

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

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In re:	)	
	)	
Pratt Zero Carbon, LLC	)	UIC Appeal No. 26-03
	)	
UIC Permit No. KSS151570001	)	
	)	
_____	)	

**PETITIONERS' REPLY TO RESPONSES OF REGION 7
AND PRATT ZERO CARBON, LLC**

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Docket References

Filings in this appeal

Short Identifier	Description
Petition	Petition for Review, <i>In re Pratt Zero Carbon, LLC</i> , UIC Appeal No. 26-03 (filed June 2026)
Region	Region 7's Response to the Petition for Review (filed Aug. 21, 2026)
Pratt	Pratt Zero Carbon, LLC's Response to the Petition for Review (filed Aug. 21, 2026)

Docket entries

Short Identifier	Description	Docket Entry
Permit	UIC Class VI Permit No. KSS151570001 (Final Permit)	EPA-R07-OW-2026-1585-0010

Short Identifier	Description	Docket Entry
RTC	EPA Region 7, Response to Comments, Permit No. KSS151570001	EPA-R07-OW-2026-1585-0009
Parsons	Comments of Jan and Gene Parsons	EPA-R07-OW-2026-1585-0004
Makuka	Comment of Jill Makuka	EPA-R07-OW-2026-1585-0005
Iwasiw	Written Comments of Petitioner Alexis Iwasiw	EPA-R07-OW-2026-1585-0006
Alberg	Comments of Walter Scott Alberg, PG	EPA-R07-OW-2026-1585-0007
City of Pratt	Comments of Kelvin Clay, City of Pratt Water Superintendent	EPA-R07-OW-2026-1585-0008

Attachments to the Permit (cited as "Permit Att. [X]")

Attachment	Description
Permit Att. B	Area of Review and Corrective Action Plan
Permit Att. C	Testing and Monitoring Plan, followed by the Quality Assurance and Surveillance Plan ("QASP"). The two documents are separately paginated and are cited here as "Permit Att. C (Testing & Monitoring Plan) at __" and "Permit Att. C (QASP) at __."
Permit Att. E	Post-injection Site Care and Site Closure Plan ("PISC")
Permit Att. G	Site Characterization

Attachments to Region 7's Response (cited as "Region Att. [X]")

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Region Att. E	1255	Iwasiw Comments
Region Att. F	1256	Makuka Comments
Region Att. G	1257	Parsons Comments
Region Att. I	870	PBI_PECCUS-1_RAI_01v2_Items_of_Deficiency_20251219 ("RAI #1")
Region Att. J	736	RAI_02v2_PBI_PECCUS-1_Items_of_Deficiency_20251021
Region Att. K	770	PECCUS-1_RAI_02v3_Items_of_Deficiency_20251201
Region Att. N	1251	Pratt PN Mailing Addresses final
Region Att. O	1250	Column affidavit (newspaper publication)
Region Att. P	N/A — not included in the administrative record	Social Media and Website Publication
Region Att. Q	N/A	CHINN Well 15-151-21910 drill stem test (DST)

I. STATEMENT OF THE CASE

Pursuant to § 124.19(c)(2), Alexis Iwasiw, Walter Scott Alberg, Jill Makuka, Gene Parsons, and Jan Parsons ("Petitioners") respectfully submit this Reply to the Responses of Region 7 of the U.S. Environmental Protection Agency ("Region 7" or "the Region") and Pratt Zero Carbon, LLC ("PZC"). The Region issued UIC Class VI Permit No. KSS151570001 (the "Permit") to PZC on May 8, 2026 under the Safe Drinking Water Act ("SDWA"), authorizing construction of a geologic sequestration well at the Pratt Energy CCUS #1 ("PECCUS-1") project in Pratt County, Kansas.

Each issue in this Reply asks whether Region 7 complied with a requirement the regulations impose. No issue in this Reply asks the Board to second-guess EPA's technical judgment. Section 146.82(a)(6) required baseline geochemical data for all underground sources of drinking water ("USDWs") before the Permit issued. Section 146.84(c)(1)(ii) required the model that delineates the Area of Review ("AoR") to account for data quality and its possible impact on the model's predictions. Section 146.90(d)(2) required the spatial distribution of the monitoring wells to rest on two things: the baseline geochemical data § 146.82(a)(6) called for, and the area of review modeling. Only one existed. Section 124.10(c)(4) required a notice method reasonably calculated to reach the persons potentially affected. Respondents' briefs do not show that the record satisfied these requirements when the Permit issued.

I.A. Issues Presented in the Petition

Petitioners continue to request review of the six issues presented in the Petition under §

124.19(a)(4)(i) (Petition at 2, 19–20). In summary:

1. Region 7 characterized the site's USDWs without characterizing the High Plains Aquifer ("HPA") as a USDW within the AoR, despite conceding the HPA "qualifies as a USDW."
2. Region 7's "approximately 230 feet" lowermost-USDW finding cannot be reconciled with the Permit's 150–200-foot monitoring-well interval for that same unit.
3. Region 7 acknowledged "communication between USDWs" without analyzing its consequences for monitoring design, confining-zone integrity, or AoR scope.
4. Region 7 delineated the AoR using a critical-pressure threshold whose controlling inputs are off-site, decades-old, or from the wrong zone, producing an AoR that excludes nearby aging legacy wells from pre-injection corrective action.
5. Region 7 made public review of the 3D-seismic fault-and-fracture data contingent on the Director's discretionary decision to modify the Permit.
6. Region 7's half-mile direct-mail notice was not "reasonably calculated to give actual notice ... to the persons potentially affected."

This Reply responds to Respondents' answers, and is organized by the requirement each answer invokes rather than by the Petition's original issue numbering. Part III.A concerns the baseline geochemical data § 146.82(a)(6) required before issuance (Petition Issue 1, Requirement 2). Part III.B concerns the data-quality accounting that § 146.84(c)(1)(ii) required of the AoR delineation (Issue 4). Part III.C concerns the basis § 146.90(d)(2)

required for establishment of the monitoring network (Issue 1, Requirement 4; Issues 2 and 3). Part III.D concerns the notice standard of § 124.10(c)(4) (Issue 6). Petitioners rely on the Petition regarding Issue 5, as to the full statement of each issue, and regarding the requirements not separately addressed here.

I.B. Independent Grounds for Policy Review

Petitioners also continue to request review on the independent policy grounds presented in the Petition (§ 124.19(a)(4)(i)(B); Petition at 54–55). PECCUS-1 is the second Class VI permit ever issued in Kansas, it sits over a regional principal aquifer underlying eight States, and it is among the first of the ethanol-CCS Class VI applications now coming forward across the Midcontinent on carbonate reservoirs overlying that same aquifer system (Petition at 54). How this Permit is reviewed will shape how other Regions review those applications and how future applicants prepare them. Board guidance would assist on four cross-cutting questions, stated in full in the Petition:

1. The minimum pre-permit characterization required of Class VI applications overlying regional aquifer systems under §§ 146.82(a)(5), 146.82(a)(6), and 146.84(a) (Issues 1–3).
2. The relationship between pre-permit § 146.84(c)(1) characterization and post-permit § 146.87 verification of foundational AoR inputs in carbonate reservoirs, including the proper limits of selective conservatism under § 146.84(c)(1)(ii) and the boundary between characterization and refinement under § 146.84(e) (Issue 4). Respondents' briefing brings that question to a point: what § 146.84(c)(1)(ii) requires of an input the permitting authority has questioned.

3. Whether public review of site-characterization data acquired post-permit may be made contingent on the Director's discretionary modification determination, displacing the comment guarantees of § 124.10 (Issue 5).
4. The minimum acceptable scope of direct-mail notice under § 124.10(c)(4) where the affected area substantially exceeds the immediate well location (Issue 6).

I.C. The Response Briefs

Respondents filed their responses on August 21, 2026. The administrative record closed when the Permit issued on May 8, 2026 (§ 124.18(a), (c)).

Several of the positions Respondents appear for the first time on appeal. Each Respondent identifies a different location in the Permit as containing the baseline geochemical data § 146.82(a)(6) requires, and neither location contains that data for the lowermost USDW (Region at 29; Pratt at 17). Both defend the AoR delineation under § 146.84(c)(1)(ii), a provision the Response to Comments never mentions (Region at 41; Pratt at 38). Region 7 reconstructs the Permit's pressure gradient from a drill stem test record the Permit does not contain, which on Region 7's own reading of it yields a different gradient, and its table of attachments lists no administrative-record number for that exhibit or for Attachment P, which it states is not in the record (Region at vii & nn.2–3, 43 n.17).

II. STATUTORY AND REGULATORY FRAMEWORK

Both Respondents discuss the background framework for the UIC program and the Class VI regulations (Region at 10; Pratt at 2). That authority arises from Part C of the Safe Drinking Water Act. The Class VI well class is new, published in December 2010 (Class VI Final Rule at 77,230). Petitioners offer additional context from that rulemaking and from the August 2010 report of the Interagency Task Force on Carbon Capture and Storage ("Task Force"), which bears on Respondents' references to the adaptive and iterative character of the regulations.

