ENVIRONMENTAL APPEALS BOARD

UIC Class VI Permit IL-155-6A-0001

Marquis Biocarbon Project

Petition to Appeal the Final Permit

Summary of Eleven Issues Presented for Review

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LOCATION · FILED

Putnam County, Illinois | May 7, 2026

Final Permit issued April 10, 2026

Slides prepared by EJC on May 29, 2026

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Project Overview

What the permit authorizes — and the context for the appeal

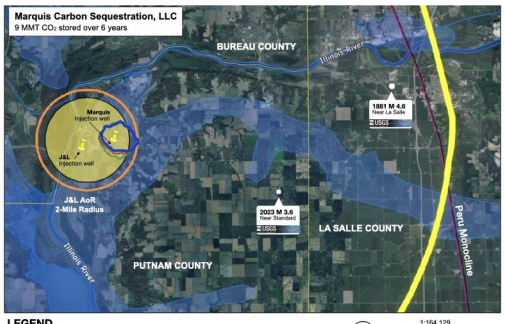
On May 7, 2026, Eco-Justice Collaborative petitioned the EPA Environmental Appeals Board to review Class VI UIC Permit No. IL-155-6A-0001, issued April 10, 2026. The permit authorizes the injection of 9 million metric tons (MMT) of CO_2 over six years into the Mt. Simon Sandstone in Putnam County, Illinois.

9 MMT
of CO_2 injected
over 6 years

29 mi²
Area of Review
diameter footprint

1.25 mi
from WPL-1
closed Class I hazardous-waste well

276 M gal
Acidic steelmaking waste
injected 1960s–2009; remains in formation



Marquis Carbon Sequestration, LLC — Project Overview Map

Largest single-project Class VI volume in the Illinois Basin — no precedent.

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ISSUE 1

CLUSTER A · MODELING DEFECTS

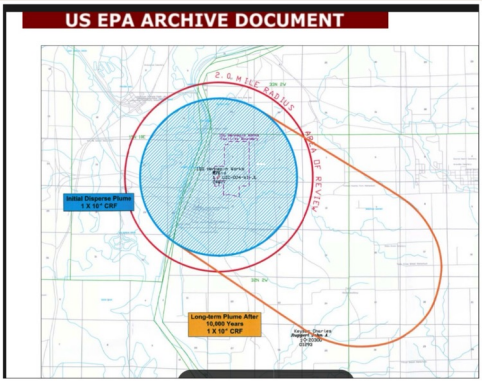
The computational model omitted the WPL-1 hazardous-waste plume

Marquis modeled how its CO_2 and pressure will move underground — but ignored 276 million gallons of acidic, metal-laden steelmaking waste (chromium, iron, chlorides) that ArcelorMittal injected into the same Mt. Simon formation from the late 1960s through 2009, just 1.25 miles from the planned CO_2 well. The waste's permitted chromium concentration is roughly 12,000 times the Safe Drinking Water Act limit.

The Illinois EPA — the agency that permitted and closed the hazardous-waste well — objected that Marquis's CO_2 injection would re-pressurize the formation and could mobilize that waste beyond its predicted limits, toward drinking water.

REGULATORY DEFECT

Before issuing a Class VI permit, Region 5 must find under 40 C.F.R. § 144.12 that injection won't endanger drinking water. It didn't. The EPA assumed pressure had returned to baseline and deferred verification to a Marquis measurement during pre-operational testing after issuing the permit.



Operational and 10,000-year plume track of the pickle-liquor plume in the Mt. Simon Sandstone. Source: U.S. EPA proposal to reissue exemption to ArcelorMittal-Hennepin Works.

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ISSUE 2

CLUSTER A · MODELING DEFECTS

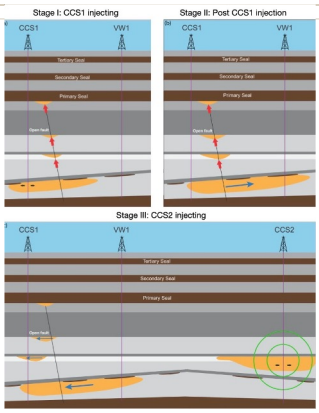
Reliance on Marquis's modeling conflicts with peer-reviewed IBDP evidence

At the Illinois Basin–Decatur Project — same Mt. Simon Sandstone formation — seismic monitoring (Bukar et al. 2025) showed CO_2 migrating upward along undetected faults to the Eau Claire Shale caprock, contrary to the pre-injection prediction (at "90% confidence") that the plume would stay deep within the formation.

