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Elizabeth Scheele  
California Air Resources Board  
1001 I Street, Sacramento, CA 95814  
P.O. Box 2815, Sacramento, CA 95812

Via Email: elizabeth.scheehle@arb.ca.gov

**Re: AHRI Comments Regarding California Air Resources Board Draft Proposed Regulation Order: *Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End Uses***

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Dear Ms. Scheele,

On behalf of the Air-Conditioning, Heating and Refrigeration Institute (AHRI), I respectfully submit the following comments and proposal in response to California Air Resources Board (CARB) Draft Proposed Regulation Order: *Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End Uses*.

AHRI is the trade association representing manufacturers of heating, cooling, water heating, and commercial refrigeration equipment. More than 300 members strong, AHRI is an advocate for the industry and develops standards for and certifies the performance of many of the products manufactured by our members. In North America, the annual output of the HVACR and water heating industry is worth more than \$44 billion. In the United States, the industry supports 1.3 million jobs and \$256 billion in economic activity annually.

For more than a decade, AHRI has worked to support regulations to reduce the consumption and production of hydrofluorocarbons (HFCs). Our members strongly supported the agreement to amend the Montreal Protocol on Substances that Deplete the Ozone Layer to phase down HFC production and consumption as a proven, predictable, and practical approach to a transition away from refrigerants with high global warming potential (GWP). We have worked cooperatively with state regulators and environmental non-governmental organizations (E-NGOs) in an attempt to harmonize regulations. And we are working closely with both foreign and domestic governments to prepare and successfully execute the safe and orderly transition to low-GWP refrigerants.

We thank the CARB technical staff for working with AHRI and for addressing many of our concerns during the rule-making process, including clarification of 'new' and 'existing' facility definitions, guidance regarding 'cumulative replacement,' and sharing data related to the installation of remote condensing unit (RCU) refrigeration equipment in California.

**Refrigeration**

**Chillers for Refrigeration Applications**

AHRI requests that CARB incorporate both chillers used in cold storage warehouses and industrial process refrigeration in Table 3 of the draft regulatory text with the same prohibitions and timing. This would allow for limits to be implemented based on technological capabilities for specific temperatures of the fluid leaving the evaporator.

This recommendation does not change the scope of equipment regulated, but it would more accurately characterize the different temperature applications served by chillers according to industry standard practice. A table with the suggested change is included below.

General End Use	Specific End-Use	Prohibited Substances	Effective Date
Chillers – Air-conditioning Applications			
Chillers	Chillers (new) designed for evaporator fluid leaving temperature > 35°F (2 °C)	Refrigerants with a GWP of 750 or greater	Prohibited as of January 1, 2024
Chillers – Refrigeration Applications			
Chillers	Chillers (new) designed for evaporator fluid leaving temperature <= 35°F (2 °C) and > -10°F (-26 °C)	Refrigerants with a GWP of 1,500 or greater	Prohibited as of January 1, 2024
Chillers	Chillers (new) designed for evaporator fluid leaving temperature <= -10°F (-26 °C) and > -58°F (-50 °C)	Refrigerants with a GWP of 2,200 or greater	Prohibited as of January 1, 2024

Table 1: AHRI suggested changes to Table 3

**Refrigeration Remote Condensing Units**

AHRI recommends that CARB re-analyze its GWP limit proposal for RCU systems within Table 3 of the proposed regulation order and increase the GWP limit to 1,500 for RCUs containing less than 150 pounds of refrigerant. This update would create many benefits, including:

- Expanding manufacturer and customer refrigerant choice for new RCU systems between 50 and 150 lbs.
- Reducing refrigerant leakage from increased equipment installations and line set use from end-user that may switch to multiple smaller systems under the current proposed regulation order.
- Reducing the compliance burden for end users affected by CARB’s proposed regulatory order.
- Reducing emissions in California by cutting the RCU SNAP limits of 2200 GWP down to 1500 GWP.

AHRI is concerned that the GWP limits for remote condensing unit (RCU) equipment in Table 3 of the proposed regulation order will have unintended consequences in California. AHRI strongly requests that

CARB allow for refrigerants up to 1500 GWP limit for RCUs containing up to 150 pounds of refrigerant until two years after CSA/UL 60335-2-89 has been adopted into California building codes, at which time a 300 GWP limit should be considered. In this rulemaking, 150 GWP limits for RCUs regulated should be limited to equipment containing over 150 pounds of refrigerant. AHRI reviewed data from CARB showing the market distribution of RCUs and found that approximately 90 percent of ‘small’ RCU systems contain less than 150 pounds of refrigerant.

