

State of California
Air Resources Board

Final Statement of Reasons for Rulemaking, Including Summary of Comments and Agency Response

Public Hearing to Consider the Proposed Amendments to
the Prohibitions on Use of Certain Hydrofluorocarbons in
Stationary Refrigeration, Chillers, Aerosols-Propellants, and
Foam End-Uses Regulation

Public Hearing Date: December 10, 2020
Agenda Item No.: 20-13-4

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I. General

The Staff Report: Initial Statement of Reasons for Rulemaking (ISOR or Staff Report), entitled "*Public Hearing to Consider the Proposed Amendments to the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Chillers, Aerosols-Propellants, and Foam End-Uses Regulation*," released October 20, 2020, is incorporated by reference herein. The Staff Report contained a description of the rationale for the proposed amendments. On October 20, 2020, all references relied upon and identified in the Staff Report were made available to the public. On May 13, 2021 and August 3, 2021, all additional references relied upon were made available to the public.

On December 10, 2020, following a 45-day comment period, the California Air Resources Board (CARB) conducted a public hearing to consider amendments to the regulation entitled "*Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Chillers, Aerosols-Propellants, and Foam End-Uses Regulation*" (hereinafter "*Proposed Amendments*"), as described in the Staff Report, and associated Notice of Public Hearing (45-Day Notice). The regulation requirements are included in Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 5, Sections 95371-95379 of the California Code of Regulations. At the public hearing, CARB staff presented the Proposed Amendments as well as additional suggested modifications to the regulatory text to address comments received following the release of the Staff Report regarding the need for changing the effective dates for some of the air-conditioning (AC) equipment.

Written comment letters were received from fifty-seven individuals or organizations during the 45-day comment period. Oral comments were presented by thirty-three individuals or organizations. Three written comments were received on the day of the Hearing. Written comments were also received by one of the thirty-three oral comment presenters on the day of the Hearing. At the conclusion of the hearing, the Board adopted Resolution 20-37, which approved the Proposed Amendments to the regulation for adoption.

Resolution 20-37 directed the Executive Officer to determine if additional conforming modifications to the regulations were appropriate. If so, the Executive Officer was directed to make the modified regulations (with the modifications clearly identified) and any additional documents or information relied upon available for a supplemental 15-day public comment period. The Executive Officer was directed to consider any comments on the modifications received during any supplemental 15-day public comment period. The Executive Officer was then authorized to either: (1) adopt the modified regulation as it was made available for public comment, with any appropriate additional modifications; or (2) make all additional modifications available for public comment for a period of at least 15 days and present the regulations to the Board for further consideration, if warranted.

After the December 10, 2020 public hearing, CARB staff proposed modifications to the originally proposed regulatory amendments in response to comments. The text of the proposed modifications to the regulations was made available for a 15-day public comment period by issuance of a "Notice of Public Availability of Modified Text" (First

15-Day Notice). The first 15-day comment period started on May 13, 2021 and ended on May 28, 2021 at 5:00 pm.

When the First 15-Day Notice and all attachments were posted on the internet, they were also electronically distributed to all persons that subscribed to the following CARB listserv topics: "HFC Reduction Measures," "Climate Change," "Commercial Refrigeration Specifications," and "Stationary Equipment Refrigeration Management Program." The email distribution list for the "HFC Reduction Measures" topic includes all persons who testified at the public hearing, submitted comments at the hearing or during the comment period, or requested notification of any proposed changes, per Section 44(a), Title 1, California Code of Regulations, and Government Code Section 11340.85. Written comment letters were received from seventeen individuals or organizations during the First 15-day comment period.

In response to comments received during the first 15-day comment period, CARB staff modified the language a second time. The text of the proposed modifications to the regulations was made available for a second 15-day public comment period by issuance of a "Second Notice of Public Availability of Modified Text and Availability of Additional Documents" (Second 15-Day Notice). The 15-day comment period started on August 3, 2021 and ended on August 18, 2021 at 5:00 pm.

When the Second 15-Day Notice and all attachments were posted on the internet, they were also electronically distributed to all persons that subscribed to the following CARB listserv topics: "HFC Reduction Measures," "Climate Change," "Commercial Refrigeration Specifications," and "Stationary Equipment Refrigeration Management Program." The email distribution list for the "HFC Reduction Measures" topic includes all persons who testified at the public hearing, submitted comments at the hearing or during the comment period, or requested notification of any proposed changes, per Section 44(a), Title 1, California Code of Regulations, and Government Code Section 11340.85. Written comment letters were received from sixteen individuals or organizations during the second 15-day comment period.

This Final Statement of Reasons (FSOR) updates the Staff Report by identifying and providing the rationale for the modifications made to the originally proposed amendments to the regulatory text, updates to the informative digest, updates to the economic analysis, and other technical updates. The FSOR also contains a summary of the comments received during the formal rulemaking process by CARB on the proposed amendments or the process by which they were adopted, and CARB's responses to those comments.

A. Mandates and Fiscal Impacts to Local Governments and School Districts

The Board has determined that this regulatory action will not result in a mandate to any local agency or school district the costs of which are reimbursable by the state pursuant to Part 7 (commencing with Section 17500), Division 4, Title 2 of the Government Code. The mandate is not reimbursable because costs associated with the Proposed

Amendments apply generally to any person who sells, leases, rents, installs, uses, or otherwise enters into commerce, in the State of California, any product, equipment, material, or substance in end-uses listed in Tables 1 through 4 of Section 95374, Title 17, California Code of Regulations. Therefore, the Proposed Amendments do not constitute a "Program" imposing any unique requirements on local agencies as set forth in Section 17514 of the California Government Code.

B. Consideration of Alternatives

Government Code Section 11346.9(a)(4) requires that CARB consider reasonable alternatives which "include, but are not limited to, alternatives that are proposed as less burdensome and equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with the authorizing statute or other law being implemented or made specific by the proposed regulation." For the reasons set forth in the Staff Report, in CARB staff's comments and responses at the hearing, and in this FSOR, the Board determined that no alternative considered by the agency would be more effective in carrying out the purpose for which the regulatory action was proposed, or would be as effective and less burdensome to affected private persons, or would be more cost-effective to affected private persons and equally effective in implementing the statutory policy or other provisions of law than the action taken by the Board.

In seeking to support California's progress toward the 2030 greenhouse gas (GHG) and hydrofluorocarbon (HFC) emission reduction goals as well as CARB's Short-Lived Climate Pollutant (SLCP) Strategy, CARB also needs to make the Proposed Amendments enforceable and transparent, allow options for small businesses, and provide flexibility to address challenges.

Government Code Section 11346.9(a)(5) requires a description of reasonable alternatives to the regulation that would lessen any adverse impact on small business as well as the agency's reasons for rejecting those alternatives. CARB staff does not foresee that any manufacturers subject to the requirements would be small businesses, except in the refrigeration sector, and in the air conditioning (AC) sector, companies that purchase ACs, but not the original equipment manufacturers (OEMs) themselves.

CARB staff considered the following alternatives:

- **More Stringent Alternative:** Would require every new refrigeration system to have a refrigerant with a global warming potential (GWP) value below 10, regardless of whether it is installed in a new or existing facility. For AC equipment, room ACs would be required to have a refrigerant with a GWP value less than ten (10), and residential and commercial AC equipment would be required to use a refrigerant with a GWP value less than 500. Although Alternative 1 would result in more emissions reductions than the Proposed Amendments, CARB rejected this alternative due to higher cost and current logistical challenges.

- Less Stringent Alternative: Would require new refrigeration systems use a refrigerant with GWP less than 1,500 and for commercial AC to be included in CARB's Refrigerant Management Program (RMP). CARB rejected this alternative because it comprises less stringent requirements for both refrigeration and AC than the Proposed Amendments in that it would yield significantly less emissions reductions and it is less cost-effective than the Proposed Amendments.
- Small Business Alternative: Would exempt small businesses from the company-wide emission reduction requirements for retail food facilities altogether. CARB rejected this alternative because it comprises less stringent requirements and would not prepare small businesses for the national HFC phasedown that is going to be implemented by the U.S. Environmental Protection Agency (U.S.EPA). CARB did relax the pace at which small retail food businesses have to achieve the company-wide targets. Companies with fewer than 20 retail food facilities in California and those not part of a national chain do not have to meet the 2026 interim target. For AC, there are no small business manufacturers that have been identified as affected by the Proposed Amendments. However, all small businesses in California that purchase a new AC system from 2023 onward are affected by the Proposed Amendments. CARB has not identified any reasonable alternatives to the requirements pertaining to stationary AC that would lessen any adverse impact on small business.

C. Updates to the Economic Impact Assessment in the Staff Report

As part of the Second 15-Day Notice, CARB staff released "*Attachment B: Updated Cost and Benefit Analysis.*" This analysis (outlined below) identifies changes made to the emission benefits, climate benefits, health benefits, and economic costs and benefits due to the Proposed Amendments.

(1) Updates to the Assessment of Benefits

Compared to CARB's originally proposed amendments in the Staff Report, the delay in the effective dates for AC equipment decreased the expected GHG emission reductions and associated benefits. Between 2022 and 2040, the average annual reduction in HFC emissions from the refrigeration and AC sectors combined decreased from 3.8 MMTCO_{2e} to 3.3 MMTCO_{2e}. Cumulative emissions reductions through 2040 decreased from 72 MMTCO_{2e} to 62 MMTCO_{2e}. The benefit of HFC reductions is estimated using the social cost of carbon, which provides a dollar valuation of the damages caused by one ton of carbon pollution and represents the monetary benefit today of reducing carbon emissions in the future. The social cost of carbon benefits varies depending on the discount rate and expressed as a range. The range of cumulative benefits through 2040 decreased from \$1.7 – \$7.2 billion to \$1.5 – \$6.3 billion.

CARB expects benefits from creating a refrigerant reuse and reclaim program. A robust reclaim program can help enhance recovery of refrigerants from equipment during its lifetime and at end of life and prevent those refrigerants from being leaked

into the atmosphere. As with other recycling programs, a program for reclamation of refrigerants also promotes a more resource-efficient circular economy. With the establishment of the Refrigerant Recovery, Reclaim, and Reuse (R4) program, CARB has laid the groundwork for building more comprehensive reclaim requirements via future rulemakings. In the long term, a robust recovery and reclamation program is expected to be an important tool in California’s strategy towards achieving a low-emissions, low-carbon future.

(2) Updates to the Direct Costs

The direct costs for the modified Proposed Amendments are estimated to be lower than those described in the Staff Report. The Proposed Amendments would have required manufacturers to produce and sell all AC equipment that use a refrigerant with a GWP value less than 750 starting January 1, 2023. Under the modified Proposed Amendments, the effective date for this 750 GWP limit will vary from 2023 to 2026, depending on the type of equipment. The baseline and incremental costs per unit for new AC equipment are the same as those discussed in the Staff Report. However, since all new AC equipment will not be required to use lower-GWP refrigerants starting 2023, the statewide costs are expected to decrease compared to the originally estimated costs in the Staff Report. Some additional costs are expected to be incurred from the R4 program.

Under the modified Proposed Amendments, the average annual direct cost is expected to decrease from \$201 million to \$164 million for the AC end-use sector through 2040. There are no changes in the costs estimated for the refrigeration sector (annual average costs, \$26 million). The combined annual direct costs for AC and refrigeration are expected to decrease from \$227 million to \$190 million through 2040. The direct costs comprise costs related to equipment, installation, maintenance, refrigerant replenishment, electricity, retrofit of manufacturing facilities, and the additional costs due to the R4 program.

(3) Updates to the Fiscal Costs

Under the modified Proposed Amendments, costs for the State government are expected to decrease from \$93.8 million to \$80.5 million over the regulatory horizon, while fiscal impacts to local governments are expected to decrease from \$81 million to \$67.7 million.

D. Updates to the Informative Digest

(1) Updates to Comparable Federal Regulations

Currently, there are no comparable federal regulations that impose global warming limits on refrigerants used in stationary refrigeration and air-conditioning. Below is a description of other federal laws that regulate different aspects related to HFCs. The Proposed Amendments do not conflict with existing federal laws.

(i) *Significant New Alternatives Policy (42 U.S.C. § 7671k; 40 C.F.R. Subpart G, 82.170 et seq.)*

Under Section 612 of the federal Clean Air Act, U.S. EPA implements the Significant New Alternatives Policy (SNAP) program, which makes it unlawful to replace any ozone depleting Class I Substance (e.g., chlorofluorocarbon or CFC) or Class II Substance (hydrochlorofluorocarbon or HCFC) with any substitute that U.S. EPA determines may present adverse effects to human health or the environment. It also requires U.S. EPA to publish a list of (a) substitutes prohibited for specific uses; and (b) safe alternatives. 42 U.S.C. § 7671k(c)(2).

Some prohibitions on the use of certain refrigerants for the stationary refrigeration sector were present in U.S. EPA's SNAP Rules 20 (40 CFR Part 82, Subpart G, Appendix U) and 21 (40 CFR Part 82, Subpart G, Appendix V). However, these are prohibitions on specific refrigerants and do not impose GWP limits. Furthermore, they were partially vacated when the D.C. Circuit Court of Appeals held U.S. EPA did not have authority to require replacement of HFCs where the manufacturer has already replaced an ozone depleting substance (ODS).¹ Thus, the Proposed Amendments do not conflict with the SNAP Program.

(ii) *American Innovation and Manufacturing Act of 2020 (42 U.S.C. § 7675)*

On December 27, 2020, Congress enacted the American Innovation and Manufacturing (AIM) Act.² The AIM Act directs U.S. EPA to engage in a rulemaking to phase down *production and consumption* of HFCs, maximizing reclamation and minimizing releases from equipment, and facilitating the transition to next-generation technologies through sector-based restrictions. U.S. EPA released a proposed rule to regulate a phase down of the production and consumption of HFCs.³ The AIM Act is different from what is being proposed in the Proposed Amendments because it addresses *production and consumption* of HFCs, not the *use and GWP* of HFCs. Therefore, the Proposed Amendments do not conflict with the AIM Act.

(iii) *Federal Appliance Energy Efficiency Standards (42 U.S.C. § 6291 et seq.)*

The federal Energy Policy and Conservation Act of 1975 (EPCA) establishes the federal energy conservation program for consumer products and appliances (e.g., AC equipment and heat pumps) (See 42.U.S.C. § 6295(o)(2)(A)). Where the federal government does not regulate energy efficiency in appliances, states may set energy efficiency standards for those unregulated appliances. The Proposed Amendments do not conflict with the federal or state energy efficiency standards because they do not regulate the energy efficiency of the appliance. Rather, they regulate the refrigerant that is used in the appliance and only set performance standards prohibiting refrigerants with

¹ *Mexichem Fluor, Inc. v. Environmental Protection Agency* (D.C. Cir. 2017) 866 F. 3d 451.

² 42 U.S.C. § 7675, Pub. L. 116-260, § 103.

³ Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act, 86 Fed. Reg. 27150 (May 19, 2021).

a certain GWP, which varies depending on the end-use. Therefore, the Proposed Amendments do not conflict with the EPCA.

(iv) *Federal Transportation and Storage Requirements (49 C.F.R. Parts 107 et seq., 171-180, 397 et seq.)*

The U.S. Department of Transportation (U.S. DOT) regulations place certain requirements on motor carriers transporting materials that may qualify as “hazardous” (explosive), including weight limits, safety permit, registration, and recordkeeping requirements, amongst other requirements. See 49 C.F.R. Parts 171 et seq., 385.403, 397 et seq. These requirements place limits on how much potentially hazardous materials can be transported and stored. This is different from the Proposed Amendments in that the Proposed Amendments do not impose any requirements on transportation of potentially flammable refrigerants and do not require use of flammable refrigerants. Rather, the Proposed Amendments only place GWP limits on refrigerants. Therefore, the Proposed Amendments do not conflict with federal transportation and storage laws.

(2) Updates to the Evaluation of Inconsistency or Incompatibility with Existing State Regulations (Gov. Code, § 11346.5, subd. (a)(3)(D))

During the process of developing the proposed regulatory action, CARB conducted a search of any similar regulations on this topic and concluded these regulations are neither inconsistent nor incompatible with existing state laws.

(i) *Codes and Standards (Cal. Code Regs., tit. 24, Part 4)*⁴

The term “Codes and Standards” is industry speak for a combination of safety standards and building codes that govern the safe use of appliances and systems in

⁴ Throughout this document there are several references to “Codes and Standards,” “Safety Standards and Building Codes,” the “California Mechanical Code,” “Building Standards,” and “UL or ASHRAE Standards,” so for purposes of clarity, this footnote provides a brief explanation that applies throughout. The term Codes and Standards is a colloquial term that refers to the combination of safety standards and building codes that need to be in place to use equipment such as AC and refrigeration systems safely. Safety standards that are developed by safety standard setting organizations are incorporated into model building codes that are developed by regional code bodies. Model codes are adopted by state governments into state-specific building codes. The California Building Standards Code is located in the California Code of Regulations, Title 24. The California Mechanical Code is one section of the California Building Standards (Part 4 specifically) and includes safety requirements for refrigeration and AC systems. Both the California Building Standards Code and its subsection, the California Mechanical Code are law. Safety standards such as those developed by ASHRAE and UL, model building codes and state-specific building codes continually evolve and are updated to reflect technological advancements in the field while ensuring safe use of new technologies. Safety standards are enforced through California building codes, which are law.

buildings. There is a multi-step national and international collaborative process in place to develop and implement safety standards and building codes. The first step in the process begins with the development of safety standards by standard-setting organizations. Safety standards are incorporated into model building codes that are developed by regional code bodies. Model codes are adopted by states into state-specific building codes.

Safety standards are typically developed by organizations that are accredited by the American National Standards Institute (ANSI). Safety standards pertaining to refrigerants and refrigerant-containing systems are predominantly developed by the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) and Underwriters Laboratory (UL). ASHRAE and UL are both ANSI-accredited organizations. The two primary model code bodies in the U.S. are the International Association of Plumbing and Mechanical Officials (IAPMO) and the International Code Council (ICC). The California Building Standards Code, like other state-specific codes, consists of a series of model codes such as the electrical code, mechanical code, fire code among others and is designed to protect public health, safety, and general welfare as they relate to the construction and occupancy of buildings and structures.

The California Building Standards Code, or California Building Code, is in the California Code of Regulations, Title 24. The California Mechanical Code is one Section of the California Building Standards (Part 4 specifically) and includes safety requirements for refrigeration and AC equipment, making it directly relevant for the Proposed Amendments. Both the California Building Standards Code and its subsection, the California Mechanical Code are law. California adopts the Uniform Mechanical Code (UMC), the model code that is developed by IAPMO. ASHRAE Standard 15-2019 refers to the latest version of the safety standard for refrigeration and AC systems developed by ASHRAE. ASHRAE 34-2019 refers to the latest version of the safety standard for the designation and safety classification of refrigerants. UL-60335-2-40 3rd Edition refers to the latest version of the safety standard for AC equipment developed by UL. Safety standards such as those developed by ASHRAE and UL, model building codes and state-specific building codes continually evolve and are updated to reflect technological advancements in the field while ensuring safe use of new technologies. Safety standards are enforced through California Building Standards Codes.

Codes and Standards are relevant to the Proposed Amendments because updates are needed to some of the relevant safety standards and the California Building Code to allow the safe use of certain next-generation refrigerants in some types of AC equipment. However, the Proposed Amendments do not require OEMs to use any specific refrigerant types and in fact, the Proposed Amendments are meant to be technology pushing to encourage innovation in the industry. The Proposed Amendments set performance standards prohibiting refrigerants above a certain GWP, which varies depending on the end-use – industry is free to comply with the regulation using any refrigerant that meets the requirements. Furthermore, the California Building Code is anticipated to be finalized in 2023 and released by January 1, 2024 with an

effective date of July 1, 2024, in advance of the 2025 deadline for AC equipment. Variable Refrigerant Flow (VRF) equipment has a compliance date of January 1, 2026, which is aligned with the effective date of the next California Building Code update, following the July 1, 2024 update. In the event there is no new technology, or the Codes and Standards are not updated, CARB has a variance process that allows for an extension of the effective date, provided all requirements are met. Hence, the Proposed Amendments do not conflict with the Codes and Standards.

(ii) California Building Energy Efficiency Standards (Pub. Res. Code § 25402 et seq. and Cal. Code Regs., tit. 24, Parts 6 and 11)

California Building Energy Efficiency Standards (BEES), under the Warren-Alquist Act (Energy Code), are developed to reduce energy consumption in newly constructed and existing buildings by prescribing energy efficiency and conservation standards throughout the entire building. These standards do not prohibit any specific refrigerants but rather regulate the overall energy consumption of the entire building.

The Proposed Amendments do not conflict with the BEES because they do not regulate the building, or the energy efficiency of the appliances used in the building. Rather, they regulate the refrigerant that is used in the appliance and only set performance standards prohibiting refrigerants with a certain GWP, which varies depending on the end-use. This is different from the BEES, which regulates the overall building energy consumption. The regulated community can comply with both the BEES and the Proposed Amendments. The Proposed Amendments do not conflict with the BEES.

(iii) California Appliance Efficiency Standards (Cal. Code Regs., tit. 20 § 1601 et seq.)

The California Appliance Efficiency Standards (CAES) establishes energy efficiency standards for consumer products and appliances that are not regulated under federal energy efficiency standards (see Cal. Code Regs., tit. 20 § 1601(b)). The Proposed Amendments do not conflict with the CAES because they do not regulate the energy efficiency or energy consumption of the appliances. Rather, they regulate the refrigerant that is used in the appliance and only set performance standards prohibiting refrigerants with a certain GWP, which varies depending on the end-use. This is different from the CAES, which regulates the actual appliance. The Proposed Amendments do not conflict with the CAES.

(iv) Fluorinated Gases; Prohibitions and Restrictions, Senate Bill 1013 (Health & Saf. Code § 39734)

In 2018, California incorporated Appendices U and V of SNAP Rules 20 and 21 by enacting the "California Cooling Act" or Senate Bill 1013 (SB 1013). Under SB 1013, the prohibitions on certain end-use refrigerants are incorporated into state law. Although SB 1013 prohibits the highest GWP refrigerants such as R-404A (GWP 3,922) and R-507 (GWP 3,985), many other high-GWP refrigerants are still currently allowed

for use. Regardless, there are no GWP limits but rather, outright prohibitions on certain refrigerants. Furthermore, the HFC Regulation incorporates SB 1013 provisions into regulation and those requirements are not changing. The Proposed Amendments do not conflict with SB 1013.

(v) *State Transportation and Storage Requirements (Veh. Code, §§ 353, 2402.7, 31301 et seq.; Cal. Code Regs., tit. 13, § 1202.1)*

State regulations place requirements on motor carriers transporting materials that may qualify as “hazardous” (explosive), including inspection requirements, safety permit, registration, and recordkeeping requirements, amongst other requirements. (See Cal. Code Regs., tit. 13, § 1202.1.) The Proposed Amendments do not regulate transportation or storage of potentially flammable refrigerants. Rather, the Proposed Amendments only place GWP limits on refrigerants. Therefore, the Proposed Amendments do not conflict with State transportation and storage laws.

Hence, there are no state laws that are inconsistent with or in conflict with the Proposed Amendments.

E. Technical Updates to the Staff Report

- (1) *Executive Summary of the Staff Report:* The second paragraph, line 8 states “In 2018, California incorporated both SNAP Rules 20 and 21—first through adopting an HFC Regulation and then the Legislature enacted the ‘California Cooling Act’ or Senate Bill 1013 (SB 1013).” SB 1013 does not adopt all of SNAP Rules 20 and 21, just Appendices U and V so the language “Appendices U and V of” should be added. The sentence should read: “In 2018, California incorporated both Appendices U and V of SNAP Rules 20 and 21—first through adopting an HFC Regulation and then the Legislature enacted the ‘California Cooling Act’ or Senate Bill 1013 (SB 1013).”
- (2) *Page 4 of the Staff Report:* The first paragraph, line 1 states “That same year, the California Legislature adopted the California Cooling Act (SB 1013), which incorporated both SNAP Rules 20 and 21 into state law.” SB 1013 does not adopt all of SNAP Rules 20 and 21, just Appendices U and V so the language “Appendices U and V of” should be added. The sentence should read: “That same year, the California Legislature adopted the California Cooling Act (SB 1013), which incorporated Appendices U and V of both SNAP Rules 20 and 21 into state law.”
- (3) *Page 94 of the Staff Report:* Table 24 lists charge sizes for Residential AC and Residential Heat Pump (HP) as 8.157 and 7.5 lbs. respectively. The charge sizes for Residential AC and Residential HP were inadvertently switched. The charge size for AC should be 7.5 lbs. and the charge size for HP should be 8.2 lbs. Additionally, the charge size for Residential HP accidentally contains two extra significant digits and that should be 8.2 lbs. and not 8.157 lbs.

- (4) *Page 11 of the Staff Report:* The second paragraph, line 1 says “These synthetic fluorinated refrigerants are commonly dubbed ‘natural refrigerants’ because unlike HFCs, these are naturally occurring gases and no companies hold patents on manufacturing them.” The words “synthetic fluorinated refrigerants” should be removed. The sentence should read: “These ~~synthetic fluorinated refrigerants~~ are commonly dubbed ‘natural refrigerants’ because unlike HFCs, these are naturally occurring gases and no companies hold patents on manufacturing them.”
- (5) *Page 11 of Staff Report:* The second paragraph, line 3 should have added “like ammonia and propane” to the sentence “Natural refrigerants have excellent thermodynamic properties, which make them ideal refrigerants.” The sentence should read: “Natural refrigerants like ammonia and propane, have excellent thermodynamic properties, which make them ideal refrigerants.”
- (6) *Page 25 of Staff Report:* The second paragraph, line 2 says “Hydrocarbons are naturally occurring substances, have GWP values of 3, and owing to their thermodynamic properties, are excellent refrigerants.” The value of 3 should be “up to 10.” The sentence should read: “Hydrocarbons are naturally occurring substances, typically have GWP values of 3 up to 10, and owing to their thermodynamic properties, are excellent refrigerants.”

F. Updates to the Environmental Analysis in the Staff Report

The Proposed Amendments do not change implementation of the regulation in any way that affects the conclusions of the environmental analysis included in the Staff Report. The proposed modifications consist primarily of definitions and provisions to ensure clarity of aspects of the rulemaking, extends some compliance deadlines, and consist of a provision that requires manufacturers to use a specified minimum amount of reclaimed refrigerant in new AC equipment or in the servicing of existing equipment.

The Proposed Amendments requiring manufacturers to use a certain amount of reclaimed refrigerant in AC equipment (the R4 program) will not result in a compliance response that alters the existing environmental determination for this rulemaking for the following reasons: The existing reclaimed refrigerant operations in the United States reclaim more than two million pounds of R-410A each year. CARB staff estimate these amounts to be adequate for equipment manufacturers to meet the reclaim use requirements under the proposed R4 program. Therefore, there will be no need for reclaimed refrigerant suppliers to build new or expanded facilities to ensure AC manufacturers can comply with the proposed R4 program. Since reclaimed refrigerant is first recovered from equipment, each pound of a refrigerant that is reclaimed is essentially a pound of avoided emissions. Thus, use of reclaimed refrigerants provides GHG reductions by lowering refrigerant leaks particularly at the end of the equipment’s life for ACs.

II. Modifications Made to the Original Proposal

A. Non-Substantial Modifications

The non-substantial modifications, described below, clarify and do not materially alter the requirements, rights, responsibilities, conditions, or prescriptions contained in the regulation as adopted by CARB and approved by the Office of Administrative Law (OAL). (See Cal. Code Regs., tit. 1, § 40.) Unless otherwise noted below, changes listed below have been made to improve grammar, punctuation, and/or ensure consistency of formatting across the California Code of Regulations.

The following non-substantial modifications were made to the Final Regulation Order:

- Indented several subsections to make the structure consistent throughout, specifically, Section 95373 (definitions of GHGp, Residential Dehumidifier, and Weighted Average GWP) as well as Section 95375(a)(3)(B) (refrigeration recordkeeping requirements).
- Deleted all extraneous spaces (e.g., "95374 (c)" to "95374(c)").
- Placed quotation marks around defined terms throughout the regulation.
- In several definitions, added the words "the," "that," "an," "has," "is," "will," "and" to make complete sentences where these words were missing.
- Removed sections from the "Authority" and "Reference" notes at the end of each sections that were not relevant.
- Fixed inconsistent use of semi-colons and commas in multiple areas for consistency and added commas, semicolons, periods where missing throughout.
- Removed "For the purposes of this subarticle" in several definitions in section 95373 because it is said at the beginning so redundant elsewhere.
- In the definition of "Air-conditioning (AC) Equipment" added "s" at the end of PTAC and PTHP to make plural and moved "ducted" from the end of heat pumps to before central air conditioning, added the word "equipment" in the third to last sentence after "Air-conditioning," struck out the word "apply" and replaced with "refers" and struck out the word "applies" and replaced with "include." Also, struck out the word "or" before "mobile air-conditioning," added "that" before "used."
- Capitalized "Trade" in the definition of "Applicant" after removing "For purposes of this regulation."

- Removed the words “specific” and “bear deterrent” in the definition of “Bear Spray” as unnecessary. Added an “n” to the word “a” before aerosol to read “an aerosol.”
- Moved the words “from a previously operational appliance” in the definition of “Certified Reclaimed Refrigerant.”
- Added “an” to the word “other” in the definition of “Chiller” and the word “and” between “cooled” and “include.”
- Deleted the last sentence in the definition of “Cold Storage” (“For purposes of this regulation, cold storage is regulated as “refrigeration equipment (new) containing more than 50 pounds refrigerant” in section 95374(c)” as this is already understood so just extra language.
- In the definition of “End-use” simplified from Table 1, Table 2, Table 3, Table 4 to “Tables 1 through 4 of.”
- Revised the definition of “Executive Order” to add “authorizes a variance from the requirements of sections 95374 and 95375 and” after the word “that” and before the word “specifies” for consistency with the variance provision.
- In the definition of “Force Majeure” added “Event” to the title, replaced the word “regulation” with “subarticle,” replaced the word “which” with “such as,” replaced the word “the” with “that”, and replaced the word “described” with “defined.”
- Removed extraneous “and” in the definition of “Household Refrigerators and Freezers” in Section 95373(a). Replaced the word “drinks” with “beverages.”
- Added the word “household” before the word “refrigerator” in the definition of “Household Refrigerators and Freezers – Built-in.” Also reworded to add “has a total refrigerated volume of” in front of 7.75 cubic feet” and “(220 liters),” as well as “more, and “a depth of” in the first paragraph.
- Added the word “household” before the word refrigerator in the definition of “Household Refrigerators and Freezers.”
- Added a “hyphen” between the words “aerosols” and “propellants” in Sections 95373(a) (Hydrofluorocarbons), 95375(b)(2)(B) and 95375 (b)(2)(C) and a hyphen between the words “one” and “component” in the “Rigid Polyurethane (PU): one component foam sealants” category in Table 2, Section 95374(b).

- Added in the words "(air district)" to the definition of "Air Pollution Control Officer" after the words "local air quality management district or air pollution control district."
- Split up the first sentence in the definition of "Industrial Process Refrigeration" by placing a period after the word "applications" and switched the word "and" for "These" before the words "are complex."
- Corrected spelling of "Celsius" (e.g., "Cenclsius" to "Celsius") in new definitions of "Low Temperature Refrigeration System" and "Medium Temperature Refrigeration System" in Section 95373(a).
- Removed extraneous "and," "a" and "or" throughout.
- Switched "that" to "which" and vice versa where grammatically correct throughout.
- Capitalized the beginning of sentences (e.g., definition of "Stationary" in Section 95373(a)).
- Renumbered all Sections and subsections to be in line with the numbering convention for the California Code of Regulations (e.g. (a), (1), (A) 1) and to fix numbering mistakes.
- Removed extraneous headings "General End-Use," "Specific End-Use," "Prohibited Substances," and "Effective Date" in Table 1, Section 95374(a) after the row for "Vending Machines."
- Switched "U" in the term "End-use" to a upper case "U" (e.g., "End-Use").
- Moved the term "(new)" from the "General End-Use" to the "Specific End-Use" in Table 2, Section 95374(b) (e.g., cold storage warehouses).
- Changed "Air-conditioning" to lower case "air-conditioning" in Table 3, Section 95374(c).
- Removed "NOTE: Authority cited. . .Reference . . ." at the end of Section 95375(b)(2)(C) and added it at the end of Sections 95375(d)(7), 95376, and 95378.
- Moved commas and periods inside quotations throughout the Proposed Amendments.
- Added an "s" where words were intended to be plural or removed the "s"

where they were intended to be singular throughout.

- Removed the duplicate word “at” in Section 95374(c), Table 3 (Chillers) in the “specific end-use” category for Chillers (new) designed for chilled fluid leaving the chiller at temperatures ≤ -10 °F (-23 °C) and > -58 °F (-50 °C).
- Replaced colons with “equal to” signs in some equations for calculating annual reclaim use requirements for AC and VRF equipment in Section 95376.
- In the definition of “Impossibility,” added the words “of this subarticle” after the word “requirements” for better flow.
- In Tables 3 and 4, added “New” in front of subheadings for “Air-Conditioning,” “Chillers,” and “Refrigeration.”
- In the definition of New Air-conditioning Equipment” replaced the word “experienced” with “undergone.”
- In the definition of “New Chiller” added the word “components” after the word “new” in paragraph (1) and in paragraph (2) replaced the word “experienced” with “undergone.”
- In the definition of “New Facility” replaced the words “for any” with “that has undergone” and “with a” with “its.”
- In the definition of “New Refrigeration Equipment” added “section 95374(a) for consistency in paragraph (1), and added “components” after the word “new” and the word “and” before “used” in paragraph (1)(A). In paragraph (1)(B), replaced the word “experienced” with “undergone.” In paragraph (2), added the word “components” after new, the word “and” after new, and section 95374(c) or” after Table 3 for consistency. In paragraph (2)(C), replaced word “experienced” with “that has undergone.”
- In the definition of “Other Refrigeration” added the word “refrigeration” after the word “retail food” for consistency.
- In the definition of Packaged Terminal Air Conditioner” added the words “builder’s choice of” before the word “energy” for sentence completeness.
- In the definition of “Polystyrene Extruded Boardstock and Billet (XPS)” added the words “purposes including” before the words “but not limited to.”
- In the definition of “Polystyrene Extruded Sheet” added the words “including, but not limited to, products” after the word “packaging.”

- In the definition of "Polyurethane" placed a period after the word "polyol" and added the word "Polyurethane" to start the next sentence, removed "and which would" before "includes."
- In the definition of "Refrigeration Equipment" added the word "refrigeration" after the words "retail food."
- In the definition of "Refrigerant Registration and Reporting System" added a hyphen between the words "web" and "based" and removed the word "a" before the word "web," replacing it with the word "the." Also replaced the words "greater than" with the word "more," and the words "implementing the" with "by."
- In the definition of "Remote Condensing Units" removed "but not limited to."
- In the definition of "Residential Consumer Refrigeration Products," replaced the word "means" with "includes," and the word "or" with "and" before "Household Refrigerators and Freezers - Built-in." Deleted the term "Household Refrigerators and Freezers," "Household Refrigerators and Freezers Compact," and "Household Refrigerators and Freezers - Built-in" in the second sentence, as well as the word "It" in the third sentence, and replaced the word "does" with "is." Replaced "and" before "campers" with "or" and replaced the semicolon after campers with a period. In the sentence beginning with "Residential Consumer Refrigeration Products" replaced the word "and" before "laboratories" with "or." In the last sentence, "non-food or non-potable drink items" was replaced with "other than food and beverages." Last, CARB staff removed the words "truck for personal use" as trucks for personal use are captured in the term "passenger vehicles" so redundant.
- In the definition of "Retail Food Facility," CARB staff added the word "unit" after "Retail food refrigeration equipment" to improve readability.
- Revised the definition of "Retire" to be "Retirement" to align with how we use it.
- Revised the definition of "Rigid Polyurethane" to delete the words "polymers produced by the reaction of an isocyanate and a polyol" as this is the definition of "polyurethane" so is already included and replaced with "made of polyurethane" to simplify.
- Revised the definition of "Rigid Polyurethane Appliance Foam" to move the term "in domestic appliances" to the end of the sentence for readability.
- In the definition of "Rigid Polyurethane Commercial Refrigeration and Sandwich Panel" removed the word "to provide" and added "for" and removed the words "doors including" before "garage doors" as "doors" is already included in "walls and doors" beforehand.

- Replaced the word “in situ” with the word “onsite” in the definition of “Polyurethane High-pressure Two Component Spray Foam,” “Rigid Polyurethane Low-pressure Two-component Spray Foam” and “Rigid Polyurethane One-component Foam Sealant.”
- Removed the word “blowing agent” in the definition of Rigid Polyurethane Low-pressure Two-component Spray Foam” as redundant (used twice). Also replaced the word “are” with “is.”
- In the definition of “Rigid Polyurethane Slabstock and Other” removed the word “closed-cell” because “Rigid Polyurethane” already includes “closed-cell” in its definition so is redundant.
- In the definition of “Supermarket Systems,” for “Indirect Systems” removed the word “central” and replaced with “indirect.”
- In Table 2, footnote (a) of section 95374(b), amended the footnote to remove the words “the purposes of,” and “under this end-use.”
- Struck out “effective date of this subarticle” and added “January 1, 2022” in sections 95375(c)(4)(A) and (B), 95375(d)(2)(A), 95375(d)(2)(B), 95375(d)(5), 95375(d)(7), 95376(d).
- Placed quotation marks on the outside of “System” and capitalized “System” in definition of “Variable Refrigerant Flow (VRF)” and added “Variable Refrigerant Volume (VRV) System” to heading of definition.
- Removed restatement of already existing definitions (GWP and Refrigerant) and the restatement regarding including equipment with more than 50 pound refrigerant in definition of “Weighted-average GWP.”
- Changed the heading for section 95375 from “Requirements” to “Prohibitions, Exemptions, Registration, Recordkeeping, Reporting, Labeling, and Disclaimer Requirements.”
- Added the word “of” before the word “section” in section 95375(a)(1).
- Added “laminated boardstock” after the word “rigid polyurethane” in section 95375(a)(2)(A).
- Added a hyphen between the words “closed” and “cell” throughout.
- In section 95375(a)(3)(B)3, struck the words “a component” after “If” and added the word “the” before “equipment” and added the words “or a component” after the word “equipment.”

