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May 10, 2024

Rajinder Sahota
Deputy Executive Officer – Climate Change and
Research
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Comments submitted electronically

RE: Comments Relate to April 10th Low Carbon Fuel Standard Workshop

Dear Ms. Sahota,

Air Products is pleased to provide comments in support of the California Air Resources Board (CARB) rulemaking for the Low Carbon Fuel Standard (LCFS). We are very appreciative that CARB has recognized the substantial role that hydrogen will play to decarbonize transportation, and we believe that this role can be further strengthened in the 15-day amendment package. The refinements we suggest will help better position California for the rapid ramp-up of hydrogen that is needed to deliver on the state's climate ambition as underscored in the 2022 Scoping Plan Update the Board approved.

Summary: Key Areas of Support and Improvement

The following is a brief summary of the key improvements we suggested in our prior 45-day package comment later. The remainder of this letter will focus on more substantive improvements that are needed to strengthen the program, including discussion of issues raised at the April 10th workshop.

- Air Products supports adopting and implementing the amendment package as soon as possible with an effective date for any stringency improvements in 2024 via pro-ration.
- We support the most ambitious carbon intensity (CI) reduction targets feasible and a robust stepdown of at least 9% prorated for 2024 to send a strong signal to the market once the rule is effective.
- We support retaining the proposed rate of annual reductions in CI with the enhanced 2025 stepdown (i.e., a 9% stepdown in CI in 2025 should be propagated through the year-by-year stringency translating into a 2030 CI reduction target of 34%)
- We support the inclusion of the Auto-Acceleration Mechanism but believe the assessment should start in 2026 based on 2025 data to provide for a timely assessment of whether the increased stringency and associated stepdown are sufficient.
- We strongly support the inclusion of a technology-neutral, CI-based, book-and-claim approach for hydrogen. However, we suggest that it be applied to all transportation fuels consumed in California, regardless of where they are produced, and consistent with standard treatment of fuels under the LCFS program.

- We appreciate the extension of low-CI electricity book-and-claim to include process energy demand for the full hydrogen fuel value chain. However, we believe eligibility for all transportation in the current regulation should be maintained and the resource-shuffling and time-matching requirements should apply equally to both hydrogen and electricity.
- We support the additional time provided to hydrogen for the beneficial use of biomethane and suggest that there not be a sunset for avoided methane to the extent biomethane is used to produce fuels that are used by zero emission vehicles (e.g., renewable hydrogen used in fuel cell vehicles).
- We applaud the proposed extension of Hydrogen Refueling Infrastructure (HRI) crediting to medium and heavy-duty vehicles, along with additional time for light-duty vehicle stations and look forward to working on language with CARB to accommodate refueling stations that serve all vehicle types.
- We appreciate and strongly support the inclusion of a Tier 1 Simplified Calculator for hydrogen, as well as clarification that hydrogen plants that are not co-located with refineries are eligible under the project-based crediting provisions.

Program Stringency

We urge CARB to be as ambitious as possible in setting the new carbon intensity reduction targets between now and 2045 and align targets with levels no less than what is needed to achieve California’s greenhouse gas targets and outcomes established in the 2022 Scoping Plan Update. CARB should be confident in setting ambitious standards, given that existing, robust cost-containment provisions in the regulation provide regulated party protection. As discussed in the 2022 Scoping Plan Update, a statewide carbon reduction target of 48% below 1990 levels by 2030, as well as carbon neutrality by 2045, create decarbonization targets that need to be supported by enhancing the stringency of the LCFS program. The transportation sector and fuel production pathways are the largest component of statewide greenhouse gas emissions, accounting for about half of the state’s climate footprint and an even greater portion of emissions that contribute to ozone and particulate matter adversely impacting the health of millions of Californians, but particularly those located in our most vulnerable communities. As such, the LCFS needs to provide, at a minimum, a proportional amount of the reductions toward the 48% reduction target.

