November 5, 2020

Rajinder Sahota
Division Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, CA 95812

Re: California Resources Corporation Comments on LCFS Workshop 10/14-15/2020

Dear Ms. Sahota,

California has once again asserted its World leadership position in reducing carbon emissions. By leveraging Federal tax credits under IRS 45Q (at no cost to the state), California's LCFS regulation along with Cap and Trade benefits can provide the best environment in the World for project success while reducing reliance on government grants or low-interest financing. As previously communicated, CRC's CalCapture project is approaching conclusion of front-end engineering design. A key next step is securing project financing. California's LCFS and Cap and Trade programs will be key components driving project appeal for investors. Future certainty and sensible treatment under these programs will be necessary to move forward with this significant emissions reduction, technology pioneering project within California's borders. Without swift CARB action to integrate the CCS Protocol into Cap and Trade and improve the LCFS regulations, CalCapture is **at risk of delays in implementation, economic benefits and the capture and sequestration of millions of tons of greenhouse gases**.

California Resources Corporation (CRC) is writing to provide feedback to the California Air Resources Board ("CARB") on the workshop held October 14 and 15, 2020 discussing potential revisions to the Low Carbon Fuel Standard (LCFS) regulation. Thank you for the opportunity to provide our input.

Specifically, we have suggestions and concerns regarding slides #42 - #44 and associated verbal comments presented by CARB staff on 10/14/20. We have organized our comments below as referenced to the specific presentation slides.

Slide #42: CCS as part of Innovative Crude Projects

Bullet #1: Staff is considering proposing more explicit eligibility criteria for CCS projects under the innovative crude provision.

a) *The current regulation states that "carbon capture must take place onsite at the crude oil production and transport facilities".*
b) *Considering revising eligibility to state "Carbon capture must take place on equipment supplying steam, heat, or electricity (behind the meter) to crude oil production or transport facilities. The credit will be prorated based on the fraction of steam, heat, or electricity supplied to the crude oil production or transport facilities. Projects using CCS are subject to the provisions of section 95490."*

Carbon Capture and Sequestration (CCS) is identified as one of the commercially ready strategies to provide near-term GHG emission reductions that are at-scale cost-effectively. As such, CRC believes that any changes made to the LCFS should expand credit generation opportunities. The LCFS provides a necessary financial incentive to implement carbon reduction projects, and changes which may limit the impact of the LCFS on project finances should be avoided. CRC is concerned that the reference to "behind the meter" is overly restrictive and will hinder the development of CCS projects which depend on LCFS credit generation. Regardless of how the energy is supplied to the transportation sector, even though the California electrical grid, decarbonization is still achieved.

Similarly, proration of credits disincentives large at-scale deployment of CCS and the associated reduction of carbon emissions. The current LCFS regulation does not have such requirements. If a project meets the criteria of being onsite and meeting the threshold emissions reduction in 95489 (c)(1)(E) it should be eligible, in its entirety, to generate credits in accordance with the CCS Protocol.

Slide #43: Miscellaneous Innovative Crude Changes

Bullet #1: Staff is considering to propose the following miscellaneous changes to the innovative crude provision:

b) Require the innovative crude credit to be prorated in those oil fields that produce both oil and gas for export

CARB's proposed changes to the existing regulation have impacts across numerous innovative crude pathways. Projects in all scenarios, except direct air capture, have a direct link to crude oil production and contribute to the reduced carbon emissions in the state accordingly. In California nearly all the gas produced is associated gas and a product of production of transportation fuels. Adding this additional complexity does not result in further decarbonization in California and would reduce the scale and likelihood of decarbonization projects. Once a project meets the existing requirements of the LCFS regulation it should be eligible to generate credits, in entirety, in accordance with the established regulations under which it was conceived, permitted, financed and constructed.

To clarify: Is CARB referring to the differentiation/proration of "dry" gas produced from a separate characterized "gas" reservoir within the field, or to associated gas? Associated, or solution, gas that is a component of oil at reservoir conditions is operationally integral with oil and natural gas liquids until ultimately sold at natural gas pipeline specifications or utilized in the oil field. Associated gas and the field processes inherent with it are intrinsically tied to oil production, and energy requirements should not be prorated. Nearly all the gas produced within California oilfields is associated gas and a byproduct of oil production.

