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August 8, 2022

Cheryl Laskowski, Chief, Transportation Fuels Branch
California Air Resources Board 1001 I Street
Sacramento, CA 95814

Comments submitted electronically

RE: Comments Related to the July 7th Low Carbon Fuel Standard Workshop

Dear Dr., Laskowski,

Air Products is pleased to provide comments in support of CARB's planned rulemaking for the Low Carbon Fuel Standard (LCFS). The LCFS is a very successful, performance-based program in helping to transition California's transportation fuels to cleaner, low-carbon alternatives and we strongly support its continued strengthening through this rulemaking. Low-carbon hydrogen will play a key role in the energy transition and continuing to decarbonize transportation fuels in California, and it is important that the LCFS provide the necessary and appropriate technology-neutral framework to advance this opportunity. We support California's climate goals and believe that Air Products can help California with the energy transition needed to meet these challenges.

Air Products is the only U.S.-based global industrial gas company and the world's largest hydrogen producer and supplier for use in numerous markets, including transportation. We are committed to rapidly scaling and decarbonizing global hydrogen supplies to support rapid decarbonization efforts in California and internationally. In just the last two years, Air Products has announced nearly $12 billion in clean energy investments, including:

- The world's largest green hydrogen project by far ($7 billion in joint investment), requiring more electrolyzer capacity than has been deployed throughout the world to date. This project alone will serve to scale global electrolyzer production capacity and manufacturing, helping to bring down the costs of this important technology.

- An innovative $1 billion net-zero carbon hydrogen production complex in Alberta, Canada, which achieves net-zero emissions through the combination of advanced hydrogen reforming technology, carbon capture and storage, and hydrogen-fueled electricity generation. Air Products recently won the Best Carbon Management Initiative Award for this project at the 2021 *Chemical Week* Sustainability Awards.

- A $4.5 billion blue hydrogen clean energy complex in Louisiana, which represents the company's largest investment ever in the United States and will sequester

more than 5 million tons of carbon dioxide (CO_2) per year. This project will capture 95% of the facility's CO_2 emissions and produce blue hydrogen with near-zero carbon emissions.

- A green hydrogen facility based in Casa Grande, Arizona just outside Phoenix which is expected to be on-stream in 2023 and will produce zero-carbon, liquid hydrogen for the transportation market.

- A $2 billion major expansion project with World Energy to develop North America's largest sustainable aviation fuel production facility in Paramount, California. The project will expand the site's total fuel capacity to 340 million gallons annually, and among other investments, includes an extension and capacity increase of Air Products' existing hydrogen pipeline network in Southern California. The project is scheduled to be onstream in 2025.

Program Stringency

We believe that the drop in credit prices over the past year is an indication of the near-term success of the program in driving alternative fuel growth and fossil-based transportation fuel displacement. Projects coming on-line now were based on stronger credit price signals in the past and we need, once again, to send strong signals to prompt future reduction projects. To send a strong future market signal to incentivize the lowest carbon fuels and more conventional fuel displacement, we urge CARB to target the most stringent 2030 target that your internal analysis indicates is technically feasible and appropriately promotes innovation. At a minimum, Air Products supports the 30% carbon intensity (CI) reduction proposed for 2030 unless further staff analysis suggests even more reduction is possible.

We urge CARB to be aggressive in setting this CI reduction target as the existing cost-containment provisions in the regulation are sufficient should the low-carbon fuel supply not develop as quickly as anticipated.

In terms of longer-term targets, we propose projections of at least 10 years rounded to the nearest 5-year increment (quinquennial). As an example, this planned update implemented in 2024 should include targets to 2035 (2033 rounded to 2035). The 10-year time horizon is needed to enable the longer-term planning required for large project execution and to provide the credit price certainty needed to realize a return on investment execute these projects. While we are not opposed to targets in 2040 or 2045 – as a practical matter there will be multiple scoping plan revisions, regulatory developments, and technological developments that will better inform those targets in the future.

Aside from setting meaningful targets, we are supportive of actions to stimulate additional credit demand. To this end, we are supportive of furthering the concept of including intrastate jet fuel as an obligation-generating fuel.

Expansion of Hydrogen Refueling Infrastructure Credits to Medium and Heavy-Duty Vehicles

We are pleased that CARB is proposing the expansion of hydrogen refueling infrastructure (HRI) credits to stations serving medium and heavy-duty vehicles (MHD). Air Products strongly supports this expansion. The current HRI program, in combination with other California incentives, has been very effective in promoting the infrastructure build-out in support of zero emission fuels and vehicles. It is important that CARB build on this success by expanding the program to truck and bus markets. This expansion will complement CARB's ambitious goals under the Advanced Clean Truck (ACT) regulation, the proposed Advanced Clean Fleet (ACF) regulation and help advance the state's goals for zero-emission vehicles in line with Executive Order N-79-20.

