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August 30, 2018

Clerk of the Board

Air Resources Board

1001 I Street

Sacramento, CA 95814

Subject: Comments to the Comments to Proposed Second 15-Day Modifications to the Low Carbon Fuel Standard and the Carbon Capture and Sequestration Protocol Dated August 13, 2018

Dear Clerk of the Board:

Occidental Petroleum Corporation (“Occidental”) appreciates this opportunity to provide comments to the California Air Resources Board’s (“CARB”) proposed amendments to the Low Carbon Fuel Standard (“LCFS”) and the Proposed Second 15-day Modifications to the Carbon Capture and Sequestration Protocol (“Protocol”) dated August 13, 2018.

Occidental values and supports CARB’s leadership role in developing amendments to the LCFS and developing a protocol for carbon capture and sequestration. CARB staff has been active and engaged in working with stakeholders to craft language that will ensure that GHG reductions from CCS are real, permanent, quantifiable, verifiable, and enforceable. The LCFS revisions and Protocol will appropriately incentivize involvement and aid California in its pursuit of mid-century climate goals.

Occidental’s specific comments to several LCFS and Protocol provisions are attached. Given the complexity of the documents, it is a testament to the tremendous effort that the CARB staff has committed to the process that the remaining issues have been narrowed to those reflected in Attachment A. We hope these comments prove helpful, and we look forward to continued engagement with the CARB staff as we move into the implementation phase of the Protocol. Should you have any questions, I may be reached at (202) 857-3000.

Best regards,

Al Collins

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Sr. Director – Regulatory Affairs

Encl.: Attachment A

**Attachment A**

Comments to Proposed Second 15-Day Modifications to the Low Carbon Fuel Standard and the Carbon Capture and Sequestration Protocol Dated August 13, 2018

Our comments are organized as follows:

* A brief description or excerpt of the current proposed low carbon fuel standard (“LCFS”) or carbon capture and sequestration protocol (“Protocol”) is provided;
* An explanation of how we understand the California Air Resources Board intends for the proposed provision to be interpreted or implemented;
* We then offer, with few exceptions, a suggested revision to the proposed provision that we believe achieves CARB’s goals and ensures permanent sequestration of CO2 while increasing the likelihood that a CCS Project will be able to meet the LCFS and Protocol.

**Comments**

1. § 95489(c)(1)(A) of the LCFS defines an innovative method as:

“[C]rude production or transport using…2. Carbon capture and sequestration (CCS). Carbon capture must take place onsite at the crude oil production or transport facilities.”

Similarly, § 95490(a)(1) of the LCFS provides:

“The following entities are eligible to submit project applications and, if approved, receive CCS credits, in accordance with following [the Protocol]…(1)…oil and gas producers that capture CO2 on-site and geologically sequester CO2 either on-site or off-site.”

The requirement that CO2 be captured on-site, is unnecessarily limiting and may inadvertently increase the cost and carbon intensity of fuels produced using carbon CCS. For example, one technology that is available to sequester CO2 is enhanced oil recovery, or CO2-EOR. Occidental is studying and developing technology to capture anthropogenic CO2 from flue gases as well as reviewing the feasibility of direct air capture. The captured CO2 will then be used in EOR. Occidental believes that it will be in position to submit an application to CARB that meets the CCS Protocol under development no later than 2019.

In preparing for such an eventuality, Occidental has analyzed the breadth of sources and methodologies for capturing CO2. Sources of anthropogenic CO2 include entities operating in several industry sectors such as ethanol and bio-refining, refining, iron and steel, cement, hydrogen production, natural gas processing, pulp and paper and ammonia. In some cases, it will prove more economically for carbon capture equipment to be located at a stand-alone centralized location rather than on site at crude oil production or transport facilities. In addition, eliminating the requirement that the carbon capture takes place on site at crude oil production or transport facilities will enable entities to positon capture facilities so as to optimize operations and minimize carbon intensity. For example, an entity could choose to re-use an existing but unused industrial location, take advantage of existing utilities and right-of-ways, perhaps even available renewable energy sources, avoid changed land uses and reduce impacts to the existing land use.

In addition, state oil and gas laws in California, Texas, New Mexico and other states may not consider the erection of carbon capture facilities on the surface interest overlying a leasehold interest to be reasonably necessary to search, develop and produce minerals. In California, Texas and New Mexico, a mineral-interest owner or an oil and gas lease may use as much of the surface when, where, and in such ways as are *reasonably necessary* to search for, develop and produce minerals. Occidental believes that the use of the surface carbon capture is reasonable, but an option of locating carbon capture and sequestration facilities off-site is likely to prove more workable.

We suggest revising the language of § 95489(c)(1)(A) of the LCFS as follows:

“[C]rude production using…2. Carbon capture and sequestration (CCS). Carbon capture may take place either onsite or off-site at crude oil production or transport facilities.”

We suggest revising the language of § 95490(a)(1) of the LCFS as follows:

“The following entities are eligible to submit project applications and, if approved, receive CCS credits, in accordance with following [the Protocol]…(1)…oil and gas producers that capture ~~CO~~~~2~~ ~~on-site~~ and geologically sequester CO2 either on-site or off-site.”

1. § 95490(c)(1) of the LCFS provides:

“Unless otherwise noted, an application for CCS credits must comply with the following requirements: (1) An application must be filed jointly by an entity that captures CO2 and an entity that sequesters the resultant CO2, unless the same entity is responsible for CO2 capture and sequestration.”