Further, according to the EIA, California produces only 10% of its natural gas usage but over 25% of all natural gas consumed in the state is used to generate base-load, dispatchable electricity, some of which is either used directly for charging electric vehicles or to power refineries and oil production. Finally, some portion of the natural gas liquids produced are supplied as feedstock in refining.

Slide #44 Carbon Capture and Sequestration (CCS)

Bullet #1: CCS and Direct Air Capture (DAC) are critical to achieving our long term carbon neutrality goals.

CRC agrees with this statement, which is backed-up by several carbon neutrality studies. Conventional CCS from point sources will be needed prior to, and in conjunction with DAC to meet our climate objectives. Conventional CCS will be more impactful than DAC in the near to intermediate term based on technology maturity and demonstrated total cost of capture. The cost difference is driven by the simple physics of a DAC capture target of 400 ppm CO_2 concentration in the atmosphere versus a natural gas power plant point-source concentration 100 times or more greater at 4%-5%. CARB currently grants DAC favorable treatment over conventional CCS on emission sources. DAC is advantaged in that its LCFS credit eligibility has no direct linkage to transportation fuels, demonstration that the CO_2 captured is anthropogenic, or even a nexus with California. Whereas CCS projects such as capture on a power plant (even one located in and supplying California) must occur onsite and meet a threshold on emissions or a carbon intensity (CI) reduction to the transportation fuel which must then be sold in California. Like DAC, conventional point-source CCS targets in California such as power plants, steam methane reformers (SMR's), and ethanol plants, should also be more strongly incentivized under LCFS as they offer a much more impactful and immediate opportunity for significant emissions reductions in California.

Bullet #2: Staff is soliciting feedback on the following:

a) Implications of ZEV Executive Order on CCS and project eligibility

At the 10/14/20 workshop, CARB mentioned consideration of a future phase-out of LCFS credits for enhanced oil recovery projects given the recent Executive Order mandating sales of zero emission vehicles by 2035 and heavy-duty vehicles by 2045. All credible projections of future world crude oil demand, even during an aggressive energy transition, predict a strong world-wide reliance on petroleum for decades to come. Even with the Executive Order, considering vehicle turnover rates and other uses of petroleum in transportation (e.g., jet, rail) and uses in the broader economy (literally thousands of everyday products), this same base need for petroleum production use will also apply to California. Further, because California imports 75% of its crude and 90% of its natural gas from outside the state, **any potential phase-out of LCFS for petroleum production with CCS in California must be directly tied to actual crude utilization in the state** rather than politically driven idealistic forecasting. Petroleum production with CCS in California will utilize California's existing resources to produce crude with much lower carbon intensity than that of established foreign imports, without needlessly subsidizing regimes that do not hold California's world leading environmental, labor and human rights standards. CRC posits that the last barrel of crude utilized in the state should be produced in California using CCS.

b) Areas for additional clarity or potential changes to the CCS protocol

CRC has been actively working with CARB to apply the LCFS CCS protocols to our CalCapture project application. We believe that there are several issues within the protocol which serve to limit successful project permitting, finance and implementation. With the common end-goal of significant and cost-effective emissions reductions in California, CRC highlights the following issues in order of expected impact:

- Buffer account adjustment based on science and empirical data.
- Third party reviewer clarification and flexibility
- Corrective action for all wells within the surface projection of storage complex
- Mandatory Corrosion Monitoring – Alignment with CalGEM
- Wellbore integrity, cementing, and casing conditions – Alignment with CalGEM
- Injection pressures in alignment with UIC Permit
- 100-year Post Injection Site Closure Monitoring
- "Act of God" Provisions
- CO_2 Leakage assumed at ½ the Detection Limit of monitoring equipment
- Requirement for Continuous CO_2 Composition Monitoring
- Seismic monitoring requirements

CRC looks forward to continuing our close collaboration with CARB. CRC would welcome the opportunity to further discuss the LCFS protocol and partner with CARB in helping achieve our mutual goals.

Sincerely,

Kenneth Haney
CCS and EOR Manager
California Resources Corporation

cc: Richard Corey (Executive Officer)
Arpit Soni (Manager, Alternative Fuels Section)