- In section 95375(a)(4)(A), replaced the word “subarticle” with “section.”
- Changed sections 95375(a)(4)(B) and 95376(c)(3) to have documents to be sent to CARB’s email (HFCREDUCTION@ARB.CA.GOV).
- In section 95375(b)(2)(A)2, added “High-Pressure Two-Component” to the beginning of the heading after “Rigid Polyurethane” to make it consistent with the definition.
- In section 95375(b)(2)(A)3 added “Low-Pressure Two-Component” to the beginning of the heading after “Rigid Polyurethane” to make it consistent with the definition.
- Added in “(HFC-134a)” and “(Other)” to differentiate “Aerosols – Propellants End-Uses” duplicate headings in section 95375(b)(2)(B) and (C).
- Removed “Unless otherwise prohibited by State regulation” from section 95375(b)(2)(B). Also added the word “specific” before “aerosol” and “end” before “uses.”
- Added the word “grams” to section 95375, subsections (c)(4)(A)(2) and (d)(2)(A)2.
- In sections 95375(c)(1) and 95375(d)(1), added the word “otherwise” before “enter into commerce.”
- In section 95375(c)(2)(A), removed the word “End-Uses” after the heading “Chillers.”
- In section 95375(c)(2)(B), moved the words “or Less” to be consistent with definition and added the word “equipment” after each equipment type.
- In section 95375(c)(2)(C), removed the word “used” as unnecessary.
- In section 95375(c)(3), added the words “of section 95374(c).”
- In section 95375(c)(4) added the words “equipment or product in an” before the word “end-use.”
- Removed “in standard format” from section 95375(c)(4)(A)3 and 95375(d)(2)(A)2, and moved the word “and” to 2 in both of these sections, as 1, 2, and 3 are requirements and 4 describes what may be used.
- Removed “California Air Resources Board” from sections 95375(c)(4)(B),

95375(d)(2)(B), 95375(d)(7), and 95376(d), as the Executive Officer is defined as CARB's Executive Officer, so it is redundant.

- In sections 95375(c)(4)(B)3 and 95375(d)(2)(B), removed the words "a component of" before the word "equipment" to after.
- In section 95375(d)(1)(A), added the word "or product" after the word "equipment" and added "an" before the word "end-use."
- In section 95375(d)(3)(A), added a heading "Approved Building Permits." And added the language "the prohibitions in Table 4, section 95374(d) do not apply to any" before the word "facilities" and added "that received an" after the word "equipment" and removed the word "applications" after the word "permit."
- In section 95375(d)(3)(B), moved the words "or Less" to after the word "Refrigerant" in the heading and after the word "refrigerant" in the body of the text.
- In section 95375(d)(4), struck the words "The following requirement shall apply" as already understood that the following are requirements and removed the "December 31" in subsection (A) and January 1" in the subheading (B). In subparagraph (A), removed the word "regulation and replaced it with "subarticle." In subparagraphs 1 and 2 of both subsections (A) and (B), removed the words "greater" and exchanged with "containing more." Also, in subsection (B), removed "January 1" in the heading.
- Switched the words "that use" for "with" in section 95375(d)(5)(A).
- Also, in section 95375(d)(5)(A)7, removed the word "through" and replaced with the word "by means of."
- In section 95375(d)(5)(A)8, removed the words "The refrigeration system must be identified as a" at the beginning of the sentence and added the word "refrigeration" after the word temperature twice.
- In section 95375(d)(6)(E), added the word "name" after "person."
- In section 95375(d)(7), removed the words "the following" before records as it is understood that it is the following records" and removed "that shows" and added "of" before "the following information."
- In section 95375(d)(7)(E), removed the words "afterwards, either."
- In section 95375(d)(7)(F), added the words "any available" before the word "spreadsheets."

- In section 95375(d)(7)(G), removed the words “The recordkeeping requirements of section 95375(d)(7) shall include documentation including but not limited to” and added “All” before the word “invoices” and “removed the word “or” and exchanged with the word “and” before the word “work.”
- In sections 95376(a) and 95376(b), added the words “of section 95374(c) after the words “Table 3.”
- In sections 95376(a)(3) and 95376(b)(3), removed the word “requirement” and exchanged for “required annually.”
- In section 95376(b)(2), added the word “baseline” to all of the equations for consistency with the other equations and removed the word “per year” as it already says “annually.”
- In section 95376(b)(4)(B), removed the words “by the VRF manufacturer.”
- Removed “must” from section 95376(c)(1) as redundant.
- In section 95376(d)(4) removed the word “or” as it already says “and.”
- Struck “including violations of any condition imposed pursuant to section 95378” from section 95377(d).
- In section 95378(a), removed the words “each” “type” and “95378” and added the words “a,” “sub” to subsection.
- In sections 95378(b)(2) 95378(c)(1)(F)2, added the word “Event” after “Force Majeure” in the heading, and capitalized the term throughout.
- Added “greenhouse gas emissions related to” to section 95378(b)(2)(B).
- Added “(e.g., parent, subsidiary)” to section 95378(c)(1)(A).
- In section 95378(c)(1)(D), added the words “of this subarticle” after the word “section(s).”
- In section 95378(c)(1)(E), removed the word “An” and capitalized the word “Explanation.”
- In section 95378(c)(1)(F), struck the word “Identify” and replaced it with the words “Identification of.”

- Struck “Rationale with” and Changed lower case “s” to Capital “S” in section 95378(c)(1)(F)2.
- Exchanged the word “expeditiously” for “timely” in section 95378(c)(1)(G) and also struck “A” at the beginning of the sentence and capitalized the word “Description.”
- In section 95378(c)(1)(I), removed the word “which” and replaced with the word “that” and removed the numbering within the subparagraph (i.e., (i), (ii), and (iii)).
- In section 95378(c)(1)(J), removed the word “A” and capitalized the word “Description.”
- In section 95378(c)(1)(K), struck the words “Excepting section 95378(b)(2) and replaced with “For variance requests based on impossibility” at the beginning. Also, struck the words “and use” and “CARB approved” and added “including” before the word “emission” and added “**(i.e., charge size as defined in section 95373, leak rate as defined by 40 C.F.R. section 82.152 and refrigerant used over the average lifetime of the equipment, system, or product)**” after the word “factors.”
- In section 95378(c)(1)(L), struck the word “A” and capitalized the word “Description.”
- In section 95378(c)(1)(M), capitalized the word “Applicant” and added the word “The” before the word “Applicant” in the second sentence. Also, struck the words “and use” and “CARB approved” and added “including” before the word “emission” and added “**(i.e., charge size as defined in section 95373, leak rate as defined by 40 C.F.R. section 82.152 and refrigerant used over the average lifetime of the equipment, system, or product)**” after the word “factors.”
- In section 95378(c)(2), removed the word “full” and added the word “that” later in the sentence.
- In section 95378(c)(3) struck the words “the following email address” as this is evident.
- Struck sections 95378(c)(4) and (5) and renumbered (6) and (7) to (4) and (5).
- In section 95378(c)(4)(new 4), removed the words “the” before the word “English” and the word “language” after the word “English.”
- In section 95378(c)(5)(new 5), removed the word “subarticle” and replaced with “section,” “such” with “that,” “as” with “to be,” and “such with “the.” The

word “such” was also removed from the last sentence.

- In section 95378(d)(1), the sentence that says “To be complete” was revised to “Applications must include all information required by section 95378, subsection (b) and (c). The sentence after that (The application will not be deemed complete until all information in section 95378 subsections (b) and () is submitted.”) was deleted as duplicitous.
- In section 95378(d)(2)(A), the words “such information is made available” was removed and replaced with “notice.” Also, the words “also on his or her own initiative was removed as redundant.
- In section 95378(d)(3), the words “any and all” were removed.
- In section 95378(6), the terms “Force Majeure Event” were capitalized and the word “that” was added.
- Added “(3) Section 95377 shall apply to violations of any variance condition” to section 95378(e).
- In section 95378(f)(1), struck the words “of this section.”
- Struck the word “the” and added “an” before the word “Executive” in section 95378(g)(1) and added “made pursuant to this section” after the word “decision in that same section.

B. Modifications Approved at the Board Hearing and Provided for in the First 15-Day Comment Period and Supplemental Rationale and Necessity for the Changes

Pursuant to the Board direction on December 10, 2020, provided in Resolution 20-37, on December 10, 2020, CARB released a First 15-Day Notice to address comments expressed by stakeholders. The First 15-Day Notice described each modification (some were already noticed in the 45-Day Notice) to the original proposal as follows:

B-1. Effective Dates for Air-Conditioning (AC) and Heat Pump Equipment

The Board directed staff to update the effective dates to reflect the status and anticipated timeline for California Building Code updates for the new refrigerant technologies. A single effective date for the GWP limit on AC equipment is no longer appropriate given the different status of building codes and safety standards (Codes and Standards) across the AC types; therefore, the amendments include three effective dates for the separate types of specific end uses in the AC category. The new compliance dates and categories are as follows:

- A GWP limit of 750 beginning January 1, 2023, for the following new AC and heat pump equipment: Room/wall/window AC, packaged terminal air-conditioners (PTACs), packaged terminal heat pumps (PTHPs), portable AC and residential dehumidifiers.
- For other new AC equipment, excluding the AC and heat pump equipment in the list above and variable refrigerant flow (VRF) systems, delay the 750 GWP limit requirements from January 1, 2023, to January 1, 2025.
- For new VRF systems, delay the 750 GWP limit requirements from January 1, 2023, to January 1, 2026.

The necessity for this change is due to additional time needed to update safety standards and California building codes that apply to most types of AC equipment. Currently, California building codes and the safety standards referenced in the building codes do not allow most types of AC equipment that contain flammable refrigerants. Equipment manufacturers have indicated that the most viable refrigerants with a GWP less than 750 are categorized as lower flammability refrigerants, or “A2L” refrigerants. California building codes and standards will not be revised to allow A2L refrigerants in most types of AC equipment in California until after the original effective date of January 1, 2023, and at the earliest by July 1, 2024, based on the existing building code adoption process and timeline.

At the time of the 45-Day notice, the building code update was still under consideration by the State Fire Marshall. After the 45-Day notice and before the Board Hearing, the State Fire Marshall indicated that their office would not be recommending revisions to allow A2L refrigerants in additional types of AC equipment in California. While there are additional alternatives being considered, those alternatives are not commercially available and there are additional considerations and approvals that need to occur.

However, there are some types of equipment that are permitted under existing safety standards and California building codes to use A2L refrigerants and are able to meet the GWP requirements by 2023. Of the types of equipment that are currently permitted to use A2L refrigerants, some already have A2L refrigerant products available on the market. This equipment contains small amounts of refrigerant. Therefore, the date stated in the 45-day Notice for these equipment types remains the same (January 1, 2023).

In addition, VRF equipment using A2L refrigerants have unique challenges as these systems are fundamentally different in design compared to other types of AC. VRFs contain higher amounts of refrigerant and have extensive refrigerant piping in the occupied space compared to traditional AC systems. Existing safety standards for VRFs include strict requirements on the amount of refrigerant and extensive safety mitigation measures, which makes the use of A2L refrigerants for VRFs infeasible at

this time. The presence of refrigerant (in piping) in individual rooms means that even if a small leak occurred, it could easily result in a higher amount of refrigerant in a small volume of occupied space than allowed by existing safety standards. Revisions to safety standards and corresponding building code updates are not expected to happen before 2026.

The single effective date for the GWP limits is no longer appropriate given the different status of building code and safety standards across the AC types; therefore, the amendments include three effective dates for the separate types of specific end uses in the AC category. The new compliance dates and categories are as follows:

- a) "Room/wall/window air-conditioning equipment, PTACs, PTHPs, portable air-conditioning equipment, and residential dehumidifiers (new)" (January 1, 2023 prohibition date).
- b) "Other air conditioning (new) equipment, residential and non-residential" (January 1, 2025 prohibition date).
- c) "Variable Refrigerant Flow (VRF) (new)" (January 1, 2026 prohibition date).

This change was necessary to allow a time extension where California building codes and safety standards need to be updated, while maintaining the stringency of the requirements where an extension was not needed. The AC industry has committed to continue to work with the codes and standards organizations on appropriate safety standards as well as research additional alternatives.

B-2. Refrigerant Recovery, Reclaim, and Reuse Requirements (R4 Program)

CARB provided stakeholder proposals for a refrigerant reclaim program in the 45-Day Notice and provided notice it would be including an alternative compliance pathway (now classified as R4). Considering the language in the 45-day Notice and comments, CARB staff included the R4 program in its presentation at the Board Hearing, and subsequently provided a First 15-Day Notice to allow public comment on the language. The proposed requirements establish a minimum amount of reclaimed refrigerant that manufacturers must use in new AC equipment and/or servicing in existing AC equipment in 2023 and 2024, and for VRF manufacturers, for years 2023, 2024, and 2025. Reporting and record-keeping requirements were also established for the R4 program for enforceability. Use of reclaimed refrigerants has direct GHG reduction benefits because it necessitates refrigerant recovery from equipment in use or at end of life, thereby preventing refrigerants from getting emitted or leaked. As discussed by staff at the Board Hearing in December 2020, one of the purposes of the R4 program is to enable better recovery, reclaim and reuse of high-GWP refrigerants, all of which are a key part of CARB's HFC emissions reduction strategy.

The "Refrigerant Recovery, Reclaim, and Reuse Requirements," or R4 Program, requires AC and VRF manufacturers to:

- Use a specified minimum amount of reclaimed refrigerant in new AC equipment or in the servicing of existing equipment.
- The minimum amount of reclaimed refrigerant is based on a percentage of the amount of refrigerant in the manufacturer's AC and VRF equipment entered into commerce in California in 2018 and 2019 (adjusted for projected growth in shipments from 2019 to 2023).
- AC manufacturers are subject to a 10 percent refrigerant reclaim use requirement annually, for 2023 and 2024. The 10 percent requirement only includes factory charge with an assumption that field charging is negligible.
- VRF manufacturers are subject to a 15 percent refrigerant reclaim use requirement annually, for 2023 and 2024 and a 25 percent refrigerant reclaim requirement for 2025. The percent requirement is only on the factory charge and is higher than 10 percent due to the high amount of field charging. Instead of including 10 percent for both factory and field charge, CARB staff simplified the requirement by increasing the percentage for factory charging. VRFs have much higher amount of refrigerant added during installation, commonly referred to as the field charge, because of the extensive refrigerant piping used in VRFs. Compared to their VRF counterparts of similar capacity, little to no field charge is added to conventional ACs. The field charge is site-specific and is determined by the refrigerant technician installing the system. Because the exact field charge is unknown prior to installation and unknown to the manufacturer even after installation, a five (5) percent reclaim use requirement was added for VRFs for 2023 and 2024. This is a nominal amount and the actual field charge may be higher. For 2025, VRFs are subject to a 25 percent reclaim use requirement because they have an additional year to comply with the 750 GWP limit and will continue to use high-GWP refrigerant for a longer period compared to other types of AC equipment.
- Certified reclaimed refrigerant can be refrigerant recovered from any geographic location as long as the reclaimed refrigerant meets the requirements of being reclaimed by a U.S. EPA certified refrigerant reclaimer, meets the requirements of 40 C.F.R. Pt. 82, Subpt. F, App. A, and contains no greater than fifteen percent new (virgin) refrigerant by weight.
- There are no requirements on where the equipment containing certified reclaimed refrigerant can be sold or distributed. Each manufacturer should check with the geographic location to ensure that the equipment can legally be sold or distributed in that location.
- The requirement to purchase and use certified reclaimed refrigerant shall be met by AC manufacturers before July 1, 2025, and for VRF manufacturers, before July 1, 2026.

- “Early Action Credit” can be applied by equipment manufacturers to partly or completely fulfill requirements on the use of reclaimed refrigerant. Each pound of refrigerant with a GWP less than 750 used in new AC and VRF equipment before the regulation’s effective date for GWP prohibitions will be credited one pound of certified reclaimed refrigerant. Only equipment entered into commerce in California are eligible for the early action credit.
- An initial baseline report is required by each manufacturer that shows the reclaimed refrigerant required amount. Annual progress reports are required, along with a combined annual and final report.

This change was necessary to help reduce the loss of emission reductions from AC equipment that would have occurred during 2023 and 2024 if the effective date for most AC equipment were not delayed. It was also necessary to create a program that takes the initial step to kickstart a refrigerant reclaim program that is needed if as part of the HFC emission reduction strategy.

B-3. Changes to Definitions

The following new definitions and acronyms were added:

- “*Certified Reclaimed Refrigerant*” was added to support the requirements for subsection 95375(c)(4) “Refrigerant Recovery, Reclaim, and Reuse Requirements” (R4 Program). This definition is necessary to characterize and represent what certified reclaimed refrigerant is, define its parameters, and align with the U.S. EPA definition.
- “*Other Air-conditioning*” or “*Other Air-conditioning Equipment*” was added when the single compliance date of January 1, 2023 for all new AC equipment was changed to three separate compliance dates depending upon the type of AC equipment. The types of AC with compliance dates of January 1, 2023 and January 1, 2026 are specifically defined and included in the regulation end-use compliance Table 3. “Other air-conditioning” with a compliance date of January 1, 2025 includes all AC not otherwise specifically defined in the Proposed Amendments. This change was necessary to delineate the different compliance dates.
- “*Packaged Terminal Air Conditioner*” or “*PTAC*” was added to establish a specific type of AC equipment to reflect different GWP prohibitions effective date, which previously only had one GWP prohibition date. Now, based on the “type” of AC, there are different compliance dates. This definition is necessary to properly define what date corresponds with each type of equipment.
- “*Portable Air Conditioner*” was added to establish a specific type of AC equipment to reflect different GWP prohibitions effective date, which previously only had one GWP prohibition date. Now, based on the “type” of AC, there are different compliance dates. This definition is necessary to properly define what date corresponds with each type of equipment.

- *"Residential Dehumidifier"* was added to establish a specific type of AC equipment to reflect different GWP prohibitions effective date, which previously only had one GWP prohibition date. Now, based on the "type" of AC, there are different compliance dates. This definition is necessary to properly define what date corresponds with each type of equipment.
- *"Room Air Conditioner,"* or *"Wall Air Conditioner,"* or *"Window Air Conditioner"* was added to establish a specific type of AC equipment to reflect different GWP prohibitions effective date, which previously only had one GWP prohibition date. Now, based on the "type" of AC, there are different compliance dates. This definition is necessary to properly define what date corresponds with each type of equipment.
- *"Variable Refrigerant Flow (VRF)"* was added to establish a specific type of AC equipment to reflect different GWP prohibitions effective date, which previously only had one GWP prohibition date. Now, based on the "type" of AC, there are different compliance dates. This definition is necessary to properly define what date corresponds with each type of equipment.

The following existing definitions were revised:

- *"Air-conditioning Equipment"* or *"Air-conditioning System"* was clarified to include heating as one of the functions on an air-conditioner, and specifically includes the term "heat pump" within the definition. Due to the nature of heat pumps, the definition for *"Air-conditioning Equipment"* or *"Air-conditioning System"* always included heat pumps used for space conditioning (heating or cooling). However, stakeholders requested clarity on this issue so it was necessary to add the term "heat pump" to the existing definition to remove any ambiguity and make it very clear to all stakeholders and the general public that heat pumps are included in the definition.
- *"New Air-conditioning Equipment"* was revised to include provisions for AC systems that have more than one outdoor compressor or condenser. The unrevised version would require an entirely new AC system even if only one of multiple outdoor compressors or condensers on an existing system were replaced. This unrevised version would have placed a burden on end-users of AC equipment that used a system with more than one outdoor compressor or condenser. The revised regulatory language was necessary to provide clarity on what "new" means for an AC system with more than one outdoor compressor or condenser.
- *"New Facility"* was revised to add "ice rinks," which was included in the purpose Section and defined but inadvertently excluded in the new facility definition. This change is necessary to reduce confusion on what requirements apply to ice rinks.

- *“New Refrigeration Equipment”* was revised to add “ice rinks,” which was included in the purpose Section and defined but inadvertently excluded in the new *“New Refrigeration Equipment”* definition. This change is necessary to reduce confusion on what requirements apply to ice rinks.

These changes were necessary to help industry understand what equipment/products are included in the regulation and what categories they fall under as well as to provide for enforceability.

B-4. Other Changes

- The interim compliance deadline for companies owning and/or operating 20 or more retail food facilities in California and national supermarket chains to achieve company-wide emissions reductions targets was changed from January 1, 2026 to December 31, 2026. The change was necessary to allow for more time to meet the interim emissions reductions targets for retail food facilities and does not impact reductions by 2030.
- Section 95375(a)(3)(A): The word “approved” was replaced by “allowable” to describe acceptable refrigerants for use in new equipment. This change was necessary to align with language used in the U.S. EPA SNAP listings of acceptable refrigerants, and because California does not approve or disapprove refrigerants at the state level – California defers to the allowable refrigerants list as regulated by the U.S. EPA.
- Additional modifications correcting grammar, punctuation and spelling have been made throughout the proposed changes. These changes are non-substantive.

B-5. Documents Incorporated by Reference

The Proposed Amendments incorporate by reference the following documents:

40 C.F.R. Pt. 82, Subpt. F, App. A, APPENDIX A TO SUBPART F OF PART 82—SPECIFICATIONS FOR REFRIGERANTS. Effective: January 1, 2017.

This document was incorporated by reference because it would be cumbersome, unduly expensive, and otherwise impractical to publish it in the California Code of Regulations. Distribution to all recipients of the California Code of Regulations is not needed because the interested audience for this document is limited to OEM technical staff, most of whom are already familiar with this document. Also, the incorporated document was made available by CARB upon request during the rulemaking action and will continue to be available in the future.

C. Modifications Provided for in The Second 15-Day Changes and Supplemental Rationale and Necessity for the Changes

Pursuant to the Board direction on December 10, 2020 provided in Resolution 20-37, on December 10, 2020, CARB released a Second 15-Day Notice to address comments expressed by stakeholders. The Second 15-Day Notice described each modification to the original proposal as follows:

C-1. Modification to Definitions

The following existing definitions were revised:

- *"Air-conditioning Equipment" or "Air-conditioning System"* was revised to include the words *"residential dehumidifiers"* and *"other"* before dehumidifiers to clarify that both residential and other types of dehumidifiers are covered under this definition, but they have different prohibition effective dates in Table 3. Stakeholders requested clarity on what was covered under each compliance effective date. This was added to the existing definition to remove any ambiguity and make it very clear to all stakeholders and the general public that both are included in the definition but have separate effective dates.
- *"Date of Manufacture"* was revised to remove the word *"or"* from the second clause and place it after the third clause. This revision was necessary to align with the original intent of the regulation and to clarify that it is not two and two but rather one of the four.
- *"Full Charge"* was revised to remove the word *"and"* from subsection (3). As written the definition says the charge can be determined by any of four methods or combination of those four methods. The *"and"* part is unnecessary extraneous verbiage since *"or"* will signify that it can be any of those, or any combination of those four methods.
- *"Residential Dehumidifier"* was revised to add the word *"portable."* This was necessary to clarify that only portable residential dehumidifiers are subject to the 2023 effective date. This aligns the definition with Table 3 in Section 95374(c) relating to the specific end uses. Specifically, the 2023 effective date applies to *"Room/wall/window air-conditioning equipment, PTACs, PTHPs, portable air-conditioning equipment, and residential dehumidifiers (new)."* All other dehumidifiers are subject to the 2025 effective date.
- *"Certified Reclaimed Refrigerant"* was revised to change reference from AHRI Standard 700⁵ refrigerant specifications to 40 C.F.R. Subpart F, Appendix A, which

⁵ Air-Conditioning, Heating, & Refrigeration Institute (AHRI), Standard 700, 2016 Edition (AHRI)

already incorporates AHRI Standard 700. This was necessary to correct the document incorporated within. The C.F.R. is largely based on the AHRI standard 700 (the 2016 edition), so it made sense to reference the federal law that, in large part, incorporates the industry standard. The C.F.R. is also referenced in the same definition earlier and was incorporated by reference as part of the First 15-Day Notice.

C-2. Modifications to Table 3

- Chiller Headings: Under Table 3 in Section 95374(c) in the “Chillers” Section, the headings were revised for clarity. CARB staff removed “Air-conditioning, Industrial Processing Refrigeration” from the “Chiller” heading and split “Chiller Air-conditioning” (added a row) from “Chiller-Industrial Process Refrigeration,” which is split into three different categories based on temperature ranges. CARB staff added the words “Air-conditioning” and “Industrial Process Refrigeration” to the general end-use category for chillers to differentiate between chillers used for AC and the chillers used for industrial process refrigeration (IPR) with different temperature ranges. This proposed change is clarifying, and no requirements have been changed. The original combined “Chillers-Air Conditioning, Industrial Processing Refrigeration” heading communicated that all AC chillers were required to have a 750 GWP and the same requirement applied to IPR chillers designed for the highest temperature applications ($> +35\text{ }^{\circ}\text{F}$ ($2\text{ }^{\circ}\text{C}$)). IPR chillers with a temperature below a certain threshold ($\leq +35\text{ }^{\circ}\text{F}$ ($2\text{ }^{\circ}\text{C}$) and $> -10\text{ }^{\circ}\text{F}$ ($-23\text{ }^{\circ}\text{C}$)), were allowed a higher GWP 1,500 (or 2,200 GWP if the temperature threshold was $\leq -10\text{ }^{\circ}\text{F}$ ($-23\text{ }^{\circ}\text{C}$) and $> -58\text{ }^{\circ}\text{F}$ ($-50\text{ }^{\circ}\text{C}$)). During the first 15-day comment period, CARB staff received a comment highlighting the possibility that some IPR chillers using higher GWP refrigerants could be modified to be used as AC chillers with refrigerants with a GWP greater than 750. The original intent as given in the Staff Report (and as written in the proposed regulatory text heading) requires all AC chillers (regardless of temperature) to meet the 750 GWP limit. This was designated by the heading “Chillers – Air conditioning, Industrial Process Refrigeration” for the first category of chillers in Table 3 that have a 750 GWP limit.
- Replace “Evaporator” with “Chiller” in Table 3: CARB staff replaced the word “evaporator” with the word “chiller” in the “Specific End-Use” categories for all IPR chillers. As a part of First 15-day Notice, CARB staff modified the language for chillers in Table 3 to clarify that the GWP prohibitions for chillers are based on the temperature of the secondary fluid in the chiller (e.g., water, glycol). However, in response to the First 15-day Notice, CARB staff received comments that the language in Table 3 could be further clarified. Specifically, the word “evaporator” was confusing because “evaporator temperature” is not a well-

Standard 700) is an industry standard that provides specifications for refrigerants. It was subsequently incorporated into 40 C.F.R. Subpart F, Appendix A in 2017 and is now federal law.

defined term and is related to the temperature of the refrigerant, and not the temperature of the secondary fluid. The Specific End-Use categories for IPR chillers now read "Chillers (new) designed for chilled fluid leaving the chiller at temperatures" followed by the temperature value or ranges.

- Correct Chiller Celsius Temperature Ranges: CARB staff revised the chiller temperature ranges to correct an inadvertent conversion error. The temperature of -10°F was incorrectly converted to -26°C. The Celsius conversion should have been -23°C. The conversion of -26°C to Fahrenheit is -15°F. This revision was necessary to provide clarity as it was unclear which temperature category put this end-use in the lower or higher GWP (-10°F or -15°F). The correction makes the different temperature ranges clear.

C-3. Modifications to the Refrigerant Recovery, Reclaim, and Reuse Requirements (R4 Program)

- Added "Other Air-Conditioning" to Optional Early Action Credit: CARB staff added the words "*Other Air-Conditioning*" in Section 95376(a)(4)(C) to clarify that "*AC equipment*" with an effective GWP prohibition date of January 1, 2023, is not eligible for early action credit. Only "other" AC equipment (already defined) with an effective date of January 1, 2025, is eligible. The type of AC equipment that have a GWP limit of 750 effective January 1, 2023 (as listed in Table 3) are ineligible for the optional early action credit because actions to reduce the GWP to below 750 in those AC equipment types would be business as usual to comply with the regulation and not "early action." This change was necessary to distinguish who is eligible for the optional early action credit.
- Added "Baseline Average" for Reclaimed Refrigerant Use Requirements for VRF: CARB staff added the words "*Baseline Average Pounds of Refrigerant in 2018 and 2019 =*" to Section 95376(b)(1). This change was necessary to make the language consistent with Section 95376(a)(1), which applies to the AC equipment manufacturers and to clarify that the equation is meant to determine the baseline for those years. This proposed change was necessary for clarity, but no requirements have been changed.
- Changes to AC/VRF Final R4 Reports Requirements: CARB staff made the following changes to the Final R4 reporting requirements:
 - Type: CARB staff removed the words "*Type and*" from Sections 95376 (c)(2)(C)(1) and (2). This change was necessary to remove extraneous text. CARB staff already specifies in those two provisions that the "type" is "certified reclaimed R-410A" and there is only one "type." R-410A is a type of refrigerant that is a blend of two HFCs: 50 percent R-32 (difluoromethane) and 50 percent R-125 (pentafluoroethane). There are no subclasses of R-410A and the regulated industry is very aware of what is meant by R-410A.

- Reports of Sale and Use: CARB staff added the words “*or sold for use*” to Section 95376(c)(2)(C)(2) so it now reads “Quantity (pounds) of certified reclaimed R-410A refrigerant used *or sold for use* in field for charging new equipment or servicing existing equipment.” Some equipment manufacturers have a servicing arm of the company structure while others do not. This change was necessary to clarify that CARB only seeks reports and records for either use or the first point of sale. Where the equipment manufacturers use reclaimed R-410A for field charging or servicing of equipment, they must report the amount used. Whereas equipment manufacturers who do not use reclaimed R-410A for field charging and/or servicing but sell it for these uses instead, they must report the amount sold.
- Added “Optional Early Action Credit” Heading: CARB staff added a heading “*Optional Early Action Credit*” to Sections 95376(c)(2)(C)(3) and (4). This change was necessary to provide consistency as all other provisions that apply to the Optional Early Action Credit are flagged by a heading. This change clarifies that the reporting requirements in Sections 95376(c)(2)(C)(3) and (4) only apply to those equipment manufacturers who wish to receive the optional early action credit for entering into commerce in California, new AC and VRF equipment using refrigerants with GWP less than 750 before the regulation requires them to do so. These headings are in line with the same headings used in Sections 95376(a)(4)(C) and 95376(b)(4)(C).
- Changes to AC/VRF Recordkeeping Requirements: CARB staff made the following changes to the R4 recordkeeping requirements:
 - Number and Type: CARB staff added in the word “*Estimated*” and changed the “*N*” to a lower case “*n*” in Section 95376(d)(2). This change was necessary to provide clarity that CARB is seeking estimates, not exact or precise records. Under the R4 requirements, AC and VRF equipment manufacturers will be required to purchase and use certified reclaimed R-410A refrigerant in either new equipment or for servicing existing equipment. Equipment manufacturers must report to CARB the amount used for each of those purposes, as applicable. If manufacturers use reclaimed R-410A in new equipment, they must keep records of the estimated number and types of equipment that contain the reclaimed refrigerant as a way to substantiate the use of reclaimed R-410A in new equipment. Based on stakeholder comments received following the First 15-Day Notice, CARB understands that manufactures may not have exact records. Thus, estimated numbers and types of equipment may be provided.
 - Names and Addresses: CARB staff removed the words “(*where available*)” and added the words “*first*” in front of “*sold*” and removed the word “*or distributed*” from that same sentence in Section

95376(d)(3). Under the R4 requirements, AC and VRF equipment manufacturers will be required to purchase and use certified reclaimed R-410A refrigerant in either new equipment or for servicing existing equipment. Equipment manufacturers must report to CARB the amount used for each of those purposes, as applicable. If manufacturers sell reclaimed R-410A for use in field charging or servicing, they must keep records of names and addresses of entities to whom the refrigerant was sold. The addition of "first" before "sold" clarifies the CARB seeks records of the first point of sale of reclaimed refrigerant made by the equipment manufacturers to distributors or servicing companies, as applicable. The removal of "or distributed" was necessary after reading through multiple stakeholder comments that indicated some do not have this information. For example, a manufacturer may not know the names and addresses of entities in the chain of sales. This change makes clear that the only information CARB seeks is the names and addresses of the first sale of the reclaimed refrigerant and if the manufacturer distributes, those names as well. The Proposed Amendments were not meant to add requirements on these AC and VRF manufacturers to gather records that they do not already have access to, so the change was necessary to clarify this aspect. However, it should be noted that if an AC and/or VRF manufacturer is seeking Optional Early Action Credit, they must prove that the equipment is actually entered into commerce in California so in this instance, the VRF/AC manufacturer may need to reach out to the distributor to gather proof. However, the Optional Early Action Credit is just optional, so manufacturers who do not want to take the extra step to gather the information to show the equipment has entered into California need not take action.

C-4. Cross-Reference Corrections

- Definition of Applicant Cross Reference: CARB staff revised the definition of "Applicant" in Section 95373(a) to correct an incorrect cross-reference (changed from Section 95377 to 95378). The definition is supposed to reference the "Variance" Section, which it did in the initial 45-Day Notice. However, after the First 15-Day Notice, CARB staff updated the numbering scheme, which required a change in the cross reference. The revised regulatory language provides for the correct Section cross-reference to Section 95378.
- Foam Attestation Cross Reference: CARB staff revised Section 95375(a)(4)(B) to correct an incorrect cross reference (added Section 95378 "subsections (c)(3) through (c)(7)"). The purpose of this cross reference was to provide direction to the regulated industry on where and how to submit the attestation. Section 95378(c) is the variance Section but provides instructions on submitting documents to CARB, so CARB just referenced that Section. However, only subsections (c)(3) through (c)(7) are relevant as those are the directions for

submitting information to CARB. The other provisions (c)(1) through (c)(2) reference provisions are only applicable to the variance process and would be confusing as it relates to the foam attestation. The changes were necessary to clarify that for submitting attestations, only subsections 95378(c)(3) through 95378(c)(7) must be followed, not all of 95378(c).

- Registration Requirements for Retail Food Facilities Cross-Reference: CARB staff revised Section 95375(d)(5)(D) to correct a reference (to "Section 95375(d)(5)"). The cross-reference should be "Section 95375(d)(5)." There is no Section 95375(3) as the California Code of Regulations subsections begin with (a), (b), (c) etc. As written, this is unclear what information must be submitted by the January 1st deadline and a change was necessary to improve clarity.

C-5. Documents Added to the Record

In the interest of completeness and in accordance with Government Code Section 11347.1, Subdivision (a), CARB staff also added the following records to the rulemaking record:

- Updated Costs and Benefits Analysis
- The Environmental Investigation Agency (EIA) and International Institute of Ammonia Refrigeration (IIAR) Letter to Chair Mary Nichols, *<150 GWP Refrigerants for Ice Rink Refrigeration Systems* (September 10, 2020)
- Underwriters Laboratories (UL) Standard 60335-2-40, Edition 3, for Household and Similar Electrical Appliances: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers (Published November 1, 2019)
- Northeast Energy Efficiency Partnerships Inc. (NEEP), *Variable Refrigerant Flow (VRF) Market Strategies Report* (September 2019)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 15-2019, *Safety Standard for Refrigeration Systems* (2019)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 34-2019, *Safety Standard for Designation and Safety Classification of Refrigerants* (2019)
- Heating, Air-conditioning and Refrigeration Distributors International (HARDI), *Historical R22 Sales and Margins Data Spreadsheet* (May 19, 2021)
- U.S. Environmental Protection Agency (U.S. EPA), *Summary of Refrigerant Reclamation Trends-U.S. EPA ODS and HFC Refrigerant Reclamation Table* (July 10, 2020)

In addition to the modifications described above, additional modifications correcting grammar, punctuation and spelling have been made throughout the proposed changes. These changes are non-substantive.

III. Summary of Comments and Agency Response

Written comments were received during the 45-day comment period in response to the December 10, 2020 public hearing notice, written and oral comments were presented at the Board Hearing. Written comments were also received during two 15-day comment periods. The following tables contain lists of organizations and individuals that provided comments during the comment periods mentioned above:

Table 1. Written comments received during the 45-Day Notice comment period.

