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August 12, 2020

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 a

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

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: *Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End Uses* and the subsequent discussions with CARB on August 5, 2020 regarding AHRI's proposal made on July 31, 2020.

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. Specifically, AHRI appreciates CARB's thoughtful consideration of stakeholder feedback during its regulatory process including the following:

- The update to the definition of "New Refrigeration Equipment" to accurately capture products affected by this definition and align with earlier AHRI comments.
- The upgrade to the End-use and Prohibited Substances table for chillers to distinguish the technological capabilities and limitations of equipment used in different temperature applications.
- Clarification of the differences in restrictions on 'new' and 'existing' facilities for cold storage warehouses and industrial process refrigeration excluding chillers.

- The exception for refrigeration equipment containing 50 pounds or less of refrigerant.
- Allowance for installation of equipment in facilities with building permit applications approved prior to the effective date of this regulation.
- The variance for special circumstances faced by manufacturers.

Refrigeration

Requests for Clarification

AHRI requests that CARB clarify the following:

- AHRI assumes that a facility is considered to be an “existing” facility if it does not meet the definition of “new”.
- Does the “cumulative replacement” terminology under the “new refrigeration” definition equate to a requirement of GWP < 150?
- AHRI assumes that the three years cumulative replacement incorporated into the definition of “new” must be consecutive.

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 $\leq -10^{\circ}\text{F}$ (-26°C) and $> -58^{\circ}\text{F}$ (-50°C)	Refrigerants with a GWP of 2,200 or greater	Prohibited as of January 1, 2024
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Table 1: AHRI suggested changes to Table 3

Refrigeration Remote Condensing Units

AHRI is concerned that the GWP limits for remote condensing unit (RCU) equipment in Table 3 of the draft regulatory text will have unintended consequences in California. AHRI strongly requests that CARB allow for refrigerants up to 1500 GWP limit for RCUs containing up to 300 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.¹ In this rulemaking, 150 GWP limits for RCUs regulated should be limited to equipment containing over 300 pounds of refrigerant.

Remote condensing units ranging from 50 to 300 pounds,² are often used in small “mom and pop” stores, storage, and small processing applications. 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 (CO₂) is left as the only refrigerant below 150 GWP. CO₂ 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-454A³ (236 GWP) which has a glide similar to that of R-448A and R-449A. The operating characteristics of R-454A are likely to enable compliance with stringent new Department of Energy (DOE) regulations for walk-in coolers & freezers (WICF) condensing units.⁴ 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.

¹ AHRI previously submitted a higher GWP recommendation for RCUs serving over 3,000 sq ft on July 10, 2020. After a discussion with AHRI members, AHRI discovered its prior suggestion was an error that incorporated GWP limits for Chillers and that RCUs over 300 lbs. should remain at 150 GWP as previous comments requested. AHRI’s current recommendation corrects this error.

² Assuming typical options and average piping lengths to the associated loads.

³ R-454A has a high discharge temperature necessitating liquid injection; therefore, units may be more costly, but not greatly so.

⁴ The energy-saving options required to make a remote condensing unit using CO₂ 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.

AHRI appreciates CARB’s consideration of these RCU issues and looks forward to discussing in further detail in the coming weeks.

Air Conditioning

The California state legislature mandated a reduction of emissions of hydrofluorocarbons by forty percent (40%) by 2030 compared to 2013 through Senate Bill (SB) 1383 which was signed into law in September 2016. Although the California state legislature mandated specific HFC transitions (SB-1013 enacted in 2018), those provisions were insufficient to reach this ambitious goal, which requires a transition faster than the timeline included in the Kigali HFC Amendment to the Montreal Protocol. As a result, CARB has included a provision in the draft regulation (July 22, 2020) limiting the use of air conditioning refrigerants having a global warming potential of 750 or greater on January 1, 2023.⁵

“Air-conditioning (new) equipment, residential and nonresidential Refrigerants with a GWP of 750 or greater prohibited as of January 1, 2023.”

In 2018, AHRI and the Natural Resources Defense Council (NRDC), along with several individual companies, requested CARB to adopt a January 1, 2023 transition date in response to CARB’s 2017⁶ workshop proposing a transition date of January 1, 2021. The January 1, 2023 date was proposed to align with the date of a DOE efficiency standards change, which mandated a transition in the same timeframe to enable manufacturers to make a single transition.

