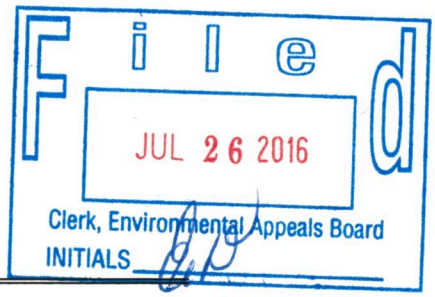

(Slip Opinion)

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

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

Decided July 26, 2016

REMAND ORDER

Before Environmental Appeals Judges Mary Kay Lynch, Kathie A. Stein, and Mary Beth Ward.

IN RE WEST BAY EXPLORATION COMPANY

UIC Appeal No. 15-03

REMAND ORDER

Decided July 26, 2016

Syllabus

Mr. Peter Bormuth petitions for review of the U.S. Environmental Protection Agency, Region 5's decision to issue a permit for the underground injection of waste in Jackson County, Michigan. Region 5 granted the permit to the West Bay Exploration Company under the Underground Injection Control Program, Part C of the Safe Drinking Water Act ("SWDA"), 42 U.S.C. §§ 300h - 300h-8. Mr. Bormuth argues that Region 5 is mistaken in its claim that several geological formations will confine the injected waste. He also claims that the record compiled by the Region does not support its decision to grant the permit and that the Region did not address his comments.

HELD: The Board concludes that it is unclear from the administrative record whether Region 5 exercised its considered judgment in evaluating the potential confining layers at the proposed wellsite. The record also does not show that Region 5 duly considered and meaningfully responded to Mr. Bormuth's comments on the potential confining layers. Accordingly, the Board remands the permit.

The Board reviewed the record documents that Region 5 relied upon in concluding that multiple geological formations will contain the injected waste. This review disclosed unexplained discrepancies between the record documents and Region 5's conclusions regarding the presence and impermeability of the designated confining formations. Given these unexplained discrepancies, it is not clear that the Region exercised considered judgment in its conclusion that the injected waste would be confined.

In his comments, Mr. Bormuth made several distinct arguments as to why the designated confining formations would not contain the injected waste. In responding to Mr. Bormuth's comments, Region 5 failed to fully explain its reasons for dismissing one of Mr. Bormuth's arguments and failed to address at all Mr. Bormuth's other arguments or explain why a response was unnecessary. Region 5 discussed Mr. Bormuth's arguments more extensively on appeal. But Region 5 cannot overcome its failure to duly consider and meaningfully respond to Mr. Bormuth's comments by asking the Board to decide these issues de novo.

Based on the foregoing, the permit is remanded for Region 5 to reconsider the issue of whether the geologic formations at the wellsite will prevent the injected brine from contaminating the underground sources of drinking water, taking into account the administrative record as a whole and the arguments raised by Mr. Bormuth.

Before Environmental Appeals Judges Mary Kay Lynch, Kathie A. Stein, and Mary Beth Ward.

Opinion of the Board by Judge Lynch:

I. *STATEMENT OF THE CASE*

Mr. Peter Bormuth petitions for review of the U.S. Environmental Protection Agency, Region 5's decision to issue a permit for the underground injection of waste in Jackson County, Michigan. Region 5 granted the permit to the West Bay Exploration Company under the Underground Injection Control Program, Part C of the Safe Drinking Water Act ("SWDA"), 42 U.S.C. §§ 300h - 300h-8, and the applicable regulations, 40 C.F.R. parts 124, 144-148. Because there are unexplained discrepancies between the administrative record and Region 5's findings related to Mr. Bormuth's challenges that the geologic formations would not confine injected waste, and because the record does not show that Region 5 duly considered and meaningfully responded to Mr. Bormuth's comments on the draft permit, the Board grants review and remands the permit.

II. *PROCEDURAL AND FACTUAL HISTORY*

A. *The Underground Injection Control Program*

The Underground Injection Control ("UIC") Program was established under the SDWA "to prevent underground injection which endangers drinking water sources." SDWA § 1421(b)(1), 42 U.S.C. § 300h(b)(1). EPA's UIC regulations specifically prohibit "[a]ny underground injection[] except into a well authorized by rule or except as authorized by permit issued under the UIC program." 40 C.F.R. § 144.11. An applicant for a permit must show that construction and operation of the underground injection well will not "endanger" drinking water sources by "allow[ing] the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons." 40 C.F.R. § 144.12(a); *see* SDWA § 1412(d)(2), 42 U.S.C. § 300h(d)(2). The UIC regulations establish minimum requirements for state-administered permit programs. *See* 40 C.F.R. pt. 145. EPA administers the UIC program in those states that, like Michigan, are not yet authorized to administer their own programs. *See* 40 C.F.R. §§ 144.1(e), 147.1151.

B. *The West Bay Exploration Company Permit Proceeding*

1. *The Initial and Revised West Bay Permit*

In April 2011, the West Bay Exploration Company ("West Bay") applied for a permit to construct and operate a Class II underground injection well[1] in Jackson County, Michigan. West Bay, *Underground Injection Control Permit Application, West Bay #22 SWD* (Mar. 20, 2011) (Region 5's attachment ("attach.") B-1) ("Appl."). That well was designated as West Bay #22 SWD. *Id.* Although Region 5 initially approved the permit for West Bay #22 SWD in December 2012, the Region withdrew the permit in April 2013, following appeals filed with the Environmental Appeals Board ("Board") by Mr. Bormuth and another petitioner. *See In re West Bay Exploration Co.*, UIC Appeal Nos. 13-01 & 13-02, at 1 (EAB Apr. 16, 2013) (Order Dismissing Petitions for Review as Moot).

In October 2014, Region 5 issued a revised draft permit for the West Bay #22 SWD well for public comment. *See* EPA Region 5, *Underground Injection Control Permit for West Bay Exploration Co., West Bay #22 SWD Well* (draft undated) (Region 5's attach. B-8); EPA Region 5, *Request for Public Comment on Draft Injection Well Permit, West Bay #22 SWD Well* (Oct. 2014) (Region 5's attach. B-9) ("Public Cmt. Request"). Region 5 also held a public hearing to obtain comment on the revised draft permit. At the public hearing, Mr. Bormuth made a statement opposing the well. Public Hearing Transcript at 22-29, 32-34 (Nov. 20, 2014) (Region 5's attach. B-10) ("Tr."). In his statement, Mr. Bormuth described roughly twenty scientific articles and government reports as support for his claim that West Bay #22 SWD would endanger underground drinking water supplies. *Id.*

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[1] Under 40 C.F.R. § 144.6, injection wells fall into six classes depending on the material being disposed of in the well. Class II wells are used to inject fluids:

> (1) Which are brought to the surface in connection with natural gas storage operations, or conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection.
>
> (2) For enhanced recovery of oil or natural gas; and
>
> (3) For storage of hydrocarbons which are liquid at standard temperature and pressure.