EPA and the Department of Energy co-chaired the Task Force (Class VI Final Rule at 77,236), whose goal was to develop "a plan to overcome the barriers to the widespread, cost-effective deployment of CCS within 10 years, with a goal of bringing five to 10 commercial demonstration projects online by 2016" (*Id.*). Its report anticipated the Class VI rule, noting that "new requirements under SDWA, expected to be finalized in late 2010, will establish a new well class for geologic sequestration under the SDWA UIC Program," and "concluded that the current statutory framework can be used to regulate CCS projects," while noting that additional actions may be needed in the longer term to facilitate widespread deployment (Interagency Task Force on Carbon Capture and Storage, *Report of the Interagency Task Force on Carbon Capture and Storage* at 101 (Aug. 2010) ("Task Force Report")).¹

¹ Report of the Interagency Task Force on Carbon Capture and Storage (Aug. 2010) ("Task Force Report"), and Appendices to the Report of the Interagency Task Force on Carbon Capture and Storage (Aug. 2010) ("Task Force Appendices"), are publicly available federal government documents, and the Class VI final rule refers to the Task Force and its report. Class VI Final Rule at 77,236. Petitioners cite them for context only; the arguments in this Reply do not depend on them. Petitioners request that the Board take official notice of them to the extent necessary.

II.A. The Adaptive Rulemaking Approach

Recognizing the uncertainties associated with geologic sequestration, EPA adopted an "adaptive rulemaking approach" when it promulgated the Class VI regulations (*In re FutureGen Indus. Alliance, Inc.*, 16 E.A.D. 717, 723 (EAB 2015) (“*FutureGen*”) (quoting Class VI Final Rule at 77,240)). In proposing the rule, EPA recognized "the need for and merits of using an adaptive approach to regulating injection of CO₂ for [geologic sequestration (GS)] at 40 CFR parts 144 through 146," an approach that "would provide regulatory certainty to owners or operators, promote consistent permitting approaches, and ensure that Class VI permitting Agencies are able to meet current and future demand for Class VI permits," while EPA would "continue to evaluate ongoing research and demonstration projects and gather other relevant information as needed to make refinements to the rulemaking process" (Class VI Final Rule at 77,240–41).

In the final rule, EPA stated that it "agrees with commenters who supported an adaptive approach to the UIC rulemaking for GS" (*Id.* at 77,241). EPA further explained that the Agency believes

“that there is a need to have regulations in place during the earliest phases of GS deployment. Finalizing today's requirements will allow early Class VI wells to be permitted in a manner that addresses the unique characteristics of CO₂ injection for GS and allow early projects to demonstrate successful confinement of CO₂ in a manner that is protective of USDWs. EPA also believes that an adaptive approach enables the Agency to make changes to the program as necessary to incorporate new research, data, and information about GS and associated technologies (e.g., modeling and well construction). This new information may increase protectiveness, streamline implementation, reduce

costs, or otherwise inform the requirements for GS injection of CO₂. The Agency plans, every six years, to review the rulemaking and data on GS projects to determine whether the appropriate amount and types of information and appropriate documentation are being collected, and to determine if modifications to the Class VI UIC requirements are appropriate or necessary. This time period is consistent with the periodic review of National Primary Drinking Water Standards under Section 1412 of SDWA” (*Id.*)

As this passage reflects, the adaptive rulemaking approach is the means by which EPA reviews the rulemaking and, where appropriate, modifies the Class VI requirements.

II.B. The Iterative Permitting Process

Both the Region and Pratt rely on the Board's description of how the Class VI regulations incorporate new information (Region at 11, 40; Pratt at 3, 43–44). As the Board has explained, “[b]y structuring the [Class VI] regulations to allow for an iterative permitting program, which accounts for increased knowledge and operational experience as permitting moves forward, the Agency established necessary requirements during the earliest phases of geologic sequestration deployment, while also creating a mechanism for incorporating into the permit, as needed, any new research, data, or information” (*In re Archer Daniels Midland Co.*, 17 E.A.D. 380, 385 (EAB 2017) (“*ADM*”); accord *FutureGen* at 723). The Board identified that mechanism in specific provisions of the regulations (*ADM* at 385 (citing § 146.84(e)); *FutureGen* at 723 (citing §§ 146.84(e), 146.85(c)(2), 146.90(j)); see also § 146.82(c)).

Petitioners agree with this description and with the Region's and Pratt's characterization of the permitting process as iterative. Petitioners are not repeating objections previously considered in the original rulemaking; they raise concerns arising from this permit in particular.

Petitioners respectfully ask only that each requirement be applied at the stage to which the regulations assign it. Section 146.82(a) identifies the information that the owner or operator "shall submit" and the Director "shall consider" "[p]rior to the issuance of a permit," including "[b]aseline geochemical data on subsurface formations, including all USDWs in the area of review" and a "[p]roposed area of review and corrective action plan that meets the requirements under § 146.84" (§ 146.82(a)(6), (13)). Section 146.82(c) separately identifies the information the Director considers "[p]rior to granting approval for the operation of a Class VI well" (*Id.*, § 146.82(c)).

The Task Force described the same sequence in its proposed training for UIC staff, grouping evaluation of "the proposed Area of Review (AoR) . . . and the proposed multi-phase computational model" and of "Class VI testing and monitoring plans" under permit-application review, and evaluation of "the Final AoR based on logging and testing" separately under "Granting Approval for CO2 Operations" (Task Force Appendices at C-7 to C-8). Each provision carries its requirement forward rather than deferring it. Section 146.84(e)(1) requires the Area of Review to be reevaluated "in the same manner specified in paragraph (c)(1)," which is the paragraph the application's delineation must already meet (§ 146.84(b)(1)). Section 146.90(j) requires review of the testing and monitoring plan to incorporate monitoring data, operational data, and the latest Area of Review reevaluation. Petitioners respectfully submit that neither the adaptive rulemaking approach nor the iterative permitting process postpones the information § 146.82(a) requires before issuance, the analysis § 146.84(c)(1) requires of the delineation, or the basis § 146.90(d)(2) requires for the monitoring network.

II.C. The Board's Review

Respondents note that a petition for review is not the appropriate forum in which to question the Class VI regulations themselves (Region at 18, 62; Pratt at 43, 52). Petitioners agree. In *FutureGen*, the Board observed that "in nearly every issue raised, in addition to alleging that the Region committed clear errors and abused its discretion, Petitioners also assert that the issue raises a matter of policy that the Board in its discretion should review," and that those "policy arguments essentially reflect[ed] disagreement with the underlying policy decisions EPA made when promulgating the Class VI regulations" (*FutureGen* at 724). The petitioners in that appeal had expressed concern over the "unique risks" of geologic sequestration and had urged "strict review" of the number and placement of monitoring wells (*Id.*). The Board explained that "[t]o the extent that Petitioners are dissatisfied with the structure of the regulations, which provide for an iterative permitting process and give broad discretion to the permitting authority, or the policy judgments underlying those regulations, a petition for review to this Board is not the appropriate forum" (*Id.*; see also *ADM* at 392, declining to reconsider, in a permit appeal, the Agency's 2010 policy determination allowing the use of proprietary models).

Petitioners do not ask the Board to reopen the 2010 rulemaking through this permit proceeding. Petitioners' concerns have emerged from the present project and the present record. Petitioners respectfully ask the Board to determine "whether the permitting authority has acted in accordance with Agency regulations" (*FutureGen* at 724).

Petitioners also note that, under the Part 124 regulations, a challenge to a permit decision may be based on "[a]n exercise of discretion or an important policy consideration that the Environmental Appeals Board should, in its discretion, review" (§ 124.19(a)(4)(i)(B)). The

policy questions presented in the Petition concern how the existing regulations apply to Class VI permits such as this one (Petition at 54–55). EPA promulgated the Class VI regulations "both to ensure the protection of underground sources of drinking water ('USDWs') and to ensure consistency in permitting of geologic sequestration operations across the country" (*FutureGen* at 722). As noted above, EPA also explained that its adaptive approach would "provide regulatory certainty to owners or operators" and "promote consistent permitting approaches" (Class VI Final Rule at 77,240). The Task Force similarly observed that clarifying regulatory requirements "would reduce uncertainty for early projects and ensure safe and effective deployment," and that "minimum Federal standards will be important" (Task Force Report at 104, 123). The Board's guidance on the questions presented would serve those goals.

The Petitioners respect the deference the Board affords the Region on technical matters. That deference applies "as long as the permit issuer adequately explains its rationale and supports its reasoning in the administrative record" (*FutureGen* at 721). 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" (*Id.*). The record as a whole must also demonstrate that the permit issuer "duly considered the issues raised in the comments" (*Id.*, quoting *In re Gov't of D.C. Mun. Separate Storm Sewer Sys.*, 10 E.A.D. 323, 342 (EAB 2002)). As the Board has also observed, deference "does not mean 'blind acceptance'" (*In re Wabash Carbon Servs., LLC*, 19 E.A.D. 128, 145 (EAB 2025) (quoting *In re Stonehaven Energy Mgmt., LLC*, 15 E.A.D. 817, 830 (EAB 2013))).

The Board has nevertheless exercised its review authority in appropriate cases, including by reviewing and remanding permit decisions (e.g., *Wabash*, 19 E.A.D. at 145 (remanding in part

where the Region "did not clearly explain" its approval of an alternative post-injection site care timeframe); *Stonehaven*, 15 E.A.D. 817 (remanding in part); *In re Bear Lake Props., LLC*, 15 E.A.D. 630 (EAB 2012) (remanding in part)). Petitioners respectfully submit that each issue presented in the Petition warrants review under these standards, for the reasons stated in the Petition and, as to Respondents' arguments, in Section III.

III. ARGUMENT

Section III.A addresses the baseline geochemical data § 146.82(a)(6) required before issuance. Section III.B addresses the data-quality accounting § 146.84(c)(1)(ii) required of the modeling that delineates the Area of Review. Section III.C addresses the basis § 146.90(d)(2) required for the monitoring network. Section III.D addresses whether the Region's notice methods satisfied § 124.10(c)(4). Each Section responds to Respondents' arguments; Petitioners rely on the Petition for the balance.

III.A. Baseline geochemical data for all USDWs was not in the record at issuance.