Small RCUs ranging from 50 to 300 pounds, are often used in small “mom and pop” stores, storage, and small processing applications.<sup>1</sup> These smaller facilities often require more flexibility than what is allowed by CARB’s draft proposed regulation. Proximity to occupied spaces and densely populated areas can create a restriction on the use of ammonia. The charge sizes needed exceed the allowable limits for hydrocarbons in many situations. Currently, carbon dioxide (CO<sub>2</sub>) is left as the only refrigerant below 150 GWP. CO<sub>2</sub> has been used in supermarket-size racks and larger systems as well as small bottle coolers for medium temperature use only. As a result, the supply chain for all required components are not yet available. Finally, there are no practical fluorocarbon refrigerant options in the medium pressure range for commercial refrigeration under 150 GWP without extremely high glide [ $>20^{\circ}\text{R}$ ].

After building codes are updated, a 300 GWP limit for RCUs can allow for more energy efficient options such as R-454A<sup>2</sup> (236 GWP) which has a glide similar to that of R-448A and R-449A. The operating characteristics of R454A are likely to enable compliance with stringent new U.S. Department of Energy (DOE) regulations for walk-in coolers & freezers (WICF) condensing units.<sup>3</sup> Even a 300 GWP limit does not provide an immediate solution for low temperature applications which will rely on new, creative, low-pressure A2L solutions that need to be enabled in the building codes to be available by 2024. However, this 300 GWP limit will address many of the challenges faced by manufacturers and retailers and is a more viable solution for delivering refrigeration needs in California.

### **Ice Rinks**

AHRI supports a GWP limit of 750 for new and existing ice rink end use applications and was surprised to see changes to the GWP limits in the October proposed regulation order. The original 750 GWP limit was decided with significant stakeholder input and accepted by CARB. This certainty helped the industry to plan and prepare for the 750 GWP allowance in ice rinks and was communicated with other stakeholders as an industry-supported aspect of the proposed regulation order. AHRI is also concerned that the new limit restricts competition in the marketplace due to ice rink patents currently effective. By requiring products to meet this patented requirement, further innovation into low-GWP solutions could be hindered. The original 750 GWP limit and existing ASHRAE protocols could be used to incentive these important advancements in ice rink technology.

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<sup>1</sup> Assuming typical options and average piping lengths to the associated loads.

<sup>2</sup> R-454A has a high discharge temperature necessitating liquid injection; therefore, units may be more costly, but not greatly so.

<sup>3</sup> The energy-saving options required to make a remote condensing unit using CO<sub>2</sub> compliant with WICF regulations increase their cost significantly even if supply chains made components available. Some options may include a larger condenser (gas cooler coils), additional cooling coils for de-superheating and intercooling, parallel compression, ejectors, and so on.

The original proposed 750 GWP limit has been communicated by CARB since the regulatory process inception and appears to have been modified to a 150 GWP limit ‘behind the scenes’ after the July 22, 2020 stakeholder meeting. This short timeframe did not allow sufficient time for stakeholder feedback and comment from either industry or the ice rink owner and end user community. AHRI is also concerned that CARB has not provided additional economic impact analysis of this new limit and worries that the change will negatively affect the feasibility of new ice rink installations, especially in low income and underserved communities. The lower proposed GWP limit also requires more sophisticated refrigerant management techniques and technical training that may not be accessible for many communities.

The 150 GWP limit for ice rinks in new constructions will significantly restrict equipment option because the design of ice rink equipment closely matches the technology used in air conditioning, and more specifically, chiller 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. Several ice rink operations have benefited from combining air conditioning and refrigeration platforms providing environmental, logistical, electronic controls, serviceability, training, refrigerant management, and financial advantages and efficiencies. Other technologies mandated by a 150 GWP limit may introduce complexities that create safety and economic barriers.

The original agreed upon 750 GWP limit also aligns with recently adopted ice rink regulations in Canada and more closely aligns with the current proposed regulatory for air-conditioning equipment, which mirror ice rink technologies. 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. For these reasons, CARB should not include a 150 GWP limit for new and existing ice rinks in its final regulation order and instead revert to the previously agreed-upon 750 GWP limit.

Again, AHRI thanks CARB for the continued dialogue to find a practical way forward to meet California’s ambitious climate goals with solutions that have been enabled in California building codes. Please contact Helen Walter-Terrinoni at [hwalter-terrinoni@ahrinet.org](mailto:hwalter-terrinoni@ahrinet.org) or 302-598-4608.

Sincerely,

*Helen Walter-Terrinoni*

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Vice President, Regulatory Affairs  
Air-Conditioning, Heating, and Refrigeration Institute