The Chemours Company
1007 Market Street
PO Box 2047
Wilmington, DE 19899

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

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

RE: Rulemaking/2020/hfc2020 (Prohibition on use of certain hydrofluorocarbons in stationary refrigeration, stationary air conditioning, and other end uses)

Dear Chair Nichols:

We are responding to the rulemaking proposal for HFC reductions in Stationary Refrigeration and Stationary Air Conditioning which is scheduled for the California Air Resources Board hearing on December 10, 2020.

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.

A rulemaking process is challenging, and the best outcome is a result of balancing science, facts, and broad stakeholder input, especially from downstream users. We want to commend CARB's staff for engaging with retail end users in developing the retail food regulations. This proved to be a very important step when addressing the issues relevant to this segment of the market. We fully support the flexibility provided to retailers by granting them multiple paths for compliance while still meeting the overall climate objective. Building in compliance options to enable both large chains as well as small ones, will ensure successful adoption of the regulations and support meeting California's GHG reduction goals.

In stark contrast to the retail food rulemaking process, the Ice Rink Proposal for <150 GWP for New Construction ice rinks does not reflect the same balance of science, facts and broad

stakeholder input utilized for the retail food regulations. As such, Chemours strongly opposes the Ice Rink Proposal.

CARB is urged to return to their original proposal of GWP **<** 750 for both new and existing 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 CO_2 for an Ice-Playing Surface

On June 23, 2020, a US patent was granted claiming the use of CO_2 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 CO_2 refrigeration system for an ice-playing surface, comprising:
    - a compression stage in which CO_2 refrigerant is compressed and an evaporation stage in which heat is absorbed from the ice playing surface;
    - a plurality of CO_2 compressors in the compression stage for compressing the CO_2 refrigerant subcritically and transcritically;
    - a gas cooling stage includes at least a plurality of heat reclaim units reclaiming heat from the CO_2 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 CO_2 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 CO_2 refrigerant in a liquid state; and
    - a controller operating the pressure-regulating device to control the pressure of the CO_2 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 CO_2 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 CO_2 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 proposed <750 GWP limit for air-conditioning applications once building codes adopt the safety standards for A2Ls. In fact, Chemours is ready with a <500 GWP limit solution once building codes adopt the A2L safety standards. On the subject of building codes, Chemours urges CARB, as a state agency, to become more involved with establishing codes to enable the use of A2L technology to meet the regulatory objectives. Alignment between the various state agencies, including the California's Fire Marshall Office, is critical as the industry moves forward to meet the <750 GWP limit. In reviewing the proposed Alternative Compliance Pathways ("ACP") in the ISOR, there seems to be a significant flaw in that the current reclaim rates, even at a national level, will not generate enough reclaim for new equipment manufactures

to comply with the proposal. Further, it is generally recognized that the aftermarket for service of existing residential AC units is at least as large, if not larger, than the demand for refrigerant in new equipment given the installed base. Thus, if there is insufficient supply to meet new equipment needs, there will also be insufficient supply to meet the service needs of the existing equipment.

If CARB moves to a requirement for 100% reclaim either in new equipment or for service and there is insufficient supply to meet the CARB mandate, how will the lack of compliance disrupt business? What loopholes and unintended consequences for illegal refrigerant will this create? How will CARB enforce such unattainable requirements? Illegal HFCs are already an issue across Europe. While we encourage recovery, recycle and reclaim, a requirement for 100% reclaim could create an illegal flow of material in ways that only illegal actors will creatively find. As a result of the lack of supply, Chemours recommends a voluntary program as a means to encourage and expand reclaim use. Further, in the event that a compliance plan for equipment manufacturers is in fact established, at an absolute minimum, it 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. On the AC regulation, we support the <750 GWP limit once building codes adopt the A2L safety standards. We urge CARB to incentivize companies by giving a credit to those who do better than the upper limit of the regulation and deliver a <500 GWP solution. We do not support a requirement for a reclaim program given lack of supply and unintended consequences. We suggest any reclaim program should be voluntary. If a more structured reclaim program is needed, then we believe a formal rulemaking process to engage all stakeholders is needed.

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