The record contains no baseline geochemical data for the Fullerton and Holdrege USDW. The Petition raised this issue under every reading of the meaning of "High Plains Aquifer," including the readings Respondents now adopt (Petition at 25-27). Respondents answer that the data are in the permit, that the naming of formations does not matter, and that any omission was harmless. None of the three answers locates the missing data. Region 7 frames site characterization as an "iterative process" in which data submitted with the application is "updated and refined before operation of the well is authorized," citing §§ 146.82(a) and (c) together (Region at 12).

Petitioners do not dispute that structure, which assigns baseline geochemical data to § 146.82(a), a provision that applies before issuance.

III.A.1. Neither page Respondents cite contains baseline geochemical data for all USDWs

Section 146.82(a)(6) requires "[b]aseline geochemical data on subsurface formations, including all USDWs in the area of review." The Task Force explained why these baseline values matter: "[b]aseline monitoring data are necessary to differentiate natural phenomena from signals associated with storage," and "the baseline geochemical information will allow the owner or operator and permitting authority to evaluate monitoring data and identify any changes in subsurface geochemistry that may indicate fluid movement" (Task Force Appendices at C-4; see n.1, *supra* (request for official notice)).

Region 7 states that the baseline data "was provided in Section 1.2.7 of Attachment G" (Region at 29). PZC states that "[t]he application also provided baseline geochemical data on the subsurface formations, including the USDWs within the AOR, consistent with section 146.82(a)(6)," citing Permit Att. G at 58 (Pratt at 17). Neither cited section contains baseline data for the Fullerton and Holdrege, which both Respondents identify as the lowermost USDW (Region at 52, 57; Pratt at 16).

Section 1.2.7 reports water-quality data in two places. It first reports water-quality data for five formations the Permit calls "saline aquifers," with average total dissolved solids "greater than 37,000 ppm" — more than three times the 10,000 mg/l at which an aquifer may qualify as a USDW (Permit Att. G at 53; § 146.3). The five formations listed are the deeper injection zone and four units beneath it (Permit Att. J at 5). Second, section 1.2.7 reports a total dissolved solids range of 158 to 355 ppm in the Sappa and Grand Island, from a 1973 publication (Permit Att. G

at 54). The same page states that "the Fullerton and Holdrege Formations are the lowermost formations containing water suitable for common uses," but the page reports no measurement of the water in them (*Id.*).

PZC cites a different section of the Site Characterization document, captioned "Geochemistry [40 CFR 146.82(a)(6)]" that addresses the carbonate geochemistry of the injection reservoirs (Permit Att. G at 58). The section states that "[t]he reservoirs at PECCUS-1 are predominantly carbonates with limestone being the dominant lithology," and it discusses expected rock-property changes resulting from CO₂ injection. The section goes on to concede that "[s]ite-specific geochemical data for PECCUS-1 and the storage complex formations is not known to exist" and that "acquisition of this data is planned for the PE AZM-1 well" (Permit Att. G at 59). The section reports no measurement of the water in any drinking water formation.

PZC also says the Region determined that "the requirements for characterizing USDWs at sections 146.82(a)(5)-(6) . . . are met," citing RTC at 8 (Pratt at 18). The only paragraph of § 146.82 that page cites is (a)(5). Neither that page nor any other page of the Response to Comments mentions § 146.82(a)(6) or baseline data.

During technical review, the Region asked PZC to "include a discussion of the characteristics of the primary aquifers providing drinking water (i.e., TDS)." PZC answered that it had added "information available on the primary aquifers" to Section 1.2.7, and the Region recorded "No further questions" (Region Att. I (RAI #1), Item 9). What appeared in the final Section 1.2.7 was a total dissolved solids range for the Sappa and Grand Island (Permit Att. G at 54). Section 146.82(a)(6) requires data on all USDWs, not on the subset for which data already existed.

III.A.2. The naming answer does not supply the missing data

Region 7 answers that the High Plains Aquifer is the regional name for the formations the Permit identifies, and that supplying that name "would not alter the substance of the data provided pursuant to §§ 146.82(a)(5) and (a)(6), nor would it have made a material difference in the Region's evaluation of the Permit" (Region at 29 (citing FutureGen at 729-30)).

The naming question does not change what the provision requires. Region 7 states the requirement accurately at Region at 30: §§ 146.82(a)(5) and (6) "require collection of data for 'all USDWs.'" On Region 7's own account, the USDWs at this site are the Sappa, Grand Island, Fullerton, and Holdrege Formations (Region at 27-28). PZC says the same, adding that the High Plains Aquifer "is a broader regional aquifer system, of which the USDWs identified in the Permit . . . are component parts" (Pratt at 15-16). Section 1.2.7 reports a total dissolved solids range for the Sappa and Grand Island. It reports no water-quality measurement for the Fullerton and Holdrege. Whichever name the formations carry, the record reports total dissolved solids for one of the two units the Permit identifies and no measurement for the other.

Hydraulic connection between the USDWs does not close the gap. Section 146.82(a)(6) requires data for "all USDWs in the area of review"; if a value for the upper unit discharged the requirement for the lower, "all" would do no work. Region 7 asks why "more general/regional data of the combined system would have more accurately represented the USDWs within the AoR" (Region at 30). Petitioners do not contend it would. Region 7 has identified the USDWs at this site as the formations, not the system (Region at 27–28); a value for one of them cannot stand for another. The record's one value is a 1973 literature range for the Sappa and Grand Island (Permit Att. G at 54). The Permit's five shallow groundwater wells sample the Fullerton

and Holdrege, and the thresholds that define a leak are to be set from that unit's baseline (Permit Att. C (Testing & Monitoring Plan) at 9; Permit Att. C (QASP) at 22). Region 7 acknowledges "communication between USDWs within the project area" (RTC at 10). Where fluids move between units, a change measured in the lowermost unit cannot be read without knowing what that unit held at baseline conditions. Section 146.82(a)(6) required baseline sampling before issuance.

The omission matters because the Region measured protection from these formations. Response 5m identifies the Fullerton and Holdrege as the lowermost USDW (RTC at 12). The Region then found "approximately 2,600 feet of separation" between the lowermost USDW and the top of the upper confining zone (RTC at 14). There are no measurements in the record for the formations identified as the lowermost USDWs.

Region 7 cites *FutureGen* for the proposition that immaterial technical criticisms do not show clear error (Region at 29). The criticisms in *FutureGen* addressed information the record contained: the *FutureGen* petitioners disputed the modeled size and shape of the plume, and the Board weighed whether that dispute affected the permit (*FutureGen* at 729-30). Here, Petitioners dispute nothing the record contains. Section 146.82(a)(6) required baseline geochemical data before the Permit issued, and the record does not have them. Where the required data are absent, there is no technical judgment to weigh.

III.A.3. The Permit assigns the § 146.82(a)(6) data to sampling beginning after issuance

The Permit issued with the § 146.82(a)(6) values still to be determined. The Testing and Monitoring Plan lists the analytical parameters for the "Fullerton and Holdrege Aquifer and Admire Gp" in Table 7-6, and states that their concentrations and threshold values "will be

determined from baseline fluid sampling and analysis results" (Permit Att. C § 7.5.2). During technical review, PZC told the Region that "the updated injection phase suite will be determined upon baseline results and will be sent to the EPA for review and approval" (Region Att. J (RAI #02v2), Item 28).

Attachment C's table of monitoring activities assigns geochemical sampling of the Fullerton and Holdrege to a "Baseline Phase" of "[a]t least 1 year," and lists § 146.82(a)(6) first among the provisions that sampling satisfies (Permit Att. C (QASP) at 11). The Testing and Monitoring Plan expressly ties that sampling to § 146.82(a)(6): "To meet the requirements of 40 CFR 146.82(a)(6) and 146.90(d), groundwater quality and geochemical baseline measurements will be taken at least throughout a year leading up to injection operations" (Permit Att. C (Testing & Monitoring Plan) at 11). The Region issued the Permit with the (a)(6) measurements still to be taken.

Petitioners do not contend that these data will never be collected. Attachment J commits PZC to sampling the Fullerton and Holdrege before injection (Permit Att. J § 5.5). The question is the timing of data collection. Section 146.82(a) applies "[p]rior to the issuance of a permit," and § 146.82(c) is the separate gate that applies before operation (Section III.A.4, *infra*). The data were due prior to the issuance of the permit.

III.A.4. The iterative structure of the permitting process does not change the fact that § 146.82(a)(6) requires baseline data be supplied before issuance

Elsewhere, Respondents rely on the iterative structure of the Class VI Rule (Region at 12; Pratt at 14). Neither applies it to § 146.82(a)(6). Region 7's position is that the baseline data was already supplied (Region at 29). PZC says pre-injection sampling will "confirm that the USDWs

have been appropriately characterized" (Pratt at 18), which presupposes a characterization already made.

Region 7's brief sorts § 146.82's submission requirements by deadline: what is due "prior to the issuance of the permit" is in paragraph (a), and what is due "prior to granting approval for the operation of a Class VI well" is in paragraph (c) (Region at 39 & n.14). Paragraph (c) does not carry paragraph (a)'s submissions forward. It never mentions (a)(5) or (a)(6). Paragraph (c)(2) covers updates to the (a)(3) geologic information. Paragraph (c)(9) covers updates to the five plans, not the data behind them. Paragraph (c)(4), the one Region 7 relies on, covers the results of the testing program the applicant proposes under (a)(8). Both (a)(6) and the (a)(8) program come due before the permit issues: if test results filed later could satisfy (a)(6), then (a)(6) would do no work at all.

