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Submitted via: <https://www.arb.ca.gov/lispub/comm/bclist.php>

Ms. Liane Randolph
Chair
California Air Resources Board
1001 I Street
PO Box 2815
Sacramento, CA 95812
CC: Elizabeth Scheele, Michael Fitzgibbon, Pamela Gupta

RE: Second Notice of Public Availability of Modified Text and Availability of Additional Documents
Proposed Amendments to the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary
Refrigeration, Chillers, Aerosols-Propellants, and Foam End-Uses Regulation

Dear Chair Randolph:

We are responding to the rulemaking proposal for HFC reductions in Stationary Refrigeration and Stationary Air Conditioning, specifically the modified text made publicly available on August 3, 2021.

Chemours is a refrigerant supplier and technology leader in providing sustainable, high performance, low global warming potential ("GWP") solutions. California's effort to reduce the climate impact of the air conditioning and refrigeration sectors has been a top priority of Chemours, not only from an industry support perspective but also in our technological developments and investments to bring these products to these sectors.

In the modified text, the definition of new facility is revised to include ice rinks. First, we would like to confirm our understanding that seasonal or temporary outdoor ice rinks would not be considered a "new facility" under this definition. Second, we would like to reiterate our opposition to the requirement that new ice rinks, according to the revised definition of "new facility", would be required to utilize a refrigerant with a global warming potential (GWP) less than 150. The Ice rink proposal requiring less than 150 GWP for new ice rinks does not reflect the same balance of science, facts, and broad stakeholder input utilized for other aspects of this rulemaking. Chemours strongly opposes the Ice Rink proposal and urges CARB to return to their original proposal of GWP less than 750 for new ice rink end use applications based on the following science and facts:

Ice Rinks New and Existing

1. New US Patent Grant on Use of CO₂ for an Ice-Playing Surface

On June 23, 2020, a US patent was granted claiming the use of CO₂ refrigeration systems for an ice-playing surface. Five (5) other relevant patent applications to this subject matter are pending. Within a couple months of the granting of the aforementioned patent CARB dramatically changed their proposal to limit refrigerant options to <150 GWP in ice rinks.

Granted Patent	Pending Patent Applications
US10690389	US2012055182
	US2020200459
	US2012247148
	US2012073319
	US2016245575

- It is important to note that the first claim in the Granted Patent US10690389 claims:
 - “A CO₂ refrigeration system for an ice-playing surface, comprising:
 - a compression stage in which CO₂ refrigerant is compressed and an evaporation stage in which heat is absorbed from the ice playing surface;
 - a plurality of CO₂ compressors in the compression stage for compressing the CO₂ refrigerant subcritically and transcritically;
 - a gas cooling stage includes at least a plurality of heat reclaim units reclaiming heat from the CO₂ refrigerant compressed in the compression stage;
 - a pressure-regulating device downstream of the gas cooling stage, the pressure-regulating device operable to control a pressure of the CO₂ refrigerant in the gas cooling stage as a function of a heat demand of the plurality of heat-reclaim units;
 - a reservoir downstream of the pressure regulating device for receiving the CO₂ refrigerant in a liquid state; and
 - a controller operating the pressure-regulating device to control the pressure of the CO₂ refrigerant in the gas cooling stage as a function of the heat demand of the plurality of heat-reclaim units, the controller, via its operating of the pressure-regulating device, causing the pressure of the CO₂ refrigerant to reach a transcritical level as a function of a heat demand of the plurality of heat reclaim units.”
- Is CARB aware of these granted and pending application patents and the impact they could have on options for ice rinks across California if the limit remains at <150 GWP? By setting a threshold at <150 GWP, for jurisdictions that cannot or choose to not take on the safety risks or cost to mitigate safety concerns that ammonia presents, CARB would be forcing rink owners and operators into an ***anti-competitive situation based on limiting the number of equipment***

manufacturers that can competitively bid on projects due to CO₂ patented technology for ice rinks.

- Based on the recently granted patent and the potential patent grants in the future, the <150 GWP limit for new ice rinks will not serve CARB's purpose of advancing and driving technology innovation, but rather will dramatically ***limit technology and competition***, ultimately leaving ice rink owners and operators with limited options.

