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[Submitted Electronically]

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

Re: 2018 Low Carbon Fuel Standard Amendments

Dear Madam or Sir:

Chevron appreciates the opportunity to review and comment on the referenced proposed amendments.

Chevron is a major refiner and marketer of petroleum products in the state of California and a regulated party under the Low Carbon Fuel Standard (LCFS). We are a member of the Western States Petroleum Association (WSPA) and we support the comments submitted by WSPA in response to this proposed rulemaking. We are providing our separate comments below that highlight the issues of greatest importance to Chevron.

If you have any questions regarding our comments, please contact Don Gilstrap at (925) 842-8903 or [DGilstrap@chevron.com](mailto:DGilstrap@chevron.com).

Thank you for providing this opportunity for Chevron to comment on the proposal.

Kind Regards,

A handwritten signature in black ink, appearing to read "Nick Economides".

Nick Economides

## **Comments of Chevron**

### **Re-Adoption of the California Low Carbon Fuel Standard: Initial Statement of Reasons**

April 23, 2018

Chevron appreciates the opportunity to submit written comments for the record on the above proposed rulemaking. Chevron is a California-based company engaged in oil and gas exploration, petroleum refining and petroleum product marketing. We are a regulated party under the Low Carbon Fuel Standard (LCFS). We are a member of the Western States Petroleum Association (WSPA) and we support the comments submitted by WSPA in response to this proposed rulemaking.

Chevron has worked with CARB over the past several months on the proposed LCFS amendments and participated in the series of workshops held by staff on individual segments of the proposed changes. Chevron has provided feedback to CARB, through WSPA, throughout the rule development process. Finally, Chevron has met with staff individually, before and after the issuance of staff's Initial Statement of Reasons (ISOR) document, to outline our thoughts regarding the proposed revisions to the program. We appreciate staff's openness in receiving our input on the topics involved in this rulemaking and look forward to working with staff on additional refinement to the details of the proposed regulation in the coming months. We look forward to discussing our comments further with CARB staff.

#### **Compliance Benchmarks**

First and foremost, Chevron appreciates staff's recognition that the credit bank may become exhausted in the near term given the original reduction targets. The proposed smoothing of the curve will reduce the negative impact to the fuel market in the short term. However, while the reduced obligation through 2020 is an improvement, our analysis of potential compliance scenarios shows that a 7.5% target in 2020 remains a challenging goal as there is presently no readily achievable path to a 7.5% reduction for the industry.

We appreciate the open, constructive engagement that CARB has maintained with all stakeholders over the life of the LCFS, and that input is reflected in this proposal. We look forward to a continued dialogue with staff as we move forward, both in assessing near-term compliance pathways, as well as the feasibility of achieving the 20% target in 2030.

#### **Fuels Subject to the Regulation**

Chevron is very supportive of staff's proposal to allow credits to be generated for alternative jet fuel supplied in the state of California. Establishing additional sources of credits that are based on sound science and encourage innovation will benefit the program. We also concur with staff's

conclusion that allowing credits for alternative jet fuel will encourage investment in renewable diesel production facilities. This will not only spur growth, but may have some positive effect on the overall cost of the LCFS to the California transportation market.

The change staff has made to the point of obligation for alternative jet fuel from the initial proposal in 2017 is a significant improvement. Documenting delivery to the airport storage facility rather than to the aircraft itself will greatly simplify tracking and reporting without sacrificing accuracy.

We are not in favor of making propane a regulated fuel by default. Propane represents a very small segment of the transportation fuel market and its inclusion would not have a material effect on the goals of the LCFS. The proposed change makes an already complicated program more complicated by adding a new population of regulated parties who must now adapt their business models to address the cost and administrative burden of a new LCFS obligation. Credits should be available for renewable propane due to its lower CI, but participation in the program should be voluntary for producers as that would be far less disruptive to the market.

#### **Generating and Calculating Credits and Deficits**

Chevron objects to the proposed change to § 95486(a)(2), where staff intends to codify their current interpretation of the restrictions on corrections to reports for prior periods. Data corrections are a routine part of business and compliance reports should be no exception. Billing errors, paperwork corrections, or simple clerical errors can result in the need to correct compliance reports after the deadline. By prohibiting beneficial corrections to previously-submitted reports, CARB is discouraging accurate reporting and unfairly penalizing reporting entities by confiscating valuable credits with no due process. We do not see how this change advances the goals of the LCFS or improves CARB's confidence in reporting accuracy.