Commenter	Date of Letter	Affiliation
Carter, Tom	2020-10-28	Johnson Controls (JCI)
Taddonio, Kristen	2020-11-09	Institute for Governance & Sustainable Development (IGSD)
Nau, Tom	2020-11-12	Manufacturer's representative (Nau)
Marshall, Robert	2020-11-13	California Fire Prevention Officers Association (CFPOA)
Hillbrand, Alex	2020-11-20	Natural Resources Defense Council (NRDC)
Skvarla, Mikhael	2020-11-20	Gualco Group (Gualco)
Rowe, Erin	2020-11-22	None listed (Rowe)
Koessel, Karl	2020-11-22	None listed (Koessel)
Forth, Chris	2020-11-23	JCI
Olson, Jessica	2020-11-24	Honeywell
Koegelenberg, Ilana	2020-11-27	shecco America Inc. (shecco)
Koscher, Justin	2020-11-30	Polyisocyanurate Insulation Manufacturers Association (PIMA)
Achong, Gypsy	2020-12-03	2050 Partners
Okada, Tetsuji	2020-12-03	The Japan Refrigeration and Air Conditioning Industry Association (JRAIA)
Chandler, Daniel	2020-12-03	350 Humboldt
Shrout, Mike	2020-12-04	California State Firefighters Association (CSFA)
Wieroniey, Stephen	2020-12-04	American Chemistry Council, Center for the Polyurethanes Industry (CPI)
Smith, Morgan	2020-12-05	North American Sustainable Refrigeration Council (NASRC)
Phoenix, Fhyre	2020-12-05	None listed (Fhyre)
Pasqua, John	2020-12-06	None listed (Pasqua)

Commenter	Date of Letter	Affiliation
Dedini, Lee	2020-12-06	350.org
Stauffer, Rebecca	2020-12-06	None listed (Stauffer)
Siegel, Emily	2020-12-06	None listed (Siegel)
Walden, Martha	2020-12-06	11 th Hour
Georges, Nicholas	2020-12-07	Household & Commercial Products Association (HPCA)
Lee, Sue Y.	2020-12-07	Humboldt State University (HSU)
Burtis, David	2020-12-07	None listed (Burtis)
Sanger, Mary	2020-12-07	None listed (Sanger)
Carr, Patrick	2020-12-07	None listed (Carr)
Kandus, Colleen	2020-12-07	None listed (Kandus)
Grunbaum, Geraldina	2020-12-07	Bay Area Air Quality Management District (BAAQMD)
Atwood, Ted	2020-12-07	Trakref
Armstrong, Mike	2020-12-07	A-Gas, Hudson Technologies, National Refrigerants, Inc. (A-Gas)
Lynn, Nadia	2020-12-07	None listed (Lynn)
Winningham, David	2020-12-07	Lennox International (Lennox)
Pace, Jennifer	2020-12-07	350.org
Skidd, Allison	2020-12-07	Rheem Manufacturing (Rheem)
Jackson, Robert	2020-12-07	National Automatic Merchandising Association (NAMA)
Thomas, Jason	2020-12-07	Carrier Corporation (Carrier)
Ihara, Nancy	2020-12-07	None listed (Ihara)
Muto, Akira	2020-12-07	Consulate General of Japan
Ali, Fariya	2020-12-07	Pacific Gas & Electric (PG&E)
Calabrese, David	2020-12-07	Dakin U.S. Corporation (Daikin)
Stewart, Jim	2020-12-07	None listed (Stewart)
Brooks, Eric	2020-12-07	None listed (Brooks)
Starr, Christina	2020-12-07	Environmental Investigation Agency (EIA)
Rosenberg, Esther	2020-12-07	Chemours
Walter-Terrinoni, Helen	2020-12-07	Air Conditioning, Heating and Refrigeration Institute (AHRI)
Floyd, Kim	2020-12-07	Community Air Protection Program – San Bernardino, Muscoy (CAPP)
Bottorff, John	2020-12-07	CleanEarth4Kids.org (CE4K)
Gauvin, David	2020-12-07	Trane Technologies, Inc. (Trane)
Tan, S.	2020-12-08	None listed (Tan)
Dorsey, Ann	2020-12-08	None listed (Dorsey)

Commenter	Date of Letter	Affiliation
Ayers, Alex	2020-12-08	Heating, Air Conditioning, Refrigeration Distributors International (HARDI)
Dietrick, Jan	2020-12-08	350 Ventura County Climate Hub (350 VCCH)
Kirschling, Karen	2020-12-08	None listed (Kirschling)
Senator Dodd, Bill	2020-12-08	California State Senate, 3rd district (Senator Dodd)

Table 2. Oral comments presented at the Board Hearing on December 10, 2020.

Commenter	Affiliation
Beste, Philip	Hansen Technologies (Hansen)
Yurek, Stephen*	AHRI
Gauvin, David*	Trane
Armstrong, Mike*	A-Gas
Gopal, Sriram	Association of Home Appliance Manufacturers (AHAM)
Chandler, Daniel*	350 Humboldt
McGinty, Katie*	JCI
Matwee, Ronald	Nortam Consulting
Starr, Christina*	EIA
Achong, Gypsy*	2050 Partners
Hillbrand, Alex*	NRDC
Hodd, Jamie	Alfa Laval
Schaefer, Dave	International Institute of Ammonia Refrigeration (IIAR)
Laisure-Pool, Colin	American Society of Heating, Refrigerating and Air- Conditioning Engineers (ASHRAE)
Lockwood, Nanette	Trane
Skidd, Allison*	Rheem
Malinauskas, Dave	CIMCO Refrigeration (CIMCO)
Calabrese, David*	Daikin
Schrift, Gary	IIAR
Ali, Fariya*	PG&E
Fay, Kevin	The Alliance for Responsible Atmospheric Policy (ARAP)
Liebendorfer, Kurt	Evapco
Forth, Chris*	JCI
Perry, Christopher	American Council for an Energy Efficient Economy (ACEEE)
Smith, Morgan*	North American Sustainable Refrigeration Council (NASRC)
Bogdan, Brian	LG

Commenter	Affiliation
Enslow, Thomas	California State Pipe Trades Council & Western States Council of Sheet Metal Workers (CSPTC & WSCSMW)
Shinneman, Chuck	Capital Engineering
Scott, Doug	VaCom Technologies
Rosenberg, Esther*	Chemours
Breen, Damien	BAAQMD
Groenewald, Wynand	Natural refrigerants consultant (Groenewald)
Meggs, Jason	None listed (Meggs)

The commenters listed above with an asterisk (*) also submitted written comments in addition to oral testimony at the Board Hearing.

Table 3. Written comments submitted at the Board Hearing on December 10, 2020.

Commenter	Affiliation
Weekley, Richard	FHP Manufacturing
Tucker, Doug	Alliance for Automotive Innovation (AAI)
Fay, Kevin	ARAP

Table 4. Written comments submitted during the First 15-Day Notice.

Commenter	Date of Letter	Affiliation
Allison Skidd	2021-05-20	Rheem
Gypsy Achong	2021-05-21	2050 Partners
David Calabrese	2021-05-21	Daikin
T. P. Nau, Jr.	2021-05-24	Refrigeration Equipment Specialist Co. (RESCO)
John Cummings	2021-05-24	LG
Nau, Tom	2021-05-25	RESCO
John Cummings	2021-05-27	LG
Lee, Sang,	2021-05-27	Denso
Mota, Armando	2021-05-27	Mota
Nau, Tom	2021-05-27	RESCO
Romanin, Vince	2021-05-27	Treau, AC and Heat Pump Manufacturer (Treau)
Okada, Tetsuji	2021-05-27	JRAIA
Maury Tiernan	2021-05-28	Geary Pacific Corp.
Dave Winningham	2021-05-28	Lennox
Rosenberg, Esther,	2021-05-28	Chemours
Thomas, Jason,	2021-05-28	Carrier
Lockwood, Nanette,	2021-05-28	Trane

Commenter	Date of Letter	Affiliation
Armstrong, Mike,	2021-05-28	A-Gas
Harfouche, Pierre	2021-05-28	Research Products Corporation (RPC)
Dettmers, Daniel	2021-05-28	Therma-Stor (Santa Fe, Ultra-Aire, Phoenix, and Quest Dehumidifiers) (Therma-Stor)
Calabrese, David	2021-05-28	Daikin
Forth, Chris	2021-05-28	JCI
Crane, Laurent	2021-05-28	Tokyo Electron U.S. Holdings (Tokyo)
Skidd, Allison	2021-05-28	Rheem
Cummings, John,	2021-05-28	LG
Cummings, John,	2021-05-28	LG
Cummings, John,	2021-05-28	LG
Walter-Terrinoni, Helen	2021-05-28	AHRI

Table 5. Written comments submitted during the Second 15-Day Notice.

Commenter	Date of Letter	Affiliation
Patel, Raj	2021-08-03	City of Pasadena
Guest, Jacob	2021-08-04	Marvel Refrigeration
Beitler, Bryan	2021-08-05	CoolSys
Ocon, Brianna	2021-08-16	AccuTherm Refrigeration
Choksi, Rupal	2021-08-17	Madison IAQ
Harfouche, Pierre	2021-08-17	RPC
Hong, Sunghyuk	2021-08-18	LG
Armstrong, Mike	2021-08-18	A-Gas
Skidd, Allison	2021-08-18	Rheem
Rosenberg, Esther	2021-08-18	Chemours
Nau, Tom	2021-08-18	RESCO
Lockwood, Nanette	2021-08-18	Trane
Couchot, David	2021-08-18	FluoroFusion
Thomas, Jason	2021-08-18	Carrier
Forth, Chris	2021-08-18	JCI
Walter-Terrinoni, Helen	2021-05-18	AHRI

For clarity in reading responses, multiple part comments were separated into a series of individual comments.

A. Comments Received During the Initial 45-Day Comment Period and at the Board Hearing

A-1. Support for Regulating HFCs and Stakeholder Engagement

CARB staff made no changes based on the comments received below. These comments are supportive of the process, stakeholder engagement, or actions in the rulemaking. CARB appreciates the supportive comments and thanks the commenters. CARB agrees that reducing HFC emissions from the refrigeration and AC sectors is vital to achieving California's HFC reduction mandates as well as the longer-term climate goals.

- (1) **Comment(s)**: HFCs are a rapidly growing global climate threat and California, as an important environmental leader, is in a strong position to spur the market's transition to climate-friendlier alternatives. (NRDC)
- (2) **Comment(s)**: What CARB is implementing and proposing to implement would not only make a difference in the American market but will really lay the stage and set a foundation for the uptake of naturals on a global basis. (Groenewald)
- (3) **Comment(s)**: This program is the first example in the globe where a government has developed a mandatory refrigeration phase-down program that is aligned with and has buy-in from industry manufacturers. (A-Gas)
- (4) **Comment(s)**: Staff's proposal today is aggressive, well-reasoned and feasible. And that's why the Air District would like to lend its support to CARB's efforts. (BAAQMD)
- (5) **Comment(s)**: 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. (Chemours)
- (6) **Comment(s)**: CARB was given a responsibility to create regulation that saves carbon. The extensions and adjustments proposed here map a path forward that keeps that promise, while working within the framework of the building industry's ability to respond. I applaud CARB's efforts to support the mandate while recognizing the capabilities and timelines of the building industry and our mutual thrust for decarbonization. (Capital Engineering)
- (7) **Comment(s)**: We support efforts to reduce the GWP of refrigerants to improve human health, help to preserve natural resources and protect our environment. (Lennox)
- (8) **Comment(s)**: We do appreciate the very hard work leading up to the proposal that CARB has presented to us today. We are supportive of CARB staff's proposal

around mini, multi, and VRF systems. And we're looking forward to working together on the 15-day language and the subsequent implementation. (LG)

- (9) **Comment(s):** The CARB team has gone beyond just incorporating retailer feedback with the rollout of an incentive program to help support the transition to climate-friendly refrigerants. We've been pleased to see the combination of a regulation developed with stakeholders and a funding mechanism to aid the transition. And we appreciate CARB's partnership throughout the rulemaking process. (NASRC)
- (10) **Comment(s):** I just want to reiterate our support for Resolution 20-37. We think it's fair and equitable. And I really want to express my thanks to the staff for all the meetings and calls that we've had over the last several years. It's been a long road, but well worked. (JCI)
- (11) **Comment(s):** We support the framework of the staff proposal today. And we also commit to continuing to work with CARB, the State Fire Marshal and the Governor's Office to ensure that the codes process continues to move forward as soon as possible. (Daikin)
- (12) **Comment(s):** We'd like to express our appreciation to CARB staff for listening and acknowledging manufacturer input throughout the rulemaking process. (Rheem)
- (13) **Comment(s):** We would like to acknowledge the great efforts the CARB team has made to incorporate industry feedback and address market challenges throughout the rulemaking process. We especially commend their work to pair the proposed regulation, which was developed in partnership with the industry, with the introduction of an incentive program to help support the transition to climate-friendly refrigerants. These two things in combination will aid the industry in accelerating the transition away from HFC refrigerants. (NASRC)
- (14) **Comment(s):** The determination and willingness to come to an agreement with industry was not easy. It took many, many, many meetings, and we really appreciate where staff has landed on this proposal and fully support it as written. (Trane)
- (15) **Comment(s):** CARB's proposed measures are groundbreaking for the U.S. and should encourage other leading states, and ideally our federal government, to take similar ambitious and feasible measures. Certain elements of the proposed measures represent the first U.S. adoption of the most ambitious existing measures on HFCs in place elsewhere globally, such as the 150 GWP limit for stationary refrigeration systems, while others are truly groundbreaking, including the required reductions in the existing HFC footprint of supermarkets. This regulation will accelerate the transition away from high and mid GWP HFC refrigerants to available ultra-low GWP cooling solutions that are consistent with science-based targets of reaching net-zero emissions by mid-century. (EIA)

- (16) **Comment(s)**: ASHRAE just wants to make sure that we get the latest refrigerant safety standards, which is ASHRAE Standards 15 and 34⁶ updated so that we can incorporate the new A2L refrigerants. I'm speaking in support. (ASHRAE)
- (17) **Comment(s)**: In light of current circumstances, we're pleased to support adoption of this regulation with 2023 compliance date for a couple of appliance types, 2025 for the majority of them and 2026 for a particular category of heating, ventilation and air conditioning (HVAC) equipment for which the underlying safety standards need even more development work, such as variable refrigerant flow systems. We also compliment CARB staff's hard work on the proposal for the refrigeration systems. Like the AC and heat pump requirements, these regulations are first of their kind and will cut deeply into this major HFC emissions source. We also especially appreciate the extra time provided smaller companies to make for a more equitable transition from HFCs in those systems, lessening the likelihood likely that there are unintended consequences for communities facing food availability challenges and more. (NRDC)
- (18) **Comment(s)**: I commend CARB on the rigorous process and all the work leading up to this proposal and strongly support finalizing and adopting it. (EIA)
- (19) **Comment(s)**: I commend Richard Corey and the CARB staff for running a thorough, engaging, and transparent process that has indeed produced a path-breaking rule for the planet and tackling global warming. We thoroughly support this rule of CARB Resolution 20-37. (JCI)
- (20) **Comment(s)**: We support California's efforts to phase down HFCs and has even offered to accelerate transition dates for our chiller products ahead of the proposed CARB schedule. Commenter is not opposed to other aspects of CARB's proposed HFC regulation as those sectors do not present the same risk as the stationary AC transition. (JCI)
- (21) **Comment(s)**: We support CARB's efforts to work with relevant authorities within California to assure that consensus safety standards are adopted into

⁶ For explanation of the ASHRAE standards, please see Footnote 7.

Title 24 of California's Code of Regulations, including ASHRAE Standard 15-2019 and UL-60335-2-40 3rd Edition.⁷ (IGSD)

- (22) **Comment(s):** I appear today to give our strong support for the revised proposal for the stationary air conditioning transition dates to achieve transition for certain equipment categories away from high-GWP HFC refrigerants to low GWP compounds and technologies as part of your effort to reduce emissions of HFCs as required by Senate Bill 1383. (ARAP)
- (23) **Comment(s):** What has been proposed is a great compromise that goes farther and faster than any regulation in the world related to stationary air conditioning equipment, farther than the F-gas regulations in Europe and farther than the step-downs agreed to in the Kigali amendments. (AHRI)
- (24) **Comment(s):** CARB's proposal to cap the GWP of new systems and reduce the GWP intensity of existing commercial systems is a good step. (NRDC)
- (25) **Comment(s):** CARB's proposal of capping the GWP of new systems at 150 is good and feasible. Natural refrigerant technology is already widely used in such systems and can support this sector. (shecco)
- (26) **Comment(s):** The proposed regulation represents a collaboration between CARB and California food retailers and resulted in a regulatory pathway that gives retailers flexibility in their strategies to meet California's HFC emission reduction targets. (NASRC)

⁷ Safety standards pertaining to refrigerants and refrigeration systems, including AC systems, are predominantly developed by the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) and Underwriters Laboratory (UL). Safety standards are typically developed by organizations that are accredited by the American National Standards Institute (ANSI). ASHRAE and UL are both ANSI-accredited organizations. ASHRAE Standard 15-2019 refers to the latest version of the safety standard for refrigeration and air-conditioning systems, developed by ASHRAE. ASHRAE Standard 15 establishes procedures for operating equipment and systems using refrigerants. ASHRAE Standard 34-2019 refers to the latest version of the safety standard for the designation and safety classification of refrigerants, developed by ASHRAE. ASHRAE standards provide guidance to manufacturers, design engineers and equipment operators for the safe use of refrigerants. UL-60335-2-40 3rd Edition is the primary safety standard for air conditioning equipment, heat pumps and dehumidifiers developed by UL. Equipment manufacturers must design a product in adherence to this standard and receive certification from UL to ensure that their product meets the requirements set forth in the standard.

A-2. Air-Conditioning and the R4 Program

A-2.1. Support for a GWP Limit Lower than 750 for AC Equipment

(27) **Comment(s):** The 750 GWP limit should be lowered to 150 because very low-GWP technologies already exist in other parts of the world. (shecco)

Agency Response: CARB staff made no changes based on this comment. CARB has worked in a transparent and public process with stakeholders, including equipment manufacturers for several years to determine a GWP limit that would result in significant GHG reductions while still being cost-effective and technically feasible. After numerous meetings with stakeholders and conducting its own research, CARB carefully considered and ultimately rejected a proposed GWP limit as low as 150. Natural refrigerants,⁸ including CO₂, hydrocarbons, water, and ammonia, as well as some HFC⁹-based A2L¹⁰ refrigerants and HFOs¹¹ have GWPs less than 150. Natural refrigerants have been investigated for use in AC applications by research institutions and manufacturers alike because of their environmentally friendly characteristics and desirable heat transfer properties. The primary reasons for rejecting a 150 GWP limit for AC are the need for further research and development of these refrigerants in ACs designed for the U.S. market as well as the need for additional changes to applicable Codes and Standards for AC products that permit the use of some of these refrigerants, since they have different properties compared to traditional refrigerants. While stringent safety regulations and product design requirements allow their safe and efficient use in

⁸ Natural refrigerants refer to compounds that occur naturally in the environment and can be used as refrigerants in refrigeration and air-conditioning equipment. Because these are naturally occurring, they are not patented. Natural refrigerants include CO₂, ammonia, hydrocarbons, water and air. These natural refrigerants are considered relatively environmentally benign because they have very low to zero GWP values and do not harm the stratospheric ozone layer. Synthetic refrigerants on the other hand, are invented in a laboratory and are typically patented. Synthetic refrigerants such as hydrofluorocarbons, and their predecessors, tend to have high GWPs and in some cases, also deplete the ozone layer.

⁹ HFC stands for "hydrofluorocarbon." HFCs are synthetic chemicals containing primarily hydrogen, fluorine and carbon. In California and around the world, HFCs are most commonly used as refrigerants. Saturated HFCs, meaning those containing only carbon-carbon single bonds, typically have high GWP values.

¹⁰ A2L is a refrigerant classification designated by ASHRAE, the primary organization that develops and publishes requirements for determining the refrigerant safety classification for refrigerants based on their flammability and toxicity properties. Based on the ASHRAE classification system (ASHRAE Standard 34), "A" represents a lower toxicity refrigerant (B represents a higher toxicity refrigerant), and "2L" represents refrigerants with lower flammability characteristics (a rating of "1" is reserved for refrigerants with no flame propagation, "2" for flammable refrigerants, and "3" for higher flammability refrigerants).

¹¹ HFO stands for "hydrofluoroolefin." HFOs are unsaturated HFCs, meaning these are HFCs which contain carbon-carbon multiple bonds. HFOs typically have very low GWP values, less than 10 in most instances.

commercial and industrial refrigeration, currently, there are limited commercially available products employing these refrigerants in AC equipment.

As an AC refrigerant, CO₂ has demonstrated low energy efficiency in some prototypes. Ammonia has additional toxicity concerns that restrict use in residential and light commercial applications. Hydrocarbons (particularly propane), classified as A3¹² refrigerants, have undergone extensive research and development worldwide exploring their applicability as refrigerants given their favorable attributes. While they have gained traction in some AC applications in other countries, the primary limiting factor to using hydrocarbons in many applications in the U.S. is the Codes and Standards that limit the use of hydrocarbons because of their flammability properties. Currently, Codes and Standards in the U.S. allow a maximum of 150 grams of hydrocarbons and only in hermetically sealed, self-contained and factory charged refrigeration and AC units. While efforts continue to be made, AC manufacturers have concluded that it is not feasible to design an AC unit using such a small amount of refrigerant. Refrigerated display cases and household refrigerators that use less than 150 grams of hydrocarbons are widely available but designing an AC unit that uses less than 150 grams has not proved to be viable. Self-contained window/wall hydrocarbon AC units are common in other countries, but these contain approximately 300 grams of hydrocarbons at minimum. These countries have different Codes and Standards that permit larger quantities of hydrocarbon refrigerants.

Nonetheless, a few companies are exploring alternative hydrocarbon technologies such as polymer membranes and advanced heat exchanger designs to design self-contained AC units within the constraints of the 150-gram limit. Testing, development, and commercialization of any successful technologies would be expected to take 2 to 3 years and, if successful, the applications will be limited to small window units at this time because of technological limitations and restrictions on the permissible amount of hydrocarbon refrigerant. While the rest of the world has embraced self-contained smaller AC units, larger central AC units are the most prevalent type of system in the U.S. There is little to no discussion at present to use hydrocarbons in central AC units, which utilize much larger quantities of refrigerants and are neither self-contained nor hermetically sealed.

Many A2L refrigerants are being considered for use in AC equipment. Safety standards for A2L refrigerants for AC equipment have largely been developed although they have yet to be adopted into California Building Codes. However, the primary A2L contenders have GWP limits higher than 150. HFOs have been and continue to be investigated for use in various application, however, further research and development are needed to bring HFO solutions to market, particularly for AC equipment.

¹²A3 is an ASHRAE refrigerant safety classification, where "A" represents a lower toxicity refrigerant and "3" represents a higher flammability refrigerant. See footnote 10.

Finally, before any refrigerants can be used in equipment in California, they must be approved by U.S. EPA under the SNAP Program.¹³ Many of the refrigerants under the 150 GWP limit are not currently approved for use in AC equipment. R-454C, an A2L refrigerant, with a GWP slightly less than 150 has been approved for use in AC equipment, however, currently there are no commercially available products in the U.S. using that refrigerant. Hence, a 150 GWP limit would not allow feasible refrigerants in most AC equipment at this time. Codes and Standards¹⁴ changes as well as SNAP approvals could enable a 150 GWP limit in the future and CARB will continue to monitor Codes and Standards and consider this in the future.

- (28) **Comment(s):** A 750 GWP limit will lead to intermediary solutions that would not be suitable in the long-term. (shecco)

Agency Response: CARB staff made no changes based on this comment. CARB views the 750 GWP limit as an intermediary step towards a more sustainable long-term solution to reduce the GHG emissions from refrigerants used in ACs. While a 750 GWP limit does not reach California’s goal of achieving carbon neutrality, or net zero GHG emissions, by the year 2045, as noted in the Agency Response to comment 27, refrigerants with a GWP less than 150 are not technically feasible at this time in most AC equipment. A 750 GWP limit will prevent locking in the current refrigerants with GWP greater 2,000 from being used in millions of residential and commercial AC units for another 15-20 years, and result in almost 65 percent reductions relative to the current baseline.

A-2.2. Support for the 750 GWP Limit with Effective Date of 2023 for AC Equipment

- (29) **Comment(s):** We support a 2023 effective date. (BAAQMD, IGSD, shecco)

Agency Response: CARB appreciates the supportive comment but made no changes based on this comment. CARB initially proposed an effective date of January 1, 2023 for the prohibition of refrigerant with a GWP of 750 or greater in all new AC equipment. Comments received from stakeholders indicated that a January 1, 2023 effective date was not possible for most equipment types under existing and expected updates to Codes and Standards that prohibit the use of “less flammable” refrigerants designated as A2L. All currently available refrigerants with a GWP less than 750 for use in non-chiller AC are either A2L,

¹³ U.S. EPA’s SNAP Program implements Section 612 of the federal Clean Air Act and makes it unlawful to replace any ozone depleting Class I Substance (e.g., chlorofluorocarbon or CFC) or Class II Substance (hydrochlorofluorocarbon or HCFC) with any substitute that U.S. EPA determines may present adverse effects to human health or the environment. See 42 U.S.C. § 7671k. It also requires U.S. EPA to publish a list of (a) substitutes prohibited for specific uses; and (b) safe alternatives. 42 U.S.C. § 7671k(c)(2). The federal SNAP Program is different from the Codes and Standards requirements, which are described in footnote 4, and is an additional requirement that a refrigerant must meet before being used in an application.

¹⁴ Please see footnote 4.

lower flammable refrigerants, or A3 extremely flammable refrigerants. There is one A1¹⁵ refrigerant, R-466A, that has a GWP lower than 750 and will not require significant updates to codes and standards, however, it is still under development and has yet to receive approval from the U.S. EPA SNAP program.” CARB extended the effective date by two years to January 1, 2025, for AC equipment not currently allowed to use A2L refrigerants, and unlikely to be allowed to use A2L refrigerants before January 1, 2023. The extended effective date of January 1, 2025 will allow sufficient time to update applicable Codes and Standards governing the use of refrigerants in AC equipment. The proposed January 1, 2023 regulation effective date remains in place for AC equipment that use relatively small amounts of refrigerant compared to central AC equipment, including room/window/wall ACs, PTACs, PTHPs, portable ACs and residential dehumidifiers. This group of AC equipment is sometimes referred to as “small AC” equipment, which currently use small amounts of refrigerant and are currently approved to use A2L refrigerants if all Codes and Standards are met (residential dehumidifiers may not use A2L refrigerants until U.S. EPA SNAP Program approval is granted).

- (30) **Comment(s):** Commenters support the 2023 date for products that are covered by existing Codes and Standards. (NRDC, JCI)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the supportive comment. As indicated in the Agency Response to comment 29, CARB has maintained the 2023 effective date for AC equipment that are currently covered by existing Codes and Standards, e.g., AC equipment currently allowed to use A2L refrigerants includes room/window/wall ACs, PTACs, PTHPs, portable ACs and residential dehumidifiers.

- (31) **Comment(s):** There are no technical barriers to the commercialization of alternatives that can meet the 750 GWP limit and hence the date should not be delayed. (IGSD)

Agency Response: CARB staff made no changes based on the received comment. CARB acknowledges that there are no technical barriers to the commercialization of AC equipment using refrigerants with a GWP less than 750. The widespread use in Australia, Japan and other countries shows that refrigerants with a GWP less than 750 can and are being used. However, applicable Codes and Standards do not currently allow the use of A2L lower flammability refrigerants such as R-32 in California. Additionally, while A1 refrigerants with a GWP less than 750 will be able to meet the requirements with existing Codes and Standards, this is only one viable option which is still under

¹⁵ A1 is an ASHRAE refrigerant safety classification where “A” stands for lower toxicity and “1” stands for no flame propagation. Although A1 are also governed by Codes and Standards, A1 refrigerants are widely in use today due to their relatively benign classification compared to some of the alternative refrigerants. A1 refrigerants are sometimes referred to as non-flammable refrigerants, even though most A1 refrigerants are flammable under certain conditions.

development and not commercially available. For more details, please see Agency Response to comment 35 below. However, the Proposed Amendments are intended to be technology forcing, so CARB anticipates other low GWP refrigerant technologies will be developed.

- (32) **Comment(s):** CARB has already delayed the effective date from January 1, 2021 to January 1, 2023. Delaying to 2025 would reward irresponsible companies that blocked progress on Codes and Standards and would give foot-dragging companies an unfair competitive advantage over responsible companies that invested in alternatives. Delaying sends a signal that CARB will bend to laggards' demands time and again. (IGSD)

Agency Response: CARB staff made no changes based on the received comment. CARB does not regulate the Codes and Standards applicable to the use of flammable refrigerants. While the Proposed Amendments do not require use of A2Ls, this is the most readily available replacement at this time. It is unlikely that Codes and Standards will be revised by January 1, 2023 to allow the use of lower flammability refrigerants in most AC equipment. CARB is still requiring some equipment types, listed in Agency Response to comment 30, to adhere to the January 1, 2023 date based A2L allowances in existing Codes and Standards. CARB will be monitoring progress on the Codes and Standards and will take this into consideration on any future modifications of the rule.

- (33) **Comment(s):** Companies not meeting the 2023 date should be required to pay the social cost of carbon associated with their products using the California Public Utilities Commission's (CPUC) refrigerant calculator using 20-year GWP values. Funds collected from this scheme could be deposited into the F-gas Reduction Incentive Program, with a prioritization of environmental justice and underserved communities. (IGSD)

Agency Response: CARB staff made no changes based on the received comment. The initially proposed 2023 effective date for most types of AC equipment was deemed infeasible. Please see Agency Responses to comments 35 and 56 for the types of equipment which have effective dates out to 2025 and 2026. CARB will consider this proposal in future rulemakings, but at this time, CARB will not be requiring fees for companies not meeting the 2023 date.

- (34) **Comment(s):** CARB should take claims about R-466A being "just around the corner" with a healthy dose of skepticism. R-466A, while low-GWP, still contains CF₃I,¹⁶ which is an ODS. U.S. EPA's SNAP Program has prohibited its use in residential applications before due to cardiac sensitization concerns. See, for instance, U.S. EPA's 1996 rulemaking on fire protection alternatives, which stated "Because of the low cardiac sensitization values, U.S. EPA is prohibiting the use of [CF₃I] in consumer residential applications...." (IGSD)

¹⁶ CF₃I is trifluoroiodomethane, which is a halomethane. Many refrigerants comprise of several compounds. One of the proposed refrigerants being researched right now for the AC sector (R-466A), which has a GWP lower than 750, contains CF₃I as one of its constituents.

Agency Response: CARB staff made no changes based on the received comment. The information is appreciated and noted.

A-2.3. Request 2025 Effective Date for AC Equipment

- (35) **Comment(s):** Change the effective date from January 1, 2023 to January 1, 2025 to allow for the development of Codes and Standards updates that will enable the safe use of A2L refrigerants. (AHRI, CFPOA, CSFA, Carrier, Chemours, Daikin, FHP Manufacturing, Gualco Group on behalf of Carrier, HARDI, Honeywell, JCI, Lennox, PG&E, Rheem, CSPTC & WSCSMW)

Agency Response: CARB staff made changes in response to the received comments. CARB staff modified the proposed regulatory language to extend the effective date to from January 1, 2023 to January 1, 2025 for certain AC equipment (excluding the smaller units) and to January 1, 2026 for VRFs. During the Board Hearing held on December 10, 2020, CARB staff recommended changing the effective dates to accommodate expected developments in available refrigerants as requested by the commenters above. Additional time is needed for the development of A1 refrigerant solutions. For A2L, the extension is needed due to the current challenges related to Codes and Standards.¹⁷ Additional time is needed to update the relevant safety standards, including ASHRAE 15 and UL 60335-2-40; update model codes developed by the International Association of Plumbing and Mechanical Officials (IAPMO); and update the California Building Code (Cal. Code Regs., tit. 24) (i.e., update Codes and Standards) to include A2L provisions. These changes are expected to happen in advance of the January 1, 2025 effective date. This is a technology forcing and technology accelerating regulation, requiring innovation and transition in this industry. To be clear, the Proposed Amendments do not require the regulated community to use any particular refrigerant.

- (36) **Comment(s):** The effective date of the regulation should be delayed to 2025 to give OEMs adequate time for equipment redesign and product development, which takes a few years from when the final code is published. (AHRI, Daikin, California State Firefighters Association, Carrier, Gualco Group on behalf of Carrier, Honeywell, Lennox, PG&E)

Agency Response: CARB staff made no changes based on the received comment. CARB did delay the effective date to January 1, 2025, for reasons explained in Agency Response to comment 35.

- (37) **Comment(s):** After January 1, 2025, the 750 GWP cap should be the sole eligible compliance path for AC equipment. The list of products in this category should be defined as those for which UL Standard 60335-2-40 3rd ed. and ASHRAE 15 2019 include the necessary safe use requirements for 2L refrigerants. For these products the underlying safety standards have been

¹⁷ Please see footnote 4.

published and state officials need only to incorporate them, adapting them as needed, into California's state building code. (NRDC)

Agency Response: CARB staff made no changes based on this comment. Except for VRFs, which have an effective date of January 1, 2026, all other types of AC equipment that have received an extension until January 1, 2025, must comply with that date as the only compliance pathway. The Codes and Standards bodies make decisions regarding adopting safety standards into California's Building Code. CARB will be monitoring progress on Codes and Standards and collaborating with the State Fire Marshal, who is the leading authority on Building Codes related to refrigerants.

- (38) **Comment(s):** The 2025 transition date you have proposed for the AC sector is a very aggressive standard and one that will require a continued public-private partnership to achieve its proposed objectives. We support its approval, because the CARB staff has shown a willingness to understand the complex challenges confronting the industry, and a need to coordinate the implementation activities with a full suite of additional approaches. (ARAP)

Agency Response: CARB staff made no changes based on this comment. CARB appreciates the supportive comment.

- (39) **Comment(s):** All products are regulated by the U.S. Department of Energy (U.S. DOE) and must meet federal energy efficiency standards. Federal regulations recognized complexities in stationary AC 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. Even if the State Fire Marshall were to unexpectedly accomplish a code change during the 2021 Triennial cycle, twelve months is simply not enough time to design, build, certify, and bring a compliant product to market. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. See Agency Response to comment 35. In 2018, signatories¹⁸ of a commitment letter submitted to CARB proposed an effective date of January 1, 2023 to transition to refrigerants with a GWP lower than 750 in AC equipment. Most

¹⁸ In 2018, industry stakeholders representing a majority of the AC market submitted a commitment letter to CARB proposing an effective date of January 1, 2023 for AC equipment to transition to refrigerants with a GWP less than 750. The letter is available at: [AHRI NRDC CARB Letter regarding SLCP HFC measures.pdf \(ahrinet.org\)](https://www.ahrinet.org/files/2018/07/AHRI_NRDC_CARB_Letter_regarding_SLCP_HFC_measures.pdf).

OEMs are global companies and must supply AC equipment using low-GWP refrigerants due to the HFC phasedown¹⁹ that is in effect in many countries.

- (40) **Comment(s):** CARB does not have the authority to make determinations about the safe use of A2L refrigerants. That authority lies exclusively with the State Fire Marshall, the California Building Code Commission (CBSC), and the legislature. (AHRI)

Agency Response: CARB staff made no changes based on this received comment. The commenter misrepresents what CARB is regulating. CARB is not regulating A2L refrigerants and is not making determinations on safety. CARB is regulating HFCs. A2Ls are an option for compliance with the regulations but are not mandated. CARB has clear authority to regulate HFCs. The Legislature passed the California Global Warming Solutions Act of 2006, (Assembly Bill 32, Nunez, Ch. 488, Stats. 2006, Health & Saf. Code § 38500 et seq.) (AB 32). AB 32 provides CARB with authority to enact regulations to achieve the level of statewide GHG emissions in 1990 by 2020 and directs CARB to monitor and regulate sources of GHG emissions (Health & Saf. Code § 38510), specifically directing CARB to “adopt rules and regulations ... to achieve the maximum technologically feasible and cost-effective GHG emission reductions from sources ... subject to the criteria and schedules set forth in this part.” (Health & Saf. Code § 38560). California’s Legislature then adopted Senate Bill 32 (Pavely, Ch. 249, Stats. 2016) (SB 32), which requires CARB to ensure that California’s statewide emissions of GHG emissions are reduced to at least 40 percent below the level of statewide GHG emissions in 1990, no later than December 31, 2030. (Health & Saf. Code § 38566). Also, the California Legislature passed Senate Bill 1383, requiring California to reduce HFC emissions by 40 percent below 2013 levels by 2030. (Health & Saf. Code § 39730.5).

- (41) **Comment(s):** The effective date of the regulation should be delayed to 2025 to provide time for training for contractors, technicians, inspectors, and others across the supply chain as well as training for first responders and for educating consumers. (CSFA, Honeywell, JCI)

¹⁹ The HFC Phasedown references two specific items. Globally, many countries ratified the Kigali Amendment to the Montreal Protocol, an international treaty that creates the framework for a global phasedown of HFCs, similar to how the world phased down and phased out ozone depleting substances under the Montreal Protocol. The United States has not yet ratified the Kigali Amendment although they were a signatory. The Kigali Amendment is different than the American Innovation and Manufacturing Act of 2020 (AIM Act), which became law in December 2020. See 42 U.S.C. § 7675, Pub. L. 116-260, § 103. The AIM Act provides U.S. EPA with clear authority to regulate HFCs under the Clean Air Act; provides the framework for a national phasedown of HFCs in the U.S.; and instructs U.S. EPA to adopt regulations to implement the AIM Act. The phasedown schedule is similar in both Kigali and the AIM Act; the main difference being that one is global, and the U.S. has not ratified yet and one is ratified by Congress and currently law that only applies to the U.S.

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 35.

- (42) **Comment(s):** Studies show that up to 85 percent of residential HVAC systems are installed incorrectly due to the lack of worker training requirements. This increases the risk of poorly installed piping that leaks and creates fire life safety hazards when you're talking about the installation of flammable refrigerants. At a minimum, piping for A2L systems should require zero leakage fittings and brazing by certified brazers, such as is already required for medical gas piping. (CSPTC & WSCSMW)

Agency Response: CARB staff made no changes based on the received comment. CARB notes and appreciates the comment. Such a requirement is currently outside the scope of the Proposed Amendments that limits the GWP of refrigerants in new AC and VRF equipment. CARB does not determine refrigerant safety standards and safe practice protocols. Safety standard setting organizations and code officials take into consideration fire and life safety hazards related to flammable refrigerants during the Codes and Standards development process. Please see Agency Response to comment 35.

- (43) **Comment(s):** The COVID-19 crisis has made it difficult to meet the 2023 effective date due to supply chain disruption, temporary closures of manufacturing facilities, reduced manufacturing capacity, and delays in product development, among others. (AHRI, Carrier, FHP Manufacturing, Gualco Group, JCI, Rheem)

Agency Response: CARB staff made no changes based on the received comment. CARB did delay the effective date to January 1, 2025, but this was based on the expected date for necessary updates to Codes and Standards to allow A2L refrigerants in AC equipment or to allow advances in technology. Please see Agency Response to comment 35. Additionally, if a regulated entity is unable to meet the requirements, they may use the variance process to extend the compliance date, provided they meet all the requirements of that process.

- (44) **Comment(s):** The effective date of the regulation should be delayed to 2025 to align with a national transition, which will lower costs to California residents. (CFPOA, CSFA, JCI, Lennox)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 35.

