

RED TRAIL ENERGY, LLC

“Our Farms, Our Fuel, Our Future”

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April 23, 2018

Clerk of the Board
Air Resources Board
1001 I Street
Sacramento, CA 95814

To whom it may concern:

Subject: California Air Resources Board (ARB) Carbon Capture and Sequestration (CCS)
Protocol under the Low Carbon Fuel Standard (LCFS) [Proposed Amendment,
Appendix B]

We respectfully request that the subject CCS Protocol continue to be discussed with stakeholders before formal adoption at this time. Ethanol fuel production integrated with CCS can help California ARB meet its new 2030 goals for significantly reduced carbon intensity (CI). However, the economic incentive via credits needs to be substantially greater than the potential costs that could be incurred to obtain an approved pathway that includes CCS; this is not the case under the current version of the CCS protocol. The most concerning topics to Red Trail Energy, LLC, are detailed below, with assistance from the Energy & Environmental Research Center based on expertise and experiences in commercial-scale CCS implementation.

Duplication of Regulations

As currently written, the CCS Protocol goes beyond established requirements for pathway approvals and CI determination; i.e., approved fuels do not require such prescriptive and stringent oversight by California ARB. For example, an ethanol facility need only provide process data that satisfies the quantification methodology (QM) to generate credits. Existing regulations at the local, state, and federal levels have been shown to be sufficient and are not further monitored by California ARB to ensure compliance, especially outside of California. In addition, systems within the fuel's production that are nebulous or highly variable, such as farming practices for biomass feedstocks, simply require formulas for calculation of CO₂ reductions with 60%–70% of resulting values allowed. A similar approach could be adopted for CI determination of CCS systems, allowing existing state and federal regulations to govern CCS management.

Not only is the current CCS Protocol more stringent for CCS systems than other fuel production systems, it is also significantly more severe than established state and federal requirements and is in direct opposition to existing laws in some other states. The U.S. Environmental Protection Agency (EPA) has implemented Underground Injection Control (UIC) Class VI rules for dedicated storage; Class II rules apply to associated storage (e.g., enhanced oil recovery [EOR]). For an individual state to obtain primary enforcement authority or primacy, the application must provide evidence of developed programs at least as stringent as EPA's rules. Most states have Class II Primacy. North Dakota is the first state to have obtained Class VI Primacy (April 2018¹), and Wyoming applied in January 2018. Clarification should, therefore, be added to address how California ARB will work through these challenges for *out-of-state* CCS Project Operators. Example language: *Programmatic changes may be proposed by out-of-state CCS Project Operators seeking pathway approval that is mutually agreed upon by the Executive Officer with site-specific evidence that the proposed program is equally secure and environmentally protective.*

100-year Postinjection/Closure Monitoring

More than 50 years postinjection, which is the EPA Class VI statute, will likely be difficult to enforce, particularly for CCS projects located out-of-state. Unlike the forestry industry that requires regular maintenance to ensure growth and stability, geologically stored CO₂ showing stability (i.e., little or no movement) postinjection requires no maintenance, as pressures will moderate and stability will improve over time. In addition, CCS projects typically involve numerous surface and pore space landowners. Surface access for monitoring and pore space agreements that extend multiple generations may be difficult to acquire and/or may go beyond out-of-state statutes. Record keeping and data management may also be a challenge given the exponential advancement of technology over time. A project requirement of >100 years thus discourages rather than incentivizes projects, especially for fuel producers looking at markets that have the potential to change every few years.