Chevron is not in favor of the proposed Buffer Account concept in § 95486(a)(3) as written. Placing credits, separated from regulated parties due to report corrections or over-performance for a fuel pathway, into an industry-wide account is inequitable to those responsible for the credit generation. A better approach is the "Reporting Entity Buffer Account" concept proposed by WSPA.

In § 95486(a)(1)(B), staff have added a provision whereby credits will not be issued if a credit generator has not fully reconciled the relevant transaction reporting with their business partners. Chevron fully supports and appreciates the formal report reconciliation process. It improves the accuracy of reporting and the overall stability of the program. However, the proposed provision is draconian in that there is no recourse provided for a reconciliation effort that goes beyond a quarterly reporting deadline. This provision would allow a reporting entity to avoid transferring

credits or accepting deficits by simply reporting an amount that is one gallon different from their business partner. In that situation, CARB proposes to simply invalidate all transfers of a given pathway between the two business partners, regardless of which party reported correctly. CARB's stated position is that the wronged party in this situation would have legal recourse to correct the situation outside of LCFS reporting. That is a cumbersome, costly and inefficient solution to what may be a minor disagreement. We urge staff to improve this provision by allowing partial transfers of credits and deficits to exclude only the difference between the reported volumes, establish a materiality threshold for reconciliation differences, and allow for prior-period corrections to be made once a reconciliation dispute is resolved.

### **Refinery Investment Credit Program**

Chevron appreciates the progress that has been made on the Refinery Investment Credit Program (RICP) in the proposed amendments. We support the change to the qualification date from permitted after January 1, 2016 to completed after that date. This recognizes the fact that considerable time can pass between permitting and completion and that a permit is not necessarily a guarantee that a project will be fully executed. Qualification for LCFS credits should occur upon achieving a decisive element in a permitted project, that is, full completion.

We are concerned about the GHG reduction thresholds proposed in the amendments. A 1% threshold can be achievable for a small-scale refinery executing a project that reduces GHGs, but this will be a much higher threshold for large refineries. We believe that the choice between an absolute threshold and a lower percentage threshold will be more equitable. We concur with the WSPA proposal to set the threshold at 10,000 MT CO<sub>2</sub>e per year or 0.5% of pre-project refinery-wide emissions, whichever is lower.

We support the inclusion of a process-improvement project category under § 95489 to qualify for RICP credits. Just as innovative technologies like solar electricity and renewable process fuels reduce GHG emissions, so can any non-routine project that also reduces the emissions associated with producing fuel and should be recognized on equal terms. Given that the carbon intensity values for CARBOB and diesel fuel are fixed, this is the most direct way for a refinery to contribute to reducing emissions related to those petroleum products.

### **Carbon Capture and Sequestration (CCS)**

Chevron is supportive of the use of CCS projects to reduce the carbon intensity of fuel pathways and generate innovative crude and refinery investment credits. However, the proposed CCS protocol is not in a useable form. Adopting the protocol as part of this rulemaking will not benefit the program and CARB should defer it to a later date and continue to work with stakeholders to refine the protocol.

Certain provisions of CARB's March 6, 2017 draft CCS regulations are likely to hinder CCS project development in California, thus substantially reducing the state's prospects for achieving its climate goals at an economic and environmental cost acceptable to its residents. Our concerns are detailed below.

100-year Post Injection Site Care (PISC) - CARB's selection of a 100-year PISC period for CCS project "permanence" has no basis in jurisdictional precedence or geologic / engineering reality. CARB attributes the 100-year term to the Intergovernmental Panel on Climate Change's (IPCC's) "Special Report on Land Use, Land-Use Change, and Forestry (SR-LULUCF). However, the SR-LULUCF does not establish nor recommend 100 years as an appropriate period to qualify for permanence. Instead, it simply used this number as a convenience-in-graphing exercise to show examples of net land use sequestration with reversals on a common GWP basis ("ton-year" concept). Also, the offsets court decision did not define permanence for forestry projects as 100 years, much less create a rationale to do so for CCS<sup>1</sup>. CCS and forestry are not similar sequestration methods by any criteria<sup>2</sup>. If CARB's intent is to seek guidance from IPCC authority in this case, then it should consider the specific findings of the IPCC "Special Report on CCS" (SR-CCS) publication (which was not used to approach the permanence issue).