- (45) **Comment(s):** The proposed 2023 deadline is premature and does not meet the Office of Administrative Law (OAL) rulemaking criteria. To meet the criteria, CARB must show how this proposed HFC Rule will be consistent with the California and national standards. The standards will not be updated in the timeframe needed to be consistent with the proposed HFC Rule. CARB acknowledges that it is acting to finalize the HFC Rule before the necessary safety requirements are incorporated into the ASHRAE and UL standards, but proposes moving forward anyways. (JCI)

Agency Response: CARB staff made changes based on the received comment. CARB has extended the compliance deadlines for AC equipment. For more details, please see Agency Response to comment 35. Under the Administrative Procedures Act, laws must be harmonious with each other (Calif. Gov Code § 11349(d)). A new law cannot conflict or contradict existing laws (Calif. Gov Code § 11349(d)). If the rule or regulation alters or impairs governing law or precedent, then it is void (*Communities for a Better Environment v. California Natural Resources Agency*, 126 Cal. Rptr. 2d 441, 448 (2002)). Also, the new rule or regulation must be within the scope of the agency's authority (*Communities for a Better Environment v. California Natural Resources Agency*, 126 Cal. Rptr. 2d 441, 448 (2002)).

The Proposed Amendments meet the OAL rulemaking criteria. CARB has been authorized by the Legislature to adopt HFC reduction measures (see Health & Saf. Code § 39730.5). Furthermore, the California Building Code only prohibits a specific type of refrigerant (A2Ls in certain end uses), not the threshold requirement (GWP limit). The two regulations impact two different aspects. The Proposed Amendments do not require any specific type of refrigerant (it does not require use of an A2L) as it is technology neutral. The Proposed Amendments are meant to be technology pushing. Manufacturers invent numerous types of refrigerants. By the new proposed deadline (January 1, 2025), there will either be updates to the Codes and Standards (to allow A2Ls in certain end uses) or there will be a new refrigerant available. Where neither occurs, CARB has created the variance process to address "impossibility" events, provided the variance requirements are met.

- (46) **Comment(s):** This rule is problematic, because it would remove dehumidifiers and larger room ACs from the California market in 2023. Considering that CARB is making a push on indoor air quality, we don't believe this is justified. The reason for this is because with respect to dehumidifiers, U.S. EPA has not approved the alternative refrigerant for humidifiers and not even started on it. Even if they were to start on it in January [2021], that process usually takes one to two years to complete. Then it takes two to three years for manufacturers to redesign, test for safety and retool their facilities. The chances of all that happening by January 1, 2023 are very low. (AHAM)

Agency Response: CARB staff made no changes based on this received comment. CARB staff respectfully disagree with the assertions of the comment. Applicable safety standards, primarily UL 60335-2-40 Edition 3, already allow A2L refrigerants for residential dehumidifiers and so does the California Building Code (See Cal. Code Regs., tit. 24, part 4). There are alternative A2L refrigerants that dehumidifiers can use, but they must first be approved for use in dehumidifiers by U.S. EPA. To receive approval to use a specific refrigerant or refrigerants, dehumidifier manufacturers must file an application with the U.S.

EPA SNAP Program. U.S. EPA communicated to CARB²⁰ that they had received and are reviewing SNAP submissions seeking approval for use of A2L refrigerants in residential dehumidifiers. Additionally, R-513A, an A1 refrigerant with a GWP less than 750, has already received approval from U.S. EPA for use in residential dehumidifiers and is permitted by Codes and Standards. See 82 Fed. Reg. 33809 (July 21, 2017), which is incorporated herein. Should there be any dehumidifiers that are unable to meet applicable Codes and Standards, an OEM may be able to utilize the variance process provided all the requirements are met.

- (47) **Comment(s):** We are disappointed that CARB has been unwilling to work with us in any real way for the entirety of this rulemaking. The statement made that they started with a 2021 date is not meaningful, because that was never a realistic time frame. 2025 is an attainable goal and would not substantively change CARB's goals. (AHAM)

Agency Response: CARB staff made no changes based on this received comment. CARB respectfully disagrees with the assertion that the Agency has not worked with stakeholders. CARB has worked with all stakeholders through a transparent and public process throughout the rulemaking. Public workshops and working groups were held with stakeholders on the following dates: October 24, 2017; October 24, 2018; March 6, 2019; August 6, 2019; January 30, 2020; and July 22, 2020. Additionally, CARB conversed via numerous one-on-one meetings, emails, and phone calls with the commenter since January 2018. CARB held its Board Hearing on December 10, 2020, providing further opportunity to collaborate. CARB then released two 15-Day Notices, providing further opportunity to comment on the Proposed Amendments. The comment appears to be based on CARB's decision to keep the regulation effective date January 1, 2023 for dehumidifiers, portable ACs, and window/wall ACs, rather than delaying the effective date to January 1, 2025. CARB respectfully disagrees that a January 1, 2023 regulation effective date applicable to dehumidifiers and other products is not achievable. Please see Agency Response to comment 46.

- (48) **Comment(s):** Commenter requests extension because testing for an A1 solution is ongoing but there are currently no commercially available solutions. (Honeywell, JCI, Rheem)

Agency Response: CARB staff made changes based on the received comment. Please see Agency Response to comment 35.

- (49) **Comment(s):** If CARB were to require a transition to refrigerants with a GWP less than 750 AC equipment on January 1, 2025, with a service ban on the use of new R-410A in existing equipment beginning in 2023, it could be a win for the environment, consumers, distributors, inspectors, fire fighters and

²⁰ Personal communication between CARB and U.S. EPA on February 8, 2021, and July 20, 2021.

manufacturers who require a safe transition to flammable refrigerants, and a success for CARB in complying with its statutory mandates for the reduction of HFC emissions. (JCI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 35. No changes were made based on the comment regarding service ban on the use of R-410A in existing equipment, as it is out of scope of the current regulation. CARB staff will be evaluating this proposal as part of future HFC rulemakings and appreciates the recommendation.

- (50) **Comment(s):** CARB should extend the date to ensure that safety is not compromised, noting that critical research and testing needs to be completed and incorporated into the Codes and Standards. (CFPOA, CSFA, JCI, Senator Bill Dodd)

Agency Response: CARB staff made no changes based on the received comment. CARB recognizes the importance of safety and the time needed for additional testing. Please see Agency Response to comment 35.

- (51) **Comment(s):** U.S. EPA SNAP approval has not been finalized for most A2L refrigerants except for R-32. (JCI)

Agency Response: CARB staff made no changes based on the received comment. While R-32, an A2L refrigerant, received approval for use in small air-conditioners such as window/wall units, portable AC, PTAC and PTHPs in 2015 (see 80 Fed. Reg. 19454 (Apr. 10, 2015), which is incorporated herein), it was not approved until recently for use in larger AC equipment types that are also covered under the Proposed Amendments. In May 2021, U.S. EPA approved SNAP Rule 23 listing certain refrigerants for use in the refrigeration and AC sectors. U.S. EPA approved six A2L refrigerants for use in new residential and light commercial AC and heat pump equipment subject to use conditions. All refrigerants, except R-32, were also approved for use in smaller equipment listed above for which R-32 was previously approved. (See 86 Fed. Reg. 24444 (May 6, 2021), which is incorporated herein). Please see Agency Response to comment 35.

- (52) **Comment(s):** The wholesale distribution industry will have to store and transport A2L refrigerants, which /require updated building and fire codes as well as updated Department of Transportation (DOT) Regulations, none of which will be updated prior to 2024. (HARDI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 35. DOT regulations do not prohibit transportation of A2Ls—rather, there are limits on how much flammable refrigerant can be transported—but this is not an outright ban. For example, propane, which is highly flammable is transported but has certain requirements for the transportation. AHRI set up the Safe Refrigerant Transition Task Force in early 2020 to address barriers related to A2L adoption across the supply chain including storage and transportation of A2Ls.

(53) **Comment(s):** Even though July 1, 2024 is the effective date for Codes and Standards, attempting to transition mid-year would disrupt the supply chain, so January 1, 2025 is the next feasible date for OEMs to transition to refrigerants with GWP less than 750. (Carrier)

Agency Response: CARB staff made no changes based on the received comment. The Proposed Amendments do not require a mid-year effective date. Please see Agency Response to comment 35.

(54) **Comment(s):** Training for contractors, inspectors, fire fighters, and trade unions (e.g., plumbers, pipe fitters), as well as education of home and business owners all must be completed before equipment using flammable refrigerants is introduced into the market. California has over 11,000 registered contractor businesses servicing heating, ventilation, AC, and refrigeration (HVACR) equipment, with each company having the potential to employ anywhere from 3 - 10 technicians on average. (JCI)

Agency Response: CARB staff made no changes based on the received comment. CARB did delay the effective date to January 1, 2025 for other reasons as outlined in Agency Response to comment 35. This should provide plenty of time to educate contractors and technicians.

(55) **Comment(s):** Providing manufacturers an additional compliance pathway to use reclaimed R-410A in their AC products until January 1, 2025 will allow time for typical product development cycles, which are about three years, and will prevent any disruption in California's supply chain for AC products. (PG&E)

Agency Response: CARB staff made no changes based on the received comment. CARB did delay the effective date to January 1, 2025, for the reasons outlined in Agency Response to comment 35. This will allow for product development without disrupting California supply chain for AC products.

A-2.4. Request Delay in Effective Date to 2026 for Variable Refrigerant Flow (VRF) Systems

(56) **Comment(s):** The effective date for VRF technology to meet the 750 GWP limit should be delayed from January 1, 2023, to January 1, 2026 to allow time for Codes and Standards updates. (2050 Partners, AHRI, DMG, ACEEE, Air Treatment Corporation, Daikin, Fujitsu, Glumac, JRAIA, LG, Mitsubishi Electric, NRDC, Norman S. Wright Mechanical Equipment Corporation, PG&E, Samsung)

Agency Response: CARB staff made changes based on the received comment. CARB staff modified the proposed regulatory language to extend the effective

date to from January 1, 2023 to January 1, 2026²¹ for VRFs. During the Board Hearing held on December 10, 2020, CARB staff recommended changing the effective date due to current challenges related to Codes and Standards and additional time needed for further development of other alternatives. Additional time is needed to update the relevant safety standards, including ASHRAE 15 and UL 60335-2-40; update model codes developed by the International Association of Plumbing and Mechanical Officials (IAPMO); and update the California Building Code (Cal. Code Regs., tit. 24) (i.e., update Codes and Standards) to include A2L provisions for VRFs. These changes are expected to happen in advance of the January 1, 2026 effective date. This is a technology forcing and technology accelerating regulation, requiring innovation and transition in this industry. CARB considered the environmental benefits of VRFs in providing an additional year for compliance. VRFs have demonstrated energy efficiency benefits and reduce fossil gas use and, thus, have the potential to support California's building electrification and energy efficiency goals. CARB is technology neutral. To be clear, the Proposed Amendments do not require industry to use A2Ls as the regulated community may develop new refrigerant technologies to comply with the effective date. A2Ls are just one compliance option.

(57) Comment(s): Many published studies have concluded that VRFs offer significant energy savings ranging from 34 to 58 percent compared to conventional HVAC systems. CARB should consider the energy efficiency benefits of VRF technology because of its potential to support California's goals of building electrification and doubling energy efficiency. Between 2023 and 2026, VRF technology should be available using R-410A to support California's building electrification and building energy efficiency goals. (2050 Partners, Consulate General of Japan, DMG, ACEEE, Air Treatment Corporation, Daikin, Fujitsu, Glumac, JRAIA, LG, Mitsubishi Electric, NRDC, Norman S. Wright Mechanical Equipment Corporation, PG&E, Samsung)

Agency Response: CARB staff made no changes based on the received comment. Evaluating energy efficiency of VRFs is outside the scope of the Proposed Amendments. CARB did delay the effective date to January 1, 2026, for reasons described in Agency Response to comment 56.

²¹ The effective date for VRFs is January 1, 2026, one year later than other AC equipment types which have an effective date of January 1, 2025. VRFs face unique challenges related to Codes and Standards updates because of their structural design, which is different from central AC systems. Their structural design imposes additional charge limitations and safety requirements. Safety standards allowing for VRFs are still in the early stages of development, unlike other AC equipment for which the safety standards are mostly complete. Once the safety standards are in place, building codes need to be updated to incorporate the latest version of the safety standards. The relevant safety standards allowing for most types of AC equipment are expected to be in place by July 1, 2024 but the safety standards for VRFs are not expected to be in place before January 1, 2026, based on building code update timelines, and hence VRFs have a later compliance date.

(58) **Comment(s):** VRF technology has other benefits as well including occupant comfort due to its ability to condition rooms independently, flexibility of installation in existing buildings because of the lack of ductwork, and its capacity to provide heating without fossil fuel combustion. (2050 Partners, DMG, ACEEE, Air Treatment Corporation, Daikin, Fujitsu, Glumac, JRAIA, LG, Mitsubishi Electric, NRDC, Norman S. Wright Mechanical Equipment Corporation, PG&E, Samsung)

Agency Response: CARB staff made no changes based on the received comment. CARB did delay the effective date to January 1, 2026, as described in Agency Response to comment 56 and 57.

(59) **Comment(s):** The assumptions for leak rates for VRFs should be reexamined and revised based on the latest data and studies available, including the entire product life cycle. Published studies around the globe indicate a leak rate of 1-4 percent compared to the 7-25 percent numbers indicated in the Staff Report. VRF systems sold in Japan, the U.S. and other countries are essentially the same so the leak rates should be similar. (JRAIA, Daikin, PG&E)

Agency Response: CARB staff made no changes based on the received comment. CARB strives to use the best available emissions factors, including estimated annual leak rates, for all equipment using HFCs. CARB periodically reviews and updates emissions factors used to estimate HFC emissions used in the annual California GHG inventory and for HFC reduction measures. Note that annual leak rates are not used as a factor in proposing a GWP limit of 750 for refrigerants in new AC and VRF equipment. All AC equipment, even those that are hermetically sealed with very low annual leak rates are subject to the 750 GWP prohibition.

(60) **Comment(s):** The Western Cooling Efficiency Center ("WCEC") at the University of California, Davis recently conducted a study of 1,853 air conditioning/heat pump (AC/HP) systems installed in buildings across the East Side Union High School District in San Jose, California, and found that the annual emissions rate over the prior 4.22 years was significantly lower than the identified leak rates in the Staff Report. WCEC found that the annual leakage rate of AC/HP equipment was 0.7 percent for R-410A equipment and 2.8 percent for R-22 equipment. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information. Please see Agency Response to comment 59.

(61) **Comment(s):** Footnote 3 of Appendix D states that "In the absence of rigorous data demonstrating a lower leak rate, EIA recommends applying a 25 percent leak rate for [VRV] systems consistent with average leak rates for supermarket refrigeration systems with which [VRV] systems share the most common architectural properties." We would note, however, that a 25 percent leak rate does not reflect actual observed leak rates and therefore is inaccurate. (Daikin, JRAIA)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information. Please see Agency Response to comment 59.

- (62) **Comment(s):** VRF OEMs have employed various best practices including air tightness, pressure resistance inspection before charging systems, gas leak inspection after charging; post-packaging / pre-shipping gas leak inspection; designing equipment to withstand effects of vibration during transport without damage to refrigeration circuit; and installer training certification to reduce refrigerant leakage across the supply chain including in manufacturing, transportation, and installation. All these practices lead to lower leak rates and the commentor's review of published studies, leak rates are reported to be between 1-4 percent, lower than CARB's assumptions. (PG&E)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information. Please see Agency Response to comment 59.

- (63) **Comment(s):** R-466A is not practical for use in VRFs because of existing standards and the required refrigerant concentration levels. The potential toxicity of one of its constituents – CF₃I is another concern as well its ozone depleting potential. Additionally, in other parts of the world, VRFs are subject to global and national phasedowns but are not subject to the type of refrigerant ban that CARB is proposing so as such VRFs around the world use R-410A. (2050 Partners, AHRI, DMG, ACEEE, Air Treatment Corporation, Daikin, Fujitsu, Glumac, JRAIA, LG, Mitsubishi Electric, NRDC, Norman S. Wright Mechanical Equipment Corporation, PG&E, Samsung)

Agency Response: CARB staff made changes based on the received comment. CARB delayed the effective date for VRF equipment. Please see Agency Response to comment 56.

A-2.5. Refrigerant Recovery, Reclaim, and Reuse Requirements (R4 Program) / Additional Compliance Pathway²²

- (64) **Comment(s):** We support CARB's alternate compliance pathway and require offsetting of lost emission reductions by using reclaimed refrigerants during the delay until January 1, 2025. If reclaimed refrigerant is not used during the delay, then OEMs should offset not only the initial charge but also the anticipated emissions over the equipment lifetime using CARB's leak rate data within a period of five years. (NRDC)

Agency Response: CARB staff made changes based on the received comment, other comments received in this initial 45-day comment period, at the Board Hearing, and the subsequent first 15-day comment period (see section B-1). CARB has proposed a refrigerant recovery, reclaim, and reuse program (R4

²² "Additional Compliance Pathway" and the proposed "R4 Program" are referring to the same program and requirements.

Program) as a requirement of the regulations that reflects knowledge gained during the rule development and comment process and the continued need for reductions in this sector to meet California's statutory requirements.

The initially proposed regulation effective date was January 1, 2023 for implementing a GWP limit of 750 for refrigerants in all new AC and VRF equipment. Due to a delay in the revision of Codes and Standards that would allow alternative refrigerants designated as A2L (i.e., those possessing lower flammability characteristics) and additional time needed for development of the A1 alternative, CARB staff proposed a delayed effective date of January 1, 2025 for larger AC equipment, and January 1, 2026 for VRFs. See Agency Responses to comments 35 and 56.

Given the continued need to meet California's statutory obligation and reduce HFC emissions by 2030, CARB released proposed options for an additional compliance pathway during the 45-Day Notice Period. The proposed requirements establish a minimum amount of reclaimed refrigerant that manufacturers must use in new AC equipment and/or servicing of existing AC equipment in 2023 and 2024, and for VRF manufacturers, for years 2023, 2024, and 2025. Reporting and record-keeping requirements were also established for enforceability. Use of reclaimed refrigerants has direct GHG reduction benefits because it necessitates refrigerant recovery from equipment in use or at end of life, thereby preventing refrigerants from getting emitted or leaked. As discussed by CARB staff at the Board Hearing in December 2020, one of the purposes of the R4 program is to enable better recovery, reclaim and reuse of high-GWP refrigerants, all of which are a key part of CARB's HFC emissions reduction strategy.

To add the new requirements, Section 95376 was re-purposed to contain the "*Refrigerant Recovery, Reclaim and Reuse Requirements (R4 Program)*." The previous Section 95376 was renumbered to 95377 and subsequent sections were similarly re-numbered with a new section number 95379 added to accommodate this change.

The R4 Program requires AC and VRF manufacturers to:

- Use a specified minimum amount of reclaimed R-410A refrigerant in new AC equipment or in the servicing of existing equipment.
- The minimum amount of reclaimed R-410A refrigerant is based on a percentage of the amount of refrigerant in the manufacturer's AC and VRF equipment entered into commerce in California in 2018 and 2019 (adjusted for projected growth in shipments from 2019 to 2023).
- AC manufacturers are subject to a 10 percent refrigerant reclaim use requirement annually, for 2023 and 2024. The 10 percent requirement only includes factory charge with an assumption that field charging is negligible.

- VRF manufacturers are subject to a 15 percent refrigerant reclaim use requirement annually, for 2023 and 2024 and a 25 percent refrigerant reclaim requirement for 2025. The percent requirement is placed only on the factory charge and the requirement is higher than 10 percent due to the high amount of field charging. Instead of including 10 percent for both factory and field charge, CARB staff simplified the requirement by increasing the percentage for factory charging. VRFs have a much higher amount of refrigerant added during installation, commonly referred to as the field charge, because of the extensive refrigerant piping used in VRFs. Compared to their VRF counterparts of similar capacity, little to no field charge is added to conventional ACs. The field charge is site-specific and is determined by the refrigerant technician installing the system. Because the exact field charge is unknown prior to installation and unknown to the manufacturer even after installation, a 5 percent reclaim requirement was added for VRFs for 2023 and 2024. This is a nominal amount and the actual field charge may be higher. For 2025, VRFs are subject to a 25 percent reclaim use requirement because they have an additional year to comply with the 750 GWP limit and will continue to use high-GWP refrigerant for a longer period compared to other types of AC equipment.
- Reclaimed R-410A refrigerant must meet the definition of “*Certified Reclaimed Refrigerant*” set forth in the regulatory text. Certified reclaimed refrigerant sourcing is not limited to California as long as the reclaimed refrigerant is reclaimed by a U.S. EPA certified refrigerant reclaimer, meets the requirements of 40 C.F.R. Pt. 82, Subpt. F, App. A, and contains no greater than fifteen percent new (virgin) refrigerant by weight.
- There are no requirements on where the equipment containing certified reclaimed refrigerant can be sold or distributed. Each manufacturer should check with the geographic location to ensure that the equipment can legally be sold or distributed in that location.
- The requirement to purchase and use certified reclaimed refrigerant shall be met by AC manufacturers before July 1, 2025, and for VRF manufacturers, before July 1, 2026. There is no prohibition on early compliance. AC and VRF manufacturers can begin meeting the requirements of the R4 program as soon as the Proposed Amendments are approved by OAL.
- “Optional Early Action Credit” can be applied by equipment manufacturers to partly or completely fulfill requirements on the use of reclaimed refrigerant. Each pound of refrigerant with a GWP less than 750 used in new AC and VRF equipment before the regulation’s effective date for GWP prohibitions will be credited one pound of certified reclaimed refrigerant. Only equipment entered into commerce in California are eligible for the early action credit. The optional early action credit is different from early compliance with the reclaim use requirements under

R4 program because the former is designed to incentivize the early adoption of lower-GWP refrigerants in the AC sector.

- An initial baseline report is required by each manufacturer that shows the reclaimed refrigerant required amount. Annual progress reports are required, along with a combined annual and final report.

Several subsequent comments reference the additional compliance pathway. For the remainder of this document, the term “R4 program” is the official name of the program and the terminology used in the regulatory text. When commenters reference the “alternate, alternative or additional compliance pathway” in the context of the AC regulation, they are referring to the R4 program.

(65) Comment(s): The Staff Report, published with the proposed regulation on October 20, 2020, anticipates that 2023 is an unachievable compliance date and sets forth an alternative compliance pathway for ACs. There is limited detail presented in the alternative compliance pathway described in the Staff Report, so stakeholders lack sufficient notice to understand the exact parameters of what an alternative program may look like. A 2023 compliance date for low-GWP AC is a legal impossibility and contravenes basic due process. A 2025 compliance date could suffer from the same inadequacies if the prescribed design requirements are amended upon adoption into the building code and manufacturers lack time to react. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. CARB respectfully disagrees with the comment, which is contradicted by the rulemaking record. Given the general nature of this comment, it is not possible to respond with specificity. Therefore, the Agency provides the following general response:

The Fifth and Fourteenth Amendments to the United States Constitution prohibits states from depriving persons of “life, liberty, or property, without due process of law.” These provisions have both procedural and substantive aspects. The substantive aspects of these due process protections ensure that the substance of challenged governmental actions are consistent with the provisions of the Constitution. The procedural aspects ensure that the government follows proper procedures in administering laws, and broadly require that a full and fair hearing be conducted before the government acts to directly impair a person’s constitutionally cognizable life, liberty, or property interests.

Procedural Due Process:

Procedural due process asks if the process is fair. It requires the government to follow fair procedures before depriving a person of life, liberty, or property. This requires adequate notice and hearing. Notice is the process that informs a person of the legal process involving the rights at issue and allowing an opportunity to respond. Procedural due process also requires an opportunity to be heard, usually in the form of a hearing. The inquiry is two prong – whether there exists a liberty or property interest which has been interfered with by the

State, and whether the procedures attendant upon that deprivation were constitutionally sufficient. *In re Illasa* (4th Dist. 2016).3 Cal. App. 5th 489, 208 Cal. Rptr. 3d 17.

In analyzing the first prong, there must be the existence of a constitutionally protected property interest, which is determined by reference to existing rules or understandings that stem from an independent source, such as state law. (*Philips v. Wash. Legal Foundation* (1998) 524 U.S. 156, 164, citing *Board of Regents of State Colleges v. Roth* (1972) 408 U.S. 564, 577). It must be more than an abstract need or desire. In *Roth*, the United States Supreme Court explained that the existence of property rights is dependent upon the existence of a legitimate claim of entitlement – “[t]o have a property interest in a benefit, a person clearly must have more than an abstract need or desire for it. He must have more than a unilateral expectation of it. He must, instead, have a legitimate claim of entitlement to it.” (*Roth, supra* at 408 U.S. 564, 577). The court further explained that because the Constitution protects rather than creates property interests, the existence of a property interest is determined by reference to “existing rules or understandings that stem from an independent source such as state law.” (*Ibid*).

The procedures did provide fair notice, comment, and opportunity to be heard, satisfying the second prong. CARB fully complied with the provisions of the California Administrative Procedures Act in promulgating the final regulation. The commenter was provided a full notice of this regulatory action, allowed multiple opportunities to comment, and provided with an opportunity to be heard at a hearing. In CARB’s 45-day notice, it incorporated two proposals, and the regulation is a logical outgrowth of the information provided in the 45-day notice. CARB held a Board Hearing on December 10, 2020, which allowed the commenter an opportunity to speak. The Commenter spoke during the Board Hearing. CARB then released a 15-Day Notice that provided all the regulatory text, giving stakeholders adequate notice of the exact language and more time to comment. CARB then released a Second 15-Day Notice, providing stakeholders with additional time to comment. In addition to speaking at the Board Hearing, the commenter submitted comments during all open comment periods as well as on the day of the Board Hearing.

Substantive Due Process:

Substantive due process asks whether the government has the right to take the action in the first place. In analyzing substantive due process challenges to a governmental action, courts first determine whether the action affects a fundamental right (or creates a suspect class of affected persons). Fundamental rights include the protections of most of the Bill of Rights. If a fundamental right is affected, a court will determine whether the challenged law was enacted to further a compelling governmental interest, and whether the law was narrowly tailored to achieve that interest.

In this matter, as stated above, due to the general nature of the comment, the Agency is unable to discern any impairment of commenter's fundamental constitutional rights. The commenter therefore has the burden of demonstrating that the regulation is not rationally related to a permissible governmental interest. As set forth in more detail in the Staff Report for this rulemaking action, CARB primarily adopted this rulemaking action to achieve reductions in emissions of HFCs emitted by refrigeration and AC equipment. The Proposed Amendments are meant to reduce emissions responsible for the threat of climate change, which is also adequately described in the Staff Report. The subset of equipment affected by this rulemaking action comprise one of the largest sources of HFCs in California. In California, stationary equipment account for approximately 60 percent of all HFC emissions. California therefore needs to reduce HFC emissions from this sector to achieve the statutory reduction target under SB 1383.

CARB is mandated to reduce HFC, and more generally, GHG emissions in California. In 2006, the Legislature passed, and the Governor signed the California Global Warming Solutions Act of 2006, (AB 32). AB 32 requires CARB to enact regulations to achieve the level of statewide GHG emissions in 1990 by 2020, authorizes and directs CARB to monitor and regulate sources of GHG emissions, (Health & Saf. Code § 38510), and specifically directs CARB to "adopt rules and regulations ... to achieve the maximum technologically feasible and cost-effective GHG emission reductions from sources ... subject to the criteria and schedules set forth in this part." (Health & Saf. Code § 38560). In 2016 California's Legislature adopted, and California's Governor Brown signed SB 32, which requires CARB to ensure that California's statewide emissions of greenhouse gas emissions are reduced to at least 40 percent below the level of statewide GHG emissions in 1990, no later than 2030. (Health & Saf. Code § 38566). In 2016, the California Legislature passed SB 1383, requiring California to reduce HFC emissions by 40 percent below 2013 levels by 2030. (Health & Saf. Code § 39730.5).

These considerations establish that the regulation serves the legitimate public purpose of protecting the health and welfare of California's residents, which purpose "clearly falls within the exercise of even the most traditional concept of what is compendiously known as the police power." (*Huron Portland Cement Co.* (1960) 362 U.S. 440, 442). The regulation is rationally related to this permissible governmental interest. As discussed above, the equipment subject to the regulation comprise one of the largest sources of HFCs in California and must therefore be regulated to ensure their emissions of HFCs are reduced. These considerations establish that the regulation constitutes a reasonable and rational means to implement a permissible governmental interest, and consequently the regulation will not violate commenter's substantive due process rights.

Legal Impossibility:

CARB respectfully disagrees with the assertion that the 2023 compliance date is a legal impossibility. Legal impossibility is a legal defense that is typically invoked in contractual and criminal matters. The individual asserting it must show that it is objectively impossible. Here, there are options for compliance, such as utilizing alternative refrigerants, and the variance process if the variance requirements are met. Hence, it is not impossible to comply with the regulation. However, in working with stakeholders, based on information provided, CARB extended the 2023 date to 2025 and 2026 to provide more time to update Codes and Standards, which are expected to be updated in 2024.

- (66) **Comment(s):** If the AC date is delayed, full lifecycle refrigerant emissions must be offset by OEMs. There is sufficient reclaimed R-410A available between 2022 and 2030 to offset lifecycle emissions for equipment entering the California market in 2023 and 2024. Emissions can be offset by OEMs until 2030 with an interim step as early as 2025 by which 50 percent of the emissions should be offset since it is desirable for reclamation to happen earlier during the 2022-2030 timeframe. (EIA)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 64. The lifecycle emissions reference the refrigerant use over the life of the equipment, including refrigerant used to replenish leaks throughout the lifetime of the equipment. Due to stakeholder comments about availability of sufficient reclaimed R-410A, CARB did not include a requirement to address lifecycle emissions.

- (67) **Comment(s):** Permit the use of nationally reclaimed refrigerant for new R-410A equipment because there is insufficient refrigerant available in California. (Rheem)

Agency Response: CARB staff made changes based on the received comment. Modifications made during the time period leading up to and included in the First 15-Day Notice makes clear that as long as the reclaimed R-410A meets the definition of "*Certified Reclaimed Refrigerant*," it's sourcing is not limited to California. Please see Agency Response to comment 64.

Regarding Supply and Demand of Reclaimed R-410A:

CARB staff estimates that between one to two million pounds of reclaimed R-410A will be needed cumulatively from 2023 through 2026 for the R4 Program, for an average of two-thirds of a million pounds annually. From 2017 to 2019, U.S. EPA refrigerant reclaimers reported more than two million pounds of R-410A reclaimed annually in the U.S.,²³ which is sufficient to meet the R4 requirements. Moreover, the key purpose of R4 program is to improve refrigerant recovery and reuse, leading to increased supply of reclaimed refrigerants.

²³ U.S.EPA Refrigerant Reclamation Summary (7/10/2020). Available here: https://www.epa.gov/sites/default/files/2020-07/documents/2020_reclamation_table.pdf.

(68) **Comment(s):** Award credit for all high-GWP refrigerants (not just R-410A) recovered for reclamation, reuse, or destruction to have greatest environmental benefit and account for the scarcity of reclaimed R-410A within the state of California. (Rheem, NRDC)

Agency Response: CARB staff made no changes based on the received comment. The reclaimed refrigerant use requirements under the R4 Program are not limited to California based reclamation and can be met with current and anticipated amounts of annual reclaimed R-410A available nationally. The recovery of R-410A from residential AC equipment is much lower than the recovery of other high-GWP refrigerants used in commercial and industrial refrigeration. The R4 Program is designed to increase the recovery and reclamation of R-410A refrigerant from AC equipment as a means of reducing HFC emissions from that sector. In the future, CARB looks forward to expanding the R4 program via future rulemakings to further enhance recovery and reclamation of high-GWP refrigerants across all end-use sectors.

(69) **Comment(s):** The likely result of CARB's proposed additional compliance pathway in the Staff Report, particularly the requirement to place and track California-specific models using reclaimed refrigerant, would be that manufacturers would limit their product offering to reduce capital, manufacturing, and development cost. Further this approach only seeks to recover emission losses for a two-year period and ignores the significantly larger emission reduction potential of an effective recovery and reclaim program that is sustainable over time and much less burdensome to administer. (Lennox)

Agency Response: CARB staff made changes based on the received comment. Please note that the Staff Report referenced entering AC equipment with reclaimed refrigerant into California. However, modifications made during the time period leading up to and included in the First 15-Day Notice makes clear that there is no requirement for AC and VRF manufacturers to enter and/or track equipment using reclaimed refrigerant in California unless they are seeking optional early action credit, which is not mandatory. For more details on the R4 program, please see Agency Response to comment 64.

Additionally, CARB acknowledges and agrees with the need for a long-term recovery and reclamation program to recycle and reuse refrigerants. The requirements of the R4 Program should provide additional incentive to recover used refrigerant. Although the R4 requirements end July 1, 2025 for most AC manufacturers, CARB supports voluntary programs that will continue to increase the supply of reclaimed refrigerant. At the December Board Hearing, CARB also mentioned the intent to start a rulemaking to expand the R4 program as part of that effort.

(70) **Comment(s):** Creating California-specific models with reclaimed refrigerant would add significant cost of consumers imposed onerous requirements on manufacturers because of the current setup of production lines at manufacturing facilities and other factors. (FHP Manufacturing, Lennox, JCI, Rheem)

Agency Response: CARB staff made changes in response to the received comments. Please see Agency Responses to comments 64 and 69.

- (71) **Comment(s):** A formal rulemaking, including all relevant stakeholders is necessary to implement a structured reclaim program. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. CARB respectfully disagrees with the assertion. CARB has engaged in a formal rulemaking for the reclaim program. The reclaim program was noticed in the 45-Day Notice, discussed at the Board Hearing on December 10, 2020, and CARB has included all relevant stakeholders in the development of the R4 Program for certified reclaimed refrigerant. Furthermore, the R4 Program was noticed in two subsequent 15-Day Notices to allow additional formal comments on the program. Please see Agency Response to comment 65.

- (72) **Comment(s):** In addition to phasing out HFCs in new equipment, as this proposal does, we in the United States must begin to lead on tackling the massive refrigerant emissions coming from existing equipment at end of life. CARB staff's presentation today incorporated aspects of our proposal to jump-start recovery and reclamation of used refrigerant in the AC sector as a compromise for an extra two years to allow a transition in new AC equipment. (EIA)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the supportive comment.

- (73) **Comment(s):** We support a voluntary reclaim program to address lack of supply of reclaimed refrigerant (Chemours)

Agency Response: CARB staff made no changes based on the received comment. To ensure there is adequate availability of reclaimed refrigerant, the R4 program is no longer limited to reclaimed R-410A sourced from California. For details on the R4 program, please see Agency Response to comment 64.

- (74) **Comment(s):** The Staff Report states that if reclaimed refrigerant is not used in equipment during the delay in effective dates for the 750 GWP limit, then manufacturers would need to offset the initial charge plus the anticipated additional service gas for the lifetime of the exempted equipment within five years. It is unreasonable to hold a manufacturer accountable for recovering or purchasing this level of refrigerant when the manufacturer is far removed from the sell and handling of refrigerant in the field—stationary units are sold to distributors who sell to contractors. (Carrier)

Agency Response: CARB staff made changes based on the received comment. Modifications made in the First 15-Day Notice makes clear that OEMs must use a minimum amount of reclaimed R-410A refrigerant for use in either new equipment or for servicing existing equipment until 2025 or 2026, depending on the type of equipment. The R4 program does not require OEMs to use reclaimed refrigerant to service equipment for their lifetime. For details about the R4 program, please see Agency Response to comment 64.

(75) **Comment(s):** The reasoning for requiring the recovery or purchase of the initial charge plus the anticipated additional service gas is unclear. Requiring a manufacturer to account for the refrigerant used for servicing if the reclaim requirement is not met in 2023-2024 is an unreasonable penalty considering that building codes have not been updated and there is an insufficient quantity of reclaim available. Commenter also objects to including anticipated additional service gas because it is impossible to know these quantities. (Carrier)

Agency Response: CARB staff made changes based on the received comment. In the Staff Report, as part of the R4 program (previously called the “additional compliance pathway”), CARB staff described potential provisions which would hold AC OEMs responsible for the emissions over the lifetime of equipment. Modifications made in the First 15-Day Notice makes clear that AC and VRF manufacturers *must* meet the R4 requirements by using reclaimed refrigerant either in new equipment or for servicing existing equipment but does not hold manufacturers responsible for lifetime servicing of the equipment. For more details about the R4 program, please see Agency Response to comment 64.

The Proposed Amendments, including the R4 program do not penalize manufacturers. These regulations were developed based on a collaborative approach between stakeholders and CARB through a transparent and public process to meet California’s legislative mandates. For more information about the stakeholder process, please see Agency Response to comment 47.

(76) **Comment(s):** There is not enough reclaimed refrigerant available, even nationally, for OEMs to comply with. There is not enough refrigerant for new equipment or the servicing demand. (AHRI, Carrier, Chemours, FHP Manufacturing, Gaulco group on behalf of Carrier)

Agency Response: CARB staff made changes based on the received comment. Please note these comments were in response to a proposed requirement of using reclaimed R-410A for 100 percent of the initial equipment charge and servicing over the lifetime of the equipment. Modifications made in the First 15-Day Notice set the reclaim use requirements at 10 percent of initial charge for all AC equipment subject to delayed effective dates for the 750 GWP limit. An additional amount above the 10 percent will be required for VRFs because a significant amount of the refrigerant in VRF systems is added in the field. Further, based on data reported to U.S. EPA by reclaimers, the amount of reclaimed R-410A nationally will be sufficient to meet the R4 requirements. For more details, see Agency Responses to comments 64 and 67.

(77) **Comment(s):** A compliance pathway will give OEMs flexibility to accelerate the transition to low GWP refrigerants for the products where investment makes the most business sense, while allowing the typical product development period for adaptation of other products. This compliance pathway has the potential to minimize disruption to California’s AC supply chain, while meeting CARB’s GHG reduction goals and establishing a market for reclaim of R-410A refrigerant,

which could support future restrictions on use of virgin R-410A refrigerant for servicing existing equipment mentioned in the Staff Report. (PG&E)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the supportive comment.