Based on the most recently published (Q3 2023) banked credit balance of over 20 million metric tonnes (MMTs) and the current rate of growth suggesting that the bank balance will easily be between 25 MMT and 30 MMTs by 2025, a step-down of at least 9% is necessary and feasible. On slide 47 of the April 10th workshop presentation, CARB estimated a bank drawdown of 27 MMTs (cumulative between 2024-2046) with a 9% stepdown and 30% CI reduction target in 2030. This suggests that the cumulative bank drawdown over the long-term is well matched to the anticipated 2025 bank balance. Based on the historical rate of innovation in the production of progressively low-CI fuels, the projections likely understate the rate of innovation providing the program maintains clear and ambitious targets. We also request that a prorated stepdown occur for the partial year of 2024, as soon as the rule is effective, to send the right signal to the market as early as possible.

We support CARB’s proposed AAM, but request that the implementation be set one year earlier than proposed to allow faster acceleration of the targets – providing increased stringency to the program if

the 2025 stepdown fails to bring the program back in balance. The signal to the market has been diminished based on substantial overcompliance for many years and based on the current and growing cumulative credit bank balance, we foresee this trend continuing unless CARB sets an ambitious CI reduction target. To facilitate the most flexible and effective AAM, we request that CARB change the reference year in 95484 (b) from 2027 to 2026 and reference years in 95484 (c), (d), (e), and (f) from 2028 to 2027.

Hydrogen Book-and-Claim Provisions

Air Products appreciates CARB's willingness to provide a 'book-and-claim' accounting approach for low-CI hydrogen, and we strongly support the provision's focus on a technology-neutral, CI-focused metric to establish eligibility for low-CI hydrogen. Focusing on CI is consistent with CARB's longstanding approach under the LCFS and the definition of clean hydrogen set in the Inflation Reduction Act (IRA). A robust book-and-claim system for hydrogen will ensure that the low-carbon attributes of a hydrogen pathway are retained and applied to end-uses where the most environmental benefit can be derived. This sends the necessary long-term signal for low-carbon hydrogen to play a meaningful role in decarbonizing transportation. CARB's design of such a system will serve as a model to other jurisdictions considering or implementing an LCFS program.

To that end, one key improvement needed is to eliminate the requirement that eligible hydrogen must be supplied to California in a dedicated pipeline as proposed in §95488.8(i)(3)(A). This requirement places an unnecessary constraint on a nascent market and will stifle investments at a time when massive capital outlays are needed to bring low-carbon hydrogen to scale. There are no dedicated interstate hydrogen pipelines to California. As such, this requirement favours only in-state hydrogen pipelines and fails to recognize the value of using hydrogen as a feedstock to renewable fuels produced out of state and imported for use in California. These fuels are actively contributing to decarbonizing California's transportation fuel mix and will become more important as sustainable aviation fuel is further incented in the regulation and through other policies. A specific geographic limitation directing that the hydrogen be supplied to California would make a wide array of hydrogen fuel supplies supporting low carbon transportation fuels for California ineligible, consequently lowering the incentive for producing low-CI hydrogen for California fuels and forgoing related emission reductions. We request that CARB modify §95488.8(i)(3)(A) as follows:

"Low-CI hydrogen is injected into a dedicated hydrogen pipeline physically connected to California a distribution system or a production facility that provides transportation fuel to California."

§95488.8 (i)(3) also limits the use of a low-CI hydrogen book-and-claim approach to hydrogen used directly as a transportation fuel and hydrogen that is used to produce alternative fuels. As long as hydrogen is still an eligible feedstock for project-based crediting in §95489, low-CI hydrogen book-and-claim should be available to all transportation fuels consumed in California, including conventional fuels. We request CARB make this improvement to enable more emission reductions across a broader array of transportation fuels and further spur investment in low-CI hydrogen. We recommend modified language in §95488.8(i)(3) as follows:

"Book-and-Claim Accounting for Pipeline-Injected low-CI Hydrogen Used in FCV and Alternative Transportation Fuel Production. Indirect accounting may be used for low-CI

hydrogen used in FCVs or to produce ~~alternative~~ transportation fuel for transportation purposes provided the conditions set forth below are met:....”

Low-CI Electricity Book-and-Claim Provisions

Air Products strongly supports CARB’s proposal in §95488.8(i)(1) to extend the existing book and claim accounting approach for low-CI electricity to include the process energy associated with other components used to process and distribute hydrogen, like liquefaction and compression. By looking beyond just the production of feedstock hydrogen, this proposal will enable greater carbon reduction ambition in California policies. Extending book-and-claim provisions to process energy will not only incentivize bringing more renewable production on-line but will also enable hydrogen to further lower its CI and help California decarbonize cars, trucks, buses, and other combustion-dependent equipment.