III.A.5. The omission of baseline data from the lowermost USDWs is not harmless

PZC states the harmless-error standard as whether a mistake has "no bearing on the procedure used" or "on the ultimate conclusion reached by the permit issuer" (Pratt at 19). Petitioners accept that standard. Respondents apply a harmless-error standard only to how the High Plains Aquifer was characterized (Pratt at 19) and to the sentence placing it "approximately 160 feet below the ground surface" (Region at 29; RTC at 12). Neither Respondent applies the harmless-error standard to the missing measurements. A harmless misstatement about depth says nothing about absent data.

The omission affected the ultimate conclusion. The Region measured protection from a unit it never sampled (Part III.A.2, *supra*). Respondents answer that the measurements will be taken before injection (Pratt at 18; see RTC at 11). That answer concedes the timing. The data

will exist when PZC begins injecting; § 146.82(a)(6) required it to exist when the Region issued the Permit.

The omission also affected the procedure. Without the baseline values, no commenter could test the Region's separation findings, and no commenter could have framed an objection from data that did not exist. The comment period closed on April 19, 2026; the Permit issued on May 8; the measurements are still to come.

III.A.6. Relief requested

Petitioners renew the relief requested in the Petition at 28–29.

III.B. The Area of Review delineation did not account for the impact of formation-pressure data quality, which the Region questioned

Petitioners do not ask the Board to find the Permit's injection-zone formation-pressure figure wrong, to choose a better one, or to redraw the Area of Review. The question is whether the Permit complies with the Rule. Section 146.84(c)(1)(ii) requires the modeling that delineates the Area of Review to take into account "data quality, and their possible impact on model predictions," and § 146.84(b)(1) required PZC's application to describe a delineation method meeting that requirement. PZC never assessed what the quality of the formation-pressure data does to the Area of Review delineation, and the Region approved the delineation without it. Nothing in the record supplies that assessment.

During technical review, the Region twice questioned the quality of the formation-pressure data underlying the Permit's 0.37 psi/ft gradient (Region Att. I (RAI #1), Items 69, 73). That gradient feeds two things: (1) the calculation of the pressure at which rock

will fracture and (2) the calculation of the critical-pressure threshold. The critical-pressure threshold fixes the size of the pressure front, which is one of the two areas on which the Area of Review boundary is drawn. In the case of fracture pressure, a too-low formation pressure estimate results in an overly conservative maximum-injection pressure. The Region noted the effect of formation-pressure data quality concerns on fracture pressure, then stopped. The Region never followed its own concern into the critical-pressure threshold calculation, where a too-low pressure gradient results in a critical-pressure threshold that is too high and a pressure front that is too small.

Parts III.B.1 and III.B.2 describe the models that delineate the Area of Review and the critical-pressure threshold model in particular. The Parts that follow show that the impact of the questioned data quality was never assessed, that Respondents' answers do not fill the gap, and that the issue was preserved.

III.B.1. Process used to delineate the Area of Review

The Area of Review is "the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity," and it "is based on available site characterization, monitoring, and operational data as set forth in § 146.84" (§ 146.81(d)). Section 146.84(c)(1) requires computational modeling of carbon-dioxide plume and formation-fluid migration until, among other endpoints, "pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer present." That differential is the critical-pressure threshold, as set out below. The modeling supporting Area of Review delineation must "[t]ake into account any geologic heterogeneities, other discontinuities, data quality, and their possible impact on model predictions" (*Id.*, § 146.84(c)(1)(ii)). The model must account for the effect of

data quality on the predictions it produces. The prediction at issue is the Area of Review boundary.

EPA's guidance builds the Area of Review from two separately computed candidate areas. The first candidate area is the "maximum extent of the separate-phase [carbon dioxide] plume" (AoR Guidance at 38). The second is the pressure front. Section 146.81(d) describes "pressure front" generally as "the zone of elevated pressure that is created by the injection of carbon dioxide into the subsurface," then supplies a narrower definition "[f]or the purposes of this subpart": the "zone where there is a pressure differential sufficient to cause" movement into a USDW. Petitioners use the narrower, operative definition. Because the pressure front "will not in all cases be larger in all directions" than the maximum extent of the carbon-dioxide plume, "it is necessary to calculate the extent of both" (AoR Guidance at 47). The Area of Review is then delineated by "drawing the contour line that encompasses the maximum extent of the separate-phase plume or pressure front" (*Id.* at 46).

Computing the maximum extent of the carbon-dioxide plume requires one model; computing the pressure front requires two models. The dynamic reservoir-simulation model, which predicts how the carbon-dioxide plume and subsurface pressure change during and after injection, provides the maximum areal extent of the carbon-dioxide plume (*Id.* at 38, 45). For the computation of the pressure front, that same dynamic reservoir-simulation model supplies the predicted pressure increase at each location (*Id.* at 44), and a second, simple static model of an open conduit between the injection zone and the lowermost USDW supplies the critical-pressure threshold, which is the pressure increase at which fluid would be pushed up that conduit into the

USDW² (*Id.* at 39, 43) and which is the differential § 146.81(d) calls sufficient. The pressure front is defined as the area where the predicted pressure increase meets or exceeds the critical-pressure threshold (*Id.* at 44; Permit Att. B at 45).

Because the predicted pressure increase is greatest at the injection well and falls off with distance, a lower critical-pressure threshold is reached farther from the well and yields a larger pressure front (Permit Att. E at 4). A change in the critical-pressure threshold alone, with the reservoir-simulation model's pressure prediction unchanged, can therefore change which area (the maximum carbon-dioxide plume extent or the pressure front) defines the Area of Review boundary.

In the Permit, the maximum extent of the carbon-dioxide plume covers 1.39 square miles, and the pressure front—computed as the area in which the simulated pressure increase exceeds the modeled critical-pressure threshold—covers 0.26 square miles, fully inside the carbon-dioxide plume (Permit Att. B at 45; Permit Att. E at 4). The Permit acknowledges that a change in the critical-pressure threshold "impacts AoR delineation, especially in the cases where AoR is determined by threshold pressure" (Permit Att. E at 16). It also reports that under one set of modeled reservoir assumptions, "the pressure buildup plume takes precedence and dictates the AoR delineation" (*Id.*).

² The study the Permit credits for its critical-pressure threshold calculation treats that calculation as a model. Permit Att. B at 41 & n.19, 44 & n.21; Jens T. Birkholzer et al., *Brine Flow Up a Well Caused by Pressure Perturbation from Geologic Carbon Sequestration: Static and Dynamic Evaluations*, 5 Int'l J. Greenhouse Gas Control 850, 856 (2011) ("Birkholzer") (describing "the static model"). The same value that Petitioners term "critical-pressure threshold" goes by other names, including "critical pressure," Permit Att. B at 52; "threshold pressure that defines the pressure front," AoR Guidance at 39; and "threshold reservoir pressure," Permit Att. B at 44.

III.B.2. How the critical-pressure threshold is computed, and how formation pressure affects it

The Permit computed the critical-pressure threshold with the model defined by Equation 2, Method 1, of the AoR Guidance (Region Att. I (RAI #1), Item 75; Permit Att. B at 41, 44). Equation 2 uses five inputs: the pore pressure at the top of the injection zone, the pressure at the base of the lowermost USDW, the depths of those two points, and the density of the injection-zone fluid (AoR Guidance at 39; Permit Att. B at 44–45 (Table 2-13)). The Permit estimated the fluid densities from salinity, temperature, and pressure (Permit Att. B at 45), and describes the model's lowermost-USDW depth, salinity, and pressure values as "based on our assumptions" (Id. at 44). The modeled critical-pressure threshold was 303 psi, which Table 2-13 labels the "[p]ressure required to force brine migration into USDW" (Id. at 45).

In its computation of the critical-pressure threshold, Equation 2 subtracts the injection-zone formation pressure (AoR Guidance at 39). An injection-zone formation pressure that is too low therefore produces a critical-pressure threshold that is too high and a pressure front that is too small.

The Permit used an injection-zone formation pressure of 1,193 psia at 3,222 feet (Permit Att. B at 45 (Table 2-13)). That value of formation pressure is itself an indirect estimate based on other measurements; it is the result of carrying to 3,222 ft the 0.37 psi/ft gradient, which was derived from drill stem test estimates (Permit Att. G § 1.2.5; Permit Att. B at 28). EPA recommends pressures "based on direct measurement of fluid properties in the direct vicinity of the proposed project" (AoR Guidance at 40).

III.B.3. The Region questioned the data quality of inputs to the critical-pressure threshold model

During technical review, the Region twice questioned the quality of the data behind the Permit's 0.37 psi/ft formation-pressure gradient. The Region wrote that the drill stem test from which the gradient was calculated "has a high probability of not being representative of the formations above and below this shale," and asked PZC to "provide more applicable pressure gradients for the adjacent formations" (Region Att. I (RAI #1), Item 69). Reviewing the fracture-gradient calculation, the Region asserted that the gradient was "calculated from data which is likely less than the initial pressure," so that "the fracture gradient calculated above would be lower than the actual fracture gradient provided" (*Id.*, Item 73).

That gradient is the basis for the injection-zone formation-pressure used to calculate the critical-pressure threshold. The Permit derives the gradient from one drill stem test in the Douglas Shale at the Briggeman-Leal-Trinkle 1 well, 2.5 miles from the site, which recorded "a final shut-in pressure of 1,350 psig" at 3,648 feet: 1,350 divided by 3,648 is 0.37 psi/ft (Permit Att. G § 1.2.5). The Permit attributes the gradient it uses to "DST data from nearby wells," identifying the wells by API number alone (Permit Att. B at 28). At the top of the injection zone, 3,222 feet, the Permit enters a formation pressure of 1,193 psia, which is equivalent to a 0.37 psi/ft gradient carried to that depth (*Id.* at 45).