- (78) **Comment(s):** There is sufficient reclaim material in the United States to support this offset program as the State considers a multi-year fulfillment program. Just California-based recovered refrigerant in the near term may not be sufficient so the State should consider the use of certified reclaimed refrigerants from the United States in whole. (A-Gas)

Agency Response: CARB staff made changes based on the received comment. Modifications made in the First 15-Day Notice makes clear that as long as the reclaimed R-410A meets the definition of "*Certified Reclaimed Refrigerant*," the sourcing is not restricted to California. Please see Agency Response to comments 64 and 67.

- (79) **Comment(s):** A 2020 reclaim study notes that approximately 8,200 metric tons of R-410A will be available nationally in 2023 for recovery. CARB estimates 20 percent loss at end-of-life and less than 20 percent of the total would be available within California's borders. There are additional losses (up to 30 percent) during the purification process allowing for less than 1,000 tons within the state to serve an estimated market demand of 4,500 metric tons. (AHRI)

Agency Response: CARB staff made changes based on the received comment. This comment suggests that limiting the reclaimed refrigerant to California sources only will be insufficient to meet the R4 requirements. Modifications made in the First 15-Day Notice makes clear that as long as the reclaimed R-410A meets the definition of "*Certified Reclaimed Refrigerant*," the sourcing is not restricted to California. For more details on the R4 program, please see Agency Response to comments 64 and 67.

- (80) **Comment(s):** Offsetting emissions associated with the installation and servicing of equipment is not feasible for manufactures because the manufacturer is removed from the selling and handling of refrigerant in the field and cannot estimate the refrigerant required for servicing, so it is unreasonable to hold the manufacturer accountable. (Carrier)

Agency Response: CARB staff made no changes based on the received comment. Modifications described in the First 15-Day Notice makes it clear that OEMs can fulfill the R4 requirements by using reclaimed R-410A either in new equipment or for servicing existing equipment. The requirements do not require offsetting emissions associated with the installation and servicing of equipment. Please see Agency Response to comment 66.

- (81) **Comment(s):** OEMs are asked to offset emissions due to a delay in building codes from 2023 to 2025, although OEMs are not responsible for the delay. (AHRI)

Agency Response: CARB staff made no changes based on this received comment. CARB and OEMs have worked together for several years to develop effective and pragmatic regulations to reduce GHG emissions from refrigerants used in AC equipment. CARB and OEMs have collaborated through a transparent and public process to develop the R4 Program to jump-start a program that will improve refrigerant recovery and help address a portion of the increased R-410A emissions from new AC equipment built in 2023 and 2024, and 2023 through 2025 for new VRFs. CARB acknowledges the willingness of industry to actively address GHG emissions from AC and VRF equipment and appreciates the collaboration.

However, the Proposed Amendments do not require OEMs to offset emissions due to delay in updates to the Codes and Standards. The Codes and Standards process is different from CARB's rulemaking and they address two separate aspects related to refrigerants. Business-as-usual cannot be the standard when trying to achieve AB 32, SB 32, and carbon neutrality. Furthermore, California is statutorily required to reduce HFC emissions by 40 percent by 2030 and this requires action by all end-use sectors. For a description of the Codes and Standards, please see Agency Response to comments 35 and 56.

- (82) **Comment(s):** We support using reclaimed refrigerant in new equipment provided reclaimed refrigerant can be mixed with virgin refrigerant at the factory and can be sourced nationwide. (JCI)

Agency Response: CARB staff made no changes based on this received comment. All reclaimed R-410A used by OEMs to meet the R4 Program requirements must meet the definition of "*Certified Reclaimed Refrigerant*" and OEMs must keep records demonstrating the same – these records should be obtained from the reclaimer. For purposes of the Proposed Amendments, there is a maximum amount of virgin refrigerant (15 percent) that a reclaimer can add into "certified reclaimed refrigerant." However, once an equipment manufacturer purchases the certified reclaimed refrigerant, they can use it as they see fit – either by using it exclusively or by mixing it with virgin refrigerant. Further, the R4 program does not restrict sourcing of reclaimed refrigerant to California. Please see Agency Response to comment 64.

- (83) **Comment(s):** Require reclaimers to be registered to sell reclaimed R-410A refrigerant in California. (A-Gas)

Agency Response: CARB staff made no changes based on this received comment. CARB proposes to rely on existing federal regulations and guidelines for refrigerant reclaimers, rather than create new requirements at an individual state level. Refrigerant reclaimers must already meet stringent requirements as summarized on the U.S. EPA webpage "*Checklist for Refrigerant Reclaimers Seeking EPA Certification*" at <https://www.epa.gov/Section608/checklist-refrigerant-reclaimers-seeking-epa-certification> which states: "EPA regulations (40 CFR Part 82, Subpart F) under Section 608 of the Clean Air Act restrict the

resale of used ozone-depleting and substitute refrigerant to a new owner unless it has been reclaimed by an EPA-certified refrigerant reclaimer.”

- (84) **Comment(s):** Require cylinders of reclaimed R-410A to be clearly marked by the reclaimer to identify the contents as reclaimed R-410A. (A-Gas)

Agency Response: CARB staff made no changes based on this received comment. In the Proposed Amendments, “*certified reclaimed refrigerant*” must be verifiable by the reclaimer selling reclaimed R-410A who “must have results of the analysis conducted to verify that reclaimed refrigerant meets the necessary specifications as required in [40 C.F.R. Part 82, Subpart F, Appendix A (Specifications for Refrigerants) (January 1, 2017)].” It is not the intent of the Proposed Amendments to create new standards for labeling of reclaimed (recycled) refrigerant.

- (85) **Comment(s):** Establish a methodology wherein independent third-party verification of reclaimers would provide a consistent standard, confirm process compliance, and ensure compliant certified reclaimed R-410A. (A-Gas)

Agency Response: CARB staff made no changes based on this received comment. CARB proposes that reclaimers must be able to verify that the reclaimed refrigerant they sell or provide to OEMs to fulfill requirements of the R4 Program meet the regulation’s definition of “*Certified Reclaimed Refrigerant*.” In the future, CARB may consider including third-party verification if the R4 program is expanded via additional rulemakings.

- (86) **Comment(s):** Allow a maximum content of 10 percent virgin refrigerant in reclaimed R-410A to ensure that out-of-ratio recovered R-410A can be re-blended into the required AHRI-700 ratio of components during the reclamation process. (A-Gas)

Agency Response: CARB staff made changes based on this received comment. In line with the suggestion made by the commenter, modifications made in the First 15-Day Notice includes a maximum allowable content of 15 percent virgin refrigerant in “*certified reclaimed refrigerant*.” This allowable virgin content is to ensure that recovered R-410A can be reclaimed to meet the purity and composition (percent mixture) standards under 40 C.F.R. Part 82, Subpart F, Appendix A (Specifications for Refrigerants). CARB arrived at the value of 15 percent through multiple stakeholder communications, which serves at a starting point. Such a limit on virgin content in reclaimed refrigerant has never been placed before and is included to prevent the regulatory loophole where unlimited virgin refrigerant could be labeled as reclaimed by mixing it with small amounts of reclaimed refrigerant. CARB may revise the maximum allowable virgin content in the future.

- (87) **Comment(s):** Allow the use of other recovered HFC refrigerants to make reclaimed R-410A. For example, R-407A and R-407C contain the two base refrigerants contained in R-410A. The inclusion of these recovered refrigerants

improves the ability of the reclamation industry to utilize separation technologies to increase the supply of reclaimed R-410A. (A-Gas)

Agency Response: CARB staff made no changes based on the received comment. To alleviate concerns about the availability, the R4 program does not limit the sourcing of reclaimed R-410A to California. However, the R4 Program is designed to increase the recovery and reclamation of R-410A refrigerant from AC equipment as a means of reducing HFC emissions from that sector and including other refrigerants will not help incentivize that additional recovery from that sector. For more details, please see Agency Response to comment 68.

- (88) **Comment(s):** Prohibit the re-use of recovered R-410A that has not been reclaimed to prevent equipment failure which can result in release of the refrigerant as well as non-equipment related warranty claims and increased repair costs to consumers. The reuse of recovered R-410A which has not been reclaimed presents traceability, reporting, and record-keeping issues. (A-Gas)

Agency Response: CARB staff made no changes based on this received comment. The R4 program requires the use of "Certified Reclaimed Refrigerant" to meet the R4 Program requirements. For the purposes of this regulation, "Certified Reclaimed Refrigerant" must meet the AHRI 700 standard as incorporated into 40 C.F.R. Part 82, Subpart F, Appendix A. Adherence with this standard is sufficient to address the concerns raised by the commenter.

- (89) **Comment(s):** We support an auditable and enforceable alternate compliance pathway to offset the continued use of R-410A until 2025 through the use of reclaimed refrigerant from 2022 to 2030. (PG&E)

Agency Response: CARB staff made no changes based on the received comment. For details about the R4 program, please see Agency Response to comment 64. CARB is proposing auditable and enforceable additional (not alternate) requirements through the new R4 Program, which will be in effect in 2023 and 2024 for AC OEMs, and 2023 through 2025 for VRF OEMs. The R4 requirements must be met within the period for which the 750 GWP requirement has been delayed. Beginning January 1, 2025 and January 1, 2026, new AC and VRF equipment respectively, will be required to use refrigerants with GWP less than 750 in California.

- (90) **Comment(s):** If CARB moves to a requirement for 100 percent 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 percent 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, a voluntary program is recommended to encourage and expand reclaim use. (Chemours)

Agency Response: CARB staff made changes based on the received comment. Please note these comments were in response to a proposed requirement of using reclaimed R-410A for the initial equipment charge and servicing over the lifetime of the equipment. Modifications made during the time period leading up to and included in the First 15-Day Notice set the reclaim use requirements at 10 percent of initial charge all AC equipment, which will be subject to delayed effective dates for the 750 GWP limit. An additional amount above the 10 percent will be required for VRFs because a significant amount of the refrigerant in VRF systems is added in the field. Further, based on CARB's analysis and data reported to the U.S. EPA by reclaimers, the amount of reclaimed R-410A nationally will be sufficient to meet the R4 requirements. For more details, see Agency Responses to comments 64 and 67.

- (91) **Comment(s):** Ensuring that a program is built around transparency and clear guidance is imperative. It is important to prevent cheating in these types of refrigerant management programs and we believe that existing programs in the state with both rigor and integrity already exist within the California EPA, that includes the ODS protocols that are currently an example will be quite helpful here. They've been able to provide baselines that we can adapt as we move forward with the process. (A-Gas)

Agency Response: CARB staff made no changes based on the received comment. CARB acknowledges and appreciates the comment.

- (92) **Comment(s):** The third-party verification step is also important in minimizing the administrative burden on program stakeholders. (A-Gas)

Agency Response: CARB staff made no changes based on the received comment. For the R4 program, OEM self-certification of the initial baseline report and annual reports is required. In the future, CARB may consider including third-party verification if the R4 program is expanded via additional rulemakings.

- (93) **Comment(s):** Limited reclaim availability will increase HVAC cost significantly. (Gaulco group on behalf of Carrier, Lennox)

Agency Response: CARB staff made changes based on the received comment. The sourcing of reclaimed refrigerant is not limited to California. Please see Agency Response to comment 67.

- (94) **Comment(s):** Due to the nature of GHG emissions having a global impact, offset credit should be given for recovery and destruction of refrigerants regardless of the source or location of recovery and destruction in the 2023-2030 timeframe (JCI).

Agency Response: CARB staff made no changes based on this received comment. CARB has an existing offset program for ozone-depleting substances (ODS), including chlorofluorocarbon (CFC) refrigerants, which ended production and import into the U.S. in 1995. For purposes of the Proposed Amendments,

CARB does not recommend an offset program for refrigerants such as HFCs, which are still in production, because it would not lead to additional reductions above the business-as-usual model. More HFC refrigerant can simply be produced due to end-user demand, negating any reductions from recovery and destruction of HFCs. California must reduce its emissions of HFCs by 40 percent below 2013 levels by 2030.

- (95) **Comment(s):** CARB suggests the use of hydrocarbons as a compliance option, but hydrocarbons are permitted in very small quantities and are not a viable option. (JCI)

Agency Response: CARB staff made no changes based on the received comment. CARB proposes to limit the GWP of refrigerants to below 750 in new AC and VRF equipment, which allows hydrocarbons without mandating the use of any particular refrigerant. The proposed GWP limit allows for the use of non-flammable and less flammable (A2L) refrigerants without limiting refrigerant availability to hydrocarbons, which have GWPs less than ten. CARB is aware that highly flammable hydrocarbons are only permitted in very small quantities and does not suggest that hydrocarbons be used in all AC equipment. CARB is technology neutral and does not recommend any specific refrigerant or group of refrigerants to comply with the Proposed Amendments. Please see Agency Response to comment 27.

- (96) **Comment(s):** CARB should establish an Alternative Compliance Path to allow for the use of virgin R-410A refrigerant in VRV technology until January 1st, 2026. (Daikin)

Agency Response: CARB staff made changes based on the received comment. Please see Agency Response to comment 64.

- (97) **Comment(s):** The added time until 2025 also gives time to establish a reclaimed R-410A market, which could support future restrictions on R-410A as CARB has indicated. (PG&E)

Agency Response: CARB made no changes based on this received comment. CARB agrees with the commenter and appreciates the support.

- (98) **Comment(s):** We support strict penalties for non-compliance with the alternate compliance pathway. (PG&E)

Agency Response: CARB made no changes based on the received comment. The additional (not alternate) requirements through the R4 Program are subject to the same penalties for non-compliance as all other requirements of the regulation.

- (99) **Comment(s):** CARB's current proposal does not address the issue of end-of-life emissions from AC equipment on an ongoing basis, which CARB acknowledges to be a key contributor of HFC emissions. (Lennox)

Agency Response: CARB staff made no changes based on this received comment. CARB acknowledges that emissions of refrigerants from AC

equipment at the end-of-life is a significant contributor to GHG emissions. The proposed R4 Program will incentivize greater recovery of refrigerant at AC end-of-life. CARB continues to work with stakeholders to develop additional programs designed to minimize refrigerant emissions at equipment end-of-life.

- (100) **Comment(s):** If regulation is delayed, consider requiring the use of higher efficiency equipment to offset up to half of the lost emissions. (IGSD)

Agency Response: CARB made no changes based on the received comment. CARB has legal mandates to reduce HFC emissions. U.S. DOE sets energy efficiency standards for AC and refrigeration equipment.

- (101) **Comment(s):** Any offsets allowance used for refrigerant recovery, reuse and destruction should be beyond what is already required. (EIA, IGSD, NRDC)

Agency Response: CARB staff made no changes based on the received comment. Certified reclaimed refrigerant used in new equipment and in the servicing of existing equipment for ACs is not currently required at the state or federal level, therefore, any use of reclaimed refrigerant will be additional to business as usual. For clarification, the R4 program is not an "offset" program. Please see Agency Response to comment 64 for a summary of the R4 Program requirements.

- (102) **Comment(s):** Consider the simplicity of enforcement of only allowing offset by certified and audited refrigerant destruction rather than dealing with the complications of illegal imports of refrigerant into California. (IGSD)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 92.

- (103) **Comment(s):** Reclaimed refrigerant should be obtained from within California. (EIA, NRDC)

Agency Response: CARB made no changes based on the received comments. A potential lack of sufficient supply is a primary reason for not limiting sourcing of reclaimed to refrigerant reclaimed from within California.

- (104) **Comment(s):** CARB should not allow inter-year trading of these compliance credits or allow a company to defer compliance into the future; deferred reduction may not be delivered. (NRDC)

Agency Response: CARB staff made no changes based on the received comment. CARB is not proposing inter-year trading of compliance credits.

- (105) **Comment(s):** OEMs should be required to meet the reclaim requirements for each calendar year to avoid deferring reductions to the future. (NRDC)

Agency Response: CARB made changes based on the received comment. Under the R4 program, CARB is proposing minimum reclaim requirements for each calendar year for the period of the delay, which can be met early, and thus will not incentivize OEMs deferring reductions to the latter months of the requirements. All reclaimed refrigerant use requirements must be met by AC

OEMs prior to January 1, 2025, and for VRF OEMs, prior to January 1, 2026. For more details, please see Agency Response to comment 64.

- (106) **Comment(s):** We strongly encourage CARB to support the development of a broad reclaim program at the beginning of next year. I believe this program similarly is well supported by CARB and industry. (A-Gas)

Agency Response: CARB made no changes based on the received comment. CARB will consider broadening the scope of the R4 Program or otherwise enhance reclaim requirements via future rulemakings.

- (107) **Comment(s):** CARB should strictly limit the duration of this alternative compliance mechanism to no longer than January 1, 2025 for the majority of ACs and heat pumps. (NRDC)

Agency Response: CARB made changes based on the received comment. The R4 Program requirements to use reclaimed refrigerant must be met before July 1, 2025 for AC OEMs, and before July 1, 2026 for VRF OEMs. Although the minimum reclaimed refrigerant requirements have specific due dates which sunset the requirements, CARB's intent is to create a reclaim program that is long lasting. CARB encourages, but does not require, OEMs to continue using reclaimed refrigerant after R4 Program requirements are completed at this time.

- (108) **Comment(s):** If 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 minimum that the upper GWP limit requires. (Chemours)

Agency Response: CARB staff made no changes based on this received comment. Modifications made in the First 15-Day Notice include an "Optional Early Action Credit." Under the R4 Program, OEMs can receive compliance credit for AC and VRF equipment that they enter into commerce in California using refrigerants with a GWP less than 750 prior to the required dates of the proposed regulation (before January 1, 2025 for AC equipment, and before January 1, 2026 for VRF equipment). Under the early action credit option, all pounds of refrigerants with a GWP less than 750 are given a credit equal to an equal number of pounds of using reclaimed R-410A in new equipment or for servicing existing equipment. CARB chose not to give additional "credit" based on refrigerants using decreasing GWP values. Giving credit based on specific GWP values lower than 750 will be complex from an implementation standpoint, for industry and the State, without achieving any additional emissions reductions because several OEMs already plan to use refrigerants well below the 750 GWP threshold to comply with the rule.

- (109) **Comment(s):** We support the AHRI proposal. (ARAP, Carrier, Daikin, JCI)

Agency Response: CARB staff made changes based on the received comments. AHRI's proposal includes a two-year delay in the regulation effective date for unitary AC, from January 1, 2023, to January 1, 2025; and a refrigerant

recovery program with some aspects of the proposed R4 Program. See Agency Response to comment 64.

The AHRI proposal included the following requirements:

- Offset the quantity of refrigerant (with a GWP of 750 or greater) placed into new equipment in 2023 and 2024 by using reclaimed refrigerant equal to ten percent of the original equipment charge of AC and VRF equipment brought into commerce into California in 2023 and 2024.
- The quantity of refrigerant may be offset by the recovery, purchase, use, or destruction of recovered refrigerant.
- The requirements can be met from 2022 to 2030.
- Additional credit is given for AC units sold from 2022 to 2030 that have smaller charge sizes than baseline, and for each GWP value of refrigerants in new equipment where the GWP is less than 750.
- Reports to CARB will be self-certified by the reporting OEM (no third-party verification).
- OEMs, sellers of reclaimed refrigerant, and refrigerant reclaimers must submit annual reports.

Beginning January 1, 2025, AHRI also proposed the following:

- 750 GWP limit for newly manufactured stationary AC equipment, understanding that safety standards and the California codes need to be aligned.
- 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 California.
- Equipment manufacturers will promote and encourage the recovery of R-410A through education of their service and dealer networks.

CARB has incorporated the following aspects of the AHRI proposal into the Proposed Amendments. See Agency Response to comment 64.

- Two-year delay in the regulation effective date for unitary AC.
- Ten percent refrigerant replacement requirements in the R4 Program for AC equipment. The quantity of refrigerant required may be by purchase and use of reclaimed refrigerant.

- Reports to CARB will be self-certified by the reporting OEM (no third-party verification).
- OEMs must submit annual reports.
- 750 GWP limit for newly manufactured stationary air conditioning equipment, understanding that safety standards and the California codes need to be aligned.
- Require reclaimed refrigerant to meet purity requirements of AHRI 700 standard.
- Allow nationally reclaimed R-410A to be used in California.
- Equipment manufacturers will promote and encourage the recovery of R-410A through education of their service and dealer networks.

The following aspects of the AHRI proposal were not included:

- The quantity of refrigerant required may be from destruction of refrigerant.
- The requirements can be met from 2022 to 2030.
- Additional credit is given for AC units sold from 2022 to 2030 that have smaller charge sizes than baseline, and for each GWP value of refrigerants in new equipment where the GWP is less than 750.
- Sellers of reclaimed refrigerant and refrigerant reclaimers must submit annual reports.
- 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.

(110) Comment(s): The AHRI proposal provides the greatest environmental benefits of any option presented to CARB thus far; we strongly prefer it over any of the other proposed alternatives presented thus far. To facilitate a contractor behavior, shift and to aid CARB in enforcement, manufacturers have also proposed to add wording directly to their equipment and supporting literature noting that any units built on or after January 1, 2023, the equipment must be serviced with reclaimed R-410A for units installed in California. Manufacturers have also agreed to promote, educate, and encourage contractors and technicians on the importance and obligation of refrigerant recovery. We have committed to CARB that we will create and provide copies of marketing, technical literature and training materials promoting such practices. (JCI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 109.

(111) **Comment(s):** We do not support differentiated discount rates for refrigerants. (Daikin)

Agency Response: CARB staff made no changes based on this received comment. The proposed R4 Program does not use differentiated discount rates for refrigerants. All refrigerants with a GWP less than 750 are treated equally for the early action credit option of the R4 Program. See Agency Response to comment 108.

(112) **Comment(s):** We do not support an incremental offset credit for refrigerants with a GWP lower than 750 since those choices were already determined and do not constitute any additional emission reductions. (EIA, NRDC)

Agency Response: CARB made no changes based on these received comments. No incremental offset credit is given to refrigerants with lower GWPs, all refrigerants with a GWP less than 750 are credited equally for the early action credit option of the R4 Program. See Agency Response to comment 108.

(113) **Comment(s):** We support offset credit for refrigerants lower than 750 GWP. (AHRI, Carrier, Chemours, FHP Manufacturing, JCI)

Agency Response: CARB staff made no changes based on these received comments. See Agency Response to comment 108.

(114) **Comment(s):** We support offset credit for smaller refrigerant charge sizes. (JCI)

Agency Response: CARB staff made no changes based on the received comment. The selection of refrigerant charge sizes by OEMs when designing cooling equipment is based upon many factors. Providing early action or compliance credit for smaller refrigerant charge sizes will not result in any additional GHG reductions above what would occur without the credit recommended in the comment.

(115) **Comment(s):** We do not support the reclamation requirements given concerns regarding the availability of sufficient quantities of reclaimed R-410A and do not support the idea of offsetting refrigerant emissions associated with installation and servicing, traditionally performed by contractors. (Daikin, JCI)

Agency Response: CARB staff made changes based on the received comments. Please see Agency Responses to comments 64 and 67. Please note the comments above are in response to stakeholder proposal included in the Staff Report and submitted by the Environmental Investigation Agency (EIA).

EIA's proposal also includes the following recommendations:

A two-year delay in the regulation effective date is acceptable if the added HFC emissions are offset by other means. A CO₂ equivalent amount of refrigerant equal to the initial refrigerant charge plus additional service gas for lifetime of exempted equipment must be offset by 2030 through:

- Purchase and use of reclaimed HFC refrigerant in new AC equipment placed on the market in California;

- Enable recovery, reclamation, and use of reclaimed HFC refrigerant for servicing existing AC equipment within California; or
- Destruction of R-410A refrigerants recovered from AC equipment within California after January 1, 2023.
- Amount of lifetime emissions for various air conditioning equipment types are subject to leak rate and lifetime expectancy assumptions consistent with California's F-Gas emissions inventory, except for variable refrigerant flow (VRF) systems based on a 25 percent annual leak rate over 15-year system lifetime.
- All activities related to the qualified exemption will be subject to verification and reporting through a third-party contracted by the manufacturer and reported on an annual basis to CARB.
- Non-compliance is subject to strict penalties and fines equivalent to California cost of carbon estimates per CO₂e offset not met.
- Add definitions as proposed for "Lifecycle Refrigerant Emissions Equivalency" and "Certified reclaimed HFC refrigerant."

CARB has accepted the following aspects of the EIA proposal:

A two-year delay in the regulation effective date is acceptable if the added HFC emissions are offset by other means. The "other means" are addressed by CARB's proposed R4 Program. The R4 Program requirements to use reclaimed refrigerant can be met by the EIA-proposed:

- Purchase and use of reclaimed HFC refrigerant in new AC equipment placed on the market.
- Enable recovery, reclamation, and use of reclaimed HFC refrigerant for servicing existing AC equipment.
- Added a definition for "*Certified Reclaimed Refrigerant.*"

Note that the EIA proposal limited reclaimed refrigerant use in new equipment entering California, and for servicing existing equipment in California. CARB proposes to not limit use of reclaimed refrigerant to only California. Non-compliance is subject to strict penalties and fines equivalent to California cost of carbon estimates per CO₂e offset not met. CARB will enforce non-compliance in alignment with other GHG-emissions related regulation.

The following aspects of the proposal were not included:

- Only a portion of the initial charge of the refrigerant in equipment and not the entire lifecycle emissions of refrigerant losses are required to meet R4 Program requirements.
- The requirement must be met by July 1, 2025 for AC OEMs, and by July 1, 2026 for VRF OEMs.
- A 2030 compliance date was not accepted due to reducing the R4 requirements, which can be met within the proposed dates.
- CARB does not accept destruction of HFCs as meeting R4 Program requirements (please see Agency Response to comment 94).

CARB proposes to use only a portion of the initial refrigerant charge size of equipment as an R4 Program requirement and does not consider lifecycle emissions. Therefore, CARB will not use annual leak rates, differential charge sizes, or end-of-life loss rates to determine the number of pounds of reclaimed refrigerant that must be used. For the reasons stated above, CARB does not propose a new definition for "Lifecycle Refrigerant Emissions Equivalency." CARB proposes that R4 Program reports be self-certified by OEMs and will not require third-party verification.

- (116) **Comment(s):** Recommend OEMs facilitate recovery, purchase, or use reclaimed refrigerant, or enable the destruction of recovered refrigerant to enable R-410A recovery from 2022 to 2030 to offset the amount of R-410A used during the delay from 2023 to 2025. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. As part of the regulatory process, CARB developed the R4 Program in collaboration through a transparent and public process with stakeholders which include many of the proposals recommended, except for credit for the destruction of refrigerant and allowing until 2030 to meet the R4 Program requirements. CARB staff determined that extending the compliance date from 2025 to 2030 for AC OEMs, and from 2026 to 2030 for VRF OEMs, would not be consistent with the intent of the R4 Program, which is to immediately help offset the delay of the initial 2023 effective date for all AC and VRF equipment. Extending the requirements would result in delayed emissions reductions. Due to the relatively short atmospheric lifetime and high GWP values of HFCs, a delay in their reductions would be counter-effective to more immediate reductions.

- (117) **Comment(s):** We recommend the use of reclaimed R-410A to offset the continued use of R-410A until 2025. The infrastructure of the existing refrigerant reclaim market for ODS as well as HFCs can be emulated and relied upon for the development of an auditable and enforceable R-410A refrigerant reclaim market. The existing ODS refrigerant reclaim market employs a robust recordkeeping process with reporting requirements to U.S. EPA. The American

Carbon Registry has a methodology in place for certifying reclaim of HFC refrigerants for offsetting GHG emissions. (PG&E)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information. CARB developed the R4 Program in collaboration through a transparent and public process with stakeholders, which requires OEM self-certification. CARB staff considered requiring third-party verification of certified reclaimed refrigerant use and distribution by OEMs, but this was rejected due to a perceived added burden to the existing reporting requirements of the R4 Program. Please see Agency Responses to comments 64 and 92.

- (118) **Comment(s):** CARB should implement a refrigerant recovery and reclaim program that is decoupled from the GWP prohibitions in new equipment. CARB should develop a refrigerant recovery and reclaim program in coordination with stakeholders. This would result in much higher emission reductions than the existing proposal where GWP prohibitions and reclaimed refrigerant requirements are coupled together and it would also be less burdensome to administer. CARB must consider alternatives that are as effective, less burdensome, and more cost-effective and recovery and reclamation meets those criteria. (Lennox)

Agency Response: CARB staff made no changes based on this comment. The R4 Program is separate from the GWP limits and was developed in collaboration through a transparent and public process with stakeholders. Please see Agency Response to comment 64.

- (119) **Comment(s):** CARB should consider giving credit during the 2023 – 2030-time frame for products that utilize refrigerants that are below 750 GWP. In simple math we propose that for every unit put in commerce into California beyond January 1, 2023, that there is a CO₂ liability equal to delta GWP of the refrigerants used to 750. If unit used R-410A, GWP = 2088, that value would be 1338 x mass of refrigerant. Then when revised units, with lower GWP, are introduced in the market. From that point you provide a credit against that liability. The credit is equal to Delta below 750 GWP and the final designed refrigerant GWP. If the new unit was designed with R-32, GWP 675, the credit would be 75 x mass of the refrigerant used in new units put into commerce in from 2023 thru 2030. (FHP)

Agency Response: CARB staff made no changes based on this comment. The Proposed Amendments do provide for an early action credit. Please see Agency Response to comment 108.

A-2.6. Safety Standards and Building Codes

- (120) **Comment(s):** CARB should be more involved with establishing codes to enable the use of A2L technology to meet its regulatory objectives. (Gualco Group on behalf of Carrier, Chemours)

Agency Response: CARB staff made no changes based on the received comments. CARB is involved in the Codes and Standards workgroup meetings. However, the Codes and Standards bodies dealing with safety have the purview and expertise and CARB will rely on these agencies to make this determination. CARB has and will continue to work with agencies and groups overseeing Codes and Standards and provide support as needed. Please see Agency Response to comments 35 and 56.

- (121) **Comment(s):** The 2023 date is premature because the requisite Codes and Standards have not been updated and the proposal does not consider the added fire risk associated with using flammable refrigerants in wildland urban interface areas in particular by adopting regulations prematurely before the necessary building codes have been updated. (Senator Bill Dodd)

Agency Response: CARB staff made changes based on the received comment. CARB recognized the delays Codes and Standards updates. Therefore, during CARB's December Board Hearing, CARB staff proposed and the Board approved industry's request to extend the compliance date to January 1, 2025, for stationary residential and commercial "Other Air-conditioning Equipment," and extended the compliance date to January 1, 2026, for "Variable Refrigerant Flow (VRF) Systems."

- (122) **Comment(s):** Concerns raised by the fire safety community, who perform critical public safety functions, have been ignored in the development of the regulation. (Senator Bill Dodd)

Agency Response: CARB staff made changes based on the received comment. Please see Agency Responses to comments 35 and 121. CARB has not ignored concerns raised by the fire safety community. CARB relies upon the expertise of necessary fire officials for the approval of requisite Codes and Standards, primarily the California State Fire Marshal, who oversees health and safety concerns related to refrigerants. In early 2020, the State Fire Marshal convened a working group to consider a proposal to incorporate the latest UL and ASHRAE safety standards into the California Building Code with provisions allowing for the use of lower flammability refrigerants in 2023. At the time of the 45-day notice for this regulation, the State Fire Marshal process was still ongoing and only a few days prior to the board hearing it became clear that the building code would likely not be updated before 2023.

The State Fire Marshal's working group includes members of the fire safety community. Members of the fire safety community, including the State Fire Marshal, identified that additional testing was needed to assess the impact of lower flammability refrigerants in the event of wildfires, as well as identify additional risks to firefighters. Necessary testing scenarios were developed by fire service professionals and safety standard experts and conducted by UL in its independent lab in late 2020 and a report was published in early 2020. UL's Firefighter Safety Research Institute has developed a training module for firefighters to prepare firefighters for the safe transition to lower flammability

refrigerants. The working group is still ongoing and is considering the adoption of lower flammability refrigerants for the next California building code update and addressing any safety related concerns.

- (123) **Comment(s):** CARB and other regulatory authorities should resolve Codes and Standards challenges prior to January 1, 2023. (Carrier)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comments 29, 30, and 31.

- (124) **Comment(s):** CARB should work with the national code adoption process and timelines to ensure there is national standardization on the codes. (CFPOA)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Responses to comments 29, 30, and 31.

- (125) **Comment(s):** January 1, 2025 is feasible only if the relevant safety standards are adopted into the building code as written. Deviations would require manufacturers to redo much of the work that has been done and not leave sufficient time for training and further delay the date beyond 2025. (Carrier)

Agency Response: CARB staff made no changes based on the received comment. The January 1, 2025 date is based on research, significant stakeholder input, and strikes the balance between requiring mandated emission reductions while allowing time to update Codes and Standards as well as manufacturing plants and the need to push technology.

- (126) **Comment(s):** The new replacement refrigerants are classified as flammable gases, and the equipment targeted for this transition includes stationary air conditioning units in residential and light commercial applications. These refrigerants are odorless and colorless. Currently the use of flammable gases in homes is allowed; however, those gases (liquefied petroleum gas and compressed natural gas) have a safety component - they are odorized. The odor is detectable far below the threshold where ignition can occur. These new refrigerants are odorless and colorless. If there is a leak, the homeowner or occupants will be completely unaware of the leak until ignition occurs. Safety measures must be developed and in place before the transition date and training must be provided to firefighters. (CSFA)

Agency Response: CARB staff made no changes based on the received comment. CARB does not set safety standards for refrigerants but is actively working with industry groups through a transparent and public process such as the AHRI Safe Refrigerants Task Force. AHRI is the trade association representing manufacturers of HVACR and water heating equipment within the global industry. AHRI's Safe Refrigerant Transition Task Force has been formed to address every step of the supply chain in the safe refrigerant transition to low-GWP refrigerants, including less flammable A2L refrigerants. The task force comprises AHRI members and stakeholders employed with contractors, government agencies, the fire service, unions, training organizations, and other businesses. All safety measures concerning A2L refrigerants are under

consideration. However, CARB did extend the dates to allow more time to allow for updates to the Codes and Standards and/or create new refrigerants.

- (127) **Comment(s):** These standards also need to be fully vetted by all stakeholders, including equipment builders, fire services personnel, technicians, and channel partners. Further, any changes in codes will have to be accompanied by an extensive, robust education and training program for thousands of contractors and first responders, as well as awareness campaigns for consumers on the higher risks related to A2L refrigerant in their homes. Once this work is complete, and should the Codes and Standards bodies determine that A2L refrigerants can be used safely, the standards can be responsibly adopted into new building codes. Any shortcut of these measures or the process overall will create undue risk. (Honeywell)

Agency Response: CARB staff made no changes based on this comment. CARB has conducted substantial engagement with stakeholders. CARB staff has also extended the compliance dates to allow the Codes and Standards process to be undertaken. Please see Agency Response to comments 1 through 28, 35, 56.

A-2.7. Service Ban on New R-410A Refrigerant

- (128) **Comment(s):** Add a service ban on newly produced R-410A for servicing existing equipment should be implemented effective 2021. (EIA)

Agency Response: CARB staff made no changes based on the received comment. Any service ban on newly produced R-410A is not within the scope of the Proposed Amendments. CARB is evaluating many options to further reduce HFC emissions, including potential sales or service bans on new high-GWP refrigerants. CARB looks forward to working with the commenter on this proposal.

- (129) **Comment(s):** Add a service ban on newly produced R-410A for servicing existing equipment should be implemented effective 2023. (Rheem, JCI)

Agency Response: CARB staff made no changes based on the received comment. See Agency Response to comment 128.

- (130) **Comment(s):** Add a service ban on newly produced R-410A in existing equipment should be implemented, effective 2025, to encourage reclaim and reduce end-of-life emissions. (AHRI, IGSD)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 128.

- (131) **Comment(s):** A R-410A service ban should include collection of refrigerants at end-of-life and permit national reclamation of R-410A. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 128.

- (132) **Comment(s):** The mechanics of a R-410A service ban can be as follows: "Seller" of R-410A must report sales to CARB as a registered seller. Registered

“Reclaimers” of R-410A must also report sales to CARB. Any “Reclaimer” or “Seller” must keep records of any sales to end-users. This should provide a mechanism to check reports from both “Sellers” and “Reclaimers,” which should ease the enforcement burden and ensure compliance and attainment of necessary emission reductions. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information. Please see Agency Response to comment 128.

- (133) **Comment(s):** A ban on the sale of virgin refrigerant could create a viable incentive for HVAC technicians to actually recover and re-use refrigerant at equipment end-of-life. By California’s own estimates, each residential unitary AC sold with high-GWP R-410A refrigerant imposes a social cost of carbon equal to \$1,169.75 – this burden is currently borne by society, instead of the manufacturers and chemical companies responsible for this pollution. CARB should do everything in its power to eliminate this unjust subsidy. (IGSD)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 128.

A-3. Refrigeration

A-3.1. Support for Alternative 1 for Refrigeration

- (134) **Comment(s):** CARB should adopt Alternative 1 for refrigeration, which results in the highest emissions reductions. (Koessel, 350 Humboldt, Fhyre, Humboldt State University, 350.org, Stauffer, Siegel, 11th Hour, Burtis, Sanger, Carr, Kandus, Lynn, Ihara, Stewart, Brooks, Floyd, 350.org, CE4K, Tan, Dorsey, 350 VCCH, Kirschling)

Agency Response: CARB staff made no changes based on the received comments. In the Staff Report, CARB staff are required to consider reasonable alternatives to the proposed regulatory actions and provide reasons why these alternatives were not included in the proposal. Alternative 1 included more stringent GWP requirements for both refrigeration and AC systems. Alternative 1 would require ultra-low-GWP (i.e., GWP less than 10) refrigerants in all new refrigeration systems containing more than 50 pounds of refrigerant that would be installed into any facility, irrespective of whether that facility is newly constructed, being re-purposed, remodeled, or is an existing facility carrying out system replacements or additions. However, during the stakeholder engagement process, it became evident that the costs associated with this alternative are potentially onerous for existing facilities. The main reason is that current ultra-low-GWP refrigerants (e.g., CO₂, ammonia, hydrocarbons) are not drop-in replacements for HFCs. Use of these refrigerants in an existing facility will require a full replacement of the entire refrigeration system – this includes all compressors, condenser, piping and, in case of supermarkets, all display cases. Such a replacement is currently expensive and logistically challenging.