Prescriptive Requirements

The detailed, prescriptive requirements and frequent use of the term “must” is excessive, as well as economically challenging and restrictive to technological advancements. Examples for surface and near-surface monitoring include requirements of atmospheric monitoring, annual vegetation surveys, grid methodology, and baseline comparisons of all data. Atmospheric and vegetative monitoring in addition to soil/vadose zone monitoring is redundant and, possibly, ineffective. Fugitive emissions that are not detected in the soil will be too small to detect in the atmosphere, especially on a windy day. Vegetation can be highly unstable, particularly in arid climates as precipitation and temperatures are widely variable from year to year. Climate cycles in general can cause natural variation in any near-surface monitoring results, causing baseline comparisons to be misleading, and isotopic analyses do not require baseline results for comparison. Alternatively, use of a “grid methodology” is required for soil gas monitoring but explicitly not defined, merely stating a basis on “site-specific factors.” The monitoring program as a whole could have this designation with desired metrics defined, such as basing frequency

¹ www.epa.gov/uic/primary-enforcement-authority-underground-injection-control-program.

and techniques on outcomes of the performed risk assessment as opposed to prescribed requirements and baseline results.

Another example is the acceptable storage complex attributes. The requirement of “at least one overlying dissipation zone” with secondary confining layer is not a technical necessity for storage security and may negate an otherwise technically viable CCS project. It may also economically prohibit a potential CCS project, as securing rights to additional pore space could result in more complex negotiations and doubling payments (at minimum) to pore space owners. Similar to previous statements, site-specific evidence of a secure storage complex could be designated instead with desired metrics further defined.

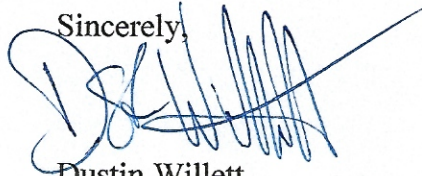
Inconsistent Definitions

Descriptions for key attributes of a potential CCS project are conflicting, such as area of review (AOR) for example, causing confusion and uncertainty regarding CCS Protocol requirements. The AOR is initially defined in the Definitions and Acronyms section as the *lateral extent* or surface footprint of the pressure front at depth in the storage complex, with pressure front defined (similar to the EPA definition) as a region where the pressure rise is sufficient to lift formation fluids from the sequestration zone due to CO₂ injection. Further on in the CCS Protocol (Section 2.4.1) the AOR is referred to as the *lateral and vertical migration* of the *free-phase and dissolved* CO₂ plume and pressure front, as well as *formation fluids*. Later in the Specific Purpose and Rationale section (Attachment 2), it is stated that the “extent of the *dissolved and free-phase* CO₂ plume and pressure front” must be tracked. The AOR is further defined in this section as encompassing the *three-dimensional (3-D) region* of the pressure front, as well as the region overlying the *free-phase (i.e., not dissolved)* CO₂ plume. All definitions (e.g., AOR, CO₂ plume, storage complex, etc.) should, therefore, be sufficiently detailed in the Definitions and Acronyms section, with revisions to the remaining document to ensure further explanation does not contradict the description.

We applaud California ARB for the substantial amount of work that went into developing the proposed CCS Protocol; it will make for a strong CCS program for the State of California. It is anticipated that California ARB will need help from out-of-state fuel producers to meet its new 2030 CI goals, which include ethanol integrated with CCS. CO₂ storage projects by nature are very site-specific, each with unique geology and infrastructure requirements for integration of CO₂ capture systems, whether a dedicated saline storage or EOR effort. Thus we recommend the CCS Protocol be more flexible to incentivize out-of-state fuel producers to participate in the LCFS program and implement CCS in a proven manner for secure CO₂ storage. At minimum, a section or language should be added that allows the California ARB to negotiate with out-of-state CCS Project Operators and related authorities to provide accounting and permanence reporting and verification that satisfies LCFS objectives, without violating other state and federal laws and primacy.

We look forward to continuing to work with California ARB further as the LCFS Program continues to develop pathways that include CCS. Please contact me with any questions at (701) 974-1105 or dustin@redtrailenergy.com.

Sincerely,

A handwritten signature in blue ink, appearing to read "Dustin Willett", with a long horizontal flourish extending to the right.

Dustin Willett
Chief Operating Officer
Red Trail Energy LLC