2. Industry Considerations

- < 750 GWP was decided with significant stakeholder input and originally accepted and maintained by CARB as recently as the July 22, 2020 stakeholder meeting. < 750 GWP provides a substantial reduction versus incumbent technology. Chemours is aware of numerous ice rinks across the United States that have installed new R-507 and/or R-134a systems for their ice plants. Setting a limit of < 750 GWP already substantially reduces the direct climate impact of those systems by ~80% and ~50%, respectively, while allowing for multiple compliance paths for the diverse needs of ice rink operators in this segment.

The industry and its stakeholders have planned and prepared for a < 750 GWP limit allowance in this application. By lowering the level to <150 GWP ice rink owners and operators will incur additional significant cost and expense as they scrap previous plans implemented to comply with the earlier <750 GWP requirement and will now have to spend additional funds to comply with the proposed <150 GWP requirement, an even greater burden given the current COVID environment these businesses are having to operate within.

3. Stakeholder Engagement

- The proposed limit of GWP < 750 has been communicated publicly by CARB for as long as the proposals have been published and as recently as the July 22, 2020 stakeholder meeting. The change for New Construction to comply with the < 150 GWP regulation minimizes opportunities for full stakeholder engagement and discussion.
- The recently proposed change to the regulation, reducing the GWP to < 150 for New Construction, did not have sufficient review and comment from industry partners or the ice rink owner community.
- To date, no independent 3rd party studies have been published on the financial impact of this change and there are substantial industry stakeholder concerns as to how this may impact the future feasibility of new ice rink installations as ice sports such as hockey grow, especially those in low income and underserved communities.

4. Technology Factors

- The proposed <150 GWP limit in New Construction significantly and unnecessarily restricts refrigeration system equipment options for this application.

- There are synergies that can be obtained by designing systems that standardize common air-conditioning and ice rink refrigeration platforms providing environmental, logistical, electronic controls, serviceability, training, refrigerant management, and financial advantages and efficiencies. A proposed change to GWP < 150 would eliminate the possibility of these synergies due to the fluid technologies available.
- Other technologies available for ice rinks with < 150 GWP introduces complexities and costs that could create safety and/or financial viability issues. Of note, is the US EPA reporting requirements summarized at:
https://www.epa.gov/sites/production/files/2019-11/documents/epcra_ice_rink_ammoniafs6.pdf
 which outlines an order of magnitude difference in threshold for ammonia reporting (500lbs) compared to non-ammonia refrigerants (10,000 lbs.)
- Reducing the GWP limit from <750 to <150 GWP notably excludes options that can be designed and installed as a factory-built and sealed unit, which provides advantages in minimizing leaks and assuring minimum energy efficiency standards.
- Limiting refrigerant options in ice rinks to <150 GWP notably runs counter to the well-recognized industry standard setting organization, ASHRAE, whose position document on refrigerants and their responsible use states in Section 3.1: “A refrigerant should not be selected based on any one single factor such as GWP, operating pressure, flammability, etc. The wide range of HVAC&R applications and their requirements throughout the world necessitates a variety of refrigerants to meet these needs.”

5. Regulatory Alignment

- The GWP < 750 aligns with regulations in Canada. It is highly beneficial to the industry to align as much as possible on North America standards as it supports economies of scale and technological developments.
- The GWP < 750 proposal aligns with the current air-conditioning proposal which, as noted above, allows for system design efficiencies across equipment used for the ice plants and building HVAC.

6. Unique Challenges in Ice Rink Applications

- Ice rinks can vary in size from quite small curling rinks to large professional arenas, as well as facilities with multiple ice sheets. The optimum system/refrigerant for each will vary. It's far from a “one size fits all” case. Regulations addressing this variety of facilities should factor in the flexibility required so as not to disadvantage the ice rink owners, operators and communities that they operate in. Many of the buildings that house ice rinks need to meet multiple requirements. As such, a limit of <750 GWP gives these multi-use buildings more options to incorporate an ice rink into their facilities while meeting all other green building requirements.

In light of the foregoing considerations, Chemours strongly recommends that CARB return the GWP limit for New Construction ice rinks to GWP < 750, which was previously validated and agreed upon by CARB with industry and end-user input. This both aggressively reduces GWP versus existing alternatives and provides the industry with several viable solutions, all without negatively impacting CARB's ability to meet

its overall climate goals. Imposing a GWP <750 Limit for ice rinks is in fact “technology advancing”, which CARB aims to be. It also follows ASHRAE recommendations for the responsible selection and use of refrigerants and encourages advancements in refrigeration system technology, such as the use of more energy efficient designs, the use of oil-free compressors, etc.