40 C.F.R. § 144.6(b).

Mr. Bormuth further submitted copies of the articles and reports to Region 5. Petitioner's Appendix A, *References Inserted into the Record at Public Comment on West Bay #22 at Colombia [sic] Elementary School on November 20, 2014*. After the public comment period and hearing, Region 5 prepared a Response to Public Comments document that discussed Mr. Bormuth's comments as well as other public comments. EPA Region 5, *Response to Public Comments* 9-12 (Dec. 8, 2015) (Region 5's attach. B-11) ("RTPC"). On December 8, 2015, Region 5 issued the revised permit for West Bay #22 SWD. EPA Region 5, *Underground Injection Control Permit: Class II, Permit Number: MI-075-2D-009, Facility Name: West Bay 22 SWD* (Region 5's attach. B-12). Mr. Bormuth again appealed to the Board.

2. *The West Bay #22 SWD Well*

The West Bay #22 SWD well is proposed to be constructed slightly to the east of the Village of Brooklyn, Michigan, in the southeastern corner of Jackson County. *See* Public Cmt. Request at 1. Jackson County is in the south central portion of Michigan's Lower Peninsula. West Bay, which is a crude oil and natural gas production company, intends to use the well for the disposal of "brine"[2] collected from approximately forty oil and gas wells in Jackson County. Appl. at attach. U, at 6, app. 5, at 7. EPA's website explains that "[d]uring oil and gas extraction, brines are also brought to the surface. Brines are separated from hydrocarbons at the surface and reinjected into the same or similar underground formations for disposal." U.S. EPA, *Class II Oil and Gas Related Injection Wells*, https://www.epa.gov/uic/class-ii-oil-and-gas-related-injection-wells (last visited July 11, 2016).

The West Bay #22 SWD well is designed to inject brine into a geologic layer named the Niagara Group.[3] RTPC at 2. At the West Bay #22 SWD wellsite,

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[2] "Brine" is a general term that applies to "[a] solution of sodium chloride and water, usually containing other salts as well." *Hawley's Condensed Chemical Dictionary* 180 (2007). On the earth's surface, "brines are warm to hot, saturated to nearly saturated, highly saline ocean and lake waters." *Water Encyclopedia: Ground Water* 51 (2005). But "brines also occur in the subsurface notably as subsurface oil-field waters and geothermal mineralizing fluids." *Id.* at 52.

[3] In an earlier UIC case, the Board cited to the following record information explaining the distinction between the geologic classifications of rock layers into groups, formations, and members: "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

the Niagara Group is present at approximately 2,600 to 3,000 feet below the surface. *Id.* In this location, the Niagara Group is several hundred feet thick and is "composed of a porous and permeable dolomite" that is "generally filled with brine throughout the subsurface." Dept. of Geology, W. Mich. Univ., *Hydrogeology for Underground Injection Control in Michigan: Part 1*, at II-41 (1981) (Region 5's attach. B-13) [hereinafter cited as "*Mich. Atlas*"]; *see* EPA Region 5, *West Bay #22 SWD Geologic Siting* 1 (Region 5's attach. B-7) ("*Geologic Siting*"). The deepest drinking water aquifer at the West Bay #22 SWD wellsite is located in the Marshall Sandstone Formation. At the wellsite, the aquifer extends from 80 to 155 feet below the surface.[4] RTPC at 2. Between Niagara Group and the Marshall Sandstone are multiple rock formations, many of which Region 5 concluded would prevent the injected brine from contaminating the Marshall Sandstone aquifer. *Id.* at 3, 9-11. Region 5 principally relied on two layers of anhydrite that it concluded directly overlie the injection zone. *Id.* Region 5 also determined that the injected brine would be confined by various salt layers and shale beds. *Id.* at 3, 10.

III. *PRINCIPLES GOVERNING BOARD REVIEW*

Section 124.19 of Title 40 of the Code of Federal Regulations governs Board review of a UIC permit. EPA's intent in promulgating these regulations was that this review should be only sparingly exercised. Consolidated Permit Regulations, 45 Fed. Reg. 33,290, 33,412 (May 19, 1980); s*ee also In re Beeland Group, LLC*, 14 E.A.D. 189, 195-96 (EAB 2008).

In any appeal from a permit decision issued under part 124, the petitioner bears the burden of demonstrating that review is warranted. *See* 40 C.F.R. § 124.19(a)(4). The petitioner bears this burden even when the petitioner is self-represented, as is the case here. *In re New Eng. Plating Co.*, 9 E.A.D. 726, 730 (EAB 2001); *In re Encogen Cogeneration Facility*, 8 E.A.D. 244, 249-50 (EAB 1999). The Board generally endeavors to construe liberally the issues presented by a self-represented petitioner, so as to fairly identify the substance of the arguments being raised. The Board nevertheless "expect[s] such petitions to provide sufficient specificity to apprise the Board of the issues being raised." *In re Seneca Res. Corp.*,

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be lumped together into larger rock units called groups, and divided into smaller units called members." *In re West Bay Exploration Co.*, UIC Appeal No. 14-66, at 3 n.1 (EAB Sept. 22, 2014) (Order Denying Review).

[4] West Bay's application indicates that the Marshall Sandstone starts at 155 feet below the surface and continues down to 226 feet deep. Appl. attach. E, at 2.

UIC Appeal Nos. 14-01 to 14-03, slip op. at 2-3 (May 29, 2014), 16 E.A.D. ___; *In re Sutter Power Plant*, 8 E.A.D. 680, 687-88 (EAB 1991). "The Board also expects the petitions to articulate some supportable reason or reasons as to why the permitting authority erred or why review is otherwise warranted." *Sutter*, 8 E.A.D. at 688; *accord In re Beckman Prod. Servs.*, 5 E.A.D. 10, 19 (EAB 1994).

The Board has discretion to grant or deny review of a permit decision. *See* 40 C.F.R. § 124.19; *In re Avenal Power Ctr., LLC*, 15 E.A.D. 384, 394-95 (EAB 2011) (citing Consolidated Permit Regulations, 45 Fed. Reg. 33,290, 33,412 (May 19, 1980)), *remanded on other grounds sub nom. Sierra Club v. EPA*, 762 F.3d 971 (9th Cir. 2014). Ordinarily, the Board will deny review of a permit decision and thus not remand it unless the permit decision either is based on a clearly erroneous finding of fact or conclusion of law, or involves a matter of policy or exercise of discretion that warrants review. 40 C.F.R. § 124.19(a)(4)(i)(A)-(B); *accord, e.g.*, *In re Prairie State Generating Co.*, 13 E.A.D. 1, 10 (EAB 2006), *aff'd sub nom. Sierra Club v. EPA*, 499 F.3d 653 (7th Cir. 2007); *see also* Revisions to Procedural Rules Applicable in Permit Appeals, 78 Fed. Reg. 5,280, 5,281 (Jan. 25, 2013).

When evaluating a challenged permit decision for clear error, the Board examines the administrative record that serves as the basis for the permit to determine whether the permit issuer exercised his or her considered judgment. *E.g., In re Ash Grove Cement Co.*, 7 E.A.D. 387, 417-18 (EAB 1997); *In re GSX Servs*, 4 E.A.D. 451, 453 (EAB 1992). The permit issuer must articulate with reasonable clarity the reasons supporting its conclusion and the significance of the crucial facts it relied upon when reaching its conclusion. *E.g., In re Shell Offshore, Inc.*, 13 E.A.D. 357, 386 (EAB 2007). As a whole, the record must demonstrate that the permit issuer duly considered the issues raised in the comments and ultimately adopted an approach that "is rational in light of all information in the record." *In re Gov't of D.C. Mun. Separate Storm Sewer Sys.*, 10 E.A.D. 323, 342 (EAB 2002) ("DCMS4"); *accord In re City of Moscow*, 10 E.A.D. 135, 142 (EAB 2001); *In re NE Hub Partners, LP*, 7 E.A.D. 561, 567-68 (EAB 1998), *review denied sub nom. Penn Fuel Gas, Inc. v. EPA*, 185 F.3d 862 (3d Cir. 1999).

