Dear Puro.earth Team,

We are writing the following Grievance Request on behalf of Eion and our recently verified Twinterstellar 3021 project. We have structured our request into two thematic areas: Governance and how it relates to CDR Quantification (especially the role of Section 6.4.1(c) of Puro's Enhanced Rock Weathering for CO2 Removal Methodology). We believe that the topics raised here are not only relevant to our project, but also have implications for the broader industry going forward. The issues raised in CDR Quantification are submitted per Puro's Grievance Policy, and include a request for issuance of additional CORCs we believe are deserved by the project. Our concerns are based on the interpretation and/or adoption of methodology requirements and are related to "credit eligibility and related processes." Thank you for your consideration in this process.

Governance

A Methodology (and the Standard it belongs to) defines what data, documents, and practices are required to issue a "claim", such as a CDR claim. It is commonly understood that unless a practice is forbidden, it is generally allowed (assuming any related requirements are followed and met). This is particularly true for those practices that are vague or undefined in the methodology, and therefore the project developer is required to interpret the methodology and implement a reasonable approach to addressing the phenomenon to be quantified. This action can take place years before the registry or verifier reviews the project.

The original Puro ERW methodology left many such phenomena to be addressed. The premise of the original Puro ERW methodology was that empirical measurement of weathering was as-yet-undefined, and therefore the bulk of the methodology is devoted to process-based modeling. Nonetheless, the methodology required some empirical substantiation for the model performance so that crediting was not based on pure conjecture.

At that time, Eion had developed not only an approach to weathering quantification, but also was the first to patent (Wolf et al) and subsequently publish what has come to be known as the "solid phase" approach accounting for plant uptake and strong acid losses (Kantola et al), which has been widely adopted within the industry. In addition, Eion developed the first ISO 14064-2 compliant ERW methodology based on this approach (Mooshammer et al), and were the first to deliver ERW credits to a buyer (Stripe) against this methodology, adding bootstrap uncertainty propagation of the weathering rate, another industry first. All of this pre-dates the revised Puro methodology, which has indeed come to resemble the work we have pioneered, away from the methodology Puro initially released. We take pride in the fact that this work has all been reviewed by experts (DNV for the methodology; peer review for Kantola et al; Stripe's science team for the first delivery; DOE for our LCA) and released to the public (CDRxiv).

The above is not meant to count Eion's accolades, but to explain the amount of time and work put into developing the standards in the ERW space. All of this makes it surprising to us the degree of latitude given to the verifier to not only objectively check our work against the requirements laid out in your methodology, but also express subjective opinions and write a few purely speculative statements in the review. While we understand that it's incredibly difficult to find experts in a new and highly competitive field, it's difficult to see how after so much time and attention placed on improving Puro's methodology, the Puro team would feel comfortable with the amount of liberty taken outside the bounds of what is specified in the methodology (and/or clarified and confirmed by Puro), especially subjective opinions about areas already more clearly defined in the revision.

Below we will highlight some of these areas. We raise this because we believe Puro runs the risk of subjecting project developers to unreasonable risks if the verification process isn't governed carefully. This poses a risk that Puro itself loses its role in being the final authority in interpreting its own methodologies.

CDR Quantification

The core of this grievance is in reclaiming some of the initial CDR claims that were changed in the final stages of the verification process. This was very unexpected since the claims below were originally approved and accepted by Puro in May 2025 (before starting the Production Facility and Output Audit with the VVB), after 8 months of review and back-and-forth, based on our flux-based approach to natural background weathering. We, therefore, reference the claims submitted for verification, and the difference between submitted vs. verified claims.

There are three components to this grievance: plant uptake, riverine losses, and background weathering.

Plant Uptake

We were deducted 112.76 t CDR in our submitted claim (using a gross claim calculated from our previously approved natural background weathering approach). This value was calculated as 5% of the initially claimed Cstored value of 2255.1 t CDR.

The plant uptake loss is the marginal increase in removal of Mg owing to additions of Mg from olivine. This loss is the sum of three individual terms

Plant Uptake = (delta DM)*(baseline Mg) + (baseline DM)*(delta Mg) + (delta DM)*(delta Mg) (eq 1)

Where delta refers to the marginal change between treated and untreated/BAU/control, and DM refers to total dry matter. It can be seen, if either delta DM or delta Mg are zero, then the Plant Uptake loss term reduces to just a single term, and if both delta DM and delta DM are zero, then the plant uptake term is zero.