A complete application package for CCS projects is crucial to ensure public confidence in a project and CARB’s review. In many cases, the same entity will capture and sequester the CO2 and, consequently, a single application will be submitted. In some cases, the entity capturing the CO2 will transfer the captured CO2 to a different entity that sequesters the CO2. In some of these cases, a joint application may be appropriate. In other cases, it may be preferable that the entities maintain an arms-length relationship, e.g., where an entity that captures the CO2 has contractual relationships with several entities that are sources of CO2 and there may be sensitivity to working with an entity that has access to competitive business information used to develop a joint application. In such cases, we suggest that it would be prudent for the LCFS language to be revised so the separate applications may be submitted by the entity that captures the CO2 and the entity that sequesters the CO2, with the Executive Officer’s approval.

We suggest revising the language of § 95490(c)(1) of the LCFS as follows:

“Unless otherwise noted, an application for CCS credits must comply with the following requirements: (1) Unless approved by the Executive Officer, ~~A~~ an application must be filed jointly by an entity that captures CO2 and an entity that sequesters the resultant CO2, unless the same entity is responsible for CO2 capture and sequestration.”

1. Section C.3.3(b) of the Protocol provides:

“The CCS Project Operator must ensure that injection pressure does not exceed 80 percent of the fracture/parting pressure of the sequestration zone…[t]he CCS Project Operator may propose an alternative injection pressure, provided the operator…(3) [r]eceives Executive Officer approval of the alternative pressure prior to injection.”

Occidental appreciates the revisions to this section of the Protocol that create a performance standard that allows an applicant to demonstrate an appropriate alternative injection pressure. Occidental also agrees that an Executive Officer approval process is appropriate before a CCS project generates credits. In the case of CO2-EOR project applications submitted pursuant to the Protocol, many will already be injecting at an alternative pressure and, as is the case with Occidental, may have 40 to 50 years of operating history to demonstrate its understanding of subsurface conditions including the frac/parting pressure. Executive Officer approval prior to generating credits is appropriate. However, if this provision were not revised, a narrow read of this requirement would preclude many CO2-EOR operations from meeting Protocol requirements simply because they are already in operation.

We suggest revising the language of section C.3.3(b) of the Protocol as follows:

“The CCS Project Operator must ensure that injection pressure does not exceed 80 percent of the fracture/parting pressure of the sequestration zone…[t]he CCS Project Operator may propose an alternative injection pressure, provided the operator…(3) [r]eceives Executive Officer approval of the alternative pressure ~~prior to injection~~.”

1. Section C.4.3.1.5(a) of the Protocol provides:

“CCS Project Operators must perform a pressure fall-off test of each well…[t]he CCS Project Operator may propose an alternative test method and/or schedule, provided the operator…(3) [r]eceives Executive Officer approval of the alternative test method and/or schedule prior to operation.”

As with Section C.3.3(b) of the Protocol, the revisions to this section create a performance standard that permits an applicant to demonstrate an appropriate alternative test method and/or schedule. Again, CO2-EOR project applicants will already be in operation. Executive Officer approval prior to generating credits is appropriate. However, if this provision were not revised, a narrow read of this requirement would preclude many CO2-EOR operations from meeting Protocol requirements simply because they are already in operation.

We suggest revising section C.4.3.1.5(a) of the Protocol as follows:

“CCS Project Operators must perform a pressure fall-off test of each well…[t]he CCS Project Operator may propose an alternative test method and/or schedule, provided the operator…(3) [r]eceives Executive Officer approval of the alternative test method and/or schedule ~~prior to operation~~.”

1. Section C.9.(c) of the Protocol provides:

“The CCS Project Operator must show proof that there is a binding agreement among relevant parties that drilling or extraction that penetrate the storage complex are prohibited to ensure public safety and the permanence of stored CO2.”

CO2-EOR takes place in active oil and gas fields and may occur in different formations that lie on top of each other at different depths. The mineral estate, sometimes called the working interest, at each depth may be owned by the same or different entities. Occidental can demonstrate that it has a legally enforceable right to exclude other parties from drilling into and extracting from its working interest. This right may not be reflected in the express language of a lease but is enforceable at law.

We understand this Protocol provision to cover drilling into and extraction from the storage complex by an entity other than the CCS Project Operator. We do not understand it to cover wells drilled through a storage complex that do not have perforations in the well bore such that fluids in the storage complex could be withdrawn or risk leakage – this would be trespass.

The working interest does not and cannot prevent an entity other than the CCS Project Operator from drilling through a formation that may include a storage complex to access another deeper resource or formation. Others may advance a well through the storage complex to reach a deeper mineral interest, to extract water, or to inject pursuant to the Safe Drinking Water Act (“SWDA”). In the case of oil and gas producing wells (Class II wells) or other injection wells, the SDWA requires states that have applied for primacy to demonstrate their standards are effective in preventing endangerment of US drinking water sources (“USDW”).[[1]](#footnote-2) The drilling tech niques that are used to protect USDW prevent the release of CO2 from a CO2-EOR project during the drilling and construction of wells.

We suggest revising Section C.9.(c) of the Protocol to clarify the intention of this provision:

“Upon injection completion, The CCS Project Operator must show proof that there is a binding agreement among relevant parties that drilling and ~~or~~ extraction wells that penetrate the storage complex are prohibited to ensure public safety and the permanence of stored CO2. Proof may be in the form of enforceable actions at law that permit a leaseholder to prevent others from accessing or trespassing on their leasehold or regulatory or other legal mechanisms that require wells that penetrate the confining layer above the sequestration zone to prevent unauthorized mixing or loss of fluids from the sequestration zone and confining layer.

1. EPA may grant primacy for all or part of a state’s UIC program. E.g.,Texas and New Mexico have primacy for UIC Class I through V wells, CA has primacy for Class II wells. [↑](#footnote-ref-2)