Monitoring methodology during the PISC - The type of monitoring specified for the bulk of the 100-year period, soil and atmospheric gas analyses, is increasingly recognized by research and in the field as prone to near-surface complexities and subject to misinterpretation of "attribution."<sup>3</sup> Although such monitoring is not particularly expensive, a risk-based monitoring program conducted over a shorter PISC period would give CARB a much better understanding of the system's future containment performance.

Plume Stability – CARB considers plume stability to be achieved when injected or displaced fluids no longer have the potential to migrate above the storage complex (defined as the reservoir and two overlying confinement layers with an intervening, porous dissipation layer). Whereas this is a functional definition (note comment below on confining system requirements), CARB is proposing that monitoring wells be left open until plume stability is established. This is problematic from two standpoints: 1) wells left idle for extended periods of time in and of themselves comprise an integrity risk and 2) sensing (e.g., pressure) at the well locations may not reflect the actual status of the plume, particularly at distal extents of the Area of Review (AoR). Placing wells early in the injection phase at such distal locations would mean that wells may be

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<sup>1</sup> See Statement of Decision, *Our Children's Earth Found. v. State Air Resources Board*, Case No. CGC-12-519554 (Jan. 25, 2013); see also *Our Children's Earth Found. v. State Air Resources Board*, 234 Cal. App. 4th 870 (2015)

<sup>2</sup> [https://www.arb.ca.gov/fuels/lcfs/workshops/12042017\\_coalition.pdf](https://www.arb.ca.gov/fuels/lcfs/workshops/12042017_coalition.pdf), p. 29-32

<sup>3</sup> <https://www.sciencedirect.com/science/article/pii/S1750583615001929>

idle for an extended period before receiving a useful signal. A more useful solution would be to give the operator the option of conducting imaging surveys and / or drilling new wells around the time of injection cessation based on the best understanding of plume status at the time. This would allow the operator to plug unnecessary wells and obviate the need for lower value, long-term monitoring (i.e., 100-year PISC).

Confinement System – CARB has recognized that CCS must be treated in a site-specific manner. However, the QM’s confining layer requirement does not meet this criterion. CARB is proposing requiring two sets of confining layers to ensure containment of injected CO<sub>2</sub> or displaced fluids. In addition, there are specific geomechanical testing criteria, notably for ductility (inverse of brittleness), that are favored. All things being equal, two seals are better than one but given the complexity of geologic systems, confinement should be considered holistically rather than relying on a numerical treatment of rock layers and their specific physical properties. For example, a seal rock that is considered “brittle” might be expected to propagate fractures further and for these fractures to remain open. However, it may, under various tectonically- favorable stress regimes, behave differently. Widely used mechanical earth models (MEMs) consider rock properties and multi-scale stresses to more reliably predict containment performance during injection. Requiring multiple confining layers that are ductile will limit consideration of suitable geologic storage venues (particularly older, deeper shales and other common lithologies of all ages such as marls and carbonates).

Assumption of Leakage Rates based on Monitoring Instrumentation Detection Limits – The QM includes the assumption that CO<sub>2</sub> has leaked at a rate of half the sensitivity of leakage detection equipment and then reduces the amount of CO<sub>2</sub> sequestered by this amount. It is inappropriate to assume leakage rates are a function of the sensitivity limits of measuring equipment. Some modern instrumentation has low enough detection limits to where the actual signal is well below the natural noise level. A more viable approach is to set appropriate detection limits relative to anticipated or determined noise level and follow a procedure to conduct further analysis to establish attribution for clear anomalies.

EOR – Since the risk profile of CO<sub>2</sub> EOR / storage is distinct due to the well-understood geologic model for EOR reservoir dynamics (most notably inherent pressure control and limited AoR), it should be treated differently from saline storage. The focus for EOR should be on wells and the potential for “leakage” via cross lease migration and subsequent production (essentially an accounting exercise).