IV. *ANALYSIS*

Based on several scientific arguments, Mr. Bormuth contends that the rock formations cited by Region 5 will not confine the injected brine. He also claims that the record compiled by Region 5 does not support its decision to grant the permit and that the Region did not address his comments. The Board concludes that these claims necessitate remand of the permit. As explained in Part IV.A below, in response to Mr. Bormuth's assertion that the record is inadequate, we conclude that

there are unexplained discrepancies between Region 5's determination regarding the presence and impermeability of designated confining layers at the West Bay #22 SWD wellsite and the administrative record. In Part IV.B below, we find that the record does not show that the Region duly considered and meaningfully responded to Mr. Bormuth's comments on the permit.

A. *There Are Unexplained Discrepancies Between Region 5's Determination on Confining Layers and the Geological Data the Region Cites in Support*

Mr. Bormuth contends that the geological data that Region 5 relies upon are either erroneous or support his contention that the rock formations above the injection zone at the West Bay #22 SWD wellsite will not confine the injected brine. Petition ("Pet.") at 3-4; Petitioner Peter Bormuth's Reply to EPA Response to Petition for Review ("Petitioner's Reply") at 20-21. In his comments at the public hearing, Mr. Bormuth argued that the geological layers above the injection zone would either be dissolved by the injected brine or penetrated due to pre-existing factures and an upward hydraulic gradient. Tr. at 22-24, 25-27. Region 5 rejected those comments, relying primarily on two core documents in the administrative record: a publication titled *Hydrogeology for Underground Injection Control in Michigan: Part I* ("*Michigan Hydrogeologic Atlas*"[5]) and drilling records from wells in close vicinity to the West Bay #22 SWD site. RTPC at 2. The *Michigan Hydrogeologic Atlas* was compiled by the Geology Department of Western Michigan University and contains regional evaluations of the suitability of Michigan's hydrogeology for underground injection of waste, as well as guidance for conducting site-specific feasibility studies for such underground injection. *See Mich. Atlas* at I-7 to -8 & ch. II.

Before the Board, Mr. Bormuth challenges the accuracy of the *Michigan Hydrogeologic Atlas*, calling it "erroneous" and arguing Region 5's reliance on it was "misplaced." Pet. at 3, 4. He also asserts that the drilling records and other documents support his claims regarding the permeability of many rock layers. *Id.*

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[5] For convenience, we have adopted Region 5's convention of referring to this volume as *Michigan Hydrogeologic Atlas*. RTPC at 2. Actually, the *Michigan Hydrogeologic Atlas* is a companion volume to *Hydrogeology for Underground Injection Control in Michigan: Part 1*. *Mich. Atlas* at I-2, -9. The *Atlas* is an oversized compendium of maps and diagrams, most of which are contained in *Hydrogeology for Underground Injection Control in Michigan: Part 1* in a reduced size. Dept. of Geology, W. Mich. Univ., *Michigan Hydrogeologic Atlas* (1981). The excerpts included in the administrative record by Region 5 are taken from *Hydrogeology for Underground Injection Control in Michigan: Part 1*. Region 5's Resp. attach. B-13.

at 8; Petitioner's Reply at 20-21. In response, Region 5 defends reliance on the *Atlas*, contending that it "combine[s] all known information regarding Michigan's hydrogeology" and "makes extensive use of maps" to show "which formations underlie a location; how thick they may be; and their hydrogeological significance." Response to Petition for Review ("Region 5's Resp.") at 28. Moreover, the Region repeatedly emphasizes to the Board its conclusion in the Response to Public Comments document that the drilling records confirm the *Michigan Hydrogeologic Atlas*'s conclusions as to the rock layers "around the West Bay #22 SWD wellsite." *Id.* at 29-30, 31 (citing RTPC at 11). The Region asserts that "[t]he *Atlas* speaks for itself," and that Mr. Bormuth "ignores the ground truth of these drilling records." *Id.* at 28, 34.

1. *Consideration of Appropriate Geological Data*

EPA regulations specify that a permit issuer in evaluating a UIC permit "shall consider * * * [a]ppropriate geological data on the injection zone and confining zone including lithologic description, geological name, thickness and depth." 40 C.F.R. § 146.24(a)(5). Our cases emphasize that "appropriate geological data" means site-specific data. Thus, in *In re Stonehaven Energy Management, LLC*, 15 E.A.D. 817 (EAB 2013), the Board held:

> Just as the Region must consider whether wells in the *area of review* for the proposed Class II well may lead to contamination of underground sources of drinking water, so too must the Region consider whether the *area's* geological conditions constitute a similar endangerment.

Id. at 828 (emphasis added). Under the UIC regulations, the "area of review" is defined as an area calculated on either a fixed radius of not less than one-fourth mile or the projected radius of the distance that injected fluids may migrate. 40 C.F.R. § 146.6. Analogously, the Board has remanded a UIC permit where the Region did not consider "appropriate and accurate site-specific information" on water wells in the immediate vicinity of the proposed UIC well. *In re Bear Lake Props.*, 15 E.A.D. 630, 638 (EAB 2012). In evaluating the geological data relied upon by Region 5, and disputed by Mr. Bormuth, we focus, therefore, on whether the data are appropriate and accurate for the West Bay #22 SWD wellsite.

The Board will defer to the Region on "scientific and technical matters, such as questions regarding geological structure." *Stonehaven*, 15 E.A.D. at 830. Deferral, however, does not mean "blind acceptance," and "the Board must ascertain whether [technical] determinations are adequately explained and supported by information in the administrative record." *Id.* Here, Region 5 argues

that the *Michigan Hydrogeologic Atlas* and drilling records support its determination that certain designated rock layers are present at the West Bay #2 wellsite and will confine the injected brine. Region 5's Resp. at 28; *see* RTPC at 3. The Board's examination of those documents, however, raises questions as to whether two or more of the specific confining layers that the Region based its decision on are present at the West Bay #22 SWD wellsite, and, as for other layers that are present, whether they can serve as confining layers.