This transition will require the use of refrigerants with a different flammability classification than the incumbent refrigerant (R-410A). Although the suitable alternatives are considered as having lower flammability (Class A2L) according to the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE),⁷ a modification to the building codes is required to enable the use of these alternatives. Code modifications must be made far enough in advance that manufacturers, who work with a three- to five-year design cycle, have the certainty necessary to design and produce compliant equipment.

The consensus safety standards that need to be adopted into code are:

- Underwriters Laboratories (UL) 60335-2-40, which is a product listing standard.
- ASHRAE 15, which describes installation requirements for equipment.
- ASHRAE 15.2 (proposed), which extracts the residential installation requirements from ASHRAE 15.

It is important to note that industry’s proffer of a 2023 transition date was premised on the expectation that safety standards and building codes would be timely, orderly, and updated to reflect changing technology. Unfortunately, that did not occur.

⁵ Proposed Regulation Order Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and other end uses. <https://ww2.arb.ca.gov/sites/default/files/2020-07/DRAFT%20CA%20SNAP%20Amendments-Reg%20Text.pdf>

⁶ Public Workshop on Rulemaking Proposal: High Global Warming Potential Refrigerant Emissions Reductions California Air Resources Board, October 24, 2017. https://ww3.arb.ca.gov/cc/shortlived/meetings/10242017/public_workshop_snap-california_10-24-17_presentation.pdf?_ga=2.182187808.621576105.1573738237-276427812.1565094831

⁷ ASHRAE 34 documents refrigerant classifications.

The building codes do not yet enable the use of low GWP refrigerants.

The air conditioning industry is now in a challenging situation in the State of California. In 2019, the Uniform Mechanical Code (UMC) was not updated through the International Association of Plumbing and Mechanical Officials (IAPMO) process to enable the use of low GWP refrigerants by adopting the necessary safety standards. California traditionally adopts the UMC on a three-year cycle and then makes modifications as needed. Although AHRI strongly advocated for the UMC to be updated to include the relevant safety standards during this cycle, the modifications did not receive the necessary votes in favor of the proposed changes.

California normally adopts modifications to the building code on a triennial cycle, but the state also has an off-cycle process for proposing and adopting modifications to the building codes, known as the intervening code adoption cycle, between each triennial code update. A handful of state agencies, including California Department of Forestry and Fire Protection (CalFIRE), have the authority to propose code changes during the intervening code adoption cycle. Neither CalFIRE, nor any other agency, submitted a proposal to adopt the relevant safety standards into the California building code update that will go into effect in July 2021.

The next available California Building Standards Commission (CBSC) code cycle to ensure safety standard adoption, will have an effective date of January 1, 2023. These delays mean that the earliest new building codes will be available for review by manufacturers by January 2022. With the design changes necessary to transition to low GWP refrigerants, January 2022 is too late to prepare for the transition.

There are over 4 million products listed in AHRI's Directory of Certified Product Performance with over 9 million new products sold and installed annually in homes and businesses maintained by over 400,000 technicians. All products are regulated by the U.S. Department of Energy and must meet federal energy standards. Federal regulations recognized complexities in stationary air conditioning products by requiring 5-year lead times from promulgation of final efficiency regulations versus 3 years for other regulated products to allow for sufficient time to redesign, test, manufacturer, distribute, educate, and install equipment. Twelve months⁸ is simply not enough time to design, build, certify and bring a compliant product to market.

AHRI has worked tirelessly to develop and disseminate information related to the safe transition to low GWP refrigerants.

Over the past five years, AHRI, in cooperation with the DOE, CARB and other concerned stakeholders have invested nearly \$7 million in research⁹ into the behavior and safe use of next generation refrigerants. This research was used in the development of the safety standards, development of training and in preparation for the transition.

In 2019, AHRI also launched the Safe Refrigerant Transition Task Force^{10,11} to address concerns related to the transition. The task force evaluated the end-to-end supply chain for conversion readiness, identified needs, and

⁸ Unions and contractor organizations have indicated to AHRI that they need eighteen to twenty-four months for training prior to the transition.