### **Invalidation of credits**

Some provisions in the proposed Protocol contemplate an invalidation of *all* credits generated upon specific occurrences, or do not rule out such a possibility. For example:

- If a well loses mechanical integrity and injection does not immediately cease.<sup>4</sup>
- Section C.7.3, which states that “financial responsibility instrument(s) must be sufficient to address the potential endangerment of public health and the environment via atmospheric leakage.”

Such an approach does not recognize the accrued benefits to the atmosphere from preventing a CO<sub>2</sub> emission in the first place and keeping it sequestered for a certain period of time, and goes against CARB’s own stated justification for using a 100-year period as the definition for permanence, which identifies a partial atmospheric benefit over shorter periods as well.<sup>5</sup>

In cases where CO<sub>2</sub> has been verified to have remained sequestered for a given period in accordance to the requirements set forth in the Protocol (i.e. absent any error, fraud or other occurrence of non-compliance that was not dealt with according to the provisions of the Protocol), CARB should recognize the atmospheric benefit of sequestration periods shorter than 100 years by applying an up-to-date calculation.

For example, as a current best practice, a time-adjusted warming potential<sup>6</sup> can be calculated for a project that injects 1MtCO<sub>2</sub>/yr for 30 years and (1) retains all injected CO<sub>2</sub> permanently or (2) emits the entirety of the injected CO<sub>2</sub> 70 years after injection begins.<sup>7</sup> In the former case of no release, the time-corrected CO<sub>2</sub>e would be -26.6Mt over an analytical time horizon of 100 years. In the latter case of the total release, the time-corrected CO<sub>2</sub>e over a 100yr analytical time horizon would be -14.9Mt. Hence, with a total release at 70yrs, the emissions/credit liability for the project should be capped at the difference of the two, i.e. 11.7MtCO<sub>2</sub>e. Such a release scenario is not possible, but we present it for illustrative purposes.

### **Unintentional CO<sub>2</sub> leakage**

Section B.3(d)(1), provides:

“All CCS projects must contribute a percentage of LCFS credits to the Buffer Account at the time of LCFS credit issuance by CARB. The CCS project’s contribution to the Buffer Account is determined by a project-specific risk rating method, outlined in Appendix G. If CO<sub>2</sub> leakage unintentionally occurs at a CCS project, LCFS credits from the Buffer Account will be retired according to the provisions for invalidation in the LCFS.”

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<sup>4</sup> ATTACHMENT 1: CCS Protocol – C: Permanence Page 77/175.

<sup>5</sup> Reference to IPCC guidance, ATTACHMENT 2: CCS Protocol Specific Purpose and Rational Page 170/175.

<sup>6</sup> As described by [Kendall, 2012](#), and using the author’s [provided calculator](#).

<sup>7</sup> Entering -1 in the calculator for years 0-29, and then entering either 0 or 30 for year 70.

In the course of continuous operations, CCS Projects may have unintentional CO<sub>2</sub> leakage from various sources. This leakage is accounted for under section C.2.2 and no LCFS credits generated for CO<sub>2</sub> that is not sequestered: fugitive or emissions from the subsurface to the atmosphere are reported under their own terms and no credits are issued for those quantities. The above language creates some ambiguity as to when and under what circumstances LCFS credits should be invalidated. Presumably, LCFS credits may be invalidated only where the CO<sub>2</sub> leakage exceeds the CO<sub>2</sub> sequestered in a given reporting period.

We offer the following proposed alternative language:

“All CCS projects must contribute a percentage of LCFS credits to the Buffer Account at the time of LCFS credit issuance by CARB. The CCS project’s contribution to the Buffer Account is determined by a project-specific risk rating method, outlined in Appendix G.

If CO<sub>2</sub> leakage unintentionally occurs at a CCS project, and the leakage exceeds the quantity of CO<sub>2</sub> stored by a CCS Project in a given reporting period, LCFS credits from the Buffer Account will be retired according to the provisions for invalidation in the LCFS.”

We further clarify that the suggested language is not intended in any way to interfere with operational requirements (relating to the cessation of injection or otherwise) for wells where leakage is detected or loss of mechanical integrity suspected.

