



Responses to Methane Protocol Stakeholder Feedback received on June 8, 2023

**HIGH-LEVEL PROTOCOL OVERVIEW:** BCarbon's Methane Capture and Reclamation Protocol is rigorous, scientifically conservative, and scalable. Some key reasons why:

- We contract with **third-party verification and validation bodies (VVBs) both before and after plugging** to approve Developers' applications. BCarbon contracts the VVB directly then bills the developer at cost to **prevent any conflicts of interest**.
- We use several years of production history data to estimate the emissions profile, to better account for the **full variation in emissions** at a wellhead.
- We offer an alternative to the prescribed field tests (required by the only other well-plugging protocol on the market), which increase hazardous exposure of workers to the wellhead, **may themselves cause GHG emissions, and are likely more costly than BCarbon's testing requirement**.
- We allow Project Developers to know approximately how many credits they'll get before they conduct field tests, **rather than adding a barrier** by requiring they wait to assess their ROI until after costly field testing is completed.
- We require **full documentation of the project lifecycle** on the blockchain in the spirit of d-MRV, making the Developer's process and progress **transparent for auditors and validators**.

### **SPECIFIC RESPONSES to the comments from Thursday's meeting**

**Note:** Comments in *italics* were received in the chat during our full group zoom on June 8, 2023. Below each comment is our response, including citations to the Protocol itself.

*COMMENT: There is some additional rigor needed in this protocol.*

RESPONSE:

- This Protocol is already extremely rigorous from a scientific standpoint. However, upon a thorough review, we have added some slight clarifications designed to ensure that the language in our Protocol fully communicates its exact level of rigor.
- Our edits:
  - Section 3.1 item #2a – explicitly states that the Final Project Plan will include a Post-Plugging test confirming the well has been plugged. This was intended in our earlier draft but has been further emphasized.
  - Section 3.2, including item #6 – explicitly states that the third-party VVBs will validate both the Provisional and Final Project Plan; explicitly states that BCarbon and the VVB will review the Final Project Plan (including results of plugging and relevant regulatory approvals) before issuing credits to the Developer.

*COMMENT: For example, the leak estimation process. The Protocol mentions "sampling if necessary" and baseline emissions modeling. It uses a single pre-plugging test to confirm the presence of methane at the wellhead "in excess of 1,925 parts per billion."*

RESPONSE:



- This question references one significant difference between our Protocol and the only other well-capping protocol on the market: while the BCarbon Protocol utilizes several years of production history to estimate the emissions profile, the other protocol uses just two point-in-time field tests.
- The reason for our difference here boils down to *rigor and feasibility*.
  - *Rigor*: the two-point measurement likely cannot account for the full variation in emissions and does not ensure stabilized measurements. By contrast, the decline curve is both a generally accepted industry practice and is more conservative than the other protocol's flat-line extrapolation based on its two point-in-time field tests.
  - *Feasibility*: practically, the industry has a very limited number of specialists to carry out the other protocol's prescribed field tests. Performing these tests increases the hazardous exposures of workers to the wellhead, may itself cause GHG emissions, and is likely more costly than BCarbon's testing requirement. Also, under the other protocol, Project Developers cannot know how many credits they'll get until they conduct these more costly field tests, which is a significant hurdle to getting wells plugged.
- The pre-plugging test is not meant to substitute for rigorous assessment of the reservoir's contents. Rather, it is one of several layers of verification of the project's eligibility – a confirmation that methane is present and leaking.
  - See Section 4.1 item #4.

*COMMENT: You should have more specifics on equipment, calibration, and methodology.*

RESPONSE:

- As is the case for all BCarbon's Protocols, our MCR Protocol remains a performance standard rather than a list of prescriptive requirements.
- This is important because it allows and encourages innovation rather than restricting developers to a single set of fixed practices.
  - This has proven to be especially important as best practices, tools and technologies may change rapidly.
- This does not mean "anything goes": equipment must still be capable of conducting measurements in accordance with the requirements of the Protocol.
  - Moreover, the output of the Developer's process will be validated and reviewed by BCarbon and our third-party experts and must be found to meet our standards at all phases of review.
  - In the coming phase, BCarbon will continue to work closely with stakeholders and experts to develop these standards and share them with the group.

