Submitted electronically Aug 30th, 2018

Clerk of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814
https://www.arb.ca.gov/lispub/comm/bclist.php

Re: Second 15-day comments on Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard

Dear Clerk of the Board,

Clean Air Task Force (CATF) and the Natural Resources Defense Council (NRDC) appreciate the opportunity to provide comments to the California Air Resources Board (ARB) on the proposed amendments to the Low Carbon Fuel Standard (LCFS) regulation, specifically Attachment B: Proposed Second 15-day Modifications to the Carbon Capture and Sequestration Protocol (Protocol) under the Low Carbon Fuel Standard.

Introduction

We commend ARB for making some important improvements to the Protocol in the 15-day Modifications released Aug. 13, 2018, following the 15-day comment period on the June 20, 2018 15-day Modifications. We believe that these strengthen the Protocol and afford a greater degree of oversight and environmental protection. We point out a few modifications that require further consideration or edits below.

The present comments do not cover the topic of post-injection monitoring, on which we are submitting separate comments.

Recommendations

A.2(a)(85)
We support the recent changes to the definition of "plume stabilization," which allow for predictive deterministic approaches to assess the risk of leakage in a 100-year timeframe. However, the terms "small" and "predictable" are subjective and not precisely defined. In addition, the definition should be focused on atmospheric leakage, not migration, out of a defined storage complex.

We recommend the following changes:

> "[...] pressure changes are sufficiently small and predictable, such that the measured rate of plume migration has a high certainty of no atmospheric CO_2 leakage over a 100-year period."

A.2(a)(107)(A)(2)
We recommend that ARB revise the definition of "storage complex" at (2) to read:

> "The storage complex must encompass the volume within which the plume is predicted to migrate."

B.2.2(e)

We continue to oppose the de-facto assumption of leakage at half the detection limit of the method(s) used to detect leaks as arbitrary, unfounded and redundant to Buffer Account contributions. If ARB continues to include such an assumption, we recommend consistency with 4.3.2(c)(2) which means setting the assumption of leakage at 5% of the detection limit of the method deployed. We also note that the provision, which appears additive, may penalize good behavior and redundancy by disincentivizing operators from deploying more detection methods.

B.3(c)(2)

The phrasing "[...] sequestered and subsequently credited" implies that CO_2 must remain sequestered for 100 years before any credits associated with the injection can be issued. As we understand it, the structure of the Protocol allows for credits to be issued once CO_2 has been injected.

C.1.1.1(e) and C.1.1.1(f)

We recommend that ARB revise the professional credentials to read:

> "[...] or equivalent qualified professional ~~geologist/engineer~~ from California or another jurisdiction that is approved by the Executive Officer."

This change will avoid precluding highly qualified individuals with related credentials (e.g. petroleum engineers) from fulfilling the role.

C.1.1.3.2

We support ARB's modification providing a choice between quarterly and annual reporting, which allows for consistency with US EPA's Greenhouse Gas Reporting Program Subpart RR requirements (at 40 C.F.R. § 98 Subpart RR). Streamlining these requirements will allow operators to more efficiently compile and submit required operational and emissions data to ARB and USEPA. However, we recommend that ARB retain the right to request quarterly reporting if circumstances such as (suspected) leakage warrant it.

C.2.3.1(d)

We support the proposed language that would allow historical data to be submitted in lieu of the data required in the preceding subsections. In some EOR storage projects, for example, where long operating histories have led to the accumulation of detailed data and records characterizing the subsurface geology including confining sequences and reservoirs as well as other useful metrics such as injectivity and production, this could yield superior quality data.

C.2.3.1(f)

We support ARB's change from the terminology "confining layer" to "primary confining layer". However, we recommend that rock mechanical formation testing requirements should only apply where geologically appropriate, i.e. where there actually is an identifiable, representative primary confining layer. In carbonate or continental clastic sequences, a discrete confining layer may not exist such that it is possible to identify a representative sample zone for the purposes of coring and attendant rock mechanical tests.

Moreover, it is important to note that sidewall coring may be damaging to wells, may not be representative compared to full cores, and may not provide added value in demonstrating integrity of the confining sequence. The operator should be required to justify a choice of subsurface sampling locations for geomechanical testing. If geomechanical testing or obtaining a representative sample is not

possible, the operator should be required to provide other evidence of the confining system integrity and properties. Also, where robust information on the storage complex and its confining system is available, as is the case in some existing projects, an operator may be able to provide better information from existing historical data and testing.

C.3.3(b)

We support the revised structure but recommend streamlining requirements with the Underground Injection Control Program, Class VI (40 C.F.R. § 146.88(a)) to not exceed 90% of the fracture/parting pressure.

C.3.3(f) and C.3.4(a)(3)

It is unclear what the purpose of the suggested addition of the term "un-remedied" is here. ARB should clarify the meaning of this term and how it impacts what will happen in practice when an automatic shutdown or alarm is triggered.

C.4.3.2(c)(2)

Requiring "a detection threshold equal to, or better than, 5% the total volume of leaked CO_2" is problematic and not useful in devising a monitoring, measurement and verification plan, since the volume of leaked CO_2, if any, cannot be known in advance. From the standpoint of atmospheric emissions and LCFS program crediting integrity, an absolute detection threshold is more relevant than a relative one. ARB could set an absolute limit, but a prerequisite would be a technical review of current technical capabilities for leak detection. Alternatively, ARB could retain the 5% formulation here and instead base it on quantities predicted for leakage events considered in the project risk assessment.

C.4.3.2.2

Field investigations and monitoring trials described in peer-reviewed literature since the promulgation of the Federal UIC Class VI rule suggest that surface methods are unreliable due to variability in soil-gas concentrations as a result of seasonal changes, changes in nearby land use, climate change, and other reasons. Instead of mandating the use of these methods, we suggest that subsurface methods that can be shown to be equivalent or better to surface and near-surface methods be allowed in place of surface methods at the discretion of the Executive Officer if they can provide early warnings for injection well shutdown or CO_2 migration out of the storage complex before CO_2 can reach the atmosphere.

Various: replace "AoR" with "Storage Complex"

For consistency with the elimination of the term "Area of Review" in the document, there are several remaining locations in the document where "AoR" should be replaced with "storage complex." Please see the following locations: p. 55 C.2.3(a)8(D), C.2.3(a)8(E); p. 56 C.2.3(c)(2); p. 64 C.2.4(b)(1)(C); p. 70 C.2.4.3(a)(1)(A), C.2.4.3(a)(1)(B); p. 71 C.2.4.3(b)(1), C.2.4.3(b)(2), C.2.4.3(c); p. 73 C.2.4.3(d), C.2.4.3(e)(1); p. 80 C.2.5(c)(3); p. 130 C.7(d);and p. 135 C.9(b).

We encourage ARB staff to contact us for any clarification, and we continue to remain available to work with staff through the final stages of the Protocol.

We appreciate the opportunity ARB has provided for our review and recommendations on the second set of 15-day Protocol modifications.

Respectfully,

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