### **Innovative Crude Production and OPGEE Updates**

In § 95488.8(i), staff proposes a method whereby a pathway applicant may use book-and-claim accounting to allocate low-CI electricity production to their electricity or hydrogen pathway, provided certain conditions are met. We propose a similar provision would benefit the program under § 95489(c), Credits for Producing Crudes using Innovative Methods. The program currently allows crude production facilities to generate credits for renewable electricity produced and consumed by the facility. In some circumstances, it may make operational sense to direct renewable electricity produced on site to the grid and consume electricity from the grid. Chevron proposes that CARB incorporate the book-and-claim accounting option for renewable electricity in the rules for innovative crude credits.

As with refinery investment credit projects, we believe there are several additional technology and efficiency options that should be added to the innovative crude section, including:

- Improvements in efficiency, including process efficiency (using advanced control systems, digitalization, etc.), power generation efficiency, and equipment energy efficiency (through facility upgrades/retrofits and use of new technologies)



- Improvements in reservoir management that lead to reductions in steam-to-oil ratios or EOR intensity, resulting in energy and GHG savings
- Credit for solar PV exports to the grid to offset own-use power at night
- Eligibility for all renewable energy produced and used on a monthly average basis for innovative LCFS credits, including offsite contracted electricity, consistent with EV and hydrogen pathways (with same requirements for tracking)

In § 95489(c)(1)(F), we believe two additional categories should be added to represent steam quality of 45-55%, and below 45%. Some fields, driven by reservoir characteristics, operate at low steam quality and fit into those categories. Such fields should also be eligible for credits for using solar steam.

The difference between solar steam and solar heat is not entirely clear in the regulation as written. It would be helpful to add clarity around the difference between the two.

Finally, as we have discussed with staff, we recommend three changes to certain default OPGEE parameters for SJV Heavy Crudes:

- Reservoir Pressure: all values should be less than 100 psia
- Wellhead Pressure: use 100 psia instead of 1000 psia
- Steam Quality: actual values range between 50-70%; CARB currently assumes 80%

We have had productive conversations with staff on these and other OPGEE inputs and look forward to continuing that dialogue. We believe that there are improvements that can be made between now and the final version to be approved in September.

### **Validation & Verification**

Chevron fully supports the addition of validation and verification procedures to the LCFS. There is widespread concern over the potential for invalid credits and, given the limited ability of a downstream buyer to protect against a “buyer beware” policy regarding such credits, these requirements will provide some protection. There should be a more explicit release of downstream buyers from liability or penalties as part of the program. With a robust verification program, it is difficult to see what further due diligence a fuel or credit buyer can do to ensure that credits are valid.

Structurally, we are pleased to see significant overlap between the LCFS verification requirements and those of the EPA’s QAP audit requirements. Any potential for synergy between the two programs will be extremely valuable to both credit generators and reporting parties. Given the number of regulatory programs at the state and federal level that affect these same fuels and require some form of attestation or verification audits, any duplication of effort quickly becomes very expensive.

There are some areas that could use some added clarity. Review and approval of audit plans require very clear guidance from CARB. As was said by potential verifiers in the workshops on this topic, clear guidance will lead to consistent quality while guidelines that are open to interpretation may lead to a “lowest common denominator” approach. Consistent quality is critical in this area to ensure both the health of the program and a level playing field between regulated parties.

We also believe that the specified-source feedstock guidelines could use additional clarity or optionality. Separate aggregator verifications would enable producers to simplify their feedstock verifications and enable aggregators to better market feedstocks to a variety of producers.

A specific element we object to is the firm rotation requirement. We do not believe this is necessary and have found the requirement to be disruptive under the MRR verification program, without adding accuracy or information security. With a limited pool of verification firms, it has been challenging to select firms, even on a six-year rotation. Participation in audit engagements by CARB staff will enable staff to “audit the auditors” without any specific mandate to rotate firms. It is worth noting that major corporations retain the same accounting firms for many years to conduct required audits of their financial statements, an area with far greater risk and exposure than the MRR or LCFS.

### **Recordkeeping**

CARB is proposing to increase record retention requirements from five years to ten years. This change contrasts with other regulatory programs and has no apparent purpose. We fear that it would be a burdensome new requirement to the regulated community with no clear benefit. CARB should retain the current five-year term.