Many facilities may need to shut down to carry out such a system replacement. If such a rule were adopted, facility owners/operators may choose not to retire and replace their old leaky systems to avoid triggering an extensive system replacement. This may ultimately result in an increase in emissions and defeat the purpose of the regulation.

At the onset of the rulemaking process, CARB's intention was to adopt a rule very similar to Alternative 1 for non-residential refrigeration systems. However, due to potential feasibility concerns and associated cost impacts which could lead to harmful shifts in end-user behavior, CARB rejected Alternative 1. As part of a middle-ground approach, CARB staff proposed a low-GWP limit of 150 for new facilities only, while existing facilities were given different GWP requirements which vary by end-use. CARB's proposal is more cost-effective than Alternative 1 and guarantees HFC emission reductions from existing retail food facilities – among the largest contributors to HFC emissions – by 55 percent by 2030. In contrast, all refrigerant conversions under Alternative 1 would be "at will" and may not occur at the same pace as the current proposal. In the future, CARB may consider proposing rules similar to those under Alternative 1 as conditions change, additional analysis is available, and additional HFC reductions are needed to meet the State's targets.

- (135) **Comment(s):** We are out of time. No more kicking the can down the road. Alternate 1 is the only responsible choice. You are in a position of responsibility, so take responsibility for solving this problem. (Fhyre)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 134.

- (136) **Comment(s):** On balance and given the current warnings of the Intergovernmental Panel on Climate Change (IPCC) that at least 50 percent of emissions need to be curtailed by 2030 to have a chance of limiting global temperature rise to 1.5 degree Celsius, the higher costs of quick action seem necessary. Given the vastly greater number of retail food markets in Europe and Japan that have adopted natural refrigerants, the claim of infeasibility by owners must be exaggerated. And both cost and feasibility are going to have to be dealt with in the near future in any case if we are to meet our goal of net-zero by 2045. (350.org, 350 Humboldt)

Agency Response: CARB staff made no changes based on the received comments. The widespread adoption of natural refrigerants in Europe and Japan is in large part due to the HFC phasedown, which is in effect in parts of the world that have ratified the Kigali Amendment to the Montreal Protocol. HFC phasedowns have resulted in a scarcity of high-GWP refrigerants thus making low-GWP alternatives more economically advantageous and feasible by comparison. In the United States, until late 2020, federal inaction on HFCs and non-ratification of the Kigali Amendment had delayed the pace of market adoption of low-GWP refrigerants. Without a nationwide policy driver to move to natural and other low-GWP refrigerants, barriers such as high upfront costs

and shortage of service technicians familiar with the new technologies continue to persist in the U.S. and in California. In December 2020, Congress enacted the federal *American Innovation and Manufacturing* (AIM) Act, which grants U.S. EPA the authority to implement an HFC phasedown in the United States.²⁴ Once implemented, a national phasedown in the U.S. should work synergistically with CARB's sector-specific HFC prohibitions in driving up market adoption of natural and other low-GWP refrigerants in California.

- (137) **Comment(s):** CARB should establish a performance standard for GWP emissions for each year, similar to a renewable portfolio standard for electricity generation or cap and trade. The performance standards increase gradually to near-zero GWP emissions from refrigerants by 2030. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. CARB's company-wide reduction targets for retail food companies are similar to the performance standards suggested by the commenter. Under CARB's regulation, the average GWP of the retail food sector will be reduced to below 1,400, which approximately a 55 percent reduction below current levels. A reduction to near-zero average GWP by 2030 is currently infeasible because it would require a complete replacement of all HFC-based retail food refrigeration systems by systems using CO₂, ammonia or hydrocarbons by 2030. This is because the current ultra-low-GWP refrigerant options are not drop-in replacements for the HFC-based refrigeration systems. For more details, please see Agency Response to comment 134.

- (138) **Comment(s):** While not fitting into the usual supermarket rapid return on investment paradigm, natural refrigerants have some advantages that are not taken into account sufficiently in the staff report assessing the costs of Alternative 1, such as lowest lifecycle costs, avoiding multiple transitions, and energy efficiency advantages. The Staff Report states that "[r]efrigerant leaks often increase energy expenditures, reduce equipment life, and increase material costs, all of which adversely affect operating budgets." However, these increased operating costs may be invisible to the organizational unit concerned with capital costs. In consequence, requirements for new natural refrigerant equipment are seen as an upfront cost unbalanced by the actual negative operating impacts of refrigerant leaks. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. CARB's economic analysis does take into account lifecycle costs, i.e., both upfront and ongoing costs. Ongoing costs include maintenance costs such as refrigerant replenishment, electricity, as well as regulatory compliance costs. CARB staff's analysis for Alternative 1 estimated statewide cumulative operational cost-savings of \$481 million dollars over the regulatory timeframe. These savings are expected due to a reduction in regulatory requirements because of leapfrogging to the lowest GWP refrigerants possible, and expected

²⁴ 42 U.S.C. § 7675; U.S.EPA, AIM Act: <https://www.epa.gov/climate-hfcs-reduction/aim-act>.

energy efficiency gains for some refrigeration systems. The reason why CARB rejected Alternative 1 are explained in Agency Response to comment 134.

- (139) **Comment(s):** The new CARB regulation, by not explicitly moving aggressively toward natural refrigerants, encourages the industry to continue developing HFC/HFOs with high GWP (1,400) and discourages research into making natural refrigerants more efficient. Another factor, not considered by CARB staff in assessing Alternative 1, is the competitive advantage provided to U.S. manufacturers of natural refrigerant equipment. Initial difficulties are balanced by not only reduced emissions and greater efficiency of non-HFCs but also the head start California, and the U.S. will enjoy in a fast-growing sector that is going to have to change radically around the world. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. GWP limits are performance standards that are designed to incentivize the development of low-emission technologies while remaining technology neutral. CARB's proposed regulation does include a 150 GWP limit for new refrigerated facilities, which is designed to increase the adoption of climate-friendly alternatives including natural refrigerants. For more details, please see Agency Response to comment 134.

- (140) **Comment(s):** Under CARB's regulation, the maximum reduction required for retailers is to a GWP of 1,400. This is an incremental improvement, not actually intended to replace HFCs with very low or zero emission alternatives. (350 Humboldt, 11th Hour)

Agency Response: CARB staff made no changes based on the received comments. When CARB adopts regulations, it must strike a balance between the environmental benefit and public health with technological feasibility and economic impact, amongst other relevant factors. While CARB agrees that aggressive action is needed to achieve HFC emissions and ultimately carbon neutrality, CARB cannot ignore the other factors it must weigh when adopting regulations. The proposed regulation strikes the correct balance at this time. The GWP limit of 150 for new facilities is intended to replace high-GWP HFCs with very low or zero emission alternatives. However, in existing facilities, such a mandate proved to be economically infeasible. For more details, please see Agency Response to comment 134. In existing retail food facilities, CARB's mandate of an average GWP below 1,400 by 2030 encourages retrofits to lower-GWP alternatives sooner than they would have occurred otherwise. Additionally, emissions reductions in the existing retail food facilities are guaranteed to occur by 2030. In contrast, all refrigerant changes under Alternative 1 would be at the discretion of the facility owners / operators and may not have occurred at the same pace. Finally, an average GWP of 1,400 was also set such that small retail food businesses, particularly those serving

California's priority populations,²⁵ have an economical path to reducing their HFC emissions. CARB staff looks forward to working with all stakeholders in the future to identify additional feasible actions that can help achieve deeper HFC reductions and carbon neutrality.

- (141) **Comment(s):** The Proposed Amendments are estimated to reduce emissions by 40 percent below baseline by 2040. This is clearly very far from the 2045 goal of net zero emissions. California needs measures like Alternative 1 to meet the carbon neutrality goal by 2045. CARB's regulation should come up with a phased way of moving to natural refrigerants in the next 10 years. (350 Humboldt, Koessel, 11th Hour)

Agency Response: CARB staff made no changes based on the received comments. For more details, please see Agency Responses to comments 134 and 140. More will be needed to meet either the near-term SB 1383 goal and the mid-century carbon neutrality goal. CARB looks forward to working with stakeholders to take further action to reduce HFC emissions and achieve the State's climate protection targets.

- (142) **Comment(s):** CARB's analysis underestimates the benefits of Alternative 1. To improve the analysis, CARB should use 20-year GWP values instead of 100-year values. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. For this rulemaking, 100-year GWP values were used to be consistent with CARB's and U.S. EPA's greenhouse gas emissions inventories. To highlight the importance of immediate action, CARB staff did discuss emissions benefits using 20-year GWP values in the Staff Report and highlighted it in the *Executive Summary* of the document.

- (143) **Comment(s):** CARB can make Alternative 1 more feasible by providing incentives and tax breaks. CARB should prioritize incentivizing stores with low profit margins, located in disadvantaged communities and "food desert" neighborhoods. (350 Humboldt, Stauffer, Siegel, 11th Hour, Humboldt State University, Burtis, Sanger, Carr, Stewart, Brooks, Floyd, CE4K, Dorsey, 350 VCCH, Kirschling)

²⁵ Priority populations include the State's disadvantaged communities, low-income communities, and low-income households. Disadvantaged communities are defined by the California Environmental Protection Agency (CalEPA) as the top 25 percent of communities experiencing disproportionate amounts of pollution, environmental degradation, and socioeconomic and public health conditions according to the Office of Environmental Health Hazard Assessment's (OEHHA) CalEnviroScreen tool. Low-income communities and households are those with incomes either at or below 80 percent of the statewide median or below a threshold designated as low-income by the Department of Housing and Community Development. More information available at: <http://www.caclimateinvestments.ca.gov/priority-populations>.

Agency Response: CARB staff made no changes based on the received comments. CARB agrees with the commenters that incentivizing the transition to low-GWP refrigerants is beneficial. In 2018, Senate Bill 1013 established an incentive program for low-GWP refrigerant technologies and tasked CARB to administer the program. In 2020, one million dollars were allocated by the Legislature to the SB 1013 program called the “F-gas Reduction Incentive Program” (FRIP). Recognizing the importance of incentivizing the transition to ultra-low-GWP (i.e., GWP less than 10) refrigerants in supermarkets as a way to achieving our emissions targets, CARB awarded funds to 13 stores installing the best available technologies.²⁶ About fifty percent of the funds were awarded to stores located in low income and disadvantaged communities. It is important to note that incentive funds are allocated by the California Legislature, and any change in taxes would likewise require action by the California Legislature. In addition, tax incentives would be implemented under a different agency.

- (144) **Comment(s):** As many European countries do, tax high GWP HFCs during the transition at a level that will serve as an incentive to change as well as recognize the social costs of the emissions. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 143.

- (145) **Comment(s):** Natural refrigerants do require bigger and more expensive upgrades of equipment. A combination of technical help and subsidies could facilitate the conversion. Taxing the emissions of large systems could incentivize the large operations. (11th Hour)

Agency Response: CARB staff made no changes based on the received comment. CARB does have a new incentive program which helps facilitate the transition to ultra-low GWP options including natural refrigerants. For more details on the incentive program, please see Agency Response to comment 143. Commercial and industrial refrigeration facilities rely on the technical support of a well-established industry of service contractors. While CARB staff do not provide technical support for the refrigerant transitions, they are always available to assist stakeholders and respond to their queries. As mentioned above, taxation falls under the purview of a separate agency.

- (146) **Comment(s):** Japan currently has an incentive program worth \$69 million each year to help facilities convert to natural refrigerants. Since Japan had a population of 125.5 million in 2018 and California’s population was 39.5 million, a comparable incentive program for California would be \$21.5 million, far above what we are spending. (350 Humboldt)

Agency Response: CARB staff made no changes based on this comment. Please see Agency Response to comment 143.

²⁶ CARB’s F-gas Reduction Incentive Program, Awarded Projects in 2020:
<https://ww2.arb.ca.gov/our-work/programs/FRIP/frip-program-awarded-projects>.

(147) **Comment(s):** If there must be a two-tiered approach, require big operations to switch to natural refrigerants by 2030 but allow smaller operations more time. Smaller operations tend to run systems that use less than 50 lbs. of refrigerant anyway. (11th Hour)

Agency Response: CARB staff made no changes based on the received comment. CARB's proposal does have a more relaxed pace of compliance for smaller operations, where companies owning fewer than 20 retail food facilities are not required to meet the interim target in 2026. Most new facilities are opened by large companies. Thus, a 150 GWP limit for new facilities will require the large companies to install low-GWP refrigerants including natural refrigerants in all new construction, re-purposed and fully remodeled facilities starting 2022. This is expected to increase the market adoption of climate-friendly refrigerants including natural refrigerants by 2030.

(148) **Comment(s):** CARB's proposed rules offers too much deference to industry preferences such as lower upfront costs. (350.org, 350 Humboldt)

Agency Response: CARB staff made no changes based on the received comments. CARB used a transparent and public process to gather relevant economic data and stakeholder input. This includes stakeholders from all sectors, not just industry. CARB held several public workshops where attending stakeholders ranged from equipment and chemical manufacturers, end-users of the refrigeration systems, design and engineering consultants, and environmental non-profit organizations. CARB's Proposed Amendments were developed after careful consideration of all available data and stakeholder feedback and did not rely on any one industry source.

(149) **Comment(s):** A swift conversion to natural refrigerants could help avoid the smuggling and black marketing of HFCs as well as sales of fake HFCs, all of which have happened in the European Union (EU). (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. The commenter is alluding to market upheavals that occurred in the EU due to a sudden scarcity of HFCs after the implementation of an HFC phasedown in that region. In general, CARB agrees that low-GWP limits on equipment will lead to lower demand for HFCs and thus could help avoid nefarious activities such as smuggling and illegal sales of HFCs. However, California's actions alone will not be sufficient to eliminate the nationwide demand for high-GWP HFCs. A national HFC phasedown and additional rulemakings are necessary to cut down the demand, use, and ultimately emissions of HFCs.

(150) **Comment(s):** The scope of CARB's rulemaking is insufficient. HFC restrictions should be extended to convenience stores and other facilities using systems with less than 50 pounds of refrigerant. It is likely that leaks or failures to reclaim are even more prevalent and greater in this population of refrigerant users, in part because of much laxer regulations. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. For this rulemaking, CARB is addressing the refrigeration and AC systems that are the largest contributors to HFC emissions. Systems containing more than 50 pounds tend to have the highest leak rates, which is why the 50-pound threshold also applies to California's Refrigerant Management Program. However, CARB agrees that all sources of HFC emissions will need to be addressed to meet the California's 2030 targets and carbon neutrality goals. Thus, CARB may consider additional rulemakings in the future to reduce the HFC emissions from systems containing less than 50 pounds of refrigerant, such as those used in convenience stores.

- (151) **Comment(s):** The cost-benefit ratio which seems to favor the preferred alternative is thrown off dramatically by questionable methodologies—the use of the social cost of carbon and discount rates. CARB's analysis underestimates the benefits of Alternative 1. To improve the analysis, CARB should use higher social costs of carbon (SCC) estimates, which should start at approximately \$100 per metric ton, and lower discount rates, of zero or below 2 percent. Additionally, CARB's staff report notes that the social costs of GHG emissions were based on CO₂, which underestimates the benefits of reducing HFCs, considering how much more potent HFCs are, at trapping heat. (350 Humboldt, 11th Hour)

Agency Response: CARB staff made no changes based on the received comment. While the dollar per ton estimates of the SCC are presented in year 2007 dollars (2007\$) in Table 9 of the Significant Regulatory Impacts Analysis (SRIA) (for consistency with the original report), these values are adjusted for inflation to 2018 dollars in our analysis to calculate the total Avoided Social Cost of Carbon (Table 10). When accounting for inflation (California CPI), the estimates shown in Table 9, range from \$20-\$91 per metric ton in 2030 and \$26-\$105 per metric ton in 2040.²⁷ As such, the analysis does consider SCC values as high as the commenter suggests.

For discount rates, the SRIA and Staff Report include a range of potential estimates of the SCC based on a range of discount rates, following results supported by Interagency Working Group (IWG) report. The SRIA notes that the National Academies of Sciences, Engineering, and Medicine (NAS)²⁸ in 2017, recommended improvements to the SCC and that there also has been research since the publication of the IWG report supporting higher SCC values, but as of yet there have been no updates to the IWG values for purposes of regulatory analysis. CARB is closely following the reestablishment of the IWG

²⁷ According to California CPI-U:

[https://www.dof.ca.gov/Forecasting/Economics/Indicators/Inflation/.](https://www.dof.ca.gov/Forecasting/Economics/Indicators/Inflation/)

²⁸ National Academy of Sciences, Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide. Available at: [http://www.nap.edu/24651.](http://www.nap.edu/24651)

under the Executive Order issued on January 20, 2021 by President Biden.²⁹ Recommendations with respect to updated values for the SCC and social discount rates coming out of the IWG will be considered for incorporation in future economic analyses by CARB.

Additionally, the SRIA does note that the IPCC has stated that the IWG SCC estimates are likely underestimated due to the omission of significant impacts that cannot be accurately monetized, including important physical, ecological, and economic impacts, which must be considered qualitatively.³⁰

At the time when the benefits analysis was performed, there were no official SCC values for HFCs. As mentioned in the Staff Report, the damages from HFC can be thousands of times higher than CO₂ on a per metric ton basis. To account for this, CARB staff estimated the social cost benefits by converting HFC emissions from metric ton to metric ton CO₂-equivalent units, which considers the high GWP values of the HFCs, thus accounting for their disproportionate impact on the climate.

Finally, it should be noted that Alternative 1 was not rejected due to the global climate benefits being underestimated relative to the regulatory proposal. It was rejected for reasons as explained in the SRIA and Staff Report; due to technical feasibility concerns and potentially onerous direct costs on facilities that may have led to significant economic impacts, such as store closures. The regulatory proposal avoids these significant economic impacts while still putting California on the path to achieve its climate goals.

(152) Comment(s): The costs of multiple transitions from high to low HFCs and then to natural refrigerants should be avoided. There is an opening because the very popular R-22 cannot be manufactured or imported anymore, so many retail stores will need to upgrade. They should only upgrade once – to natural refrigerants. Otherwise, you are inflicting on them the costs of a future second upgrade. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comments. The Staff Report does note that R-22 systems are aging and nearing retirement, and a unique window of opportunity exists in the next five years to accelerate the transition of refrigeration and AC equipment to lower GWP refrigerants. However, current cost and feasibility concerns prevented CARB from placing very low GWP limits on existing facilities. For more details, please

²⁹ The White House, Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, January 20, 2021. Available at: <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-public-health-and-environment-and-restoring-science-to-tackle-climate-crisis/>.

³⁰ Intergovernmental Panel on Climate Change, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate change: https://www.ipcc.ch/site/assets/uploads/2018/03/ar4_wg3_full_report-1.pdf.

see Agency Response to comment 134. In GWP terms, CARB's rules set the ceiling, not the floor. Refrigeration system end-users are encouraged to adopt the refrigerants with very low GWP even in existing facilities and avoid multiple transitions and associated costs. CARB's regulation certainly does not require multiple transitions. With the 150 GWP limit for new facilities, CARB intends to send the market signal that the future of refrigerants is low- or no-GWP.

- (153) **Comment(s):** The Staff Report states that to switch to a natural refrigerant, a complete remodel must be done, which necessitates closing the store during the remodel. However, there are workarounds. For example, there are propane "plug in" cases that can be used during the refit. For most chains the same set of temporary cases can be re-used as each store is remodeled. Or conversion can be phased in. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comments. CARB agrees that a phased approach is possible for existing stores. The Staff Report outlines some of these strategies by which existing stores can lower their potential emissions.³¹ These strategies include partial conversions to systems with GWP less than 150, such as low-GWP microdistributed systems and low-GWP standalone systems. The latter are the "plug in" systems mentioned by the commenter. In placing the average GWP limit at 1,400, CARB provides flexibility for the stores to adopt a range of technology options that best suit their needs but does not require them to stop at the GWP of 1,400. Where possible, end-users are encouraged to adopt refrigerants with the lowest GWP footprint possible. The target average GWP of 1,400 will result in existing stores cutting their emissions in half by 2030 without necessarily having to make changes to all their stores or adopting any one type of system. This flexibility is important for all stores but more so for stores owned by small businesses, including those serving priority populations, so that they have an economical path to reducing their HFC emissions.

- (154) **Comment(s):** A very recent economic model used existing stores in England to optimize investment strategies in deciding between upgrading and remodeling. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comments. CARB appreciates the information.

- (155) **Comment(s):** Since the GWP of refrigerants stems from both direct (leaks) and indirect (energy use) effects, CARB is missing an opportunity by not coordinating its standards with green building standards to reduce overall energy use in supermarkets and similar locations. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. Other State agencies like the California Energy Commission are targeting energy efficiency in supermarkets and similar locations, and CARB's HFC regulations work

³¹ Page 18 of the Staff Report contains a list of options for complying with the weighted-average GWP and GHGp reduction targets.

in concert with those efforts to holistically reduce overall emissions, both direct (HFC emissions) and indirect (energy related GHG emissions).

- (156) **Comment(s):** ASHRAE is a non-profit organization focusing on design for sustainability. In 2015 they published Advanced Energy Design Guide for Grocery Stores which laid out ways in which supermarkets could save 50 percent of the energy they use. The Total Equivalent Warming Impact (TEWI) should be incorporated by CARB into its regulations so that the indirect effects of refrigeration (life cycle energy use) are regulated. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information. Where feasible, energy consumption was included in the economic analysis. The document cited by the commenter contains several measures that can reduce the energy consumption of supermarkets. However, apart from choosing low-GWP refrigerants, which CARB factored into its analysis, other energy efficiency measures can be applied even in grocery stores that use high-GWP HFCs.

- (157) **Comment(s):** One way to help the transition in this time frame would be to require training of certified technicians on the installation and use of natural refrigerants. The training should be paid for or offset by CARB. Lack of training on natural refrigerants among certified technicians causes two concrete problems: “[Lack of mandatory training] is potentially dangerous as natural refrigerants require specific training to address associated risks with toxicity, flammability, or higher operating pressures. This puts the untrained certified personnel at risk. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. While CARB recommends enhanced training of technicians to support the adoption of low-GWP climate friendly refrigerants, the technician’s certification program is run by U.S. EPA and is not under CARB’s purview.

- (158) **Comment(s):** Consider expecting goals for city and county Climate Action Plans to do what they can to help move this program faster. All people must be educated about the opportunities to reduce GHGs by refrigerant management. (350 VCCH)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the suggestion.

- (159) **Comment(s):** Many scientific circles consider HFCs to be the number one threat as our world heats up and people increasingly need cooling substances for air and food. It would be difficult to overstate the importance of moving aggressively towards low GWP solutions. (11th Hour)

Agency Response: CARB staff made no changes based on the received comment. CARB shares the commenter’s concerns but as part of the regulatory development process, must take factors such as technological feasibility and economic impacts into account. For more details, please see Agency Responses

to comments 134 and 140. CARB looks forward to working with stakeholders in the future to develop measures that achieve greater HFC emissions reductions and carbon neutrality.

A-3.2. Ice Rinks

Comments Supporting 150 GWP Limit for New and Existing Ice Rinks

- (160) **Comment(s):** CARB's regulation places a GWP limit of 150 on new refrigeration systems in new ice rinks. CARB should extend the GWP limit of 150 to new refrigeration systems in existing ice rinks. It is technically feasible to do so – currently, ammonia and CO₂ are being used in new and existing ice rinks across North America. (IIAR, EIA, Evapco, Nortam Consulting, Alfa Laval, CIMCO Refrigeration, Groenewald)

Agency Response: CARB staff made no changes based on the received comments. CARB's approach with the Proposed Amendments has been to place a 150 GWP limit for new refrigerated facilities while providing flexibility and higher GWP limits to existing facilities. The 150 GWP limit for new facilities, including ice rinks, is supported by the fact that the incremental cost for climate-friendly, ultra-low-GWP refrigerants like CO₂ and ammonia is lowest for newly constructed, fully re-purposed or remodeled facilities. On the other hand, higher GWP limits for existing facilities are currently necessary because the refrigerants like CO₂ and ammonia are not "drop-in" replacements for existing F-gas based refrigeration systems. This may present logistical and economic challenges for the owners/operators of existing facilities. Thus, a 150 GWP limit for existing facilities may cause harmful shifts in end-user behavior leading to higher emissions if end-users choose to delay replacement or not to replace their old, leaky systems. While CARB appreciates the support for the 150 GWP limit and agrees that it is technologically feasible even for existing ice rinks, a higher GWP limit of 750 has been allowed to minimize logistical challenges and prevent disruption to ongoing businesses. Similarly, GWP limits greater than 150 have also been set for existing facilities in other refrigeration end-uses like supermarkets. For more information, see Agency Response to comment 134.

Further, CARB staff note that the 750 limit for existing ice rinks does not prevent the existing ice rinks from installing low-GWP refrigerants like ammonia and CO₂. Existing facilities should opt for refrigerants below the 150 GWP threshold where feasible.

- (161) **Comment(s):** Eighty percent or more of the ice rinks in California use ammonia today, with zero climate impacts. There is no reason to allow a high GWP limit like 750 to permit the use of HFCs. (EIA, Nortam Consulting, Alfa Laval, CIMCO Refrigeration)

Agency Response: CARB staff made no changes based on the received comments. CARB appreciates the information about the prevalence of ammonia use in ice rinks in California. CARB's 750 GWP limit for existing ice rinks is aimed at preventing an increase in emissions from facilities that will soon be replacing their aging F-gas systems. Based on CARB's Refrigerant Management Program (RMP) database, most non-ammonia ice rinks today use R-22 (GWP 1,810) and R-134a (GWP 1,430). In particular, R-22, which is an ODS, will be completely phased out in the U.S. by 2030, and many ice rink owners/operators will be looking to switch to a different refrigerant. A 750 GWP limit allows existing ice rinks to have some additional refrigerant options while still achieving significant emissions reductions and minimizing any potential logistical challenges. Thus, the dual approach of a 150 GWP limit for new ice rinks and a 750 GWP limit for existing ice rinks represents a good compromise of getting to an ultra-low-emissions scenario in new facilities and achieving significant reductions in existing facilities while minimizing harmful shifts in end-user behavior. For more details, please see Agency Response to comment 160.

- (162) **Comment(s):** Even if the 150 GWP limit is not applied to all existing ice rinks, at least the ice rinks currently using ultra-low-GWP refrigerants like ammonia should be prohibited from switching to a higher GWP HFC / HFO to prevent an increase in emissions from those facilities. (EIA)

Agency Response: CARB staff made no changes based on the received comment. Ice rinks that use ammonia today already have the necessary permits, are familiar with the safety protocols, and have access to service contractors and refrigerant supply chain to maintain their systems. Thus, none of the barriers that would affect a new user of ammonia apply to them, reducing the likelihood of their switching to higher-GWP alternatives. Additionally, if existing ice rinks using ammonia switch to HFCs with GWP values of 150 or higher, they will become subject to CARB's RMP regulation.³² Under the RMP, ice rinks will have to report their annual refrigerant use and may become subject to an annual implementation fee. Thus, via RMP, CARB will be able to monitor the emissions from such ice rinks, and should the need arise, CARB may place more stringent requirements on the existing ice rinks in the future. Overall, ice rinks already using ammonia or other ultra-low-GWP refrigerants have little regulatory incentive to switch to higher GWP alternatives.

- (163) **Comment(s):** Concerns about safety of ammonia have been tackled with end-users following relevant codes and standards already in place. Safety is an issue with any refrigerant, but real-world experience shows that ammonia is being safely used in majority of ice rinks today. There have been more fatal accidents

³² Any facility using refrigeration systems containing more than 50 pounds of refrigerant with a GWP of 150 or greater is subject to CARB's Refrigerant Management Program (RMP) regulation.

with freon-based refrigerants than ammonia even though there are far more ammonia systems in use. Thus, a 150 GWP limit should be placed on all ice rinks. (Nortam Consulting, IIAR)

Agency Response: CARB staff made no changes based on the received comments. CARB agrees that safety is a concern for all refrigerants. Adherence to strict safety regulations, particularly in commercial and industrial refrigeration, have allowed the refrigeration industry to maximize the benefits of using energy-efficient refrigerants like ammonia. Furthermore, CARB's 150 GWP limit for new facilities is a performance standard and does not prescribe the use of any one refrigerant. Currently, CO₂ is also commercially available and used in ice rinks across United States and Canada. Additionally, chemical manufacturers are also already developing synthetic refrigerants that can comply with the 150 GWP limit.

- (164) **Comment(s):** Ammonia systems are cost competitive with HFC systems. In fact, over their lifetimes, ammonia systems outperform HFC systems due to better energy performance, lower price of natural refrigerants compared to synthetic patented HFCs, and reliability / longevity of the system. Thus, existing ice rinks should also have a GWP limit of 150. (Nortam Consulting, Alfa Laval, CIMCO Refrigeration, Evapco, Vacom Technologies)

Agency Response: CARB staff made no changes based on the received comments. Please see Agency Responses to comments 160 and 161.

- (165) **Comment(s):** CARB should amend the proposed regulation order to include replacement of existing ice rink systems [under the 150 GWP limit]. (EIA)

Agency Response: CARB staff made no changes based on the received comments. Please see Agency Responses to comments 160 and 161.

- (166) **Comment(s):** I'm in support of the 150 GWP limit for replacement systems on ice rinks. These systems are going to have a much lower lifecycle cost, even if the first cost is slightly higher, due to the engineering and better integration with the facilities. (VaCom Technologies)

Agency Response: CARB staff made no changes based on the received comments. Please see Agency Responses to comments 160 and 161.

- (167) **Comment(s):** Systems involving natural refrigerants are cost effective, very efficient, very safe and reliable, and have been in place for many years. And therefore, we support amending the proposal to expand the GWP limit to replacement of chillers in existing ice rink facilities. (IIAR, Alfa Laval)

Agency Response: CARB staff made no changes based on the received comments. Please see Agency Responses to comments 160 and 161.

(168) **Comment(s):** Refrigerants like ammonia, CO₂ and hydrocarbons have very low GWP values, are low-cost commodities because they are not patented, energy-efficient, and safe due to well-developed safety standards. Thus, we support CARB's 150 GWP limit for new ice rinks and recommend adopting the same for existing ice rinks. (IIAR)

Agency Response: CARB staff made no changes based on the received comment. For more details, please see Agency Responses to comments 160 and 161.

(169) **Comment(s):** I'm commenting to share our support for CARB's proposed 150 GWP limit, including the proposed inclusion of ice rinks at the 150 GWP limit as well. Technology advances over the last five years in low-charge ammonia systems have made this equipment even more safe and easy to use as well as readily and commercially available. Ammonia systems are cost competitive with HFC systems, where only slightly increased up-front costs. Even in specific situations where the ammonia system may be slightly more than an HFC system, it is competitive when it comes to total cost of ownership due to 15 to 20 percent better energy efficiency with ammonia than HFCs. (Evapco)

Agency Response: CARB staff made no changes based on the received comment. For more details, please see Agency Responses to comments 160 and 161.

(170) **Comment(s):** Natural refrigerants like ammonia, CO₂ and propane have been used safely, efficiently, and cost effectively for decades in the processing of nation's and California's gas supplies, food supplies, and storage and transportation of both. These low-cost commodity refrigerants are not patented, have many other applications in addition to use as refrigerants, agriculture, and fuel to name a few. They have well developed safety Codes and Standards for all applications, have very minimal, if any, long-term environmental effects known through more than 100 years of application, and therefore, have very minimal, if any, risk of needing replacement in a few years or causing some new harm yet to be determined. For these reasons, and for the cooling and freezing energy efficient thermodynamic properties, further reducing GHGs from reduced electricity use, we do strongly support CARB's proposed 150 GWP limit for refrigerants used in ice rinks and we recommend that CARB amend the proposal to expand the 150 GWP limit to replacement of chillers in existing ice rink facilities currently using ammonia or CO₂. Refrigerants greater than 150 GWP, that less than 750 GWP, such as R-513A, are relatively new refrigerants with unknown long term environmental and health effects. (IIAR)

Agency Response: CARB staff made no changes based on the received comment. For more details, please see Agency Responses to comment 160 and 161. Further, CARB relies on U.S. EPA's SNAP Program to assess the

acceptability of refrigerants. R-513A is currently listed as an acceptable substitute for ice rinks by U.S. EPA.³³ (See 83 Fed. Reg. 50026 (Oct. 4, 2018).)

(171) **Comment(s):** Each ammonia ice rink systems saves roughly 71 metric tons of CO₂ emissions annually, when compared to an HFO blend rink system such as R-513. Over the equipment life expectancy, this represents 1,775 metric tons of CO₂ emissions, which is equivalent to removing roughly 400 cars from our roads. We look forward to this ground-breaking regulation, setting an example of what good looks like for the remainder of North America. Eighty percent of ice rinks in California utilize refrigerants with a GWP of 10 or less. It is a proven technology and has been embraced by the State. (CIMCO)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Responses to comments 160 and 161.

(172) **Comment(s):** EIA and a coalition of over 120 stakeholders, representing the refrigeration industry, including end users, sent CARB a letter urging you to apply a 150 GWP to ice rinks. CARB has applied this only to new facilities, which are a tiny minority of this sector's footprint. CARB regulations should be technology neutral, but not neutral when it comes to ensuring we can achieve the goal of carbon neutrality in the next 20 years in a safe and cost-effective way. Ice rink systems being replaced in 2024, when this limit applies, can be expected to operate until 2044. We strongly urge an amendment to the proposal in the 15-day changes, to apply a 150 limit to existing facilities. The key fact here is more than 80 percent of ice rinks in California already use these low-GWP refrigerants. Why are we not holding them to the same standard as supermarkets, which by comparison only use these refrigerants in five percent [of the facilities]. (EIA)

Agency Response: CARB staff made no changes based on the received comment. For more details, please see Agency Responses to comments 160 and 161.

Comments Opposing 150 GWP Limit for New Ice Rinks

(173) **Comment(s):** CARB had proposed a GWP limit of 750 for new and existing ice rinks. After July 2020, CARB changed their proposal to reduce the GWP limit for new ice rinks to 150. Reducing the GWP to less than 150 for new ice rinks was a “behind the scenes” change and did not have sufficient review and comment from industry partners or the ice rink owner community. (Chemours, AHRI)

Agency Response: CARB staff made no changes based on the received comments and respectfully disagrees with the assertions. During the rulemaking process, CARB’s proposed rules are subject to change and depend on the availability of data and stakeholder input. To engage with stakeholders and

³³ Refrigerants listed as “Acceptable” by the U.S. EPA under the Significant New Alternatives Policy Program, for ice skating rinks available at: <https://www.epa.gov/snap/substitutes-ice-skating-rinks>.

ensure development of appropriate requirements, CARB held several workshops over multiple years on the proposed HFC amendments. The change in CARB's proposal after the July 2020 workshop for ice rinks was a direct result of incorporating feedback from additional stakeholders. CARB staff took in comments both during and after the workshops while developing the final rules. While CARB staff did initially propose a 750 limit for ice rinks based on early input from a limited number of industry stakeholders, input from additional stakeholders representing a much broader swath of the ice rink industry was received during and after the workshop held in July 2020. CARB staff received a letter signed by over 120 signatories including many equipment manufacturers, equipment installers, end-users, academics, and others, all supporting a 150 GWP limit for ice rinks.³⁴ In light of the new information and broader industry input, CARB staff determined it would be appropriate to limit the GWP of new ice rinks to below 150. CARB included in the 45-Day Notice the proposal to limit new ice rinks to below 150 GWP in the regulatory language and Staff Report for public review and comment. Stakeholders had the opportunity to submit comments during the public comment period on this proposed requirement. Several stakeholders supported the 150 GWP limit for ice rinks via comments (see comments 160 – 172) and testimony at the Board Hearing on December 10, 2020.³⁵ Thus, the development of CARB's GWP limit for ice rinks from what was described in the first rulemaking workshop to what was proposed in the 45-day Notice resulted from an open and transparent public process and reflective of much broader stakeholder input than initially received by CARB.

(174) Comment(s): The change in the GWP limit for new ice rinks to less than 150 does not reflect the same balance of science, facts and broad stakeholder input utilized for the retail food regulations. We urge the Board to return to their original proposal of GWP less than 750 for both newly installed and existing ice rinks. (Chemours, Trane)

Agency Response: CARB staff made no changes based on the received comments. For more details, please see Agency Response to comment 173. Low-GWP refrigerants like CO₂ ammonia and are already in use in ice rinks in California and other parts of the United States, Canada, and the world. Despite evidence that a 150 GWP limit is feasible for new and existing ice rinks, CARB proposed a 750 GWP limit for existing ice rinks to prevent any logistical challenges associated with replacing old F-gas-based systems with refrigerants like CO₂ and ammonia, because that would necessitate the replacement of all

³⁴ The Environmental Investigation Agency (EIA) and International Institute of Ammonia Refrigeration (IIAR) Letter to Chair Mary Nichols, <150 GWP Refrigerants for Ice Rink Refrigeration Systems (September 10, 2020). Available at: <https://eia.salsalabs.org/climatefriendlyicerinks/index.html>.

³⁵ California Air Resources Board. Transcript for Public Hearing held on December 10, 2020 available at: <https://ww3.arb.ca.gov/board/mt/2020/mt121020.pdf>.

system infrastructure. In doing so, CARB used the same dual approach across the different refrigeration end-use sectors of retail food, industrial process refrigeration, and cold storage and used the same in-depth stakeholder input process that it utilized for all other end-use sectors.