2. *Geological Data on Which Region 5 Relied*

At the West Bay #22 SWD wellsite, the Marshall Sandstone aquifer is vertically separated from the injection zone in the Niagara Group by approximately 2,400 feet. RTPC at 2. In responding to Mr. Bormuth's comments, Region 5 asserted that many of the geologic layers in this 2,400-foot subsurface area would confine the injected brine, placing primary emphasis on a layer of rocks known as "the Salina Group" for confining brine injected to the Niagara Group. The Salina Group directly overlies the Niagara Group. *Id.* at 3. In particular, Region 5 points to two of the deepest formations in the Salina Group, the A-1 Evaporite and A-2 Evaporite, as confining the injected brine. *Id.* at 3, 10; *see Geologic Siting* at 4-5 (containing diagrams showing the A-1 and A-2 Evaporite to be two of the three or four deepest formations in the Salina Group). The A-1 and A-2 Evaporite Formations are composed of "massive anhydrite," a mineral that Region 5 describes as "impermeable." RTPC at 3, 10. Additionally, Region 5 noted that the Salina Group also contains "multiple formations of carbonate, anhydrite and shale." *Id.* at 10. According to Region 5, these formations "contain thick salts, which make them 'essentially an aquiclude,' or a structure preventing passage of water."[6] *Id.* Region 5 relied on drilling records for wells in the vicinity of the West Bay #22 SWD wellsite to show the presence of the Salina Group formations at the location in Jackson County where West Bay #22 SWD would be constructed. *Id.* at 11. Specifically, on the latter point, Region 5 wrote: "Drilling records for these other wells also show 1) the presence of the Salina Group as the first confining zone; and 2) that the Salina Group's composition is consistent with its description in the *Michigan Hydrogeologic Atlas*." *Id.* Finally, Region 5 claimed that several impermeable shale layers above the Salina Group serve as additional confining layers. Specifically, Region 5 cited to the "Antrim Formation, Bedford Shale

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[6] An aquiclude is "a geologic formation or stratum that confines water in an adjacent aquifer." *Webster's Third New Int'l Dictionary* 108 (2002).

Formation, Bell Shale Formation, Sunbury Shale Formation, and Coldwater Shale Formation." *Id.* at 10, 12.

The record supports Region 5's conclusion that the *Michigan Hydrogeologic Atlas* generally shows that the Salina Group and the other shale formations cited by Region 5 *can* be excellent confining layers. However, examination of the *Michigan Hydrogeologic Atlas* raises significant questions as to whether several of these formations are in fact present at the site of West Bay #22 SWD wellsite, and, as to the formations that are present, whether local conditions affect their ability to function as confining layers. The drilling records raise similar questions regarding the presence or absence of these formations at the West Bay #22 SWD wellsite and the potential for site-specific conditions that may affect the permeability of the formations. We examine each of the formations individually in some detail below.

a. *Salina Group: A-1 Evaporite Formation*

Region 5 repeatedly stressed in the Response to Comment document that the A-1 Evaporite Formation in the Salina Group will confine injected brine. RTPC at 3, 10. The Board's examination of the documents cited by Region 5 raises a question as to whether the A-1 Evaporite Formation is present in the Salina Group at the West Bay #22 SWD wellsite. The *Michigan Hydrogeologic Atlas* and the drilling records appear to be in accord that *some* of the formations in the Salina Group are present at the West Bay #22 SWD wellsite. But, as explained below, both the Report and the drilling records also appear to indicate that the A-1 Evaporite is not one of those formations.

The *Michigan Hydrogeologic Atlas* provides detailed information on the spatial subsurface spread – vertically and laterally – for the underground rock layers in the geologic area known as the Michigan Basin. The *Atlas* explains that the lateral spread of the Salina Group in Michigan generally, and Jackson County specifically, was shaped by the structure of the Salina Group's underlying geologic layer, the Niagara Group. *Mich. Atlas* at II-36, -37 fig.2.16.

The *Michigan Hydrogeologic Atlas* states that the Niagara Group geologic layer developed as a "reef-rimmed basin" [7] centered in and around a large area of

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[7] This usage of the term "basin" refers to "a large or small depression in the surface of the land, the lowest part often being occupied by a lake or pond." *Webster's Third New Int'l Dictionary* 183 (2002). As such a basin is filled in over time with layers or strata of sedimentary rock (e.g., the Michigan Basin), it is referred to as a structural or geologic

subsidence in what is now the State of Michigan. *Id.* at II-32, II-41. The *Atlas* divides the Niagara Group into three "gradational zones with distinctive rock characteristics." *Id.* at II-36. These zones, or "facies" to use the geological term,[8] are labeled the "basinal [or basin] facies," the "shelf facies," and the "bank facies." *Id.* The basinal facies are located on the central floor of the basin. On the other hand, the shelf and bank facies are positioned on the perimeter of the basin, having been formed from pinnacle and barrier reefs that rimmed the basin. *Id.* at II-37 to -38, figs. 2.16 & 2.17. The thickness of the three zones reflects their location in the basin and the conditions of their formation. The central basinal facies or zone is relatively narrow (50 – 120 feet). As the floor of the basin slopes upward toward the basin's rim, the thickness of the Niagaran zones increases for both the shelf facies (120 – 300 feet) and the bank facies (300 – 400 feet).[9] *Id.* at II-36, II-39.

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basin, meaning "a broad area of the earth beneath which the strata dip usually from the sides toward the center." *Id.*; *see McGraw Hill Concise Encyclopedia* 226 (1998).

[8] The geological term "facies" refers to "any observable attribute of rocks, such as an overall appearance, composition, or conditions of formation." *McGraw Hill Concise Encyclopedia* 783 (1998).

[9] The *Michigan Hydrogeologic Atlas* describes the basinal, shelf, and bank facies as follows:

> In the central part of the basin, the Niagara Group consists of a thin (50 – 120 feet) dense limestone (micrite) termed the *basinal facies* that grades outward into a dolomitic limestone.
>
> * * *
>
> The *shelf facies* of the Niagaran, a dolomitized skeletal limestone, encircles the basin facies and grades outward into the *bank facies*. The shelf facies thickens outward from about 100 feet on its inner margin to 300 feet and includes "pinnacle" reefs.
>
> * * *
>
> The Niagaran section is thickest in the bank facies * * *. Across the southern Lower Peninsula the facies is between 300 feet and 400 feet thick. The bank facies is a dolomitized carbonate bank-reef complex that developed along and on the stable arch areas * * *. Here, the Michigan Basin subsided less and widespread organic activity resulted in a broad accumulation of reefal material.

Because the Salina Group is essentially draped over the Niagara Group, it is thickest in the central basin zone (where the Niagara Group is relatively narrow) and thins over the shelf and bank facies zones of the Niagara Group (where the Niagaran shelf and bank facies rise above the central basin and become increasingly thick). *Id.* at II-38 fig.2.17. The result, the *Michigan Hydrogeologic Atlas* explains, is that a "number of the lithologies [rock layers][10] [of the Salina Group] are restricted to an area roughly equivalent to the combined extent of the basin[al] and shelf facies of the Niagaran Group." *Id.* at II-42.

The A-1 Evaporite is one of these lithologies. The *Michigan Hydrogeologic Atlas* states that the A-1 Evaporite "is generally not present south of the shelf facies" in the southern portion of the Lower Peninsula. *Id.* at II-43; *see id.* at II-37 fig.2.16 (graphically showing how the A-1 Evaporite and several other Salina Group layers do not rise above the level of the basinal and shelf facies and therefore do not extend onto the Niagara Group's bank facies[11]). Jackson County is located in the south-central portion of Michigan's Lower Peninsula. Importantly, the *Michigan Hydrogeologic Atlas* includes a map appearing to show that all but a small portion of northern Jackson County is situated over the Niagaran's bank facies. *See Id.* at II-38 fig.2.17. Thus, the *Michigan Hydrogeologic Atlas*'s general description of the Salina Group suggests that the A-1 Evaporite is not present in most of Jackson County. A map in the *Atlas* showing the spread and thickness of the A-1 Evaporite also appears to show that only a small portion of northwestern Jackson County has A-1 Evaporite at a thickness greater than zero feet. *See id.* at II-44 fig.2.19. The West Bay #22 SWD well site is in the far southeastern corner of Jackson County.