*COMMENT: Increase requirements stated on chain of custody/documentation of measurement (photos, etc.) for each well.*

RESPONSE:

- See comments above on the Protocol as a performance standard. The key here is that the necessary documentation must meet BCarbon's standards at all phases of review.
- In Section 4.1 item #3a, BCarbon's statement from the local regulatory agency (or statement of attestation from a certified engineer) takes into account requisite



documentation and ensures that the necessary reporting and verification criteria have been met by the applicant.

- In Section 5.10.4, we state that the full “lifecycle” of each project will be recorded on the blockchain. This includes results from field monitoring, measurements, and verifications.

*COMMENT: Other protocols include testing over minimum pre-plugging 30-day period with specified equipment, competency of methane emissions measurement specialist, and methodology. Calibration records and qualifications of specialist required. This temporal period in other protocols allows for variations in methane leaking (temperature and barometric pressure cause variations in methane readings) and ensures stabilized measurement (more accurate baseline). The measurement activity is documented for verification, which should be done.*

RESPONSE:

- Regarding the question of variations in leaking: BCarbon’s methodology uses a larger base of data than the two-point measurement methodology in the other protocol.
  - This means that we are more able to account for variance in leakage and conservatively allocate credits using industry-accepted practices.
- Regarding the documentation of measurement and methodology: in Section 5.10.4, we state that the full “lifecycle” of each project will be recorded on the blockchain, including results from field monitoring, measurements, and verifications.
  - We believe our d-MRV recording process differentiates our Protocol by making all the information described in this question more transparent to a third-party viewer for each project.
- Regarding the qualifications of our specialists: BCarbon will select expert validators to prevent conflicts of interest between applicants and reviewers. In accordance with our goals of transparency, we will publish our selection criteria on our website as well as discuss it in our stakeholder group to vet any concerns. BCarbon’s entire reputation rests on its ability to certify high integrity, high-quality credits. We have no motive to undermine our own credibility.

*COMMENT: The post-plugging test must read “at or below pre-plugging test.” This has substantially less rigor than protocols that require testing after plugging, with specified equipment and methodology. Under the ACR protocol, if emissions are detected, the well must be remediated until there are no emissions.*

RESPONSE:

- See Section 5.9.1 item #6 – we do in fact require that the post-plugging test is at or below the pre-plugging test.
- Regarding the specificity of methodology: we do not prescribe specific measurement techniques for the reasons detailed above explaining the Protocol as a performance standard. The test must meet the standards of BCarbon, our validators, and the relevant regulatory authorities.
- If emissions were still detected at the well, our policy is to not issue any credits unless a post-plugging test demonstrates emissions below the Protocol threshold (1,925 parts per billion). This is effectively the same requirement as ACR’s protocol.
  - We have added language to the protocol to explicitly clarify this policy – see Section 5.8.

*COMMENT: The Protocol does not include verification, even just a desk audit of project developer’s data. This is an integrity risk.*



RESPONSE:

- As in all of BCarbon's Protocols, we do in fact require verification and validation, as outlined in the following sections of the Protocol:
  - Section 3.2 – we require third-party validators, contracted by BCarbon, to review the Developer's Project Plan both before and after wells have been plugged to assess the (a) rigor and validity of their planned methods, and (b) the success of their efforts.
  - Section 4.2 – we require the well to have received approval from the local regulator that it has been appropriately plugged and decommissioned.
  - Section 5.10.2 – in the absence of plugging requirements set by local and state authorities, project developers must follow guidelines for verification of cement plugs as set by the American Petroleum Institute (API).
- Significantly, the Protocol is set up for a digital MRV framework – relevant information from field monitoring, emission factors, data refinements, verifications, and the complete profile of physical and environmental attributes of the Project will be available and permanently transparent.
  - This d-MRV framework allows for greater transparency and disclosure and allows third-party audits to occur even beyond the timeline outlined in our Protocol.
- We have added further language clarifying that third-party validation and verification is required both pre- and post-plugging under our Protocol (see pages 8 and 9). This was always embedded in the Protocol language, but the comment has prompted us to further clarify our validation and verification requirement.

We appreciate all comments from our stakeholder group and strive to incorporate responses to every bit of feedback that we receive to the group's full satisfaction. For further information about these comments and our responses, please contact

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