PZC produced no measurement in response to the Region's questions about formation-pressure data quality. The three API numbers are 15-151-21589 (the Briggeman-Leal-Trinkle 1), 15-151-21405 (Kerr #1), and 15-151-21910 (Chinn #1) (Petition Atts. 4–6). PZC instead answered that the other two wells, API 15-151-21405 and API

15-151-21910, "indicate pressure gradient values close to 0.37 psi/ft," giving no value, depth, or date for either well (Region Att. I (RAI #1), Item 69). The Region recorded "No further questions" to both of its inquiries, and the final Permit still derives the gradient from the Douglas Shale test (Id., Items 69, 73; Permit Att. G § 1.2.5).

In preparing its Response, Region 7 has now gone to a public well database, retrieved the summary of the drill stem test for API 15-151-21910 ("Chinn #1"), and used that summary to compute a pressure gradient of approximately 0.35 psi/ft (Region at 43 n.17 & Att. Q). PZC had told the Region that this well, Chinn #1, indicated a gradient "close to 0.37 psi/ft." The record now holds two values for the same physical quantity, and the Region produced the second from a well PZC had cited in support of the first. For the third well, API 15-151-21405, no pressure or pressure-gradient value appears anywhere, and the Permit never shows what any of the three wells contributes to the 0.37 figure. Section 146.84(c)(1)(ii) required the Area of Review modeling to account for the effect of data quality on the Area of Review boundary it predicts.

III.B.4. The Chinn #1 drill stem test does not establish the quality of the formation pressure estimate

Petitioners do not offer 0.35 psi/ft in place of the 0.37 psi/ft gradient, and Petitioners do not contend that either figure is wrong. Both rest on the formation-pressure data whose quality the Region questioned, and § 146.84(c)(1)(ii) required the Area of Review delineation to account for what the quality of that data does to the Area of Review the modeling defines. That accounting for data-quality impact is what the record lacks.

Region 7 offers Attachment Q, a summary of the Chinn #1 drill stem test, as support for the 0.37 psi/ft gradient. Petitioners do not ask the Board to rely on Attachment Q, which the

Region's table of attachments lists with no administrative-record number (Region at vii). If the Board does consider it, the exhibit does not establish the quality of the data the Region questioned. It shows a further problem with the same data.

The exhibit records two shut-in pressures for the same zone in the same drill stem test: an initial shut-in pressure of 1,429 psi and a final shut-in pressure of 1,387 psi, values that are 42 psi apart (Region Att. Q). Region 7's 0.35 psi/ft comes from the initial shut-in pressure reading. The Permit's 0.37 psi/ft comes from "a final shut-in pressure of 1,350 psig" at a different well (Permit Att. G § 1.2.5). In its Response, the Region is comparing an initial shut-in pressure to a final one, and nothing in its exhibit identifies either as the static formation pressure the calculation calls for.

The Region's comparison assumes that an initial and a final shut-in pressure measure the same quantity. Its own exhibit shows the two disagree: at Chinn #1 they differ by 42 psi (Region Att. Q). If they measure the same quantity, that 42 psi is uncertainty in the measurement itself. If they do not measure the same quantity, the Region is comparing a gradient derived from one quantity against a gradient derived from a different quantity. Either way, Attachment Q cannot establish the data quality of the figure it is offered to support.

What the critical-pressure threshold calculation requires is static formation pressure. EPA's guidance provides that the threshold reservoir pressure (i.e., the critical-pressure threshold) defining the pressure front "may be calculated based on static pressure within the injection zone and the lowermost USDW" (Testing and Monitoring Guidance at 75). A shut-in pressure reaches formation pressure only once the buildup has stabilized. Borah, the reference EPA's Site Characterization Guidance cites for measuring formation pressure by drill stem testing, treats the length of the flow and shut-in periods as "critical to obtaining good reservoir

data" (Borah at 131; Site Characterization Guidance at A-21 to A-22 & tbl. A-2). Attachment Q reports shut-in durations but no buildup data from which stabilization could be judged, no statement that either reading reached static level, and no information on whether pressure readings were extrapolated, as is recommended practice (Borah at 135). The Kansas Corporation Commission well-completion form on which drill stem tests are reported calls for the operator to state "whether shut-in pressure reached static level." The form for the Chinn well does not (Petition Att. 5). For the Briggeman-Leal-Trinkle test that sets the Permit's gradient, the record is thinner still: the Permit reports no shut-in duration at all.

Attachment Q therefore does not answer the Region's concern that the gradient was "calculated from data which is likely less than the initial pressure" (Region Att. I (RAI #1), Item 73). Neither the Permit nor the Response to Comments answers it either.

III.B.5. The Region's data-quality concern was followed into only one of two calculations

The formation-pressure gradient feeds two calculations: (1) the fracture-pressure calculation, which sets the maximum injection pressure and (2) the critical-pressure threshold. In the fracture-pressure calculation, a too-low formation-pressure gradient produces an underestimated maximum injection pressure. In the critical-pressure threshold calculation, the same too-low formation-pressure gradient produces an overestimated (too high) critical-pressure threshold and a correspondingly underestimated (too small) pressure front.

The Region assessed the formation-pressure gradient as too low and followed that assessment into the fracture-pressure calculation only. It wrote that a formation-pressure gradient "calculated from data which is likely less than the initial pressure" means "the fracture gradient calculated above would be lower than the actual fracture gradient provided" (Region Att. I (RAI

#1), Item 73). Nothing in the record carries the same data-quality-impact assessment into the critical-pressure threshold.

To compute the critical-pressure threshold, Equation 2 subtracts injection-zone pressure; so an underestimated injection-zone pressure raises the critical-pressure threshold and shrinks the pressure front (Part III.B.2). The pressure front is one of the areas from which the Area of Review is drawn, and the Area of Review fixes where potential conduits must be identified, evaluated, and, if necessary, corrected (§ 146.84(c)(2)–(3), (d)).

Section 146.84(c)(1)(ii) required that accounting, § 146.84(b)(1) required PZC's application to describe a delineation method meeting that requirement, and the Region approved the delineation without it.

III.B.6. The sensitivity analysis left four of the threshold model's five inputs fixed, including the one the Region questioned

The Petition argued that the Area of Review modeling does not "[t]ake into account ... data quality, and their possible impact on model predictions" because the operator "left the gradient at a single borrowed value and excluded it from the sensitivity sweep" (Petition at 41). Respondents answer that PZC's reservoir-model sensitivity analysis satisfied § 146.84(c)(1)(ii). Region 7 says "Pratt performed a sensitivity analysis that '[took] into account ... data quality, and their possible impact on model predictions'" (Region at 41). PZC says it "accounted for any uncertainty" in salinity "by evaluating salinity in the sensitivity analysis over a broad range . . . , consistent with its obligations under section 146.84(c)(1)(ii)" (Pratt at 38).³

³ The Response to Comments mentions neither § 146.84(c)(1)(ii) nor the sensitivity analysis. Respondents first offered the sensitivity analysis as satisfying the provision in their response briefs; so answering it does not raise "new issues or arguments" in a reply. § 124.19(c)(2). Preservation of the underlying issue

PZC varied seven parameters: rock compressibility, gas hysteresis, brine salinity, irreducible water saturation, oil saturation, permeability, and grid size (Permit Att. B at 49). Table 9-1 of the PISC plan, describing sensitivity analysis parameters, lists five of those parameters and none beyond them (Permit Att. E at 14). Only one of the seven—brine salinity—affects the critical-pressure threshold. Brine salinity alters injection-zone fluid density, which is one of the critical-pressure threshold model's five inputs. PZC carried the salinity change through to the critical-pressure threshold model: the Permit recomputes the threshold at 249 psi in the low-salinity case and 430 psi in the high (*Id.* at 52). The other six parameters varied as part of the sensitivity analysis are inputs to the dynamic reservoir-simulation model and alter the predicted pressure buildup, but none is an input to the critical-pressure threshold calculation.

Section 146.84(c)(1)(ii) covers the critical-pressure threshold calculation whether that calculation is a second model or one step inside a single one (Part III.B.1). Either way, the rule asks what the quality of the data does to the model's prediction.

Four of the critical-pressure threshold model's five inputs were never varied in any sensitivity analysis. One of those four inputs kept constant is the injection-zone pressure, whose data quality the Region twice questioned. In the low-salinity case, decreased fluid density altered the critical-pressure threshold such that the pressure front increased by more than 110 percent; the high-salinity case raised the modeled critical-pressure threshold so high that the pressure front was eliminated (*Id.*). PZC varied one input to the critical-pressure threshold calculation and not the one the Region had questioned, and the Region approved the delineation anyway. PZC

rests on Alberg's comment and § 124.13, addressed in Part III.B.9, *infra*, not on Respondents' briefing; § 124.19(c)(2) governs only what this Reply may contain.

points to the salinity sensitivity analysis as satisfying § 146.84(c)(1)(ii), saying it "accounted for any uncertainty" there (Pratt at 38).

III.B.7. No analysis tested the impact of formation-pressure data quality on the pressure front

No sensitivity analysis varied injection-zone formation pressure, and neither discussion of those analyses addresses the effect of formation-pressure data quality on the critical-pressure threshold (Permit Att. B at 49–53; Permit Att. E at 14–16; Part III.B.6, *supra*). Respondents defend the absence of that accounting two ways: (1) with a recomputation that PZC ran on appeal, and (2) with an explanation for leaving the formation pressure out of the sensitivity analysis. Neither response provides the data-quality impact analysis section 146.84(c)(1)(ii) required.