Consistent with the *Michigan Hydrogeologic Atlas*, the drilling records from the West Bay #22 SWD site vicinity do not appear to reflect the presence of the A-1 Evaporite. These drilling records report the top of the Niagara Group at

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Mich. Atlas at II-36, -39 to -41.

[10] A lithology is "the rock found in a geological area or stratum expressed in terms of its structure, mineral composition, color, and texture." *Webster's Third New Int'l Dictionary* 1322 (2002).

[11] Figure 2.16 from the *Michigan Hydrogeologic Atlas* illustrates how the Salina Group's A-1 and A-2 Evaporite layers do not extend onto the bank facies in the northern Michigan basin. The text of the Atlas indicates there is a similar phenomenon in the southern part of the Michigan basin. *See Mich. Atlas* at II-43, -46.

2,652 feet underground and describe the formation immediately above as the B Evaporite.[12] *Geologic Siting* at 11, 14.[13] In addition to the B Evaporite, the records show that two other Salina Group formations – the C Shale and the G Unit – are found at the West Bay #22 SWD wellsite. *Id.* at 11. The drilling records make no explicit mention of the A-1 Evaporite. *Id.* Diagrams included in a Region 5 memorandum on the geologic siting of the West Bay #22 SWD well show that if the A-1 and A-2 Evaporites are present, they would be below the B Evaporite, C Shale, and G Unit. *Geologic Siting* at 4-5.

Region 5's Response to Public Comments document describes the A-1 Evaporite as a confining layer for West Bay #22 SWD wellsite, citing the *Michigan Hydrogeologic Atlas* and drilling records in support. However, the Response to Comments document does not discuss the information in the *Michigan Hydrogeologic Atlas* bearing on the A-1 Evaporite's presence, or lack thereof, in Jackson County. Neither does the Response to Comments document acknowledge that the drilling records do not, on their face, appear to identify the A-1 Evaporite as present at the West Bay #22 SWD wellsite.[14]

b. *Salina Group: A-2 Evaporite Formation*

Region 5's reliance on the A-2 Evaporite Formation as a confining layer presents some of the same questions regarding its presence at the West Bay #22 SWD wellsite as does the A-1 Evaporite Formation. The *Michigan Hydrogeologic Atlas* appears to generally suggest that A-2 Evaporite is not present at the West Bay #22 SWD wellsite, or is only minimally so. The *Atlas* states that "[o]ver the bank reef complex [the A-2 Evaporite] is a dense anhydrite generally less than 40 feet thick." *Mich. Atlas* at II-46. However, the relevant map in the *Michigan*

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[12] The drilling records describe the geologic layer immediately above 2,652 feet underground (the designated start of the Niagara Group) as "B Evap-Anhydrite Wh-Lt Gy W/Dolomite-Vfxln, Lt-md Gy, Intbd at base with Anhy. AA." The layer immediately below 2,652 feet is described as "Dolo & Limst-Wh-lt Gy, Dns, Anhydritic@[approximately 2,775 feet]-Wh, Dns." *Geologic Siting* at 11.

[13] The drilling reports are attached to the Region's memorandum on the geological siting of West Bay #22 SWD. The drilling record for the well designated "West Bay & Boyd #2-27" contains the most detailed information. *Geologic Siting* at 10-16.

[14] Confusingly, West Bay's application states that the injection zone includes both the Niagara Group and the "Salina A1." Appl. attach. G, at 3. The application indicates that the confining layer will be the "Salina A2 Evaporite." *Id.* at 2.

Hydrogeologic Atlas appears to show that the A-2 Evaporite does not extend south of the northern one-third of Jackson County. *See id.* at II-47 fig.2.21. The drilling records from the West Bay #22 SWD site vicinity report that the Salina Group's B Evaporite Formation is present immediately above the Niagara Group and contain no mention of the A-2 Evaporite. *Geologic Siting* at 11.

As with the A-1 Evaporite, the Response to Comments document cites both the *Michigan Hydrogeologic Atlas* and drilling records to support the Region's determination. RTPC at 10, 11. But again the Response to Comments document fails to discuss the specifics from the *Michigan Hydrogeologic Atlas* and the drilling records bearing on whether the A-2 Evaporite is present at the West Bay #22 SWD wellsite.

c. *Salina Group: Other Formations.*

Several other formations in the Salina Group are generally documented by the *Michigan Hydrogeologic Atlas* and the drilling records as present at West Bay #22 SWD wellsite. Specifically mentioned by both of these records are the B Evaporite, the C Shale, and the G Unit, though the *Michigan Hydrogeologic Atlas* is more equivocal than the drilling records. *Compare Mich. Atlas* at II-49 to -50 (the upper non-salt containing portion of the B Unit "thins from a maximum of more than 80 feet in the basin center to a zero edge * * * over the northern part of the bank facies and the southern flank of the basin"), II-51 (the C Shale "thins across the southern bank facies"), II-57 ("[t]he Salina G-Unit is a sequence of dolomitic and anhydritic shales that range in thickness from a zero edge in southern Michigan to more than 100 feet in the northeastern quadrant of the Southern Peninsula"),[15] *with Geologic Siting* at 11 (reporting the thicknesses of the B Evaporite, C Shale, and G Unit at the West Bay #22 SWD wellsite as approximately 180, 70, and 230 feet,[16] respectively).

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[15] The *Michigan Hydrogeologic Atlas* also is less clear on the presence of the C Shale and G Unit at the West Bay #22 SWD wellsite compared to the A-1, A-2, and B Evaporites because the relevant maps do not show Jackson County. *See Mich. Atlas* at II-52 fig.2.24 (C Shale), II-58 fig. 2.28 (G Unit).

[16] The drilling record for the well designated as "West Bay & Boyd #2-27" indicates that this well was drilled at an angle, and a conversion table is provided for the "True Vertical Depth" of the various formations identified in the drilling record. *See Geologic Siting* at 10-15 (describing measured depth of the distance drilled through the B Evaporite, the C Shale, and the G Unit as 206, 81, and 269 feet, respectively). Because

Despite the presence of these formations at the West Bay #22 SWD wellsite, both the *Michigan Hydrogeologic Atlas* and the drilling records raise questions about the degree to which these formations will serve as confining layers in that location. First, Region 5 emphasized that these other Salina Group formations act as aquicludes because of the presence of thick salt layers. RTPC at 3, 10. Yet, the extent to which the Salina Group's salt layers extend over the bank facies or zones is unclear. For example, the *Michigan Hydrogeologic Atlas* describes the Salina Group's suitability as a confining layer in the following fashion: "Throughout the central portion of the Michigan Basin *where the group contains thick salts* and basinward of the reef trend, the unit is essentially an aquiclude." *Mich. Atlas* at II-42 (emphasis added). More specifically, the *Atlas* also states that the B-Salt, a portion of the "B Member" of the Salina Group, "does not extend south of the southern edge of the shelf facies of the Niagaran." *Id.* at II-49. In other words, the *Michigan Hydrogeologic Atlas* confirms Region 5's statement that the Salina Group's salt layers are important to the ability of other Salina Group formations to function as aquicludes, and, at the same time, casts doubt on the presence of these salt layers at the West Bay #22 SWD wellsite. Further, the drilling records do not explicitly mention the presence of any salt layers in the Salina Group formations at the West Bay #22 SWD wellsite.[17] *See Geologic Siting* at 11.