Marquis's own application admits the injection site comprises seven distinct depositional environments — braided fluvial channels, tidal systems, eolian dunes — settings where fluid flow is notoriously hard to predict.

REGULATORY DEFECT

Marquis relied on the same class of deterministic model that failed at IBDP, and EPA's own 2013 Class VI guidance recommends geostatistical/stochastic methods for exactly these heterogeneous conditions. Region 5 ignored both — rendering its reliance on Marquis's model clearly erroneous under §§ 146.84(c)(1)(ii) and 124.17(a)(2).



Carbon dioxide migration along faults at the Illinois Basin–Decatur Project, revealed by time-shift analysis of seismic monitoring data. Bukar et al. (2025).

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ISSUE 3

CLUSTER B · MONITORING AND WELL-INTEGRITY INADEQUACIES

The 12-year alternative post-injection site care period lacks substantial evidence

Region 5 cut post-injection monitoring from the 50-year default under § 146.93(b)(1) to 12 years — a fourfold reduction — without the "substantial evidence" § 146.93(c) requires.

No CO_2 sequestration project has yet finished its post-injection monitoring period, so EPA has no real-world data to rely on. That leaves Marquis's underground flow model as the foundation for the required "substantial evidence" — and Issues 1 and 2 show that model is defective.

EMPIRICAL CONTRADICTION

The approved 12-year window also falls within the 7–13-year range in which IBDP — using state-of-the-art well construction — documented well failures. Region 5 did not address this evidence.

POST-INJECTION MONITORING

REGULATORY DEFAULT

50 yr

§ 146.93(b)(1)

APPROVED FOR MARQUIS

12 yr

Falls within the 7–13 yr window in which IBDP documented well failures.

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ISSUE 4

CLUSTER B · MONITORING AND WELL-INTEGRITY INADEQUACIES

Injection wells are designed for only 18 years — not the project life

40 C.F.R. § 146.86(b)(1) requires casing and cement to be designed for the life of the geologic sequestration project. That life is not capped at 18 years (6 years of injection plus 12 years of monitoring).

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40 C.F.R. § 146.93 sets a 50-year default post-injection site care period; shorter alternatives are permitted only when site-specific modeling shows drinking water will be protected. EPA Region 5 approved just 12 years for Marquis, and Final Permit § P.6(d) reserves the Director's authority to extend monitoring if needed.

But the Marquis wells are engineered for just 18 years — the injection phase plus the truncated PISC window. That fails both rules at once: the wells aren't designed for the project's full life, and the Director's extension authority is illusory because extending monitoring requires functioning wells — and by then there won't be any.

Wells designed for only 18 years total (6 yr injection + 12 yr monitoring) cannot reliably function during any continuation or extension.

WELL LIFE vs. PROJECT LIFE

Injection (6 yr)

6 yr

Approved post-injection monitoring

12 yr

Total designed well life

18 yr

Regulatory default monitoring window

50 yr (extendable)

Gap: design life ends before monitoring obligations may end.

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ISSUE 5

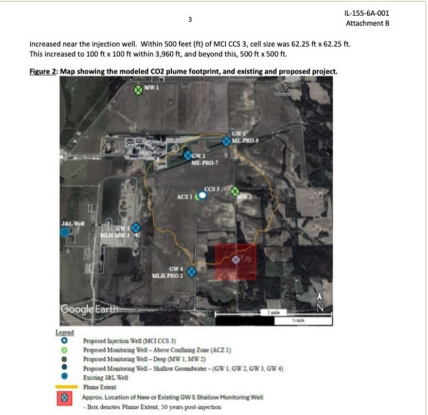
CLUSTER B · MONITORING AND WELL-INTEGRITY INADEQUACIES

Monitoring-well network does not provide direct injection-zone coverage

Marquis's two deep monitoring wells sit outside the modeled CO_2 plume path, and no monitoring well is placed between Marquis's injection well and the existing hazardous-waste well. Because the modeled CO_2 plume appears to intersect the two-mile-radius hazardous-waste plume, an undetected interaction could harm drinking water before it's discovered — failing the § 146.90(d) obligation to track the CO_2 plume.