To ensure that the MHD HRI crediting approach is effective in promoting the advancement of this infrastructure, we offer feedback below on the concepts proposed to date.

- As mentioned in our prior comments, we believe that private fleet MHD vehicle stations (behind the fence) should also be able to earn HRI credits. This is an important complement to the anticipated Advanced Clean Fleet regulation adoption and will help facilitate fleet transitions for mass transit and ports where public access is unlikely. Because of the superior range, payload, and refueling experience that hydrogen fuel cell MHD vehicles exhibit relative to their battery-electric counterparts, many fleets will be more inclined to install centralized hydrogen refueling facilities but may be reluctant based on the high initial capital cost. Offering MHD HRI credits to these private fleets operating their own HRI infrastructure will help these fleets overcome the high initial capital costs and transition sooner to zero-emission vehicles – many of which operate in communities disproportionately impacted by diesel exhaust emissions.

- We support the proposed credit cap at 2.5% of the previous quarter deficits, but this MHD HRI credit cap of 2.5% must be in addition to LDV HRI cap of 2.5% and stations offering both should have a combined cap of 5%.

- We agree with the 15-year crediting period as proposed in the July 7th workshop.

- We request that CARB consider a higher Maximum Station Capacity of 4800 kg/day vs. the 3000 kg/day proposed as it is more likely that stations that service MHD vehicles will be larger given the higher fueling demand.

- The HDV HRI pathways application deadline in 95486.2 (a)(1)(B) needs to extend beyond December 31, 2025 so we recommend setting a separate deadline for these applications of 2030 or later.

- CARB requested feedback on mechanisms to track station availability for quarterly reporting. The Station Operational Status System (SOSS) reporting system is managed by

the California Fuel Cell Partnership and used for tracking station uptime in the light-duty HRI applications should be extended to MHD HRI and we encourage ARB to work with CAFCP to ensure SOSS data reliability and integrity as it is expanded to MHD hydrogen stations.

- The Hydrogen Station Capacity Evaluation (HySCapE) model referenced in the current regulation determines, based on several user inputs regarding hydrogen station design, the maximum station capacity allowed for HRI credits. We understand that this model is being updated for use with the MHD HRI credit program. CARB needs to reference the latest version of the model in the regulation and assure that it delineates credits appropriately for dual use hydrogen stations, i.e. those serving both LD and MHD FCEVs.
    - CARB should provide flexibility in the MHD vehicle HRI language to include new fueling methods that may not be included in HDV HySCapE model. For example, MHD vehicle fueling may include liquid hydrogen fueling in the future.

Specifying the Date for Hydrogen to be a Regulated Fuel

Air Products is not opposed to CARB's proposal to provide a specific date when hydrogen will be a regulated fuel in the LCFS. This certainty will be helpful to manage the associated compliance implementation. We suggest a date later than 1/1/2024 so that there is enough time following adoption. If the regulation is not adopted until the 4th quarter 2023, we suggest making the requirement effective 4/1/2024 so there is at least one quarter's time between adoption and implementation.

Opportunities for Lower Carbon Hydrogen in Future Workshops

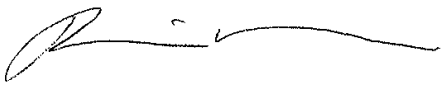
While not covered in this particular workshop, we continue to support work on the following topics that we hope will be discussed in detail at future workshops.

- 'Book and Claim' provisions for low carbon hydrogen to recognize its environmental benefits in the energy transition.
- Recognition of existing renewable electricity and renewable natural gas 'book and claim' provisions to lower the carbon intensity of the full hydrogen value chain from production to dispensing.
- Development of a Tier 1 simplified calculator for hydrogen.
- Updates and routine reviews of the CA-GREET models to ensure the most accurate and consistent application of emission factors to the hydrogen value chain – as well as recognition of new supply chains including ammonia as a hydrogen carrier.
- Updating the Energy Economy Ratios (EERs).
- Development of alternative co-product allocation methodologies where appropriate.
- Recognition of the low carbon intensity of biopropane or other organic feedstocks for hydrogen production.

- Development of SB-1505 regulatory provisions to enhance certainty in the regulation.
- Discussion of potential improvements to the CCS provisions and protocol.

Air Products appreciates the opportunity to provide this feedback and we would be happy to meet with CARB to discuss further or work through draft language. Please feel free to contact me by phone (916-860-9378) or email hellermt@airproducts.com.

Respectfully,



Miles Heller
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