Next, another potentially complicating issue is that the drilling records show that each of the three Salina Group formations identified at the West Bay #22 SWD wellsite, the B Evaporite, the C Shale, and the G Unit, contain dolomite. Mr. Bormuth claims that the Salina Group formations are permeable, and that the presence of dolomite, as evidenced in the drilling records, supports this claim. Pet. at 3; Petitioner's Reply at 20-21. Some support for this claim is provided by the *Atlas* in that it ties the permeability of the Niagaran bank formations to dolomite. Specifically, the *Michigan Hydrogeologic Atlas* states: "Dolomitization of the [bank facies] has produced a very porous and permeable lithology that is generally filled with brine throughout the subsurface." *Mich. Atlas* at II-41.

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the true vertical depth is only reported for three to four points in every 100 feet drilled, estimation of the thickness of formations is only approximate.

[17] The drilling records designate formation names and also contain other site-specific information, much of which is abbreviated. *Geologic Siting* at 11. Region 5 has cited to no analysis in the administrative record explaining the notations in the drilling records.

On the other hand, neither the absence of salt layers nor the presence of dolomite may affect the ability of the B Evaporite, the C Shale, and the G Unit to function as confining layers. As to the B Member of the Salina Group, the *Michigan Hydrogeologic Atlas* states that "the presence of either salt or anhydrite should indicate that the member is an aquiclude." *Id.* at II-49. The drilling records identify a significant layer of B Evaporite at the West Bay #22 SWD wellsite and describe it as containing anhydrite. *Geologic Siting* at 11. The *Michigan Hydrogeologic Atlas* states that 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." *Mich. Atlas* at II-51. Finally, the *Michigan Hydrogeologic Atlas* explains that "[i]n those portions of the Southern Peninsula where the shales of the G Unit are more than 40 feet thick it is probably an aquiclude." *Id.* at II-57. The drilling records appear to indicate that the G-Unit is more than 200 feet thick at the West Bay #22 SWD wellsite. *Geologic Siting* at 11. Moreover, as to all three of these formations, the *Atlas* explicitly recognizes that they contain some dolomite but does not indicate that the presence of dolomite in these formations makes them permeable as it does in the Niagaran. *Mich. Atlas* at II-49 (B Member), -51 (C Shale), -57 (G Unit).

The questions raised by the *Michigan Hydrogeologic Atlas* and the drilling records concerning the permeability of these formations are not discussed in the Response to Public Comments document. Specifically, the Response to Public Comments document fails to address whether these layers in the Salina Group play a confining function in the absence of salt or whether these layers' impermeability is compromised by the presence of dolomite.

d. *Other Shale Formations*

As indicated in Part IV.A.2 above, the *Michigan Hydrogeologic Atlas* generally describes the Antrim Formation, Bedford Shale Formation, Bell Shale Formation, Sunbury Shale Formation, and Coldwater Shale Formation as adequate, if not excellent, confining layers. The *Michigan Hydrogeologic Atlas* also generally appears to support Region 5's claim that these formations should be present at the West Bay #22 SWD wellsite site. *See Mich. Atlas* at II-76 to -78 (Bell Shale), -80 to -81 (Antrim Shale), -83 (Bedford Shale), -85 (Bedford Shale), -86 (Sunbury Shale), -89 (Sunbury Shale), -91 to -92 (Coldwater Shale). The drilling records, however, only explicitly confirm the presence of the Antrim Shale,

the Sunbury Shale, and the Coldwater Shale.[18] *Geologic Siting* at 11. The drilling records also raise questions concerning the impermeability of two of these layers. As to the Sunbury Shale, the drilling records describe it as mixed with Berea siltstone. *Id.* The *Michigan Hydrogeologic Atlas* describes the formation below the Sunbury Shale as the Berea Sandstone. It states that in eastern Michigan, the Berea Sandstone "has good aquifer characteristics" and has several fields in eastern Michigan that "produce oil and gas." *Mich. Atlas* at II-86. Additionally, the drilling records describe the Coldwater Shale as "silty." *Geologic Siting* at 11. Mr. Bormuth argues that the Berea Sandstone penetrates the Coldwater Shale, making it permeable, and also relies on the information in the drilling reports to make the same point. Pet. at 8; Petitioner's Reply at 20-21. Along similar lines, the *Michigan Hydrogeologic Atlas* states that "[t]he Coldwater would be an excellent confining layer except in the eastern part of the state where sandstones are present." *Mich. Atlas*, II-91. The West Bay #22 SWD wellsite is in the southeastern corner of Jackson County, which puts the wellsite in the eastern half of Michigan. Again, the Response to Comments document addresses none of these issues.

3. *The Unexplained Discrepancies Between Region 5's Determinations and the Administrative Record Warrant a Remand of the Permit*

The decisionmaker must exercise her "considered judgment" in making a site-specific determination that the proposed underground injection well will not endanger underground drinking water supplies. *In re San Jacinto River Auth.*, 14 E.A.D. 688, 702-03 (EAB 2010) (holding that in a permit case the permit issuer "must apply [the regulatory] provisions to the facts of the case and exercise considered judgment"). The Board has repeatedly remanded permit decisions that fail to evidence the exercise of "considered judgment" or "reasoned analysis." For example, in *Bear Lake Properties*, the Board remanded a UIC permit because the EPA regional office "fail[ed] to provide the Board with a clear explanation or analysis supporting its conclusion that all water wells within the area of review had been identified and considered." 15 E.A.D. at 639. The Board specifically called attention to unexplained "apparent discrepancies" in information in the administrative record and concluded that these showed that the regional office had "failed * * * to assure the public that [it] relied on accurate and appropriate data in satisfying its obligations." *Id.* Similarly, in a case involving a Clean Air Act permit, *In re Pio Pico Energy Center*, CAA Appeal Nos. 12-04 to 12-06

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[18] The drilling records report a fourth shale layer as well but do not identify the formation by name. *Geologic Siting* at 11.

(EAB Aug. 2, 2013), 16 E.A.D. ____, the Board held that the EPA regional office did not exercise "considered judgment" because it "overlooked highly relevant information in the record * * * that appear[ed] to directly conflict with part of the Region's underlying rationale for selecting the permit's emission limit for particulate matter." *Id.* at 93-94, 16 E.A.D. at ___. The Board found that the Region's failure to square the conflicting information with its rationale for the emission limit "cast[] doubt" on the adequacy of the emission limit. *Id.* at 97.