PROCESS DEFECT

The public never had the chance to object to this placement. Between the draft and final permit, EPA reassigned the deep injection-zone monitoring role to MCI MW-2 — but the draft permit had identified a different well in that role, so commenters could not evaluate whether MW-2 was actually sited where the regulation requires. Region 5 issued no re-notice under §§ 124.10(d) and 124.13.



Attachment B, Final Permit. No deep monitoring well is proposed between MCI CCS3 and the J&L well (WPL-1), nor within the modeled CO_2 plume path.

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ISSUE 6

CLUSTER D · HAZARDOUS-WASTE INTERACTION AND CAPROCK

"No corrective action" determination for WPL-1 omits mechanical-pressure analysis

The hazardous-waste well (WPL-1) is the only well in the ~14.5-mile pressure front fully penetrating the Eau Claire confining zone. Region 5 did not quantitatively analyze how that pressure front will affect WPL-1's plug integrity or mobilize the residual acidic, metal-laden steelmaking waste left in the formation — as § 146.84(c) requires.

Region 5's "no corrective action" determination instead relies on the same stale 2007 ArcelorMittal modeling challenged in Issue 1, and on a qualitative analysis that never asks what happens when CO_2-acidified brine, chromium, and sulfuric acid interact with the WPL-1 cement and steel under elevated pressure for decades.

JURISDICTIONAL DEFECT

Region 5 issued the determination without deferring to IEPA — the state primacy agency for the Class I well — and declined commenters' requests for independent mechanical-integrity testing and re-logging of WPL-1 before injection. That displaces state jurisdiction and fails the response obligation of § 124.17(a)(2).

PRESSURE FRONT

~14.5 mi

Reach of the pressure front from CCS3 — beyond the modeled CO_2 plume.

WELL INTEGRITY

1 of 1

WPL-1 is the only well in the 29-mile AoR that fully penetrates the Eau Claire confining zone — yet no mechanical pressure analysis was performed.

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ISSUE 7

CLUSTER C · SEISMIC RISK UNDERANALYZED

Seismic monitoring reduced to ~1.1% of the AoR on cost grounds

Between the draft and final permit, Region 5 accepted two monitoring cuts at Marquis's request: 3D seismic coverage dropped from AoR-wide to 3.72 mi² (roughly 1.1% of the 29-mile-diameter AoR), and micro-seismic monitoring shrank from AoR-wide to a ~1-mile radius around CCS3. The public had no opportunity to comment on either change.

3D seismic = sound-wave imaging used to track the CO_2 plume and pressure underground.

STATUTORY DEFECT

Region 5 accepted the cuts on the explicit ground that broader coverage was "practically infeasible" because of land acquisition and right-of-way costs. But the Safe Drinking Water Act does not authorize EPA to relax monitoring on the basis of applicant cost (42 U.S.C. § 300h(b)(1)), and cost is not among the factors enumerated in § 146.90(g). If an applicant can't secure monitoring access across the AoR, the regulation's proper response is alternative monitoring methods — not a cost-driven reduction. Plus the shrunken micro-seismic radius does not reach the Peru Monocline at the AoR boundary (see Issue 8).

3D SEISMIC COVERAGE

1.1%

of the 660.52 square-mile Area of Review

DRAFT → FINAL

AoR-wide → 3.72 mi²

Cost is not an authorized factor under 42 U.S.C. § 300h(b)(1).

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ISSUE 8

CLUSTER C · SEISMIC RISK UNDERANALYZED · PART 1 OF 2

Finding that seismicity will not interfere with containment is unsupported

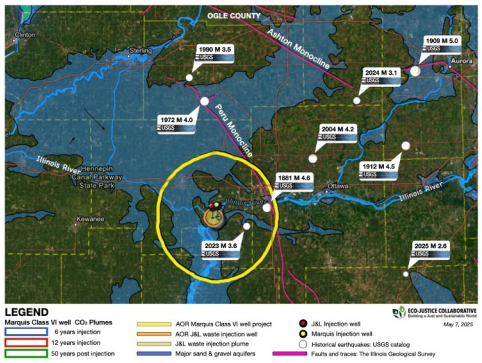
Region 5 called the AoR "seismically stable" despite at least three Peru Monocline earthquakes — two M4.6 and M5.1, large enough to damage buildings. It required no fault-stability analysis under § 146.82(a)(3)(v) or § 146.83 — contrary to EPA's own Class VI guidance — and never modeled whether injection could trigger quakes.