Eion presented trial data showing no change in yield, nor change in Mg concentration, between treated and untreated plots, for corn, soy, and cotton, across multiple soil types and multiple years. Puro rejected this data set because it did not include pasture grasses, which constitute the bulk of the submitted project crop type. Eion presented a remote sensing analysis that showed that there was no significant difference in NDVI between treated and untreated fields, as well as analytical analysis of treated and untreated pasture grasses, which also showed no significant difference. Puro rejected both of these analyses and subjected us to a 5% default value.

My goal below is to show that the chosen default is outside a reasonable interpretation of what could possibly have been removed.

> Treated hay samples mean: 4720[1] g Mg / t DM (ppm)
> Untreated hay samples mean: 3650[1] g Mg / t DM (ppm)
> Delta Mg: 1070 gMg / tDM = 1.070 kgMg/tDM
>
> Baseline hay yield in MS is 2.38 short tons[2] / ac @ 10% moisture[1] = 4.8 tDM/ha.
>
> 4.8 tDM/ha * 1.070 kgMg/tDM = 5.136 kg Mg/ha
>
> Project area is 3155 ac = 1276 ha.
>
> 5.136 kg Mg/ha * 1276 ha * (1 t / 1000 kg) = 6.554 t Mg removed from the project relative to counterfactual baseline.
>
> 6.554 t Mg * (44/24) * 2 = 24.03 t CDR / project. This is what we believe the true loss should be, and thus we should be returned 88.73 t CDR. It is equivalent to 1.1% of the original 2255.1 t Cstored claim.
>
> The difference between the default value (112.76) and our value (24.03) is 88.73. By eq 1, this would be attributed to a difference in dry matter yield:
>
> 88.75 t CDR * (24/44) / 2 = 24.2 t Mg
> 24.2 t Mg / 1276 ha * (1000 kg/t) = 18.966 kg Mg / ha
> 18,966 g Mg/ha = (delta DM t/ha)*(baseline Mg g/t) + (delta DM t/ha)*(delta Mg g/t)
> 18,966 g Mg/ha = (delta DM t/ha)*(baseline Mg g/t + delta Mg g/t)
> delta DM t/ha = 18,966 g Mg/ha / (baseline Mg g/t + delta Mg g/t)
> delta DM t/ha = 18,966 g Mg/ha / (3650 + 1070) = 2.266 t/ha

[1] From 50316 PREVOST FARMS (01-21-2025).pdf
[2] From https://extension.msstate.edu/publications/mississippi-hay-market-analysis

> If delta DM is 2.266 t/ha, this is a 47% yield increase relative to the baseline value of 4.8 t DM/ha. We would welcome such a yield increase, but it is not supported by any evidence.

As a summary, we believe that a more accurate representation of plant uptake is 24.03 tonnes, rather than the originally deducted 112.76 tonnes (a return of **88.73 CORCs**).

Riverine Losses

We were deducted 112.76 t CDR. This value was calculated as 5% of the initially claimed Cstored value of 2255.1 t CDR.

The 2024 methodology provides the following guidance for this term:

“For the pathway losses from surface water systems, as a conservative estimation, the value of mCO2e$_i$ shall equal 5% of the value of Cstored (see [36]),” where citation [36] is Zhang et al.

In the course of commenting on the Puro ERW methodology currently in revision, three pieces of information came out:

1. That this loss term represents off-gassing from carbonate system re-equilibration, and not pedogenic carbonate formation in rivers.
2. That this loss term is a median value across the entire study area in the US.
3. That authors acknowledged that removal of CO2 in off gassing was double-counting against subsequent offgassing in marine systems, which have a default value of 10%.

The revised methodology(§ 6.3.9 and § 6.3.10) makes a number of improvements, including distinguishing between riverine carbonate precipitation and riverine CO2 offgassing, and allowing watershed-specific data-constrained models to be used. It also addresses the double-counting issue, in equation 6.12 of the 2025 draft methodology.