Air Conditioning-Stationary Equipment

Chemours is actively working on the A2L safety standards and promoting adoption of the use of such refrigerants into the building codes. Our preference is to have building codes ready for the 2023 date, but despite all our efforts, 2023 appears to no longer be possible. Chemours supports the modified prohibition dates identified in this notice. The January 1, 2023, prohibition date for room/wall/window air conditioning equipment, PTACs, PTHPs, portable air-conditioning equipment, and residential dehumidifiers(new) should be contingent upon adoption of the updated building codes and equipment standards. CARB should remain engaged to ensure preparedness for this transition.

Chillers - Air-Conditioning

Compliance with the January 1, 2024 effective date remains dependent upon approval of new substitutes for use in this end use, such as R-454B.

Chillers - Industrial Process Refrigeration (IPR) - Exemption below -58 °F

It is important for CARB to stay consistent with EPA and retain the unique industrial refrigeration definition and accommodations. The US EPA has defined IPR as "complex, customized systems used in the chemical, pharmaceutical, petrochemical, and manufacturing industries. These systems are directly linked to the industrial process".¹ We also recommend that CARB provide flexibility and provide an exemption for IPR below -58 °F.

Chemours would like to highlight that the current refrigerant options utilized in IPR systems have unique technical challenges that CARB has not considered. IPR in these temperature ranges need increased flexibility in GWP levels since limiting options can result in the system operating pressures to reach a vacuum which could necessitate an air purging system, which may cause refrigerant loss from the system.

Refrigerant Recovery, Reclaim, and Reuse Requirements (R4 Program)

In the modified text, CARB proposes a definition of reclaimed refrigerant that would permit reclaimed refrigerant to originate from any geographic location. Chemours requests this definition be modified to either specify this to mean reclaimed or recovered refrigerant may originate from any geographical location in the United States or to strike this aspect of the definition completely. Elimination of this aspect of the definition would align with the proposed definition included in the recently published proposed rule to phase down hydrofluorocarbons (HFCs) according to the American Innovation and

¹ https://www.epa.gov/sites/default/files/2015-08/documents/compliance_guidance_for_industrial_process_refrigeration_leak_repair_regulations_under_section_608_of_the_clean_air_act.pdf

Manufacturing (AIM) Act. If this definition is not modified, we anticipate an increase of imported refrigerant that is misrepresented as being reclaimed.

If not crafted carefully and with stringent controls, reclaimed refrigerant policies present a substantial opportunity for deceptive practices by suppliers resulting in misrepresented reclaimed or recovered refrigerant. Part of a well-crafted policy includes recordkeeping requirements which should include documentation that certifies the origin of the reclaimed refrigerant. The importance of certifying the origin of reclaimed material is demonstrated by the petition process to import Class I and Class II substances. If reclaim is defined too broadly, in the absence of a certification mechanism, combined with market incentives created by the phasedown regulations, creates an opportunity for circumvention of the requirements and disadvantages entities which are compliant.

To encourage early transition and use of lower GWP solutions, the R4 Program should contain a credit for GWP technologies that are better than the upper 750 GWP limit. A credit is the best way to recognize that companies can deliver even more reductions than the upper limit requires.

Conclusion

We urge CARB to return the limit for New Construction ice rinks back to <750 GWP and maintain both new and existing ice rinks at <750 GWP. This is technology forcing and will allow multiple compliance pathways for large and small community ice rinks. Established prohibition dates should be contingent upon appropriate codes and standards being in place. A strong policy regarding reclaimed refrigerant is necessary to dissuade import of misrepresented reclaimed refrigerant. We believe it is important for CARB to stay consistent with EPA and retain the unique industrial refrigeration definition and accommodations. IPR systems need greater flexibility to enable the operations to run at a positive pressure and avoid a vacuum. We request an exemption for IPR below -58 °F. Chemours appreciates the continued dialog around these standards and remains at your disposal to clarify any of the above noted points submitted for your consideration.

Sincerely,

Esther Rosenberg

Esther Rosenberg
Global Regulatory Advocacy