In this case, it is not clear based on the administrative record that Region 5 met its responsibility to exercise considered judgment in making a site-specific determination regarding the confining layers for the West Bay #22 SWD well. Five of the geologic formations that the Region cited as confining any injected brine may be absent from the wellsite. Both the *Michigan Hydrogeologic Atlas* and the drilling records raise unanswered questions as to whether the A-1 Evaporite, the A-2 Evaporite, the Salina Group's salt layers, the Bedford Shale, and/or the Bell Shale are present at the West Bay #22 SWD wellsite. These geologic formations were not extraneous to the Region's conclusions. Rather, the Region asserted that two of the formations (the A-1 and A-2 Evaporite) directly overlie the injection zone and the Region emphasized these formations as central to its rationale that the injected brine would not contaminate underground drinking water sources. *See* RTPC at 3, 10. Further, even as to several of the geologic formations whose presence is confirmed by the record, the Region did not address site-specific information that raised reasonable questions about their potential to serve as confining layers (e.g., Would the Salina Group formations present at the West Bay #22 SWD wellsite act as confining layers in the absence of salt layers? Would the Sunbury Shale be impermeable if it contains Berea siltstone? Would the Coldwater Shale confine fluids if it is "silty"?). Given these unexplained discrepancies between the determinations in Region 5's Response to Public Comments document and the information relied on by the Region to support those determinations, it is not clear that the Region exercised considered judgment in its conclusion that the injected brine would be confined. Accordingly, consistent with Board practice, we are remanding the permit.

Importantly, the Board emphasizes that it has not concluded that the Niagara Group at the West Bay #22 SWD wellsite is inappropriate for the injection of brine. Rather, the Board holds that the Region has not adequately explained how it took into account the record information bearing on this question. One or more of the geologic formations at the site may be more than adequate to confine the brine injected into the Niagara Group, but we cannot make that determination based on the Region's analysis to date.

B. *The Record Does Not Show That Region 5 Duly Considered and Meaningfully Responded to Mr. Bormuth's Comments*

A separate claim in Mr. Bormuth's Petition is that Region 5 did not adequately address and respond to his comments. Mr. Bormuth asserts that the Region "deliberately" ignored "facts" contained in his public comments. Pet. at 9, 10. In addition, Mr. Bormuth has identified specific arguments he raised in the public comment period that Region 5 allegedly chose "to ignore" or "decline[d] to respond to." Petitioner's Reply at 16.

It is incumbent on the permit issuer to "duly consider[] the issues raised in the comments," *DCSM4*, 10 E.A.D. at 342, and respond to the comments in a "meaningful fashion." *In re Wash. Aqueduct Water Supply Sys.*, 11 E.A.D. 565, 585 (EAB 2004). A comment response may be succinct – a permit issuer's response to a comment is not required "to be of the same length or level of detail as the comment." *In re NE Hub Partners, LP*, 7 E.A.D. 561, 583 (EAB 1998); *see* 40 C.F.R. § 124.17(a)(2) (requiring permit issuers to "[b]riefly describe and respond to all significant comments"). But the comment response must be "clear and thorough enough to adequately encompass the issues raised by the commenter." *Wash. Aqueduct*, 11 E.A.D. at 585. If the permit issuer does not meaningfully articulate its reasons for accepting or rejecting comments, the Board "cannot properly perform any review whatsoever on that analysis and, therefore cannot conclude that it meets the requirement of rationality." *DCMS4*, 10 E.A.D. at 342-43.

It is particularly important for the permit issuer to adequately address comments that raise technical or scientific issues. As the Board has noted, "the locus of responsibility for important technical decisionmaking rests primarily with the permitting authority, which has the relevant specialized expertise and experience." *In re Peabody W. Coal Co.*, 12 E.A.D. 22, 33 (EAB 2005). For that reason, the Board should generally not be asked to resolve technical issues in the first instance. In an earlier challenge by Mr. Bormuth to a West Bay UIC permit, we did not allow Mr. Bormuth's attempt "to use [his] appeal to bypass the Region" and present his scientific arguments and supporting data directly to the Board. *In re West Bay Exploration Co.*, UIC Appeal No. 14-66, at 12 (Sept. 22, 2014) ("Order Denying Review"). The Board explained that:

> Allowing this tactic would turn the administrative permit process on its head. 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. 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.

Id. (citations omitted). As described below, Region 5, by not fully responding to Mr. Bormuth's comments at the permit proceeding, is essentially asking the Board to resolve science questions as a first-line decisionmaker.

At the public hearing on the permit for the West Bay #22 SWD well, Mr. Bormuth presented several distinct arguments, at least in outline form, and discussed the data supporting those arguments. He also submitted to Region 5 hard copies of the studies and reports he was relying on. The studies appear to be from reputable scientific journals and the reports are from EPA or other government agencies.[19] The arguments made by Mr. Bormuth included claims that:

1. The injected brine would convert the layers of impermeable anhydrite into permeable gypsum. Tr. at 22-23.
2. The conversion of anhydrite to gypsum would be "accelerated in the presence of certain salts like those contained in the brine that West Bay will be injecting." *Id.* at 23.
3. The conversion of anhydrite to gypsum would proceed quickly because the "solubility of anhydrite increases sharply with [increases in] pressure." *Id.* at 24-25.
4. The injected brine would dissolve any salt layers between the injection zone and the Marshall Sandstone aquifer. *Id.* at 24.
5. A hydraulic gradient exists in the Michigan basin that would drive injected fluids upward into overlying formations. *Id.* at 25-26.
6. Evidence exists of fracturing and cross-formational flow in the Michigan basin that would allow upward migration of injected brine. *Id.* at 27.

He concluded that the West Bay #22 SWD wellsite and other injection wells approved by Region 5 are "going to destroy the groundwater of this county and the southern Michigan basin." *Id.* at 29.

Region 5 devoted three pages in its Response to Public Comments document to address Mr. Bormuth's comments. Much of that discussion, however,

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[19] Region 5 emphasizes that included in Mr. Bormuth's submissions were citations to Wikipedia, the online, open source encyclopedia. Region 5's Resp. at 5. Mr. Bormuth did cite to Wikipedia in two instances, but those citations concerned points that he also supported with references to scientific articles. Tr. at 28-29.

is a repetition of Region 5's position that the presence of such formations as the A-1 and A-2 Evaporite and the salt layers in the Salina Group, as well as other rock layers, will confine the injected brine. RTPC at 9-10, 12. Only a single paragraph, a mere eight sentences, discussed Mr. Bormuth's arguments concerning why the existing rock formations would not contain the injected brine. *Id.* at 10-11. That paragraph focused almost exclusively on Mr. Bormuth's first argument above, that the brine will convert the anhydrite layers to gypsum. Region 5 did not respond to Mr. Bormuth's other five arguments or explain why a response was unnecessary given how it had responded to his first argument.

Even as to the anhydrite conversion issue, Region 5's response failed to engage the full extent of Mr. Bormuth's argument. Region 5 stated that the studies relied upon by Mr. Bormuth address chemical reactions of anhydrite that occur only in near-surface conditions, and that "[s]uch 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." RTPC at 10-11. However, Region 5's response does not explain *why* temperature and pressure at depth will inhibit anhydrite conversion to gypsum. A further explanation would appear to have been warranted given that Mr. Bormuth cited studies that he claimed show that the greater pressures that occur at depth will increase the solubility of anhydrite and thus increase the speed of its conversion to gypsum (described as Argument #3 above). Tr. at 24-25. Accordingly, given Region 5's failure to fully explain its dismissal of the anhydrite conversion claim and failure to address at all Mr. Bormuth's other arguments, the Board concludes that Region 5's Response to Public Comments document did not provide sufficient information for the Board to evaluate Region 5's rejection of Mr. Bormuth's comments.