- (175) **Comment(s):** CARB has not provided additional economic impact analysis of the new limit of 150 GWP on new ice rinks. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. CARB followed the statutory requirements for analyzing the costs and benefits associated with the proposed rules on a statewide level. In the Standardized Regulatory Impact Analysis (SRIA), CARB staff estimated statewide costs for a 150 GWP limit for all new systems containing more than 50 pounds of refrigerant intended for use in new facilities. Given the number and variety of businesses that use such refrigeration systems, the analysis categorized all end-uses into four broad categories – commercial (retail), commercial (other), cold storage and industrial process refrigeration. Ice rinks, along with other recreational facilities falls under the commercial (other) end-uses. All facilities registered with CARB in the R3 database were assumed to be impacted by the 150 GWP limit and as such, were included in the economic analysis. The NAICS codes of all registered facilities assumed to be affected by incremental costs due to the regulation are given in Table 69 in the SRIA. NAICS code 713940 for “fitness and recreational sports centers” covers ice rinks and is included in that table. As part of the analysis, systems using low-GWP refrigerants like ammonia and CO₂ were assumed to be 20 percent more expensive than HFC systems for the commercial (other) end-use category (see Table 16 in the SRIA). Cost estimates shared by stakeholders also show that ammonia chillers used in ice rinks can be 5 to 20 percent more expensive than HFC chillers. Thus, the SRIA adequately captures the economic impact of the 150 GWP limit on new ice rinks.

It is also important to note that according to industry estimates, a majority of the ice rinks in California use low-GWP refrigerants like ammonia today. Thus, the supporting infrastructure such as available service technicians, refrigerant supply chain, and general familiarity with use of the low-GWP refrigerants already exists, all of which contribute to lowering the costs.

Further, as discussed in the SRIA, opening of new facilities is expected to be correlated with population growth. Most new refrigeration systems will be installed in existing ice rinks and on average only 1 to 2 percent are expected to be used in new facilities (that includes new construction and re-purposed facilities not previously used as ice rinks). Based on public estimates, there are currently fewer than 100 ice rinks in California. On average, only one to two new ice rinks are expected to be either newly constructed or be newly installed in an existing building in California every year. Thus, the vast majority of new systems will be installed in existing ice rinks, which have a higher GWP limit of

750 and for which, there are no costs above the baseline. It is therefore unlikely that a 150 GWP limit on new ice rinks will have any significant impact on new ice rinks in California.

- (176) **Comment(s):** The change minimizes opportunities for full stakeholder engagement and discussion and industry partners did not have sufficient review and comment time. (Chemours)

Agency Response: CARB staff made no changes based on the received comments. CARB staff respectfully disagree with the assertion as CARB engaged in years long discussions with stakeholders, provided for 45-Day, and two 15-Day notices, giving industry ample time to review and comment. For more details, please see Agency Response to comment 173.

- (177) **Comment(s):** 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 U.S. 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). (Chemours)

Agency Response: CARB staff made no changes based on the received comment. A 150 GWP limit in new ice rinks is not prescriptive about the choice of refrigerant. One of the refrigerant options under the 150 limit is ammonia, which is a historically used refrigerant. Strict safety regulations, such as those referred to by the commenter have allowed the refrigeration industry to use ammonia and derive benefits from this highly energy-efficient refrigerant. Additionally, recent advances in ammonia technology have made it possible to use smaller amounts of ammonia to refrigerate effectively. These “low charge” ammonia systems are gaining popularity around the world. Based on stakeholder input, most new ammonia chillers used in ice rinks use less than 500 pounds of refrigerant. Further, the 150 GWP limit also allows the use of CO₂, which is widely used in ice rink refrigeration systems across Canada and gaining popularity in the United States. CO₂ is classified by ASHRAE as an “A1” refrigerant, indicating that it is non-toxic and non-flammable. CO₂ has been used as a refrigerant historically and is regaining popularity due to its low environmental impact and low cost as compared to synthetic patented HFC/HFO refrigerants. CO₂ is currently used in ice rinks across Canada and the United States. Additionally, HFOs with ultra-low GWP values (less than 10) are also under development. Since the effective date for ice rink GWP prohibitions is January 1, 2024, CARB’s regulation gives the industry enough time adapt to the change.

- (178) **Comment(s):** There are no independent published third-party studies on the financial impact of a 150 GWP limit for new ice rinks. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. CARB followed the statutory requirements for analyzing the costs

and benefits associated with the Proposed Amendments. For details about the economic analysis, see Agency Response to comment 174.

- (179) **Comment(s):** The 150 GWP limit may impact ice rinks in low income and underserved communities. (Chemours, AHRI)

Agency Response: CARB staff made no changes based on the received comments. For all refrigerated facilities including ice rinks, CARB has employed a dual approach: a 150 GWP limit for new facilities and higher GWP limits for existing ones. Thus, even though existing facilities hold the highest potential for emissions reductions, they were given higher GWP limits – such as a 750 GWP for ice rinks – specifically to reduce the impacts to ongoing businesses, particularly small businesses in low-income and disadvantaged communities.

- (180) **Comment(s):** The lower proposed GWP limit also requires more sophisticated refrigerant management techniques and technical training that may not be accessible for many communities. (Chemours)

Agency Response: CARB staff made no changes based on the received comments. Low-GWP refrigerants like ammonia and CO₂ are already used in ice rinks in California today. The supporting infrastructure such as available service technicians, refrigerant supply chain, and familiarity with use of the low-GWP refrigerants already exists. As the market adoption of low-GWP refrigerants increases in California, the support services are expected to scale up to meet the demand.

- (181) **Comment(s):** The only refrigerants currently permissible under the 150 GWP limit would be CO₂ and ammonia. Ammonia is toxic and flammable. Its use requires permits from local authorities having jurisdiction. (Chemours, AHRI)

Agency Response: CARB staff made no changes based on the received comments. CARB relies on the U.S. EPA's SNAP Program, which reviews refrigerants within a comparative risk framework on the basis of environmental and health risks, including factors such as ozone depletion potential, GWP, toxicity, flammability, occupational and consumer health/safety, local air quality and ecosystem effects.³⁶ Before it can be used in an end-use, the refrigerant must be deemed acceptable under the SNAP Program. Both CO₂ and ammonia are currently deemed acceptable by U.S. EPA for use in ice rink refrigeration systems and are already used in ice rinks in California today.

GWP limits in the Proposed Amendments are performance standards and do not prescribe the use of any refrigerant as CARB remains technology neutral. Further, CARB GWP limit of 150 applies only to new ice rinks, i.e., newly constructed, and re-purposed facilities not previously used as ice rinks.

³⁶ U.S. EPA, Overview of Significant New Alternatives Policy (SNAP) Program:

<https://www.epa.gov/snap/overview-snap>;

See also, Substitutes in Ice Skating Rinks: <https://www.epa.gov/snap/substitutes-ice-skating-rinks>.

(182) **Comment(s):** CO₂ use in ice rinks is subject to patents. As of June 23, 2020, a U.S. patent was granted on the use of CO₂ in ice playing surfaces. There are five other patent applications pending in this space. CARB changed their proposal dramatically after the patents were granted in June 2020. Is CARB aware of these patents? (Chemours)

Agency Response: CARB staff made no changes based on the received comments. CARB's Proposed Amendments are designed to achieve the maximum emissions reductions possible in every sector. CO₂ is one of two refrigerants that are currently available to comply with the 150 GWP limit in new ice rinks. The presence of a patent does not prevent end-users from using the patented system or refrigerant. For example, chemical companies also hold patents to their synthetic HFC/HFO refrigerants. The patents on HFC refrigerants held by one or two chemical companies have not prevented widespread use of those refrigerants nor have the patents prevented the industry from innovating further. Variations on system-type patents may be sought by others as well. After CARB held the workshop in July 2020, CARB staff received a letter signed by over 120 signatories from many equipment manufacturers, end-users, academics, and others, all in support of a 150 GWP threshold for refrigerants in new and existing ice rinks. Until the 45-Day Notice and 15-Day Notice, proposed regulatory language is subject to change. Frequently, regulatory language described in a workshop is preliminary for purposes of discussion and for staff to obtain feedback to make further improvements to the initial regulatory concepts. Moreover, several stakeholders testified at the December 2020 Board Hearing in support of the 150 GWP limit as well. Based on these factors, any patent on CO₂ use in ice rink refrigeration systems does not appear to be a limiting factor in the adoption of the refrigerant or the GWP limit of 150 itself. Furthermore, the Proposed Amendments include a variance procedure where impossibility and force majeure issues arise.

(183) **Comment(s):** For end-users who cannot or choose not to use ammonia, CO₂ will be the only option. CO₂ use in ice rinks may be subject to current and future patents. This limits technology and competition. (AHRI, Chemours)

Agency Response: CARB staff made no changes based on the received comments. Performance standards like GWP limits that don't prescribe the use of any one refrigerant or technology are designed to encourage innovation. As the commenter states, currently a 150 GWP limit would allow at least two refrigerant options: ammonia and CO₂. For more details on ammonia and CO₂, please see Agency Responses to comments 181 and 182.

Further, a GWP limit of 150 does not hinder the development of other compliant low-GWP refrigerants; rather, it encourages development and adoption of climate-friendly, ultra-low-GWP refrigerants. As stated previously, CARB intends this to be a technology-forcing regulation. The GWP limit of 150 for new ice rinks goes into effect in 2024, two years later than other refrigeration end-use sectors. Thus, chemical manufacturers have several more

years to develop and bring to market additional low-GWP refrigerants for ice rinks that comply with the GWP limit. CARB understands that there is already work underway to adapt synthetic chemicals below 150 GWP for ice rinks and other end-uses. CARB sees no reason to grant a higher GWP limit just because a compliant synthetic refrigerant is not currently market ready as many times regulations are meant to spur innovation. Finally, end-users who cannot use either of the available refrigerants can apply for a date extension through the variance process, provided they meet all the requirements listed in the regulatory text. All variance requests will be reviewed on a case-by-case basis.

- (184) **Comment(s):** A GWP limit of 750 aligns for ice rinks aligns with regulations in Canada and supports economies of scale and technological developments. (AHRI, Chemours, Trane)

Agency Response: CARB staff made no changes based on the received comments. The vast majority of new systems are expected to be installed in existing ice rinks, which must comply with the 750 GWP limit. Ultimately, CARB's intention is to adopt the use of the lowest GWP refrigerants possible in every end-use sector. The 150 GWP limit for new refrigerated facilities (including ice rinks) is a market signal that the future of refrigeration in California is one that minimizes GHG emissions to the greatest extent possible. Refrigerants with GWP values well below the 150 GWP limit like ammonia and CO₂ are used in ice rinks in Canada and U.S. today. CARB's GWP limit of 150 for new facilities is broadly based on and aligned with the European Union's F-gas regulation. The EU is a much larger market and alignment with them is more likely to drive the growth and market adoption of new climate-friendly technologies in California.

- (185) **Comment(s):** The industry and its stakeholders have planned and prepared for a 750 GWP limit allowance in ice rinks. 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. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. All proposed rules remain subject to stakeholder input and changes until they become law. CARB staff always emphasized the dynamic, iterative nature of the rulemaking process at all public workshops.

CARB staff note that for new ice rinks, the GWP limit of 150 will go into effect in 2024, two years longer than any other end-use, which gives ice rink end-users ample time to plan such that they can comply with the regulations. If the commenters and their industry partners communicated any regulations to the end-users as "final" before CARB finalized the regulation, that was premature.

- (186) **Comment(s):** Ice rink chillers should be held to the same standard as AC chillers. Design of ice rink equipment closely matches AC technology, specifically chiller applications. (Trane, AHRI, Chemours)

Agency Response: CARB staff made no changes based on the received comments. While some equipment manufacturers may develop or modify AC chillers to make them suitable for use in ice rinks, the use of AC-like chillers for refrigeration purposes cannot be considered as the technical rationale for a higher GWP limit for all ice rink systems. There are commercially available chillers today which can comply with a GWP limit of 150 – such chillers are currently in use in ice rinks in California and the United States.

- (187) **Comment(s):** There are synergies that can be obtained by designing systems that standardize common AC and ice rink refrigeration platforms providing environmental, logistical, electronic controls, serviceability, training, refrigerant management, and financial advantages and efficiencies. A proposed change to GWP less than 150 would eliminate the possibility of these synergies due to the fluid technologies available. (Chemours)

Agency Response: CARB staff made no changes based on the received comments. CARB respectfully disagrees with this comment because GWP limit of 150 does not prevent chemical and equipment manufacturers from using low-GWP refrigerants in the equipment types that achieve the synergies and benefits listed above.

- (188) **Comment(s):** In 2012, the Government of Quebec had a requirement for only CO₂ and ammonia in ice rinks. That was overturned in 2017 to allow for HFOs with less than 750 GWP. This is due to toxicity of ammonia, lack of any competition due to patents on CO₂ in ice rinks, absence of viable options that lower thresholds, and technology unavailability. (Trane)

Agency Response: CARB staff made no changes based on the received comment. CARB acknowledges that different countries with different laws may resolve disputes differently based on the laws of those countries. This comment appears to be referring to an incentive program by the Government of Quebec that provided incentives for CO₂ and ammonia in ice rinks and was eventually modified to include additional refrigerants under the 750 GWP limit. California bases its decisions on factors relevant to the State and its public process for rule development. However, CARB appreciates the information.

- (189) **Comment(s):** Ice rink sizes vary widely, from rinks located in multi-use buildings to professional arenas. Many of the buildings that house ice rinks need to meet multiple requirements. A 750 GWP limit gives multi-use buildings more options to incorporate ice rinks into their facilities while meeting other green building requirements. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. There is no evidence that a 150 GWP limit will restrict new ice rinks in multi-use buildings from meeting the additional green building requirements. If anything, a lower-GWP refrigerant will help lower the carbon footprint of any building.

- (190) **Comment(s):** Community ice rinks have limited budgets and resources. They do not have the option to go for variances. They don't have regulatory resources. They don't have the necessary regulatory personnel or finances to manage an

extensive regulatory process for requiring getting variances or navigating that process. Having a 750 GWP limit expands their choices. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. As stated earlier, all existing ice rinks, including community rinks, have a 750 GWP limit under the Proposed Amendments.

- (191) **Comment(s):** A 150 GWP limit runs counter to ASHRAE's position that refrigerants should not be selected on the basis of a single factor like GWP. (Chemours, AHRI)

Agency Response: CARB staff made no changes based on the received comment. A GWP limit is a performance standard and does not prescribe the use of any one refrigerant. Furthermore, the limits were not chosen based solely on GWP. The limits were chosen based on environmental factors, technical feasibility, cost, and other factors identified by stakeholders. For more details, please see Agency Responses to comments 160 and 161.

- (192) **Comment(s):** It would be really difficult to implement a 150 GWP in existing facilities, as many of them are quite old, and really not compliant with the current building codes, which would make them even more difficult to comply with the new building codes. (Trane)

Agency Response: CARB staff made no changes based on the received comment. Facilities must ensure compliance with all Building Codes and any other applicable laws. Non-compliance with existing laws is not a valid rationale for relaxing any standard.

A-3.3. Retail Food Refrigeration

- (193) **Comment(s):** Shift the interim compliance step for companies with 20 or more retail food facilities from January 1, 2026 to December 31, 2026 to reflect the full reporting year. The majority of planning and project development will happen in the first couple of years. This will accommodate a more robust planning process without losing the benefits of a mid-way check-in. (NASRC).

Agency Response: CARB staff made changes based on the received comment. Table 4 of Section 95374(d) of the Proposed Amendments now extends the January 1, 2026 deadline to December 31, 2026.

- (194) **Comment(s):** The fastest way to reduce GHG emissions would be to accelerate the transition timeline for the retail food company-wide, weighted average GWP requirement of 1,400 / 55 percent reduction from what has been proposed. We encourage CARB to adopt earlier transition dates for all the categories. Instead of 2026 and 2030, CARB should set the transition dates in 2024 and 2026, respectively, and consider applying an interim compliance deadline to all companies, rather than only those owning or operating 20 or more retail food facilities. (Honeywell)

Agency Response: CARB staff made no changes based on the received comment. CARB staff set the compliance dates in 2026 and 2030 to provide sufficient time and flexibility to the retail food industry to plan and execute the transition in a sustainable manner. Additionally, the pace is set such that businesses have some time to evaluate which climate-friendly technologies work best for them. Technological developments in the commercial refrigeration sector are moving at a rapid pace and ultra-low-GWP (GWP less than 10) refrigeration systems are fast approaching cost parities with the HFC systems. Under the Proposed Amendments, businesses will be able to take those new ultra-low GWP technology options into consideration and not just switch to the currently economical retrofits. Nevertheless, all companies must complete the transition by 2030, which is the target year for achieving emissions reductions under Senate Bill 1383.

- (195) **Comment(s):** We appreciate the extra time provided to smaller companies to make for a more equitable transition, lessening the likelihood likely that there are unintended consequences for communities facing food availability challenges and more. (NRDC)

Agency Response: CARB staff made no changes based on this comment. CARB staff appreciates the supportive comment and recognition of CARB's intent behind setting different compliance timelines for large and small retail food companies.

- (196) **Comment(s):** CARB should apply the interim target to small companies as well. (Honeywell)

Agency Response: CARB staff made no changes based on the received comment. The interim target was not applied to small companies to make the transition more equitable and minimize any disruptions to stores operating in low-income and disadvantaged communities. From an emissions standpoint, large companies are responsible for most of the HFC emissions in the State. Based on CARB's RMP database, nearly 80 percent of the supermarkets and grocery stores in California are owned by large companies. As the large companies comply with the interim step, challenges such as shortage of experienced service technicians and costs associated with the transition will decline. All of these factors will reduce the barriers faced by small businesses in transitioning to lower-GWP refrigerants.

- (197) **Comment(s):** The weighted-average GWP targets for retail food companies should be further reduced and the pace should be accelerated. The 2030 timeline is not ambitious enough. (shecco)

Agency Response: CARB staff made no changes based on the received comment. The GWP targets were set such that current statewide emissions would be reduced by more than half by 2030 while permitting use of the most economical option of retrofit refrigerants like R-448A/R-449A, which have a GWP just below 1,400. Unlike Europe, very-low-GWP refrigerant options are yet to achieve cost parity with HFC refrigerants in the United States. The GWP targets and the pace are set to provide a path to a sustainable transition while

minimizing the economic burden on small businesses, especially those serving disadvantaged communities. For more details, please see Agency Responses to comments 194 and 196.

A-3.4. Remote Condensing Units (RCUs)

- (198) **Comment(s):** The charge threshold for RCUs subject to the 150 GWP limit should be raised to 150 pounds. Approximately 90 percent of 'small' RCU systems contain less than 150 pounds of refrigerant. This will expand the refrigerant choices for RCUs containing less than 150 pounds of refrigerant. (AHRI, Rheem)

Agency Response: CARB staff made no changes based on the received comments. As listed in Table 3, the GWP limit of 150 is for systems installed in new facilities only. For the purposes of the Proposed Amendments, a new facility is either newly constructed, re-purposed to be used for refrigeration or an existing refrigerated facility that undergoes a major remodel where most of the refrigeration system is replaced. In new facilities, there is flexibility to design the refrigeration systems such that they can comply with the 150 GWP limit. Low-GWP refrigerants are already used in RCUs around the world. For example, RCUs using CO₂ are widely used across Europe. Additionally, if suitable RCUs are unavailable, other types of systems can be used to meet the same cooling needs. For example, in some cases microdistributed propane systems can be used in lieu of RCUs. CARB's intention is to expand refrigerant choices through market adoption of available climate-friendly refrigerants and not simply allowing continued use of the climate-damaging, high-GWP refrigerants.

CARB staff notes that each year, a very small number of facilities are either newly constructed, re-purposed or fully remodeled. Thus, the vast majority of new refrigeration systems including RCUs will be installed in existing facilities, which do not have to comply with the 150 GWP limit. For example, in existing supermarkets, any refrigerant with a GWP below 1,400 can be used to comply with the company-wide reduction targets.

- (199) **Comment(s):** The GWP limit for RCUs containing up to 150 pounds of refrigerant should be 1,500. Apply the 1,500 GWP limit to all RCUs smaller than 150 pounds, including those under CARB's current size threshold of 50 pounds. This will avoid incentivizing end-users switching to smaller systems thereby preventing leaks, expand refrigerant choice, reduce compliance burden, and reduce emissions. (AHRI, Rheem)

Agency Response: CARB staff made no changes based on the received comments. A higher GWP limit for RCUs under 150 pounds could become a loophole under which all new facilities could use RCUs with a GWP fifteen hundred times higher than the currently available low-GWP refrigerants like CO₂. This would result in an increase in emissions and defeat the purpose of the Proposed Amendments.

RCUs of all sizes are already subject to HFC prohibitions under California's current regulation. The current prohibitions are equivalent to a de-facto GWP limit of 2,200. Lowering the GWP limit to 1,500 would be an incremental improvement and will not offset the extra emissions that would occur if RCUs above 50 pounds are allowed to continue using high-GWP refrigerants. The size threshold of 50 pounds was chosen to tackle the emissions from the systems with the highest leak rates. This "worst first" approach is also used by the U.S. EPA for federal refrigerant management under rule 608 and for CARB's RMP regulation.

- (200) **Comment(s):** Low-GWP (less than 150 GWP) refrigerant RCUs are not available for all uses. CO₂ is a viable option but may need technological enhancements in some units, for example, in low-temperature RCUs. (Rheem)

Agency Response: CARB staff made no changes based on the received comment. Given the prevalence of similar technologies in other countries, CARB believes that the current challenges with RCUs using low-GWP refrigerants like CO₂ in California are a result of low market demand and not technological infeasibility. One of the goals of the regulation is to accelerate the market adoption of these climate-friendly technologies. New facilities have the flexibility to install the lowest-GWP alternatives available.

- (201) **Comment(s):** For RCUs used in walk-in coolers and freezers (WICF), it could be difficult or very costly, to comply with the federal energy requirements applicable to WICF when using low-GWP refrigerants like CO₂. Compression must be accomplished by using either (i) a low-side compressor plus a high-side compressor; or (ii) a two-stage compressor with intercooling, both of which would negatively impact efficiency versus single-step compression with a group A1 or A2L refrigerant. (Rheem)

Agency Response: CARB staff made no changes based on the received comment. The comment above is speculative as CARB has received no evidence that RCUs using CO₂ cannot meet the federal energy requirements for WICF. Additionally, to reiterate, the 150 GWP limit applies only to RCUs in new facilities, which have flexibility to design their refrigeration system infrastructure such that they can meet all current laws. In case an end-user is unable to use any of the available low-GWP refrigerants in a new facility, they can apply for a date extension through the variance process, provided they meet all the requirements.

- (202) **Comment(s):** CARB should allow for refrigerants up to 1,500 GWP 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. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Responses to comments 200 and 201.

- (203) **Comment(s):** After Building Codes are updated, CARB should consider a 300 GWP limit for RCUs, which can allow for more energy efficient options such as R-454A, which has refrigerant characteristics similar to that of R-448A and R-449A. The operating characteristics of R-454A are likely to enable compliance

with stringent new U.S. DOE regulations for walk-in coolers and freezer (WICF) condensing units. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Responses to comments 200 and 201.

- (204) **Comment(s):** Small RCUs ranging from 50 to 300 pounds 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. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. CARB’s proposed GWP limit of 150 does not affect any existing facility. Thus, any small businesses operating today such as mom-and-pop stores, small storage, and processing facilities will not be required to switch to low-GWP refrigerants, although CARB does encourage such a transition.

A-4. Chillers

- (205) **Comment(s):** Can you please clarify the following item relative to Table 3: When listing the evaporator temperature limits for chillers, is this the temperature of the fluid being cooled or is it the bubble point temperature of the refrigerant being evaporated in the evaporator? (JCI)

Agency Response: CARB staff made changes based on the received comment as well as subsequent comments received during the first 15-day comment period. Initially, in the proposed regulation order published as part of the 45-Day Notice, chiller GWP limits were written as being dependent on the “minimum evaporator temperature.” However, as evident from this comment, this term was not clear. To clarify, CARB staff sought input at a workshop held on February 19, 2021, to define the term “evaporator temperature.” Based on stakeholder input, CARB staff ultimately decided to eliminate the use of the term entirely. This is because the term “evaporator temperature” does not have a standard definition. Thus, instead of defining the term “evaporator temperature,” as part of the First 15-Day Notice, CARB staff modified the language in Table 3 directly to indicate that the GWP limits for chillers depends on the temperature of the chilled fluid. However, in response to the 15-Day Notice, stakeholders further commented that the terminology was still confusing (see comments 360-363). To further clarify, CARB staff accepted some recommendations made by commenters in the first 15-day comment period. As part of the Second 15-Day Notice, the language in Table 3 for chillers used in IPR was modified to read “Chillers (new) designed for chilled fluid leaving the *chiller* at temperatures” followed by the temperature value or ranges. This edit eliminates the use of the word “evaporator” and replaces it with “*chiller*.” This edit was made to clarify that the chiller GWP limits depend on the designed temperature of the chilled secondary fluid leaving the chiller, and not the refrigerant’s boiling/bubble point.

- (206) **Comment(s):** Can you please clarify the following item relative to Table 3: If a chiller is used as the upper stage heat rejection device of a refrigeration system in a cold storage warehouse, would the chiller's GWP limit be set by the chiller requirements or the lower cold storage warehouse requirements? (JCI)

Agency Response: CARB staff made no changes based on the received comment. This comment seeks a clarification. Section 95374(c), Table 3 of the proposed regulatory text states that in new cold storage warehouses, starting January 1, 2022, all refrigeration equipment containing more than 50 pounds of refrigerant must use refrigerants with a GWP less than 150. This rule is applicable to chillers used in new cold storage warehouses as well. Section 95347(b), Table 2 of the proposed regulatory text states that in existing cold storage facilities, starting January 1, 2023, new systems must not use the prohibited substances listed in Table 2 of the regulatory text. The same prohibitions apply to chillers in existing cold storage warehouses. Please note that the prohibitions listed in Table 2 for existing cold storage warehouses were a part of Senate Bill 1013 and are not new requirements under the Proposed Amendments.

- (207) **Comment(s):** CARB should incorporate both chillers used in cold storage warehouses and IPR 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. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. IPR is a broad category which covers many end-uses ranging from food processing to manufacturing of plastics and pharmaceuticals. In IPR, chillers are used for attaining precise temperatures needed for the different processes and may not be able to perform as desired if a lower-GWP substitute refrigerant is not compatible with the equipment that was designed for the high-GWP refrigerant it is intended to replace (e.g., if the lower-GWP refrigerant has a high glide or a different pressure). On the other hand, cold storage, ice rinks, and retail food refrigeration are more uniform end-uses that do not have the diverse temperature needs as IPR. Thus, CARB does not see any justification for applying the IPR chiller limits to other refrigeration end-uses.

- (208) **Comment(s):** For chillers, the language in Table 3 should be "Chillers (new) designed for evaporator fluid leaving temperature." This is in line with standard industry practice. (AHRI)

Agency Response: CARB staff made changes based on the received comment. Please see Agency Response to comment 205.

A-5. Definitions

- (209) **Comment(s):** Commenter seeks clarification on the definitions of refrigerant "reclamation," "destruction," and "servicing" as well as the meaning of

“destruction,” “previously recovered,” and “additional” as written in the Staff Report, Appendix D. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. The Staff Report, Appendix D consists of stakeholder reclaim proposals. While CARB incorporated many of the concepts into the Proposed Amendments, these terms were not included in either the first or the Second 15-Day Notices, nor included in either of the proposed regulatory texts that were released with each set of notices, except with regard to the word “servicing” which is used once in reference to Section 95376 (a)(4)(B)—“Certified reclaimed R-410A refrigerant purchased and used in the servicing of existing equipment.” This term is not defined because it is used once and generally understood that servicing equipment means performing routine maintenance or repair work.

- (210) **Comment(s):** Revise the definition of AC equipment to account for the instance when an entire VRF system needs to be replaced due to failure of a single outdoor unit. (Daikin)

Agency Response: CARB staff made changes based on the received comment. The revised definition of “*New Air-Conditioning Equipment*” addresses this comment and specifically would not require replacement of an entire VRF system due to the failure of a single outdoor unit. Additionally, to provide clarity, CARB staff removed the words “*new exterior*” from Section 95373(a).

- (211) **Comment(s):** Clarify “*New Refrigeration Equipment*” Definition for Tables 1 and 2 as commercial refrigeration systems routinely undergo modifications. It is recommended that CARB provide more clarity as to how this definition should be interpreted and implemented. This is particularly important for part B.2. of the definition, as the capital cost of replacing a system will vary significantly depending on the new system design and refrigerant. (NASRC)

Agency Response: CARB staff made no changes based on the received comment. The definition of “*New Refrigeration Equipment*” as it applies to Tables 1 and 2 is: “Any refrigeration equipment that is: (A) First installed using new or used components, or a combination of new or used components; or (B) modified such that: (1) The nominal compressor capacity is increased; or (2) The system has experienced cumulative replacements, within any three-year time period, of components in full or exceeding 50 percent of the capital cost of replacing the entire refrigeration system, excluding the cost of refrigerated display cases.”

The comment seeks a clarification for part B.2 of the definition above. The clause prevents piecemeal replacement of an existing system as a way to continue to use high-GWP refrigerant past the useful life of the system. Once a system is close to retirement and the cost of making modifications or component replacements over a cumulative three-year period exceeds the cost of replacing it, it should be replaced with a new system with a lower-GWP refrigerant which is not prohibited in Tables 1 or 2. The cumulative cost of

component replacements over a three-year period should be compared to the cost of a new system which is the most widely used in each equipment category. CARB's assumption is that the most widely used system type will have the lowest upfront cost and will be the default choice for most end-users. For example, when comparing a supermarket system, the cumulative costs of making component replacements to an existing R-404A system should be compared to the cost of purchasing a new, centralized R-448A/R-449A system. Even though there are a variety of new system types available to end-users (e.g., microdistributed R-290, CO₂ transcritical and cascade systems), the more expensive options are preferential and their higher first costs cannot be used as the basis for comparison with costs of making component replacements in an existing system.

Please note that for the retail food facilities complying with the company-wide targets (given in Table 4 of the Proposed Amendments), most supermarkets and grocery stores will carry out refrigerant retrofits or system replacements as part of their compliance strategy for the systems large than 50 pounds. Since those systems will be switching to lower-GWP refrigerants as part of that strategy, the intent of the definition above will be met.

- (212) **Comment(s):** The "New Air-Conditioning Equipment" definition would have a significant negative impact on the use of AC products in California. It would be necessary to replace an entire VRV system (with low GWP refrigerant) even though only one of the outdoor units in a multi-module system might need to be replaced. This would put an unnecessary burden on users to replace entire systems when only one outdoor unit is out of order. Furthermore, replacement would be impossible because revisions to codes and standards for low GWP refrigerant VRV have not been completed. CARB has provided for refrigeration systems to align with the building permit date, but no such provision is available for AC. (Daikin)

Agency Response: CARB staff made changes based on the received comment regarding the definition of "New Air-Conditioning Equipment." Please see Agency Response to comment 210.

Regarding the exemption for approved building permits, CARB staff made no changes based on this comment. In Table 3, the exemption for approved building permits is deliberately limited just to refrigeration equipment. This is because the GWP limit of 150 for new refrigerated facilities goes into effect on January 1, 2022. This is the earliest effective date for any prohibitions among all regulated end-use. Typically, project planning for new commercial, cold storage and industrial refrigeration facilities is carried out a year or two in advance. This exemption will prevent any disruptions to new refrigeration facilities that have already been planned fully and all details of the refrigeration systems have been finalized. A similar exemption is not warranted for other end-uses due to their extended effective dates. The effective dates for other equipment types go into effect 2023 or later, which gives all regulated entities enough time to plan to

use compliant refrigerants after the approval of the regulation. Additionally, not all equipment in Table 3 requires a new building permit. Those that do, for example some AC and VRF equipment, have effective dates starting in 2025 and 2026. This provides over three years after the Proposed Amendments are approved for end-users to plan and use compliant refrigerants.

- (213) **Comment(s):** CARB should harmonize definitions across regulations; we thank CARB for aligning definition of aerosol propellants to match CARB's consumer products regulation. (HCPA)

Agency Response: CARB staff made no changes based on the received comment. In adding in the definitions of "aerosols" and "propellants," CARB did attempt to align the definitions with those of the existing consumer products regulation and appreciates the acknowledgement. In terms of the comment asking that CARB harmonize the definitions across regulations, CARB did attempt to harmonize the HFC definitions with that of existing federal and state regulations in which industry is already aware.

A-6. Other Comments

- (214) **Comment(s):** COVID vaccines will need storage temperatures where "natural refrigerants will not do the job." How will CARB handle those applications? (Nau)

Agency Response: CARB staff made no changes based on the received comment. The commenter seems to suggest that natural refrigerants cannot be used for very low temperature applications, such as storage of some vaccines. While CARB does not agree with the premise of the comment, all refrigeration systems used for very low temperature refrigeration and cooling, i.e., below – 50 degrees Celsius, are exempt from the prohibitions. Please see Sections 95375(a)(2)(B) and 95375(c)(2)(C). Furthermore, the GWP limit of 150 only applies to new systems containing more than 50 pounds of refrigerant in new facilities. The definition of new facilities excludes the very low refrigerators and freezers used for medical purposes. Finally, if a regulated entity is unable to meet the requirements, they may use the variance process to apply for a date extension provided they meet all the requirements of that process.

- (215) **Comment(s):** Proposed new policies on refrigerants are woefully inadequate. (Rowe)

Agency Response: CARB staff made no changes based on the received comment. The comment lacks details without which, CARB cannot respond. CARB sought to strike the balance of environmental protection with other important factors, such as cost, environmental benefit, small businesses, environmental justice, and feasibility, amongst others. While CARB will need additional measures to meet its SB 1383 mandates, the Proposed Amendments are intended to be technology forcing but pragmatic and were based on significant work carried out with all stakeholders.

(216) **Comment(s):** The most common replacement for R-22 in supermarket systems R-404A, is more than twice as potent a GHG than R-22. Just a single pound of R-404A is as potent as roughly 2 tons of CO₂. (350.Org)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information. Please see CARB's Staff Report for further discussion on short lived climate pollutants and CARB's Short-Lived Climate Pollutant Reduction Strategy, which is identified in the references section of the Staff Report.

(217) **Comment(s):** The United States is behind other countries when it comes to recovery and reclamation of refrigeration due to lack of enforcement of existing laws, mixing of refrigerants in the recovery process and the cost of reclamation, especially for mixed refrigerants. (Lennox)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information.

(218) **Comment(s):** End the pollution from bad refrigerants. Fight the chemical leaks. (Pasqua)

Agency Response: CARB staff made no changes based on the received comment. The comment lacks details without which, CARB staff cannot respond. As explained in the Staff Report, leaks from equipment are significant, so it is important that actions must be taken in addition to leak inspection and repair, such as switching to refrigerants with low GWP values.

(219) **Comment(s):** Refrigerant with GWP of 300 as a compliance option as proposed by CARB is not viable because current SNAP listed refrigerants with GWP ~300 are not suitable for stationary AC applications. (JCI)

Agency Response: CARB staff made no changes based on the received comment. CARB's proposed GWP limit for new AC equipment is 750, not 300. CARB will continue to monitor the feasibility of lowering the GWP limits in the future.

(220) **Comment(s):** OEMs can increase refrigerant recovery through distribution channels, service and dealer networks, and customers by promoting the program and providing training. (AHRI, Rheem)

Agency Response: CARB staff made no changes based on the received comments. CARB appreciates the comments and looks forward to industry-led programs to increase refrigerant recovery.

(221) **Comment(s):** CARB should revise leak rate data based on recent published studies. Using revised leak rates would result in lower emissions and achieve CARB's emission reduction goals with a 2025 transition date. A proposal for this has previously been made to CARB and had been rejected by CARB. (JCI)

Agency Response: CARB staff made no changes based on the received comment. CARB has moved the effective date for most AC equipment from 2023 to 2025, although the change was not made due to the leak rates used in estimating potential emissions from AC equipment. The Senate Bill 1383 emissions reductions goal for HFCs is 40 percent below 2013 levels by 2030. If

leak rates were changed, the change would apply to both the baseline emissions in 2013, and the goal emissions in 2030. Therefore, the relative reductions as a total percent of all HFC emissions would remain the same. Furthermore, CARB staff based its leak rates on CARB's F-gas inventory, which CARB believes to be the most accurate data supporting the leak rates identified in the Staff Report. CARB is not aware of any more recent data on leak rates and the commenter has not provided references to any updated studies.

- (222) **Comment(s):** The commenter is an independent non-profit concerned with climate change and the role of refrigerants in causing it. In 2020 it rated 16 U.S. retail chains on their approach to refrigeration and refrigerants. The maximum score was 100 percent, minimum zero percent. Highest scoring was the Aldi chain at 71 percent; a chain that has over 300 HFC-free stores. Whole Foods scored 46 percent, Target 34 percent, Walmart and Albertsons 15 percent, Costco 4 percent, and Trader Joe's zero percent. These low scores indicate the need to put teeth in the regulations or – preferably – switch very rapidly to natural refrigerants. (350 Humboldt)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information.

- (223) **Comment(s):** Rheem expresses support for the revisions to the disclosure statement that were included in the October 22, 2020 regulatory text. (Rheem)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the support.

- (224) **Comment(s):** Four years after the Kigali Amendment, Trader Joe, Wal-Mart, and Costco—big corporations with lots of money—all continue to emit high amounts of HFCs. Apparently, the capital costs of replacing their refrigeration equipment—an estimated one percent of total costs—is enough to discourage these large corporations even though the financial advantages of natural refrigerants more than repay the investment. (11th Hour)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information. Please see Agency Response to comment 134.