On appeal, PZC reruns the critical-pressure threshold model with a different formation temperature and reports a difference of "approximately 1 psi" (Pratt at 38). Temperature and formation pressure are not comparable inputs to the critical-pressure threshold model. Temperature affects the threshold only indirectly, as one of the values from which the Permit estimates fluid density. Changing the injection-zone pressure directly changes the critical-pressure threshold by the same number of pounds per square inch because the critical-pressure threshold model subtracts that pressure when computing the threshold (AoR Guidance at 39; Permit Att. B at 44).

Even small changes in the formation-pressure gradient used to estimate the injection-zone pressure result in large changes to the critical-pressure threshold. The Permit obtains the injection-zone pressure by carrying the 0.37 psi/ft gradient to the top of the injection zone at 3,222 feet. A change of 0.01 psi/ft in the gradient therefore changes the injection-zone pressure

by $3,222 \times 0.01$, or about 32 psi, and correspondingly changes the computed critical-pressure threshold by the same 32 psi. Region 7's own alternative gradient of approximately 0.35 psi/ft is 0.02 psi/ft below the Permit's (Region at 43 n.17). That 0.02 psi/ft change in the formation-pressure gradient changes the magnitude of the critical-pressure threshold by about 64 psi, more than a fifth of the Permit's 303 psi threshold. That comparison shows how far the threshold travels on a small change in the gradient, not what the gradient should be. PZC's temperature substitution moves the threshold three tenths of one percent.

PZC explains that "[p]ressure gradient was not included as a sensitivity parameter because available well test data from multiple wells indicate very similar pressure gradients across the study area, suggesting limited regional variability" (Pratt at 41). That reasoning addresses how much the gradient varies from place to place. It does not address the quality of the data the gradient came from, which is what the Region questioned and what § 146.84(c)(1)(ii) requires accounting for. EPA's guidance lists variability and data quality as distinct contributors to parameter uncertainty, which "results from poor data quality (e.g., measurement errors, analytical imprecision, limited sample size), lack of data, and the inherent variability in natural systems" (AoR Guidance at 23). The Region's concern was that the readings run low. It wrote that the gradient was "calculated from data which is likely less than the initial pressure" (Region Att. I (RAI #1), Item 73). Consistency among the three wells does not answer that concern. If, for example, drill stem test readings tend to understate formation pressure, they will tend to understate it at all three wells.

The omission of data-quality impact analysis also shaped what PZC planned to collect. The Permit states that the "[f]indings from this sensitivity analysis will be used to prioritize

collecting pre-operational data that the free phase CO₂ plume and elevated pressure front are most sensitive to, such as permeabilities, fluid saturations, and reservoir geochemistry" (Permit Att. B at 53). Formation pressure is not and could not be on that list. PZC held it fixed in every run; so the analysis had no way to register its impact. Section 146.87 governs the collection those findings inform. It does not supply the accounting § 146.84(c)(1)(ii) required before the Region approved this Area of Review.

III.B.8. Respondents' remaining answers do not substitute for the analysis § 146.84(c) requires

Region 7 invokes *FutureGen*, where the Board declined to consider a suggestion made "for the first time on appeal" that "the pressure front may be inaccurately delineated as a result of inaccurate plume modeling" (Region at 41, quoting *FutureGen* at 731). The *FutureGen* petitioners raised the theory in their reply brief; their petitions had disputed the modeled size and shape of the plume without connecting either to the Area of Review boundary (*Id.* at 730–31). Unlike in *FutureGen*, the Petition here made the connection and made it from the Permit's own figures: the 0.37 psi/ft gradient sets the formation pressure at the top of the injection zone, that pressure is one of five inputs to the 303 psi critical-pressure threshold, and the Permit draws the pressure front at "the pressure buildup at or above the threshold value of 303 psi as calculated in Table 2-13" (Petition at 41; Permit Att. B at 45). Also unlike in *FutureGen*, the Region itself questioned the data quality of an input that determines where the Permit draws the pressure front.

Region 7 makes a related objection to the Petition's Attachment 8, saying it cannot evaluate the pressure front shown there because Petitioners appear to have "conducted their own modeling" (Region at 49–50). Attachment 8 reproduces the permitted Area of Review from the

Permit's Figure 2-19 and the operator's 303 psi pressure front from Figure 2-20 (Petition at 83). Its third contour applies the Permit's own critical-pressure threshold model at a formation-pressure gradient of 0.4 psi/ft rather than 0.37, and traces where the Permit's modeled pressure field reaches the resulting threshold (Permit Att. B, Fig. 2-17; Petition at 83). Petitioners did not re-run the reservoir simulation; the pressure field is the Permit's own. Seeing what a change in the assumed formation pressure does to the model's prediction is what § 146.84(c)(1)(ii) required, and the Region approved the delineation without it.

Region 7 says in a footnote that "[p]erforming a sensitivity analysis is not explicitly required in a permit application unless an applicant is trying to demonstrate that an alternative post-injection site care timeframe is appropriate," and elsewhere that "an alternative timeframe is not being requested in this Permit" (Region at 41 n.16, 24 n.9). Petitioners do not contend that a sensitivity analysis was required. Section 146.84(c)(1)(ii) applied regardless, and the analysis PZC chose to run never assessed how the Region's formation-pressure data quality concerns affected the modeling supporting the Area of Review delineation. Region 7 identifies nothing else in the record that accounts for the quality of that input or its effect on the model's predictions.

That the modeled pressure front is smaller than the modeled plume does not make the omission immaterial. The Permit models a maximum pressure buildup of 339 psi (Permit Att. E at 4) against a threshold of 303 psi (Permit Att. B at 45). The pressure front is the area where buildup falls within that 36 psi band, and at 3,222 feet a change of 0.01 psi/ft in the gradient moves the threshold by 32 psi (Part III.B.7, *supra*). The Permit also reports a modeled case in which "the pressure buildup plume takes precedence and dictates the AoR delineation" (Permit

Att. E at 16). Region 7 answers that Petitioners show only that the pressure front "could" exceed the carbon-dioxide plume (Region at 46). Section 146.84(c)(1)(ii) requires the modeling to account for data quality and "their possible impact on model predictions." The provision addresses possible impact. No one determined that possible impact for the formation-pressure data the Region questioned. Which artificial penetrations require corrective action under § 146.84(c)(2), (3) and (d) depends on a boundary drawn from that data.

Region 7 says the pressure gradient was "asked and answered during the Region's technical review" (Region at 42 (citing Region Att. I (RAI #1), Item 69)). The Region asked twice, and neither answer supplied a measurement (Part III.B.3).

Both Respondents answer that site-specific measurements will come before injection (Region at 40; Pratt at 3). PZC says the Area of Review "would be adjusted" to account for them (Pratt at 36). Region 7 says the inputs "will be verified and/or adjusted as required during pre-injection testing" (Region at 44). Sections 146.87 and 146.82(c)(4) govern that later testing. Section 146.84(c)(1)(ii) governs the modeling that delineates the Area of Review, a delineation that was complete when the Permit issued. Compliance with the later requirement does not establish compliance with the earlier one. PZC adds that the Area of Review is reevaluated at least every five years (Pratt at 34). Each reevaluation is performed "in the same manner specified in paragraph (c)(1)," so the Rule applies to every future delineation the same requirement it applied to this one (§ 146.84(e)(1)).

Region 7 asks the Board to defer to its technical determinations (Region at 37). Petitioners do not ask the Board to weigh a technical judgment, to choose a better formation pressure value, to recompute the critical-pressure threshold, or to redraw the Area of Review.

Petitioners ask the Board to hold that § 146.84(c)(1)(ii) required an assessment of what the quality of the formation-pressure data does to the modeled Area of Review, and that no such assessment appears in the record. Deference attaches to determinations the record reflects. As PZC puts it, the Board defers "as long as the administrative record adequately reflects and supports the permit issuer's decision" (Pratt at 22).

III.B.9. The issue is well preserved by Alberg's comment

Petitioner Alberg is a geologist who worked in the Pratt County area beginning in 1981 and served as District Manager and Geologist for the Kansas Corporation Commission's District #1 (Alberg at 1). He thanked the Region "for taking the time to visit with me on the availability of the reports such as fall off tests, DST results, pressure tests, Electric logs, rock samples and other reports," said he "may be submitting an open records request to look at some of this information if it is available for review," and asked the Region to "direct me to whom this request would be directed to" (*Id.*). The Response to Comments does not answer that request.

Alberg also questioned the AoR modeling result. He observed that the modeling "showed the CO₂ plume not migrating more than ¼ mile or so from the well bore, and then it talks about a pressure pulse reaching out as far as 2½ to 3 miles" (*Id.* at 2). He asked that "[s]ome what if scenario modeling" be run to test the modeled plume size, and wrote that the age of the nearby wells and the location of the City of Pratt's planned treatment facility "leaves me wondering if the AOR should be expanded" (*Id.*).

The Region recorded those concerns and answered them. Comment 6a states that "[s]everal commenters expressed concern that the area of review calculated by modeling and established in the draft permit does not adequately consider all nearby operations, potential

injection zones, fault systems in basement rock, and nearby artificial penetrations," and the Region answered by describing a 500-foot buffer analysis (RTC at 13). Section 124.17(a)(2) requires the Region to "[b]riefly describe and respond to all significant comments on the draft permit raised during the public comment period," so the Response to Comments is the Region's own record of what it received and treated as significant.

Region 7 answers that Petitioners' arguments about the quality of the model's inputs are "hardly the inevitable, much less sole set of arguments that might conceivably have emerged from" Alberg's comment, which it describes as a "specific comment about perforation locations" (Region at 37). It was not so limited. As set out above, Alberg told the Region he wanted access to drill stem test and pressure test records and asked to be directed to the records process, questioned the modeled pressure pulse, asked for alternative modeling, and asked whether the Area of Review should be larger. The comment raised the reliability of the model's inputs, which is the issue presented here.