In principle we don’t need to present any new argument other than to adopt equation 6.12 to address the double counting:

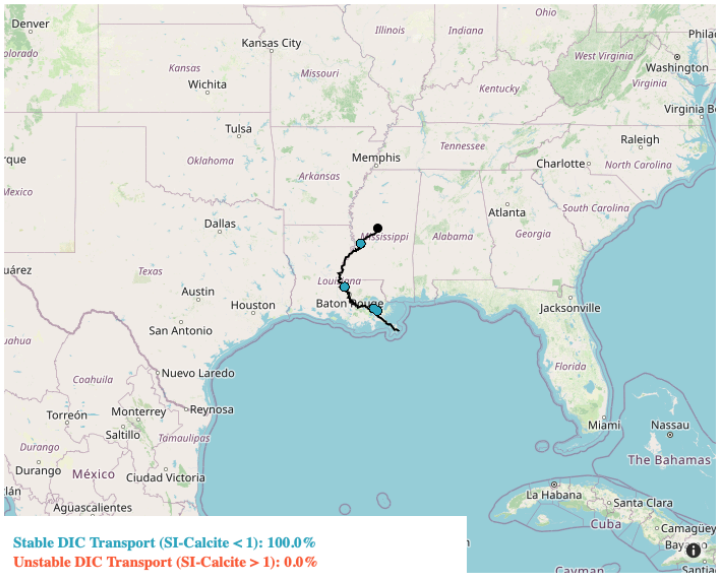
Loss_ocean = ([1 - Loss_river] - dC/dA) * (1-f)

Where Loss_river = 0.05, dC/dA = 0.9 and f = 0 for silicates.

Loss_ocean = ([1 - 0.05] - 0.9) * 1 = 0.05, i.e. the amount remaining after the default riverine loss (5%).

So as long as we can show that there is no carbonate precipitation (SI_calcite < 1) and Loss_river is always <= 10%, then the sum of the two terms will always be 10%.

Riverine data is provided in the folder riverine_losses.zip, which (a) identifies all stations in the flowpath for the project in file flowpath_stations.csv (b) calculates the riverine loss term is always <= 10% in the file dDIC_dTA.csv, and (c) calculates the saturation index for all timepoints, which is always below 1. This data are from the Glorich dataset, which in turn collects data from the USGS stations.



Our true value should be 0 tonnes for riverine losses, and thus we should be returned **112.76 tonnes/CORCs**.

Background Weathering

Some historical context on background weathering as a component of the CDR calculation in Eion's journey, Eion was incorporated in November 2020; was awarded a pre-purchase contract by Stripe in December 2021; and began its first project in spring of 2022. This project included co-located small plot field trials also in 2022 to quantify plant uptake, strong acid, and background weathering. We delivered this project and it was accepted in the Fall of 2022. This work was deeply reviewed by, at minimum, seven PhD's, including four at Eion and three at Stripe. All of this took place before Puro had released its first draft methodology in November 2022. Looking back at this draft methodology, it is possible to see that it was written without any awareness of the empirical approaches developed in the industry to constrain ERW-based CDR (which Eion was the first to introduce in the peer reviewed literature, in Kantola et al).

Based on this work, Eion began the present project in January 2023, with essentially identical methods, including for the background weathering. Puro introduced a revision to the 2022 methodology in October 2024 ("2022 v.2"). In this version, Puro made

virtually no mention of background weathering, except in the context of process modeling.

In reviewing our project, Puro originally decided to introduce a new requirement in May 2025 that the background weathering be calculated only with the same methodological approach used for the weathering of the mineral amendment (this perspective is formalized in the draft revision released for comment in September 2025). Thus, Puro was asking us to comply with a requirement not present in a methodology when we submitted in September 2024. In addition to spending an extensive amount of time to comply with this request, we don't believe it is a reasonable expectation to have no grace period based on market standards given our team's experience in other pathways.
The fact remains that we designed the Twinterstellar project to conform to a methodology that was previously reviewed and accepted by experts in the field, and relied on designed experiments specifically intended to constrain this parameter.

