

# MACPHERSON

POWERING THE FUTURE

August 30, 2018

To: Clerk of the Board, California Air Resources Board (CARB)  
1001 I Street  
Sacramento, California 95814  
<http://www.arb.ca.gov.lispub/comm/bclist.php>

From: Macpherson Energy Corporation  
PO Box 5368  
Bakersfield, CA 93388-5368

RE: Comments to APPENDIX B: Proposed Second 15-day Modifications to the Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard

CARB and Staff,

Macpherson Energy Corporation (Macpherson) appreciates the efforts and time CARB and its consultants have put into the development of the proposed Carbon Capture and Sequestration (CCS) Program. The benefit of a CCS program is that it removes CO<sub>2</sub> from the environment thereby reducing California's CI. Macpherson's comments support a scientific approach to reducing California's Carbon Intensity (CI) by applying set standards and engineering practices to ensure safe CCS.

Macpherson recognizes that approving a CCS site requires multiple phases with numerous California and Federal governmental agencies, and engagement with the citizens of California. With this level of oversight a set regulatory path, based on science, must be implemented. Without a working regulatory process the developing and implementing a successful CCS project would be impossible.

In an effort to make CCS successful in California Macpherson provides three recommendations:

1. Replace the proposed CCS Protocol Appendix B 1. A(1) Applicability with the following:  
*"The Carbon Capture and Sequestration (CCS) Protocol applies to CCS projects that capture carbon dioxide (CO<sub>2</sub>) and sequester it onshore at subsurface geologic sites that include reliable sealing layers, appropriate geology, and good spatial location, such as those found in an exempted aquifer, a saline formation, or depleted oil and or gas reservoirs. The CCS Protocol applies to both existing and new CCS projects and existing CCS CO<sub>2</sub> projects, provided the projects meet the requirements for permanence pursuant to section C of this protocol."*
2. In many places "AOR" has been replaced by "storage complex" or "surface projection of the storage complex". However, "AOR" is still used in the document, but is no longer defined. Macpherson's recommendations are to redefine Storage complex to be consistent with the changes recommended above for A(1) Applicability, and add a definition for AOR.

**“Storage Complex”** means the three-dimensional subsurface volume that is characterized, modified by corrective actions, and monitored so sequestration under the Permanence Requirements (section C).

(A) *“The storage complex includes the injection zone (in which the CO<sub>2</sub> is emplaced), a sequestration volume, which is expected to contain the CO<sub>2</sub>, and overlying and possibly underlying geologic formations that are required to provide assurance of storage. The storage complex must include a multi layered confining system that retards vertical migration of CO<sub>2</sub>. The storage complex must extend laterally over (1) the volume from which CO<sub>2</sub> (as a free or dissolved phase) could escape from storage in the subsurface if a permeable pathway exists, and (2) the area over which the plume may migrate.”*

Add a definition for AOR:

**“Area of review (AOR)”** means the area encompassing the lateral extent of the storage complex.

3. Replace the current language in section 2.1 Minimum Site Selection Criteria with the following:

**2.1 Minimum Site Selection Criteria**

(5) *“Depending on the distance between the sequestration zone and basement rock, the Executive Officer may require the CCS Project Operator to identify and characterize additional dissipation interval(s) below the storage complex, or describe active reservoir pressure management procedures (e.g., brine extraction) or other techniques to reduce seismic potential, to limit the extent of downward overpressure propagation and lower the potential for induced seismicity within formations beneath the injection zone.”*

Macpherson believes its comments are consistent with CARB’s August 30, 2016 “Technical Discussion Series: Site Selection” work, and that these comments will:

- Improve the safety of a CCS project,
- Provide a scientific based regulatory managed pathway,
- Provide the flexibility necessary for a successful CCS project,
- Provide real CO<sub>2</sub> reductions, and
- Reduce California’s overall CI.

Sincerely,



Tim Lovley  
Macpherson Energy Corporation

CC: California Independent Producers Association