Region 7 further states that Petitioners offer "their opinion, for the first time on appeal," about the adequacy of the inputs (Region at 37). This Section rests on the Region's own statements during technical review, on the Permit's own tables, and on PZC's explanation for excluding the pressure gradient from its sensitivity analysis.

Region 7 also argues that it was "effectively denied the opportunity to respond" to arguments about the quality of the model's inputs, and that under *MCN Oil & Gas* concerns about "the quality, reliability, or origin of the data" had to be raised when "such data were available for public scrutiny" (Region at 23, 37). Section 124.13 asks whether the issue was reasonably ascertainable. It was, and Alberg raised it. *MCN Oil & Gas* asks a different question:

it conditions its holding on data that "were available for public scrutiny at the time." The derivation was not.

Table 2-9 attributes the 0.37 psi/ft gradient to "DST data" from three wells, identified by API number alone. The Permit states the gradient as a conclusion and never shows what any of the three contributes to it. The well names appear nowhere in the Permit; they come from Kansas Corporation Commission records and from Region 7's own exhibit (Petition Atts. 4, 6; Region Att. Q). Region 7 has now reconstructed the derivation for the first time on appeal, by searching a well database and producing a drill stem test record the Permit does not contain (Region at 43 n.17 & Att. Q). The Permit never disclosed which measurement from which well produced the 0.37 figure, and when the Region went to the underlying record it arrived at a different gradient for one of the three wells. The Response to Comments says nothing about the provenance of that gradient (§ 124.17(a)(2)).

PZC argues that Alberg's comment was not a request for documents at all (Pratt at 30). It block-quotes two sentences and omits the third. Alberg asked the Region to "direct me to whom this request would be directed to" (Alberg at 1). PZC also argues that nothing in the comment suggests the data were insufficient (*Id.*). A commenter who asks the Region where to direct a records request for drill stem test and pressure test data has raised the availability of the subsurface pressure data on which the Permit rests.

Region 7 has also put § 146.84(c)(1)(ii) in issue, defending the Permit on the ground that "Pratt performed a sensitivity analysis that '[took] into account any geologic heterogeneities, other discontinuities, data quality, and their possible impact on model predictions'" (Region at

41). Responding to a ground Region 7 advanced for the first time in its Response is not raising a "new issue[]" or argument[]" within the meaning of § 124.19(c)(2).

III.B.10. Relief requested

Petitioners renew the relief requested in the Petition at 45-46.

III.C. The monitoring network was approved without the basis that § 146.90(d)(2) requires

Section 146.90(d)(2) requires the monitoring frequency and spatial distribution of monitoring wells to be "based on baseline geochemical data that has been collected under § 146.82(a)(6) and on any modeling results in the area of review evaluation required by § 146.84(c)." The Permit fixed the locations and depths of the five shallow monitoring wells before any baseline geochemical data for the Fullerton and Holdrege existed, and Attachment C schedules the sampling that would produce those data for a phase beginning after the Permit issues (Permit Att. C (QASP) at 11; Permit Att. C (Testing & Monitoring Plan) at 11). The Region approved the plan without the data.

III.C.1. The groundwater monitoring arguments are preserved

The Region states that "none of the public comments make any reference to the Permit's Testing and Monitoring Plan, at all, let alone the very specific issue of well placement" (Region at 23; accord *Id.* at 53). The Parsons comment says the proposal "includes five shallow groundwater monitoring wells," and describes monitoring running through "the 12 years of injection and for 50 years during the Post-Injection Site Care period" (Parsons at 1). Those are the wells at issue here.

The Region answered under its own heading, "Testing and Monitoring," describing the Permit's "water quality monitoring directly above the confining zone and in the lowermost USDW"—the unit at issue here—and finding that "PZC has met the testing and monitoring requirements pursuant to 40 C.F.R. Parts 146.90 and 146.93" (RTC at 16). Both Respondents cite the comments by range (Region at 23 (citing "generally Attachments C-G"); Pratt at 21 (citing A.R. #1253-1257)), and each range contains the Parsons comment. Iwasiw's comment adds that the aquifer "wasn't included in the geologic modeling, well construction, aor – in any of the plans submitted," and the Testing and Monitoring Plan is one of the plans submitted (Iwasiw at 5).

Alberg raised the same subject. Commenting on a 650-foot perforation zone, he asked "[H]ow are you going to know where the CO₂ gases/fluids are going?" (Alberg at 2).

III.C.2. The groundwater monitoring network was determined before the baseline geochemical data existed

The Region states that "the Region accepted data for 'all USDWs' in compliance with §§ 146.82(a)(5) and (6)," and that "[t]his data was used to determine the monitoring frequency and spatial distribution of the monitoring wells under 40 C.F.R. § 146.90(d)(2)" (Region at 58). That cannot be so. The data did not exist.

Section 146.90 requires the testing and monitoring plan to be "submitted with the permit application, for Director approval." The plan approved here had to satisfy paragraph (d)(2), which names two bases for the spatial distribution of the wells. One basis is "baseline geochemical data that has been collected under § 146.82(a)(6)." No such data existed for the Fullerton and Holdrege when the Permit issued (Part III.A, *supra*). Attachment C sets the locations of the five monitoring wells (Permit Att. C (Testing & Monitoring Plan) at 9). The

same attachment schedules the sampling that would produce the baseline data for a phase beginning after the Permit issues (Permit Att. C (QASP) at 11).

Respondents do not dispute the requirement. PZC states it: the regulations "do not dictate the location and number of monitoring wells but specify that the location and placement must be "based on baseline geochemical data that has been collected . . . and on any modeling results in the area of review evaluation" (Pratt at 5). The Region sets out the same provision (Region at 58). Respondents answer that the regulations leave the Region discretion over where the wells go (Region at 25, 56). Paragraph (d)(1) does. It bases "[t]he location and number of monitoring wells" on project-specific information, "including injection rate and volume, geology, the presence of artificial penetrations, and other factors." Paragraph (d)(2) is a separate requirement, and it is the one at issue. Petitioners do not say the Region chose the wrong locations or that (d)(1) was violated.

The record shows what set the placements. The Plan gives a reason for each of the five wells: downhole pressure at the injection well, the Swingle #1 and Rolf #1 artificial penetrations, the structural dip to the northeast, and the town of Pratt to the southwest (Permit Att. C (Testing & Monitoring Plan) at 9). No placement rests on baseline geochemical data. The technical review did not dictate placement of monitoring wells based on geochemical data. The Region asked PZC to add a lowermost-USDW well "close to the proposed injection well where the formations will experience higher increases in pressure," and PZC reconfigured the network in response, removing one well and adding another (Region Att. J (RAI #02v2), Item 21). The Region later asked for a fifth well "near the Rolf #1 artificial penetration," and PZC proposed

LUSDW GW5 (Region Att. K (RAI #02v3), Item 3). No one invoked baseline geochemical data, because none had been collected.

Respondents answer that monitoring is iterative: the depths "will be verified" during the pre-operational phase, amendments follow § 146.90(j) (Region at 52), and the plan is "adaptive" (Pratt at 23). However, paragraph (j) requires review of the plan to incorporate monitoring data, operational data, and the most recent area of review reevaluation. Baseline geochemical data under § 146.82(a)(6) is not on that list.

III.C.3 Relief requested

Petitioners renew the monitoring-well relief requested in the Petition at 33 and 36.

III.D. The notice methods were not reasonably calculated to reach the persons potentially affected

Petitioners address several responses to the Petition's Issue 6, which concerned adequate notice.

The persons potentially affected by this Permit are not limited to the owners of the parcels nearest the well. They include the owners of land overlying the aquifer within and beyond the modeled Area of Review, the City of Pratt as a public water supplier drawing from that aquifer, and Kansas Groundwater Management District No. 5, the public body that manages use of the High Plains Aquifer in Pratt County (Petition at 51; Iwasiw at 4). The question is whether the Region's chosen methods were reasonably calculated to reach them.

III.D.1. Issue 6 was preserved

PZC contends that Issue 6 was not preserved (Pratt at 48–49). Region 7 does not (Region at 60–61). Alberg's comment raised notice directly. He wrote that "the only notification was in the

back pages of the Tri-County Tribune," that because the well "falls within a three-mile radius of the City of Pratt" he had assumed "the city personnel would have been notified," and he asked the Region to "reach out to other governing agencies to see if they have any response to this proposed injection well" (Alberg at 1). The Region read it the same way, responding with the steps it took "[p]ursuant to 40 C.F.R. Part 124.10 and 124.12" (RTC at 6). The issue was before the Region while it could still act on it.

III.D.2. Issue 6 concerns the notice method as a whole

Respondents assert that Petitioners lack standing to raise concerns about notice provided to others and that any defect was harmless (Region at 60-61; Pratt at 50-51). Issue 6 does not rest on the omission of a single addressee. It asks whether the Region's method was "reasonably calculated to give actual notice of the action in question to the persons potentially affected by it" (§ 124.10(c)(4); Petition at 50, 52). PZC acknowledges the governing exception and argues only that this case falls outside it: allegations of "fundamental defects in the integrity of the notice process as a whole that may be prejudicial to the notice rights of the petitioner and others . . . may require Board remedy" (Pratt at 51 n.4, quoting *In re Russell City Energy Ctr.*, 14 E.A.D. 159, 182, 184 (EAB 2008)). Petitioners' contention is that this record presents that case. The half-mile radius was measured from the Area of Review boundary (RTC at 6), a boundary the Region drew using an input it twice questioned and never tested (Part III.B, *supra*).