UNADDRESSED RISK · PERU MONOCLINE

Two quakes hit inside the AoR — the 1881 M4.6 near LaSalle (which Region 5's Response to Comments misdates as 1972) and the November 2023 M3.6 near Standard, IL. Larson (2002) and Carpenter (2011) both concluded the Monocline may have been reactivated — findings Region 5 did not address.

UNADDRESSED RISK · CO-LOCATED J&L WELL

§ 146.84(c) requires analyzing seismic risks in both directions — how Marquis injection could affect nearby wells, and how those wells could affect the project. Region 5 did neither for the co-located J&L hazardous-waste well, leaving uncharacterized the risk of induced quakes damaging J&L containment or opening cross-contamination pathways.



"Seismically stable" finding by Region 5 despite historical earthquakes on the Peru Monocline — including two within the AoR — that could affect containment if induced seismicity occurs.

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ISSUE 8

CLUSTER C · SEISMIC RISK UNDERANALYZED · PART 2 OF 2

Finding that seismicity will not interfere with containment is unsupported

Only 63 feet of permeable "hot sand" separates CCS3's deepest injection point from the Precambrian basement — the deep bedrock where most Illinois earthquakes originate. That's roughly one-quarter of the buffer ADM built into CCS #2 in Decatur, a precaution taken after its CCS #1 pilot produced substantial microseismicity.

WHAT IBDP LEARNED	ADM CCS#2	MARQUIS CCS3
Total separation	270–320 ft	~63 ft
Dedicated buffer (Argenta)	50–100 ft	0 ft — none
Lower-zone character	Low-perm seal	Permeable reservoir

ADM CCS#1 — perforated only ~8 ft above basement — produced 2011–2014 basement microseismicity. ADM responded by perforating CCS#2 shallower, with a dedicated Argenta buffer. Marquis has not followed that lesson.

ALSO UNANALYZED · 9 MMT IS UNPRECEDENTED

Marquis plans to inject 9 MMT of CO_2 — more than any prior Class VI project — but Region 5 never analyzed whether that cumulative volume could trigger earthquakes. It also ignored two studies: Zoback & Hennings (2025) found that total injected volume (not peak pressure) is the best predictor of induced-quake size, and that even a small pressure bump can trigger earthquakes; Bukar et al. (2025) showed CO_2 migrating along faults too small for seismic surveys to detect at IBDP — undermining Marquis's "no faults seen" rationale. Bukar also documented ~350 m of CO_2 movement in just four months, making Marquis's planned five-year re-scan interval far too infrequent.

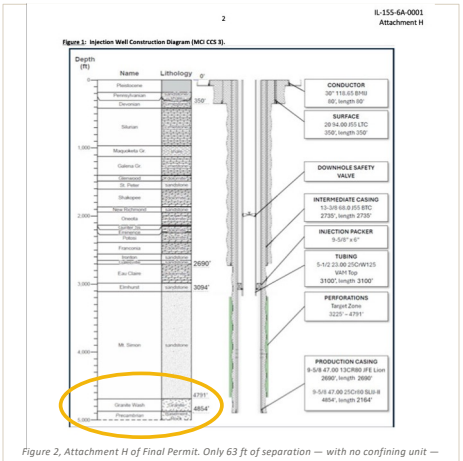

Figure 2, Attachment H of Final Permit. Only 63 ft of separation — with no confining unit — between the perforation at 4,791 ft and the pre-Cambrian basement.

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ISSUE 9

CLUSTER D · HAZARDOUS-WASTE INTERACTION AND CAPROCK

The confining-zone finding mischaracterizes the dominant lithology

§ 146.83(a) requires a confining zone "of sufficient areal extent and integrity to contain" the CO_2. ISGS Bulletin 95 (Willman et al., 1975) characterizes the Eau Claire where Marquis sits as predominantly dolomitic sandstone held together by carbonate cement — not shale. Neufelder et al. (2012) found that across the Eau Claire, "much of the formation has behaved as a fluid conduit instead of as a seal," and warned that CO_2-acidified brine can dissolve the cement, turning seal-quality rock into reservoir-quality rock. Region 5's response leans on the Eau Claire's "geochemical buffering capacity" as a property of shale, not the rock present at the Marquis site.

REGION 5 RELIED ON

Shale

Strong, ductile seal on which the § 146.83(a) finding rests.