⁹ Research results can be found at this website. <http://www.ahrinet.org/Resources/Research/AHRI-Flammable-Refrigerants-Research-Initiative>

¹⁰ Differences in the properties of next generation refrigerants (e.g., flammability and toxicity) may require changes to current practices to minimize risk while meeting regulations. Some new refrigerants are historic products that have not been used in some time or that will be used with larger charge sizes (e.g. ammonia and hydrocarbons)

¹¹ More information about the AHRI Safe Refrigerant Transition Task Force is available at the following website. <http://www.ahrinet.org/SafeRefrigerant>

resolved issues or make recommendations to enable the safe use of low-GWP refrigerants in a timely manner to meet regulatory requirements.

AHRI has provided significant information to CalFIRE, who has convened a working group to discuss the safety standards and the changes needed to the building codes to enable the use of low GWP refrigerants in hopes that harmonizing legislation would have enabled the necessary code changes by year end to comply with the January 2023 transition. However, due to the pandemic, legislation is no longer a practicable option, and the best outcome from CalFIRE's working group is a code change that will be only be finalized by January 2022 which does not provide stakeholders with sufficient time to comply with a January 1, 2023 transition date.

The entire supply chain is facing the challenge of the COVID-19 pandemic.

The pandemic has disrupted manufacturer's business operations and their preparations for the 2023 transition. Based on a survey of AHRI members in April 2020¹², the pandemic has directly led to at least temporary closures of manufacturing facilities for sixty percent (60%) of members by April 2020 and over eighty percent (80%) of members are experiencing reduced manufacturing capacity. Most members have been forced to furlough staff to address the economic impact of the COVID-19.

The pandemic has also changed the long-term outlook of the industry. Half of the industry has experienced lower availability of resources for research & development, resulting in the postponing of 2020 investment for new products as planned. Over eighty percent (80%) of respondents are experiencing supply chain disruptions. By mid-April, one-third (1/3) of AHRI members were already unable to consistently source parts, components, and supplies needed to manufacture equipment. As a result, resources have been reallocated to address these supply chain disruptions (e.g., qualification of alternate components). Other resources have been unavailable for other reasons (e.g., furlough or social distancing requirements). Additionally, almost half of the respondents were experiencing delays in equipment certifications.

Most members have been forced to furlough staff to address the economic impact of COVID-19. Manufacturers have taken important steps like social distancing, moving to remote work, and providing additional healthcare support to ensure the safety and well-being of their employees, prevent the spread of illness, and comply with state requirements. These steps, however, have led to reduced staffing and resources.

AHRI proposes that CARB delay the 750 GWP limit until January 1, 2025 and suggested the following provisions and commitments on July 31, 2020.¹³

As a result of the challenges related to the building codes and the pandemic, AHRI is seeking a delay in the January 1, 2023 transition date limiting GWP of refrigerant to below 750 to January 1, 2025 with a limit of 750 GWP. AHRI understands that CARB still needs to meet the statutory mandate and makes the following proposal to compensate for a delay until January 1, 2025.

July 31, 2020 AHRI Proposal

- January 1, 2025
 - 750 GWP limit for newly manufactured stationary air conditioning equipment, understanding that safety standards and the California codes need to be aligned

¹² The entire industry of essential heating and cooling equipment manufacturers were represented.

¹³ AHRI made this proposal in a meeting on July 22, 2020 to CARB and is formalizing the proposal through this correspondence.

- Prohibit the sale, re-sale, transfer and/or import for use in California of newly produced R-410A, except for export from California
- Require the collection of all refrigerants at end-of-life
- Require reclaimed refrigerant to meet purity requirements of AHRI 700 standard
- Allow nationally reclaimed R-410A to be used in California¹⁴
- Equipment manufacturers will promote and encourage the recovery of R-410A through education of their service and dealer networks

CARB has cited concerns with the above proposal and asked AHRI to develop an alternative option. AHRI looks forward to discussing the new proposal with CARB in the coming days in hopes of resolving transition timing so that it can be included in the proposed regulation in October.

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 or 302-598-4608.

Sincerely,

Helen Walter-Terrinoni

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

¹⁴ If we assume an average lifetime of air conditioning equipment of approximately 20 years, then 5% are replaced annually and that refrigerant can be reclaimed for use which precisely matches the need for servicing refrigerant if leak rates approximately 5% (including emissions during servicing equipment). Although, this seems like a perfect match, there are additional losses during the reclaim process, so additional reclaim will be needed from other states to support California.