February 1, 2016
Date