ISGS BULLETIN 95 FINDS

Dolomitic Sandstone

Weaker seal; carbonate cement is vulnerable to dissolution by CO_2-acidified brine.

EXTRAPOLATION DEFECT

Marquis based its site geology on a single test well (MCI MW-1) and extrapolated those findings across the entire 661 mi² Area of Review using two analogs roughly 100 miles away: IBDP to the south, in a different (carbonate-dominated) geologic zone with documented seal capacity, and UPH-3 to the north, drilled only to characterize the underlying Mt. Simon reservoir with no published Eau Claire seal characterization. EPA's own Geology Memo concedes that its rock properties come from MCI MW-1 alone — and seismic surveys provide structural context, not the lithologic proportions that determine seal capacity. A 661-square-mile permit cannot rest on this thin foundation.

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ISSUE 10

CLUSTER E · PUBLIC PROCESS FAILURES

Five monitoring reductions were not re-noticed

Between the draft and final permit, Region 5 accepted five applicant-requested monitoring reductions — all in one direction (less protection), all at Marquis's request. The cumulative effect of five simultaneous reductions is qualitatively different from any single change, and raises "substantial new questions" under 40 C.F.R. § 124.14(b).

REQUIREMENT	DRAFT	FINAL
CO_2 stream purity	99.86 %	**99.0 %**
3D seismic area	AoR-wide	**3.72 mi² (~1.1% of AoR)**
Microseismic radius	AoR-wide	**~1 mile**
PNC logging frequency	Continuous	**Annual**
Isotope analysis frequency	Continuous	**Annual**

When comments raise substantial new questions, § 124.14(b) required a new draft permit, a revised statement of basis, or a reopened comment period. Region 5 did none — and addressed the five reductions only individually, never their cumulative effect.

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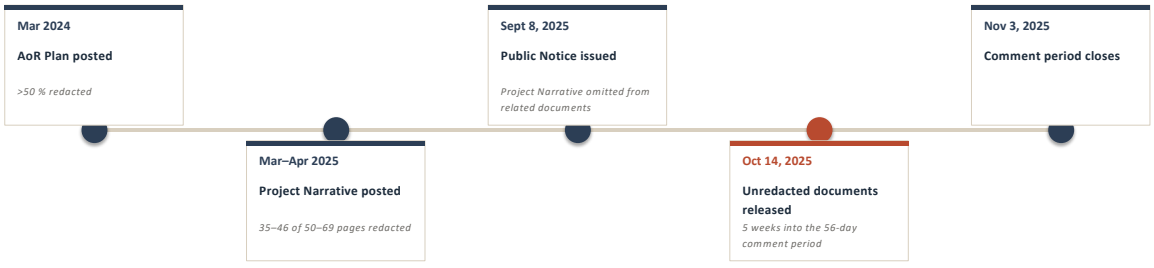
ISSUE 11

CLUSTER E · PUBLIC PROCESS FAILURES

Application materials were substantially redacted during most of the comment period

More than 50% of the AoR & Corrective Action Plan and Project Narrative were redacted during most of the 56-day comment period. EPA's Sept. 8, 2025 Public Notice omitted the Project Narrative from "Related Documents" entirely and posted only an 11-page abbreviated version of the 183-page AoR Plan. Unredacted versions were released only on October 14, 2025 — five weeks into the comment period, one day before EPA's availability session, and 15 days before the hearing.



These materials contain the geologic, modeling, and site-characterization data on which Region 5's § 144.12 non-endangerment finding rests. Region 5's framing — that unredacted release is a discretionary "courtesy," not a requirement — is inconsistent with 40 C.F.R. §§ 124.10(d)(1)(vi) and 124.18 and warrants Board guidance on CBI handling in Class VI permitting.

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ENVIRONMENTAL APPEALS BOARD · RELIEF REQUESTED

What we are asking the Board to do

STAY

All contested permit conditions remain stayed pending Board action under 40 C.F.R. §§ 124.16(a) and 124.19(b).

REMAND

Vacate or remand the Final Permit with instructions to Region 5 to take the corrective actions specified in each issue's relief paragraph.

RE-NOTICE

Direct Region 5 to provide an opportunity for public comment on any revised determinations before issuing a new final permit.

Each of the eleven issues rests on a clearly erroneous finding of fact, conclusion of law, or important policy question warranting Board review.

Slides prepared by EJC on May 29, 2026

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