Because hydrogen is an important feedstock in the manufacture of either renewable biofuels or conventional transportation fuels (under the project-based crediting provisions), and the expectation that these fuels will be used for decades, as indicated in the presentation at the workshop, CARB should encourage all emission reductions possible in all fuels used for transportation in California. Furthermore, alternative fuels have a global supply chain that serves the California market. Hydrogen will also be served by the global market, and a wider signal to the low-carbon hydrogen market will further lower emissions, serve California’s transportation energy needs and provide leadership to other jurisdictions. We request retention of the end-use flexibility provided in the current regulation by modifying the following provisions as indicated:

Modify proposed provision 95488.1 (i)(1): *as follows:*

“... for hydrogen production ~~through electrolysis~~ and processing for transportation purposes (including hydrogen that is used in the production of ~~as~~ a transportation fuel), or for direct air capture projects, provided the conditions set forth below are met:....”

Modify proposed provision 95488.8 (i)(1)(C) as follows:

“For direct air capture projects or for hydrogen used as a transportation fuel (including hydrogen that is used in the production of a transportation fuel), low-CI electricity must meet the following criteria: ...”

Hydrogen Refueling Infrastructure (HRI) Credits

Air Products strongly supports the expansion of crediting to medium and heavy duty (MHD) vehicles and continued crediting for light duty (LD) vehicles. The current HRI program, in combination with other California incentives, has been very effective in promoting the build-out of zero-emission vehicle infrastructure. It is important that CARB build on this success by expanding the program to the truck and bus markets. This expansion will complement CARB’s ambitious goals under the Advanced Clean Truck (ACT) and Advanced Clean Fleet (ACF) regulations and help advance the state’s goals for zero-emission vehicles in line with Executive Order N-79-20.

Air Products believes that multi-modal stations, which include fueling for both Light-Duty (LD) and MHD vehicles, utilizing shared compression, storage and dispensing equipment, will play an important role in

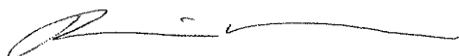
California's hydrogen fueling network, provided that the correct policy signals are in place. Clarity is needed in the regulation or in guidance as to how the provisions in the separate LD and MHD sections apply and complement one another so as to recognize and encourage efficiencies associated with multi-modal stations. Please reference our prior comments on the 45-day package for the language we proposed in this regard at the following link: [Air Products comments 45-day package](#).

We understand that CARB has some concern that reporting/recordkeeping will be difficult in discerning when vehicles of different types are fueling – LD vs. MD vs. HD. Specific quarterly reporting parameters for hydrogen used as a transportation fuel include the quantity of hydrogen fuel dispensed per fueling station equipment, as set forth in section 95483.2(b), with a certified fuel pathway code and with transaction type “FCV Fueling” by vehicle weight category: LDV & MDV and HDV. 95941(d)(2) (D) prescribes a methodology for distinguishing between vehicle classes for natural gas fueling. A similar approach can be applied to a hydrogen fueling event of 10 kg or less would be considered to have been supplied to a LD vehicle and fueling events of greater than 10 kg would be considered to have supplied a MHD vehicle. For hydrogen dispensing, this includes the station owner's declaration that the station meets an appropriate SAE protocol for LDV, MDV, and HDV vehicles and appropriate countermeasure(s) that prevent the compressed hydrogen storage system (CHSS) gas temperature from exceeding the CHSS maximum temperature limit. We believe that viable methodologies can be refined with CARB as part of the post-adoption implementation process.

We recommend that CARB realign the definition of “Application” in the regulation to correspond to the categories of vehicle types for the purposes of the HRI categories. For example, with the transition of ZEV-HRI crediting to LD-HRI crediting, the term LD becomes a standalone application. At the same time, the EER classes for LMDV and HDV need to be maintained for accurate credit calculation.

Air Products appreciates the opportunity to provide this feedback for the April 10th workshop and we would be happy to meet with CARB to discuss any of these topics further. Please feel free to contact me at hellermt@airproducts.com.

Respectfully,



Miles Heller
Director, Greenhouse Gas, Hydrogen, and Utility Regulatory Policy