Region 7 explains that the Board has found notice defects harmless where a petitioner does not show how they "impacted the public comment proceedings or resulted in harm to the petitioner" (Region at 60). The record reflects such an impact. The Region received five comments (Pratt at 10). Four were submitted by Petitioners (Region Atts. C, E-G). The fifth,

from the City of Pratt's Water Superintendent, is dated three days after the comment period closed and states that the City "has been informed by Pratt Energy" of the application (City of Pratt at 1). No comments were received at the public hearing (RTC at 3).

III.D.3. Notice under § 124.10(c)(1)(x) and notice under § 124.10(c)(4) are separate requirements

PZC explains that the Region "must provide" two kinds of notice: mail to the persons listed in § 124.10(c)(1), and notice by "[a]ny other method" under § 124.10(c)(4) (Pratt at 47). Petitioners agree, and the text of the rule reflects that structure: notice "shall be given by the following methods," and paragraph (c)(4) is stated without condition: (c)(2) applies to particular permit types and programs and (c)(3) applies when an approved State administers the program, while (c)(4) applies to every notice given under the section (§ 124.10(c)). The Region's mailings to the Kansas Corporation Commission and the Kansas Department of Health and Environment under paragraph (c)(1)(x) (Pratt at 50) address that paragraph. They do not, by themselves, resolve whether paragraph (c)(4) was satisfied. EPA explained that the Class VI mailing requirement clarifies that those agencies must receive notice "in addition to the general public," and that "[e]arly and frequent public involvement through education and information exchange is critical to the success of GS" (Class VI Final Rule at 77,273). Petitioners do not ask the Board to revisit § 124.10 (Region at 63). Petitioners ask only that paragraph (c)(4) be applied as written.

PZC observes that Petitioners do not cite a provision requiring mailed notice to GMD 5 (Pratt at 49), and Region 7 understands Petitioners to seek a "direct mail" requirement that "does not exist" (Region at 61). The Region's mailing list names four State agencies and twenty-six private parties, and no unit of local government (Region Att. N).

Petitioners' contention under paragraph (c)(4) is narrower. They do not read it to require direct mail in every case. They contend that the method the Region chose here was not reasonably calculated to reach the persons potentially affected (Petition at 50–52). Region 7 answers that its half-mile mailing "exceeded the regulatory requirement," and that Petitioners did not "cite the complete text of the regulation" (Region at 61). Paragraph (c)(4) leaves the method open, but whatever method is chosen must be "reasonably calculated to give actual notice of the action in question to the persons potentially affected by it." Region 7 emphasizes the clause "including press releases or any other forum or medium to elicit public participation" (*Id.*). That clause illustrates permissible media. It does not displace the condition that the method be reasonably calculated to give actual notice to the persons potentially affected.

The Region provided notice to agencies by mail. Its mailing list includes the Kansas Corporation Commission, the Kansas Department of Health and Environment, the Kansas Department of Wildlife and Parks, and the Kansas State Historic Preservation Office. It does not include GMD 5 or the City of Pratt (Region Att. N). PZC explains that the newspaper notice was reasonably calculated to reach GMD 5 because the paper circulates in the county where GMD 5's offices are (Pratt at 49). Petitioners note, however, that the Region provided notice to the other agencies by mail rather than relying on the newspaper. The newspaper notice was published once, on March 5, 2026 (Region Att. O). The dates of the website and social media notices come from Attachment P, a June 29, 2026 email that, as Region 7 notes, is not part of the administrative record (Region at vii n.2). Petitioners do not ask the Board to rely on Attachment P. If the Board considers what Region 7 has offered, the exhibit states that the notice was posted

on the Region's website on March 5 and that the first social media post was made on March 31, twenty-six days into the comment period (Region Att. P).

III.D.4. The Region did not mail notice to the City of Pratt

PZC states that the Region "provided notice to the City of Pratt" (Pratt at 52). The Response to Comments describes the Region as having "consulted with the City of Pratt regarding the proposed permit" (RTC at 6) and as having had "subsequent communication with the City of Pratt" (RTC at 14). It does not describe mailing the notice to the City, and the City does not appear on the mailing list (Region Att. N).

PZC characterizes the argument about the City's facility as "untethered to the regulatory language" (Pratt at 52). The argument rests on paragraph (c)(4)'s reference to "persons potentially affected." The City's Water Superintendent wrote that two, possibly three, of the City's remaining wells "may be located in the potential subsurface flow path from the ethanol plant" (City of Pratt at 2). Region 7 expects that locations outside the area of review will not experience "negative effects" (RTC at 14). That expectation concerns anticipated harm; paragraph (c)(4) asks who is potentially affected.

III.D.5. Relief requested

Petitioners renew the relief requested in the Petition at 53.

IV. CONCLUSION

Each issue in this Reply asks whether Region 7 complied with a requirement the regulations impose. None asks the Board to second-guess a technical judgment. Section 146.82(a)(6)

required baseline geochemical data for all USDWs in the area of review. Section 146.84(c)(1)(ii) required the computational modeling supporting the delineation of the area of review to account for data quality and its possible impact on model predictions. Section 146.90(d)(2) required the spatial distribution of the monitoring wells to rest on two things: the baseline geochemical data § 146.82(a)(6) required, and the area of review modeling. Only one existed. Section 124.10(c)(4) required a notice method reasonably calculated to reach the persons potentially affected.

On the first three issues, Respondents' briefs do not locate the missing material. The Respondents identify pages that contain no baseline geochemical data for the lowermost USDW. On the Area of Review, the Region questioned the quality of the formation-pressure data twice during technical review, received no measurement, and issued the Permit. Four of the five inputs that produce the critical-pressure threshold were never varied, and the one the Region questioned was among them. Respondents defend the delineation under a provision the Response to Comments never mentions, and reconstruct the gradient for the first time on appeal from a drill stem test the Permit does not contain. On notice, the Respondents defend the methods the Region chose without addressing whether those methods were reasonably calculated to reach the City of Pratt, Groundwater Management District No. 5, or others the project may affect. A permit decision rests on the administrative record as it stood when the Permit issued (§ 124.18(a), (c)).

Petitioners renew each request for relief made in the Petition without narrowing it (Petition at 55), and rely on the Petition as to Issue 5 and every matter not separately addressed here.

Dated: September 19, 2026

Respectfully submitted,

DocuSigned by:

Alexis Iwasiw

C9C4C35A3BD7465...

Alexis Iwasiw

3537 FM 1115

Waelder, TX 78959

alexis.iwasiw@outlook.com

661-607-5282

Lead Petitioner

Signed by:

Walter Scott Alberg

A53B05002D5344C...

Walter Scott Alberg, PG

609 Meadowlark Lane

Pratt, Kansas 67124

scottalberg@hotmail.com

620-388-3780

Signed by:

Gene Parsons

3A08E32A963B4FE...

Gene Parsons

50472 SE 10th Street

Pratt, Kansas 67124

gene2412@live.com

620-672-6934

Signed by:

Jill Makuka

11E84EC767E641C...

Jill P. Makuka

10068 NE 20th Street

Pratt, Kansas 67124

parsonsjn@gmail.com

620-770-0601

Signed by:

Jan Parsons

299056333E44406...

Jan Parsons

50472 SE 10th Street

Pratt, Kansas 67124

jsp77@live.com

620-672-6934

Pro se Petitioners

Petitioners authorize Alexis Iwasiw to receive service on all Petitioners' behalf.

CERTIFICATE OF COMPLIANCE WITH WORD LIMIT

Pursuant to § 124.19(d)(1)(iv) and the Board's Order Granting in Part Motion for Extension of Time and to Increase Word Limit (June 30, 2026), I, Alexis Iwasiw, Lead Petitioner, certify on behalf of all Petitioners that this Reply complies with the applicable word limit. The Reply contains approximately 13,900 words, exclusive of the table of contents, table of authorities, table of attachments, this certificate of compliance, and any attachments. The word count was determined by the word-processing system used to prepare this document.

Dated: September 19, 2026

DocuSigned by:
Alexis Iwasiw
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Alexis Iwasiw, Lead Petitioner

CERTIFICATE OF SERVICE

I, Alexis Iwasiw, Lead Petitioner, certify on behalf of all Petitioners that on September 21, 2026, a true and correct copy of the foregoing Reply was served to the parties listed, all of whom consented to service by electronic means.

DocuSigned by:
Alexis Iwasiw
C9C4C35A3BD7465...

Dated: September 19, 2026

Alexis Iwasiw, Lead Petitioner

Clerk of the Board

U.S. EPA, Environmental Appeals Board

Via EAB E-Filing System

1200 Pennsylvania Avenue, NW
Mail Code 1103M
Washington, DC 20460-0001

Samantha Pappas

Attorney, Water Branch, Office of
Regional Counsel
Counsel for U.S. EPA, Region 7
Via E-mail

U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, KS 66219
(913) 551-7924
pappas.samantha@epa.gov

Kerry L. McGrath

Hunton Andrews Kurth LLP
Counsel for Pratt Zero Carbon, LLC
Via E-mail

2200 Pennsylvania Avenue, NW
Washington, DC 20037
(202) 955-1519
kmcgrath@Hunton.com

Samuel L. Brown

Hunton Andrews Kurth LLP
Counsel for Pratt Zero Carbon, LLC
Via E-mail

50 California Street, Suite 1700
San Francisco, CA 94111
(415) 975-3700
slbrown@Hunton.com

Abigail N. Klauer

Hunton Andrews Kurth LLP
Counsel for Pratt Zero Carbon, LLC
Via E-mail

50 California Street, Suite 1700
San Francisco, CA 94111
(415) 975-3700
aklauer@Hunton.com