Region 5 provides a much more extensive response to Mr. Bormuth's arguments in its brief filed with the Board. Region 5's Resp. at 15-34. Not only does Region 5 address each of the six arguments described above, but it discusses by name the scientific studies and reports relied on by Mr. Bormuth.[20] As noted,

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[20] Region 5's detailed explanation for opposing Mr. Bormuth's appeal has elicited from him in his Reply Brief the fullest statement yet of his scientific arguments as well as citations to new studies that allegedly rebut assertions in Region 5's Response Brief. In particular, Mr. Bormuth cites to an abstract from a scientific conference that asserts that the Coldwater Shale in the area of Ann Arbor, Michigan, just to the west of the West Bay #22 SWD wellsite, has "matrix permeability and low angle horizontal fractures." Petitioner's Reply at 21, (citing A. Preuhs & L. Lemke, *Modeling Bedrock Transmissivity;*

the Board generally defers to the Region's judgment on matters that are fundamentally technical or scientific in nature. But the fact that the Board defers to the permit issuer's judgment on technical issues "does not relieve the [permit issuer] of its obligation to adequately explain and support its rationale in the record." *In re ConocoPhillips Co.*, 13 E.A.D. 768, 799 (EAB 2008); *see also In re Dominion Energy Brayton Point, LLC*, 12 E.A.D. 490, 510, 560-62, 645-47, 668, 670-74 (EAB 2006); *In re Russell City Energy Ctr.*, 15 E.A.D. 1, 12, 39-42, 66 (EAB 2010), *petition denied sub nom. Chabot-Las Positas Cmty. Coll. Dist. v. EPA*, 482 F. App'x 219 (9th Cir. 2012). Hence, Region 5 cannot overcome a failure to clearly articulate a basis for the rejection of a number of significant comments by essentially asking the Board to decide those matters, especially technical matters, de novo. *In re Indeck-Elwood*, LLC, 13 E.A.D. 126, 162 n.68 (EAB 2006) (noting that a permit issuer must articulate the reasons for its conclusion and must adequately document its decisionmaking as part of the permit decision itself and not for the first time on appeal); *In re Chem. Waste Mgmt*, 6 E.A.D. 144, 151-52 (EAB 1995) (declining to rely on rationale permit issuer raised for the first time in response to an appeal).

We recognize that Region 5 faced a difficult task in responding to Mr. Bormuth's comments. Not only did Mr. Bormuth raise complex, scientific arguments, but he presented them only during the relatively brief time allowed for oral statements at the public hearing for the West Bay permit and not through detailed written comments. Further, Mr. Bormuth's oral presentation was not organized around the particular scientific claims he was making but rather consisted of Mr. Bormuth going through each of his separate submissions sequentially and stating what each article or report showed. The written briefing process on the permit before the Board appears to have clarified Mr. Bormuth's scientific arguments, in part, because Mr. Bormuth was made aware of Region 5's disagreements with his scientific analysis. Ideally, this interactive approach to clarifying complex scientific comments should occur in the EPA regional office portion of the administrative proceeding and not await appeal to the Board. On this point, the Board observes that the governing regulations found in Part 124 of Title 40 of the Code of Federal Regulations provide Regional Administrators with a variety of tools for ensuring that the permit issuer gets the full benefit of the public's input through the administrative proceeding at the regional level and for building a

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Implications for Contaminant Transport in an Overlying Glacial Aquifer System, https://gsa.confex.com/gsa/2014AM/webprogram/Paper245785.html).

thorough record for appellate review when complex science or policy issues are raised in connection with a UIC or other permit. *See, e.g.*, 40 C.F.R. § 124.14(a)(1), .14(b). Region 5 used these procedures to withdraw a previous version of the current permit and held another round of comment after deciding to reissue the permit. Nonetheless, in so doing, Region 5 did not take full advantage of all of its options – for example, issuing a revised statement of basis that addressed the scientific concerns expressed by Mr. Bormuth on the original permit – that might have led to a more fully developed record for appellate review.

V. *CONCLUSION*

Based on the foregoing discussion, the Board concludes that it is unclear from the administrative record whether Region 5 exercised its considered judgment in evaluating the potential confining layers at the West Bay #22 SWD wellsite. The record also does not show that Region 5 duly considered and meaningfully responded to Mr. Bormuth's comments on the potential confining layers. According, the Board remands the permit for Region 5 to reconsider the issue of whether the geologic formations at the West Bay #22 SWD wellsite will prevent the injected brine from contaminating the Marshall Sandstone aquifer, taking into account the administrative record as a whole and all of the arguments raised by Mr. Bormuth in his public comments and in this proceeding.

If Region 5 concludes that injected brine at the West Bay #22 SWD wellsite would endanger underground drinking water sources, it should issue a notice of intent to deny the permit under section 124.6(b) and follow the appropriate procedures for a permit denial in part 124. If Region 5 concludes that injected brine at the West Bay #22 SWD wellsite would not endanger underground drinking water sources, Region 5 should supplement the record to (1) provide a site-specific account of the designated confining layers at the West Bay #22 SWD wellsite that is supported by the administrative record; and (2) articulate in a revised Response to Public Comments document a full account of its reasons for rejecting each of Mr. Bormuth's scientific arguments concerning whether the geologic formations at the West Bay #22 SWD wellsite will confine injected brine.[21] Additionally, the

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[21] Region 5 should consider all of the arguments and scientific materials referenced by Mr. Bormuth in his Reply Brief. Region 5 broadly addressed Mr. Bormuth's public comments for the first time in its Response Brief; therefore, Mr. Bormuth's arguments and scientific materials in his Reply brief constitute fair rebuttal and should be considered on remand to ensure that the Region compiles an adequate record should this matter be appealed again. *Cf. In re Dominion Energy Brayton Point, LLC*, 13 E.A.D. 407, 418

Region may reopen the record for additional public comment as necessary, in accordance with 40 C.F.R. § 124.14. Anyone dissatisfied with Region 5's decision on remand must file a petition seeking Board review in order to exhaust administrative remedies under 40 C.F.R. § 124.19(l).[22]

So ordered.

(EAB 2007) (holding that the Board may consider newly submitted materials on review in response to the addition by the Region of new material to the administrative record).

[22] Following the conclusion of the briefing, Mr. Bormuth filed a motion to supplement the record with a recent UIC permit designated as the "Savoy Creque #3-20 Permit." Petitioner Peter Bormuth's Motion to Supplement (Apr. 11, 2016). Given our disposition of Mr. Bormuth's petition, this motion is now moot. Moreover, Region 5 has indicated it intends to withdraw that permit. *In re Savoy Energy, LP*, UIC Appeal Nos. 16-01 to -03, slip op. at 2 (EAB June 3, 2016), 17 E.A.D. ___ .

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **REMAND ORDER** in the matter of West Bay Exploration Company, UIC Appeal No. 15-03 were sent to the following persons in the manner indicated:

By U.S. First Class Mail:

Peter Bormuth
142 West Pearl Street
Jackson, MI 49201

By Pouch Mail:

Kris P. Vezner
Office of Regional Counsel
USEPA REGION 5
77 West Jackson Boulevard
Mail Code: C-14J
Chicago, IL 60604-3507

Dated: JUL 26 2016

Annette Duncan
Secretary