In order to comply with this request, our only option was to use data that was collected by accident: soil samples in fields where rock dust was seemingly applied, but where as-applied maps did not show applications. Consequently, we developed a more thorough, relevant, and accurate approach: a flux-based approach. This was accepted by Puro on June 6, 2025 (we started the Production Facility and Output Audit with the VVB the following week). The verifier, however, refused to accept the approach, despite prior assurance from Puro (on a subject that the methodology is silent on) and without explanation during verification. They insisted that we instead use the contaminated (i.e., with weathering material) soil measurements as controls.

The "accidental" solid phase control data set in question is particularly sensitive to assumptions; as an example, when we imposed the same z-score value for outlier detection as for the main deployment area, we arrived at one estimate of background weathering. The verifier proposed running the outlier detection method *a second time* to target a specific data point they felt was still an outlier. This is not the only source of subjectivity: one may examine the delta-Ni to exclude some samples that may have received fugitive dust; or examine the proximity of points to application areas for the same effect; or choose specific points as representative of particular nearby fields; etc. In other words, because this was not a designed experiment, an investigator can subjectively turn any number of knobs to achieve the result they wish. In the end, the verifier chose not to use a z-score approach at all, but rather the interquartile range, with an unusually wide aperture, as well as a number of other subjective decisions, resulting in a background weathering rate multiples higher than the highest observed weathering rate found in the literature.

The "flux based" approach we provided does not suffer from this subjectivity: it is based on an actual observed magnesium concentration in leachate multiplied by a net infiltration rate gathered from reputable 3rd party sources. We make a simple assumption that this flux should be proportional to exchangeable Mg pools. This simple framework conforms to basic physical intuition: if the net infiltration rate goes to zero,

the background weathering goes to zero. If the exchangeable fraction goes to zero, the background weathering goes to zero. If the exchangeable fraction doubles (relative to the experimental conditions), the background weathering doubles.

The verifier's analysis contained a number of incorrect statements that speak to either lack of comprehension or even intent to select a method that gives a larger background weathering loss. Most relevant, however, was the verifier's specific comments regarding our approach (in blue below):

The final approach used to calculate counterfactual weathering is called "the flux approach" because it accounts for the flux of Mg in the porewater relative to the pool of exchangeable Mg (Mehlich 3 extraction) initially in the soil (Figure 1). This results in a leaching rate of 80 kg Mg/ha/yr, which aligns with more closely with the literature references. Puro initially accepted the eligibility of this approach on the basis that the resulting weathering rate is plausible in the context of literature values. The conceptual basis for the approach was not considered when determining eligibility.

As clarified by Puro, the role of the auditor as described in Rule 6.4.1(c) of the ERW Methodology is to provide an opinion on the eligibility of the quantification method, which may or may not result in a change to the approved quantification method. It is 350Solutions' opinion that the flux approach is not eligible for the reasons described below.

While we deeply respect Puro's dedication to rigor and accurate scientific methods, we believe that this exercise resulted in unreasonably high background weathering loss calculations - much higher than anything seen in nature or published in literature - based on misinterpretations of our core approaches and the rejection of an approach previously approved and determined to be eligible by Puro. Overall, we think Section 6.4.1(c) of the ERW Methodology for CO2 Removal was incorrectly interpreted and applied by the verifier, allowing for an approach already deemed eligible by Puro to suddenly be disallowed at the end of a verification. We think a clarification of the rule by Puro, acknowledging that the verifier is limited to verifying claims, not determining the eligibility of, or overruling Puro on, approaches already determined to be compliant with the methodology, would be an appropriate recourse to recover lost claims.

For these reasons, we believe the 1316 - 748 = **568 CORCs** should be reinstated.

CDR Quantification Summary:

Eion requests that the following CORCs be re-examined to be included in our project:

- Plant Uptake: 88.73
- Riverine Losses: 112.76
- Background Weathering: 568

Conclusions

Eion is proud to be the first to issue credits in ERW through Puro and we look forward to continued work in the field together. We included extensive detail in the grievance document to help provide context on the lengthy technical discussions we engaged in during the process, which the Puro team was not exposed to, that culminated in excessive losses deducted from our project. We thank you for your time and attention to this grievance, and we believe that your investment in examining it will be valuable to the ERW industry as a whole going forward.