- (225) **Comment(s):** We respectfully urge CARB to consider amending the implementation date for refrigerated vending machines to January 1, 2022. (NAMA)

Agency Response: CARB staff made no changes based on the received comment. The Proposed Amendments do not make any changes to the vending machine effective dates and therefore, these comments are outside the scope of the Proposed Amendments and CARB is not required to respond. However, in the March 2018 HFC regulations, consistent with partially vacated U.S. EPA Rules 20 and 21, CARB prohibited HFC-134a (and other HFCs) in new refrigerated vending machines in California manufactured on or after January 1, 2019. CARB understands from industry feedback that the preferred refrigerant

replacement are hydrocarbons such as propane refrigerant (R-290), which are currently not allowed in vending machines used indoors in areas of ingress/egress due to the high flammability rating of hydrocarbon refrigerants. However, A1 HFC-134a substitutes with GWPs less than 750 are available and are allowed by safety standards and California Building Codes and listed as acceptable by the U.S. EPA SNAP Program (R-450A with a GWP of 601 and R-513A with a GWP of 630). Please see 79 Fed. Reg. 62863 (October 21, 2014), 80 Fed. Reg. 42053 (July 16, 2015), and Cal. Code Regs. Tit. 24, Part 4, which are incorporated by reference. It should also be noted that the 2019 effective date was originally in the federal SNAP Program and vending machine OEMs were aware of the federal 2019 deadline as early as 2015 when the U.S. EPA SNAP Rule 20 was published. See 80 Fed. Reg. 42870 (July 20, 2015); 79 Fed. Reg. 46126 (Aug. 6, 2014), which are incorporated by reference. In addition, any change to effective dates through this regulatory process would not remedy potential non-compliance with the 2019 effective date since the effective date is already past due.

(226) Comment(s): Commenter supports the revisions to the disclosure statement. (Rheem)

Agency Response: CARB staff made no changes based on the received comment. CARB staff appreciates the support. Based on previous stakeholder comments, CARB staff modified the language of the disclosure statement in Section 95375(a)(3)(A) to remove the words *“as part of the sales transaction and notice”* and removed the last sentence: *“is prohibited from use in California with any refrigerants on the “List of Prohibited Substances” for that specific end-use, in accordance with California Code of Regulations, title 17, Section 95374. This disclosure statement has been reviewed and approved by [THE COMPANY] and [THE COMPANY] attests, under penalty of perjury, that these statements are true and accurate.”* CARB then added the following language: *“This equipment meets the regulatory requirements for hydrofluorocarbons as of the manufacturing date. Only those refrigerants approved in the state for specific end uses may be used.”* CARB further amended the disclosure statement in its First 15-Day Notice to switch out the word *“approved”* with *“allowable.”* The disclosure statement now reads:

Disclosure Statement. As of the effective date of this subarticle, any person who manufactures motor-bearing new refrigeration equipment for sale or entry into commerce in the State of California, must provide a written disclosure to the buyer. The required written disclosure must state: *“This equipment meets the regulatory requirements for hydrofluorocarbons as of the manufacturing date. Only those refrigerants allowable in the state for specific end uses may be used.”*

CARB staff made these changes to simplify the disclosure statement requirements and to reduce the *need* for OEMs to have multiple disclosure statements for different states. This way, one statement can meet the needs for

different states. However, the OEMs will need to confirm that the disclosure statement is in fact true (if the equipment has the disclosure statement that the equipment meets the regulatory requirements for HFCs—the equipment must contain legal refrigerant).

- (227) **Comment(s):** Refrigerants should be evaluated based on their 20-year GWP value rather than their 100-year value to accurately reflect their climate impact. (shecco)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 142.

- (228) **Comment(s):** We do not support the idea to include refrigerant service charges over the equipment lifetime. This should be limited to initial factory charge, as it is difficult for manufacturers to take full responsibility for installing and servicing procedures which are traditionally performed by contractors. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. The Proposed Amendments only requires the use of reclaimed refrigerant for a portion of the original factory refrigerant charge (or initial charge in the field); the requirement does not include any refrigerant used during equipment servicing or refrigerant lost from annual leaks and end-of-life emissions.

- (229) **Comment(s):** CARB should exercise caution and engage with stakeholders regarding developing future regulations for heat pump technologies such as water heaters, clothes dryers and pool heaters are emerging technologies, which are emerging technologies that support California's building electrification efforts. (PG&E)

Agency Response: CARB staff made no changes based on the received comment. The comment speaks to future regulations and does not provide recommendations on the current Proposed Amendments, so CARB is not required to respond. However, CARB notes that air-source heat pumps are covered by the Proposed Amendments. CARB will consider developing future regulations for the heat pump technologies mentioned by the commenter and looks forward to engaging with stakeholders, as it has done for all regulations.

- (230) **Comment(s):** In the Staff Report (p. 24), it is stated that A2L refrigerants must be approved under the U.S. EPA SNAP Program. However, the SNAP Program must approve new uses for all alternatives, no matter their ASHRAE 34 designation. Daikin requests CARB modify this language to note that all new alternatives must undergo the SNAP approval process. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. Page 24 deals specifically with A2L refrigerants, which is why it discusses A2L refrigerants only. Under the SNAP Program, U.S. EPA must approve all new alternatives, including refrigerants that are A1 (non-flammable), A2 (flammable), A2L (less flammable), and A3 (highly flammable), regardless of their ASHRAE 34 designation. CARB did make clear that this applies to all refrigerants in the Staff Report on page 21 ("In addition, all refrigerants require approval by the U.S.

EPA.”) Please see footnotes 7 and 13 in this FSOR for an explanation of ASHRAE and the U.S. SNAP Program, respectively.

- (231) **Comment(s):** CARB should be skeptical about claims related to R-466A. In the past, compounds containing CF3I, which is a component of R-466A, have been flagged by U.S. EPA as unsuitable for residential applications due to health concerns. (IGSD)

Agency Response: CARB staff made no change based on the received comment. Any refrigerant, even if compliant with the GWP limit, can only be used in California if it is listed as an acceptable substitute for that end use by U.S. EPA under the federal SNAP Program.

- (232) **Comment(s):** CARB should scrutinize claims regarding financial hardship due to COVID-19; industry trade publications point to upward market trends. (IGSD)

Agency Response: CARB staff made no changes based on the received comment. CARB’s process has mechanisms in place to scrutinize claims for extensions through the variance process. Any applicant requesting a variance will be required to apply for a variance and fulfill all requirements of the variance process. The definition of “*force majeure*” makes clear that financial inability to perform not related to the force majeure event does not qualify for a variance and the “*impossibility*” definition also makes clear that the event must be beyond the control of the applicant, despite exercising foresight to prevent noncompliance. (See Cal. Code Regs., tit. § 95373.) Also, the applicant needs to be able to prove the force majeure or impossibility event as well as the applicant’s best efforts to anticipate and address the event and any potential noncompliance, including minimizing adverse effects of noncompliance. This will need to be proven by clear and convincing evidence. The process is that the applicant submits the application—it must be complete and contain all documents required under Section 95378 (c)(1) (e.g., supply certain information, compliance plan, quantification of emissions, mitigation plan, amongst others). The Executive Officer then determines if it is complete – if it is then CARB will post the application and allow the public to comment on the application. This will allow the public to provide information that could counter the claim. The Executive Officer will then provide written notice of the approval or denial, as well as any required conditions upon approval. The applicant must certify under penalty of perjury that the application is true and accurate to the best of the applicant’s knowledge after conducting due diligence. Last, CARB’s Executive Officer may revoke the variance (which is granted through an Executive Order), if the applicant no longer meets the criteria. (See Cal. Code Regs., tit. § 95378.) Thus, there are provisions in place to ensure that only the OEMs truly needing a variance receive the Executive Order. The variance is on a case-by-case basis and is not transferrable—so Trade Groups cannot submit a request on behalf of all their members—each individual OEM must submit its own variance request.

- (233) **Comment(s):** Revise GWP value of hydrocarbons. Not all hydrocarbons have a GWP of 3 as indicated in the Staff Report. (Daikin)

Agency Response: CARB staff made no change based on the received comment. CARB staff agree with the comment and acknowledge that hydrocarbons typically have GWP values below 10. Some hydrocarbons have a GWP of 3, but more generally, the GWP values of hydrocarbon refrigerants are below 10. Because the GWP value of 3 for hydrocarbons is not used to quantify any benefits from the regulation, CARB’s analysis does not need to be changed. CARB staff do note this in section I.E of this document, under “Technical Updates to the Staff Report.”

- (234) **Comment(s):** CARB should be consistent with the use of 100-year GWP values in the Executive Summary of the Staff Report. (Daikin)

Agency Response: CARB staff made no changes based on this comment. To be consistent with the F-gas inventory, CARB staff used 100-year GWP values for the analysis and calculating the avoided social costs of carbon. Because HFCs are very potent short-lived climate pollutants, their 20-year GWP values provide a better estimate of their damage in the near term. This is why, in the Executive Summary of the Staff Report, the emissions reductions are expressed using both, the 100-year and the 20-year GWP values for comparison.

- (235) **Comment(s):** Clarify the applicability of the variance process for non-niche end-uses, including whether manufacturers can apply for variances in non-niche end-uses and when CARB will begin accepting applications. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. All variance processes are identified in Section 95378(d). The process is discussed in Agency Response to comment 232. Non-niche end-uses can apply for the variance process, provided they meet all applicable criteria and requirements. CARB used the word “niche” in the Staff Report, not the proposed regulatory order. CARB worked very closely with stakeholders to identify what OEMs could do and what challenges they may face. CARB expects the OEMs using the variance process will mostly fall under niche (smaller, more specialized end-uses). CARB used the word “niche” to denote its understanding of the types of OEMs that would typically be applying for a variance. However, CARB did not put this in the Proposed Amendments because anyone can apply for a variance and the proposed regulatory text does make this clear. CARB will begin accepting applications as soon as the Proposed Amendments become law. For end-uses that do not qualify, please see CARB’s enforcement policy available at: <https://ww2.arb.ca.gov/resources/documents/enforcement-policy>.

- (236) **Comment(s):** Clarify the factors used for calculating emissions in a Force Majeure situation. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. Force Majeure situations are not required to calculate their GHG emissions. Section 95378(c)(1)(K) says “Excepting section 95378(b)(2) . . .” CARB is excepting the quantification requirement for force majeure variance applications. The reason for this is CARB does not want to add to this requirement on a company that is dealing with a potential catastrophe.

(237) **Comment(s):** CARB should consider the fire safety in addition to climate change. (Senator Bill Dodd)

Agency Response: CARB staff made no changes based on the received comment. CARB did consider fire safety in addition to climate change. CARB relies on the expertise of the State Fire Marshal, Codes and Standards organizations and other entities with jurisdiction over safe use of refrigerants.

(238) **Comment(s):** Commenter supports the federal action, i.e., AIM Act, since a structured phasedown is the most effective way to reduce HFCs. CARB's SB 1383 requirements can be coordinated with the federal phasedown of HFCs. (HARDI)

Agency Response: CARB staff made no changes based on the received comment. Under SB 1383, CARB has specific legislative mandates to reduce the HFC emissions in the State of California. CARB is counting on a federal phasedown to achieve emissions reductions and has submitted joint comments with other states on implementation of the AIM Act.³⁷ However, additional actions are needed to meet California's target of achieving emissions 40 percent below 2013 levels by 2030. CARB does coordinate with federal partners and will continue to do so.

(239) **Comment(s):** California should align with national and global efforts to reduce HFCs. This would maximize environmental benefits and reduce costs for consumers and manufacturers. (Lennox)

Agency Response: CARB staff made no changes based on the received comment. Other regions such as Japan, Europe, Australia, and Canada are transitioning the AC equipment to less than 750 GWP. California is generally consistent with the significant transition occurring in 2025 internationally although some requirements may be different or have different compliance dates. In addition, California has different legal mandates and requirements than these other countries and must comply with its own laws.

(240) **Comment(s):** All refrigerants pose risks, but based on sound engineering design, quality construction, and proper maintenance, refrigeration systems are safe. (Hansen)

Agency Response: CARB staff made no changes based on the received comment. CARB staff appreciates the information.

³⁷ See Comments of Massachusetts; California, by and through the Attorney General and the California Air Resources Board; Connecticut; Delaware; Iowa; Illinois; Maine; Maryland, by and through the Attorney General and the Maryland Department of the Environment; Minnesota; New Jersey; New York; Oregon; Vermont; and the City of New York on "*Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program under the American Innovation and Manufacturing Act*, 86 Fed. Reg. 27,150 (May 19, 2021), Docket ID No: EPA-HQ-OAR-2021-0044" (July 1, 2021).

(241) **Comment(s):** The Proposed Amendment to add subsection (B)'s option for a one-time attestation reduces the compliance burden for manufacturers that never used or no longer use any prohibited substance. We encourage CARB to approve this amendment. (PIMA)

Agency Response: CARB staff made changes based on the received comment. CARB appreciates the supportive comment. CARB made further revisions to the attestation requirement in Section 95375(a)(4)(B) in a First 15-Day Notice to correct a cross reference as CARB updated the numbering so corrected the cross reference to 95378(c), which is to the notice requirements in the variance provision. CARB further updated this Section in a Second 15-Day Notice by correcting the cross reference to only be subsections (c)(3) through (c)(7) as these are the only provisions in the variance process that discuss submission requirements and are therefore, the only relevant subsections.

(242) **Comment(s):** For the variance, the public notice requirements included in subsection (d) are critical to ensuring that any final decision on a requested variance is based on a full and complete record. This is especially important in competitive end-use categories like foam insulation used to insulate buildings and homes. A decision to allow one manufacturer continued use of HFCs can create a significant competitive advantage over products that are in direct competition with manufacturer's products. We encourage CARB to maintain robust public notice requirements if the Board approves the proposed variance section. (PIMA)

Agency Response: CARB staff made no changes based on the received comment. CARB agrees with a robust public process and proposed the public notice requirements to allow members of the public to comment on the application to prevent competitive disadvantages so CARB can make an informed decision. Please see Agency Response to comment 232.

(243) **Comment(s):** Recordkeeping requirements put additional burden on manufacturers without a meaningful benefit to CARB. The foam sector is different than the refrigerant sector. There is not on-going maintenance of foam products. The entire foam industry must be compliant with the new restrictions the date the restriction becomes effective. The restrictions on products in Table 1 became effective on January 1, 2020. Therefore, on-going recordkeeping requirements will not provide CARB novel information that cannot be accomplished with a one-time reporting solution. (CPI)

Agency Response: CARB staff made changes based on the received comment. Recordkeeping requirements are practices that all industries utilize to run their businesses. CARB did add a one-time attestation for companies that no longer utilize prohibited substances. Please see Agency Response to comment 241. For companies that do utilize prohibited substances, recordkeeping is necessary for enforcement and therefore, CARB is still requiring recordkeeping for these foam end-uses.

(244) **Comment(s):** Although the proposal will achieve substantial emission reductions by 2030, it is unlikely to be sufficient to fully meet the target under SB 1383, even assuming full federal implementation of the Kigali Amendment. Therefore, following prompt finalization of the current proposal, CARB must begin the process of considering, through an additional rulemaking, means of achieving additional near-term reductions. This should include additional measures to reduce refrigerant leaks and end-of-life emissions from equipment. (EIA)

Agency Response: CARB staff made no changes based on the received comment. CARB agrees with this comment and looks forward to working with stakeholders to discuss additional measures. It should be noted that the United States has not ratified the Kigali Amendment at this juncture but has adopted the AIM Act (described in footnote 19).

(245) **Comment(s):** The state should include AC equipment in its Refrigerant Management Program (RMP), which presently requires facilities with refrigeration systems containing more than 50 pounds of high-GWP refrigerant to conduct and report periodic leak inspections; promptly repair leaks; and keep service records on site. AC equipment accounts for a significant portion of installed capacity and ultimately emissions. If these systems are not included in future R3 management programs, then the state will (1) continue to have no visibility of the actual GHG impact from this class of equipment; and (2) remain unaware of the actual activity as it relates to maintenance and how that maintenance is impacting GHG emissions. (Trakref)

Agency Response: CARB staff made no changes based on the received comment. As part of regulatory development, CARB staff considered including AC equipment in the RMP program. CARB staff rejected that regulatory alternative because refrigerant management programs are more effective for commercial refrigeration systems than for commercial AC. This is because there is fewer commercial refrigeration systems, and these systems have higher per unit charge sizes and leak rates. Fugitive emissions from commercial AC sector are substantial because of the sheer number of ACs, but this presents a greater implementation challenge. Further, for AC equipment, there is an existing program implemented by South Coast Air Quality Management District (AQMD) under Rule 1415 that is similar to RMP but also applies to commercial AC systems with more than 50 pounds of refrigerant. South Coast AQMD Rule 1415 covers 40 percent of the state's population within its jurisdiction and requires commercial facilities with ACs to register their facility, conduct annual leak inspections, repair leaks within 14 days and keep records on site. This is business as usual for the 40 percent of the state population within the jurisdiction of South Coast AQMD. CARB may consider this as a future measure.

(246) **Comment(s):** The Proposed Amendments as drafted do a great job of addressing all new AC equipment; however, there is no accountability to ensure the equipment is properly installed, and, if the state relies on suppliers to control inventory, then its goals may be undermined. An example would be the U.S. efforts in 2010 to curb the installation of R-22 equipment, which lead the

industry to produce and sell “dry-ship” units in replacement of selling pre-charged equipment. The sale of these “dry-ship” units allowed buyers to install R-22 well after the new install ban was put in place. The sellers were able to suggest to authorities that they sold them dry (without refrigerant), and that installation was beyond their control. It was accepted that neither the manufacturer nor the supplier had any control over the refrigerant that was installed. Installers claimed ignorance, and these dry units remained available for sale years after the ban went into place. Therefore, technically obsolete equipment continued to erode the buyer's trust in the market since they were buying new equipment that would not be serviceable after the production ban went into place. If the state is facing challenges from manufacturers, then we encourage the state to consider the gross value of the GHG emissions impact on each unit, rather than the limit on each material. The state could implement a total GWP allowable threshold for each appliance (example of 15,000 GWP) in this case. (Trakref)

Agency Response: CARB staff made no changes based on the received comment. Unlike the case for the R-22 phasedown, under CARB’s Proposed Amendments, equipment manufacturers cannot install any AC equipment using a refrigerant with a GWP greater than 750 manufactured on or after the effective date. Thus, there is no risk of end-users purchasing equipment for which they do not have access to the refrigerant.

B. Comments Received During the First 15-Day Notice Period

Written comments were received during the 15-day comment period in response to the May 13, 2021 notice of public availability of modified text and availability of additional documents. A list of commenters and their affiliations are provided in Table 4.

For clarity in reading responses, multiple part comments were separated into a series of individual comments.

B-1. Air-Conditioning and the R4 Program

- (247) **Comment(s):** CARB should not lump residential and commercial/industrial portable ACs into a single category. They should be treated differently with regards to compliance dates and should be defined differently. Commercial and industrial portable ACs, or spot coolers as they commonly called, are different in both size and functionality compared to residential units. They are larger in size and manufactured in small quantities. Both the cold air and hot air are rejected into the same space. In contrast, residential portable units are smaller in size and manufactured in large quantities. They have a single-duct or dual-duct configuration, where the ducting separates the space where hot air is rejected from the space where cold air is released to provide conditioning. Spot coolers are similar to commercial stationary air conditioners, are subject to the same safety standards, face the same challenges and thus should be treated similarly and subject to a compliance date of January 1, 2025, which is the date

of compliance for commercial air conditioners. Just because there are residential portable AC units on the market using lower-GWP refrigerants today does not justify requiring all portable AC units to comply with the January 1, 2023 date. (Denso)

Agency Response: CARB staff made no changes based on the received comment. The vast majority of portable ACs, irrespective of being used in residential or commercial applications, are currently able to meet applicable Codes and Standards as A2L refrigerants are allowed in these end-uses. In the event there are portable AC uses where no products are able to comply with refrigerant charge limits of UL 60335-2-40 and the California Building Code (See Cal. Code Regs., tit. 24, part 4), as of January 1, 2023, applicants may use the variance process in the Proposed Amendments to apply for an extension of the effective date provided all conditions of the application process are met. CARB will evaluate all applications for variance on a case-by-case basis.

- (248) **Comment(s):** I am concerned about the requirement on GWP limits for all AC equipment by January 1, 2023. My company supplies emergency cooling equipment to a variety of consumers and businesses whose revenue will be impacted due to a lack of AC. (Mota)

Agency Response: CARB staff made no changes based on the received comment. The requested delay in the 2023 effective date has already been made by CARB in response to comments received during the 45-Day Public Comment period and noticed in the First 15-Day Notice. The regulation effective date for most AC equipment was delayed by two years, until January 1, 2025 and January 1, 2026 for VRF equipment. Please see Agency Responses to comments 35 and 56. The January 1, 2023 regulation effective date only applies to smaller equipment that will be able to achieve the refrigerant transition, including: Room/wall/window air-conditioning equipment, packaged terminal air-conditioners (PTACs), packaged terminal heat pumps (PTHPs), portable AC equipment, and residential dehumidifiers. Some of these equipment types are already sold in California today with refrigerants with a GWP less than 750. The Proposed Amendments do not impact existing equipment already in use and only impacts new equipment that is manufactured after the effective date of the regulation.

- (249) **Comment(s):** We are a seed-stage hardware startup in San Francisco, California that is building AC/heat pump units that are easier to install and more pleasant to use. Our technology allows us to make a 9K BTU heat pump that uses 350 grams of R-290 in a safe manner by containing the refrigerant to a hermetically sealed outdoor unit. Regulation that pushes the industry towards the safe and timely uptake of units using very low-GWP natural refrigerants would help us introduce climate-friendly heat pumps into more homes, particularly in the United States. (Treau)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the information regarding heat pump technology that uses small amounts of a low-GWP hydrocarbon refrigerant.

- (250) **Comment(s):** According to the 15-Day Changes, “Certified” reclaimed refrigerants can be refrigerant recovered from any geographic location as long as the reclaimed refrigerant meets the requirements “being reclaimed by a U.S. EPA-certified reclaimer” regardless of where the equipment with the reclaimed refrigerant is sold or delivered. We would like you to clarify the following points: (A) Can a reclaimer outside the United States (including a non-U.S. subsidiary of a reclaimer in the United States) be certified by the U.S. EPA, and (B) providing that is the case, is the sale of equipment with refrigerants reclaimed outside the United States by a U.S. EPA-certified reclaimer to the United States subject to the CARB requirement for the use of reclaimed refrigerants. (JRAIA)

Agency Response: CARB staff made no changes based on the received comment. This comment asks for clarification but makes no recommended changes to which CARB can respond. However, CARB is not aware of any U.S. EPA-Certified Refrigerant Reclaimers outside the United States and its territories. Only U.S. EPA can answer with certainty if refrigerant reclaimers outside the U.S. and its territories can become U.S. EPA-certified. As for the second request for clarification, the commenter asks about equipment being sold into the United States. If a manufacturer enters AC or VRF equipment into California which has a GWP 750 limit effective date of January 1, 2025 or January 1, 2026 respectively, then they are subject to the R4 program requirements. For more details, see Agency Response to comment 64.

- (251) **Comment(s):** The ratio of reclaimed refrigerant required in VRF/VRV is 15 percent for 2023 and 2024, and 25 percent for 2025. We disagree that a higher percentage should be imposed in the final year. It would be unfair to impose a higher percentage in the final year to keep a level playing field (for VRF/VRVs compared to other AC equipment). The delay in the transition of VRF/VRV to lower-GWP refrigerants is not the responsibility of the OEMs; it is due to the delay in the revision of Codes and Standards. We recommend setting the percentage of VRF/VRV to the same percentage for three years, even if it is higher. For example, instead of 15 percent in 2023 and 2024 and 25 percent in 2025, it may be conceivable to adopt a flat rate of 17 percent for all three years. It is the average of 10 percent, 10 percent, and 30 percent. (JRAIA)

Agency Response: CARB staff made no changes based on the received comment. The R4 Program requirement for VRFs may be fulfilled at any time before the final date of compliance for VRF manufacturers reclaimed refrigerant requirement of July 1, 2026. Therefore, there is no need to wait until 2025 to fulfill the 25 percent reclaimed refrigerant requirement. Given that the additional year for VRF OEMs to continue using R-410A refrigerant will have a significant impact on HFC emissions, the increased requirement for VRFs in 2025 is reasonable. For more details, please see Agency Response to comment 64.

(252) **Comment(s):** OEMs sell their equipment mostly through distributors. There are also many interstate transactions, and it may be difficult to determine the location of equipment depending upon the timing of sales, and the baseline may differ significantly depending on where the equipment is located. In addition, if this rule is not clear at the time of confirmation, accurate verification will be difficult at a later date. We request that all stakeholders gather to discuss specific methods and take measures to prevent loopholes and fraud. (JRAIA)

Agency Response: CARB staff made changes based on the received comment. Through a Second 15-Day Notice, CARB made clear that it is only looking for the first point of sale or use (for manufacturers who also have a servicing arm) and removed the word “distributed” to make clear that CARB is not asking manufacturers to contact their distributors to acquire this information. Please note, however, for the R4 Program, to qualify for “optional early action credit,” equipment containing refrigerants with a GWP less than 750 prior to the regulation effective date must be entered into commerce into California. For manufacturers claiming early action credit, they may need to reach out to their distributors to gather this information to receive the benefit. But this is a voluntary measure that is not mandatory so does not place this requirement on any manufacturer not voluntarily participating in the optional early credit.

(253) **Comment(s):** The January 1, 2023, prohibition date for room/wall/window air conditioning equipment, PTACs, PTHPs, portable AC equipment, and residential dehumidifiers (new) should be contingent upon adoption of the updated Codes and Standards. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. Existing California Building Code Standards (See Cal. Code Regs., tit. 24, part 4) permit the use of lower flammability refrigerants in these equipment types and thus they can meet the January 1, 2023 effective date. In fact, there are some existing products on the market using lower flammability refrigerants currently being sold in California. The existing California Building Codes also permit the use of lower flammability refrigerants in these equipment types if they are listed and used in accordance with the manufacturer’s instructions.

(254) **Comment(s):** In the proposed modified text for the R4 Program, CARB proposes a definition of reclaimed refrigerant that would permit reclaimed refrigerant to originate from any geographic location. This definition should be modified to specify this to mean reclaimed or recovered refrigerant may originate from any geographical location in the United States. (Chemours, A-Gas, Hudson, National Refrigerants)

Agency Response: CARB staff made no changes based on the received comment. The source of reclaimed refrigerant is not limited to California. Reclaimed refrigerant can come from any geographic location under the R4 Program as long as it meets the definition of “Certified Reclaimed Refrigerant” included in the regulatory text. To meet the definition, the reclaimed refrigerant must be reclaimed by a U.S. EPA-certified refrigerant reclaimer; must meet all

of the specifications in 40 C.F.R., Part 82, Subpart F, Appendix A; must have results of the analysis to show it meets the C.F.R. specifications; and the reclaimed refrigerant must contain no greater than 15 percent new (virgin) refrigerant by weight that meets the AHRI 700 specifications. This must all be supported by documentation.

- (255) **Comment(s):** 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. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 108.

- (256) **Comment(s):** Update Section 95376(a)(4)(C) to provide *Optional Early Action Credit* for use of Refrigerant with a GWP less than 750 in new equipment entering in commerce in any state prior to January 1, 2025. In California, the Codes and Standards are not on schedule to allow < 750 GWP refrigerant AC units into commerce until late in 2024. CARB can still drive early introduction by providing manufacturers with credit for product introduced in other states where Codes and Standards are complete. Providing the credit for other states would help manufacturers incentivize consumers and contractors to create demand, which would not exist otherwise. CARB should modify the Proposed Amendment to provide *Optional Early Action Credit* for use of Refrigerant with a GWP less than 750 in new equipment entering in commerce in any state prior to January 1, 2025. (Carrier)

Agency Response: CARB staff made no changes based on the received comment. The intent of the early action credit is to incentivize the early adoption of lower-GWP refrigerants in AC and VRF equipment *in California* prior to the regulation effective date, Codes and Standards permitting. The purpose of the Early Action Credit is to reduce emissions inside California, which would not be achieved if credit were given for lower-GWP equipment shipped to other states.

- (257) **Comment(s):** Section 95376(c)(2)(C)6 (R4 attestation) should be removed as it may create unexpected hurdles for manufacturer compliance and does not promote actions that have environmental benefit. It is not clear what the purpose of this requirement is. First, if other government entities propose rules requiring a certain level of reclaimed refrigerants, it would increase demand for reclaim refrigerant that could exceed the supply. Thus, manufacturers could be forced to decide which programs they will comply with and which they would not. Second, including private or voluntary programs in this section further strains supply and disincentivizes manufacturers, reclaimers, and other stakeholders from creating programs that promote the use of reclaim because of the potential for non-compliance. While this language may eliminate the small risk of double counting, it creates a greater risk of reducing overall environmental benefit by limiting recovery and reclaim programs. This does not

support CARB's stated goal to increase the amount of reclaim used in the market, and therefore, should remove this from the regulation. (Carrier)

Agency Response: CARB staff made no change based on the received comment. The attestation is necessary to avoid giving credit towards R4 requirements that occurred for a different program or would have happened anyway, which would not be considered real and additional reductions above and beyond business as usual (without the R4 requirements). The attestation requires OEMs to ensure that they are not double counting. Each OEM is in the best position to determine what programs they are participating in and thus, best positioned to make this attestation.

- (258) **Comment(s):** We support the proposed use of reclaimed R-410A in the service of existing installed equipment. AHRI 700 is a minimum refrigerant purity standard that allows for a broad range of possible refrigerant quality. Reclaimed refrigerant quality is distinctly different from virgin refrigerant with respect to consistent composition and contaminant profiles, even with the proposed inclusion of fifteen percent (15%) virgin. The quality concerns of reclaimed refrigerant raise the risk of failing the federally mandated minimum efficiency requirements. (Trane)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the support of the proposed use of reclaimed R-410A to service existing installed equipment. The R4 Program does not prescribe the use of reclaimed refrigerant in new equipment. OEMs can choose to use it either in new equipment or for servicing existing equipment. For more details, please see Agency Response to comment 64.

However, it is unclear what the commenter means by "AHRI standard allows for a broad range of possible refrigerant quality." The R4 program requires the reclaimed R-410A to meet the definition of "*Certified Reclaimed Refrigerant*." This definition includes meeting the U.S.EPA requirements under 40 C.F.R. Part 82, Subpart F, Appendix A –*Specifications for Refrigerants*. For clarity, in the definition of "*Certified Reclaimed Refrigerant*," CARB replaced the reference to AHRI 700 with the C.F.R. referenced listed above. These federal specifications are based on AHRI 700-2016 standard. 40 C.F.R. Part 82, Subpart F, Appendix A states that "the purpose of this standard is to evaluate and accept/reject refrigerants regardless of source (*i.e.*, new, reclaimed and/or repackaged) for use in new and existing refrigeration and air-conditioning products." It is therefore unclear what the commenter means by "The quality concerns of reclaimed refrigerant raise the risk of failing the federally mandated minimum efficiency requirements" because once reclaimed refrigerant meets the federal specifications, it is indistinguishable from new or virgin refrigerant.

- (259) **Comment(s):** The Early Action Credit should include the use of reclaimed R-410A used prior to 2023 since the credit would be unusable until mid-2024 due to Codes and Standards. We appreciate the desire to commercialize next generation low GWP refrigerants in the stationary HVAC space prior to 2025,

but the Codes and Standards will not allow this until July 2024, leaving little or no room for actual early action credit. We propose that the credit include the use of reclaimed R-410A in new or existing equipment prior to 2023. As it stands, the mandatory use of reclaim only spans for two and a half years. Furthermore, the industry did not start using R-410A in any significant way until 2010, making supply constrained because the original equipment is still within its expected life span. Adding another year and a half would further bolster the reclaiming industry and allow for more of a ramp up to 2023. (Trane)

Agency Response: CARB staff made no change based on the received comment. Under R4, "*Optional Early Action Credit*" is specifically designed to accelerate the adoption of AC equipment using refrigerants with GWP less than 750 in California. Please note that this is an optional compliance provision. Use of reclaimed refrigerant that meets the definition of "*Certified Reclaimed Refrigerant*" is not prohibited before 2023 and can be used to comply with the reclaimed refrigerant use requirements under the R4 program. However, use of reclaimed refrigerant before 2023 is not eligible for the "*Optional Early Action Credit*." Please see Agency Response to comment 64.

- (260) **Comment(s):** We would like to support CARB's decision to allow a portion of virgin supply to be a part of the definition of certified reclaimed refrigerant. The maximum 15 percent in the current proposed rule is necessary to guarantee sufficient supply of reclaimed R-410A to meet the compliance obligations of the State of California and OEMs during this transition period. (A-Gas)

Agency Response: CARB staff made no change based on the received comment. CARB appreciates the feedback on the maximum allowable amount of new refrigerant that can be used in reclaimed refrigerant while still meeting the definition of "*Certified Reclaimed Refrigerant*."

- (261) **Comment(s):** The definition of "geographic location" related to the sourcing of recovered refrigerant should be specified to encompass only the United States. We believe that establishing the United States as the geographic location for the source of recovered refrigerants supports the demand requirements for the program, and that extending the geographic location beyond the United States would create traceability challenges as documentation requirements for internationally recovered material is not aligned with U.S. EPA reporting requirements. (A-Gas)

Agency Response: CARB staff made no change based on the received comment. Please see Agency Response to comment 254. The requirement that the certified reclaimed refrigerant be reclaimed from a U.S. EPA-certified refrigerant reclaimer and that it meets certain standards and be supported by documentation will help ensure the traceability and quality requirements for reclaimed refrigerant.

- (262) **Comment(s):** As they apply to residential whole-home dehumidifiers, generally, the commenter agrees that AC units for which the Codes and Standards already permit the use of A2L refrigerants and those where compliant solutions already exist should comply with the requirements by 2023. However, the commenter urges

CARB to differentiate between “portable” dehumidifiers and “whole-home” dehumidifiers and follow the compliance deadlines for similar AC units because: (A) While the California Building Code does not prohibit the installation of small whole-home dehumidifiers with an A2L refrigerant, U.S. EPA only recently published SNAP Rule 23 permitting the use of A2L refrigerants in this application. By not delaying the implementation date for whole-home dehumidifiers, CARB’s regulation would burden dehumidifier manufacturers as compared with small central AC units manufacturers; (B) there are currently no compliant units in the market; and (C) a rushed transition to develop- new products using A2L refrigerants may sacrifice energy efficiency. (RPC)

Agency Response: CARB staff made changes based on the received comment. The Proposed Amendments already differentiate between portable and whole home dehumidifiers. The definition of “*Residential Dehumidifier*” states that the equipment is “*self-contained,*” which would not apply to a whole home dehumidifier that is connected to the home’s AC via ducting. To provide additional clarity, CARB staff added the word “*portable*” to the definition of “*Residential Dehumidifier.*” For the purposes of this regulation, a whole home dehumidifier would be regulated as “*Other Air-Conditioning Equipment*” with a regulation effective date of January 1, 2025, and not as a “*Residential Dehumidifier,*” which is both self-contained and portable.

(263) **Comment(s):** Many of our regulatory challenges stem from the fact that dehumidifiers are not classified appropriately by size of function. We manufacture commercial/industrial, restoration, whole-home, and crawlspace dehumidifiers. Most of these units are ducted, subject to code compliance and contain over 2 lbs. of refrigerant. We do not manufacture any products that are sold directly to the consumer and contain small amounts of refrigerant. Regulation is typically geared towards the smaller units while the larger units are lumped in with larger AC equipment. We propose separate definitions for dehumidifiers, consumer dehumidifier, residential dehumidifier, restoration dehumidifier and commercial dehumidifier. Additionally, we request that all dehumidifiers have a compliance date of January 1, 2025. It appears that CARB’s intention is to push back the compliance date for commercial and restoration dehumidifiers to January 1, 2025, which we support, and would like clarification on and confirmation if that is indeed the case. (Therma-Stor)

Agency Response: CARB staff made changes based on the received comment. CARB staff added the words “*residential dehumidifier*” and “*other dehumidifier*” to the definitions to make clear that all dehumidifiers must comply with the regulatory requirements. Hence, the Proposed Amendments do distinguish the different types of dehumidifiers—they either fall under “*residential dehumidifier*” (2023 compliance effective date) or “*other dehumidifier*” which is included in the “*air conditioning equipment*” definition (which has a January 1, 2025 compliance effective date). The definition of residential dehumidifier already excludes the larger whole-home, commercial

and industrial dehumidifiers that may be unable to meet applicable Codes and Standards by the January 1, 2023 effective date. Since Codes and Standards already permit the use of lower-GWP refrigerants for residential dehumidifiers, they are subject to the January 1, 2023 compliance date. OEMs of other dehumidifier products that are used in the residential sector, which are subject to the January 1, 2025 date are expected to be able to comply with the Codes and Standards, which are expected to be updated by July 1, 2024. If the Codes and Standards are not updated, OEMs unable to meet them may apply for a variance (provided the requirements are met) until the Codes and Standards are updated, which again, is expected in 2024, before the 2025 deadline.

- (264) **Comment(s):** We support the transition to low-GWP refrigerants but are concerned about the accelerated 2023 effective date for dehumidifiers and its potential inadvertent impact on human health and safety. Additionally, there may be a negative environmental impact caused by sacrificing energy efficiency in an effort to meet the low-GWP requirement by 2023. Likewise, various market forces are converging to make it extremely difficult for us to transition to a sub 750 GWP refrigerant by January 1, 2023. (Therma-Stor)

Agency Response: CARB staff made no changes based on the received comment. In response to the comment related to impacts that decreases in energy efficiency have on human health and safety, it is not clear how the connection is being made and therefore, CARB is unable to respond to this comment without more information because it is ambiguous. Likewise, it is unclear what is meant by “converging market forces” that would make it hard to comply with the regulatory requirements and therefore, CARB is also unable to respond to this comment without more information as it is also ambiguous. Please see Agency Response to comment 263.

- (265) **Comment(s):** The dehumidifier industry does not know the requirements of the Codes and Standards. In most cases, the same standards that apply for AC equipment apply for dehumidifiers, namely UL 60335-2-40 and ASHRAE standards 15 and 15.2,³⁸ but since these standards haven’t been published or adopted into codes yet, it is not possible for us to know what these requirements will be. (Therma-Stor)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 263.

³⁸ See footnote 7 for more background on ASHRAE and UL standards. In addition, ASHRAE 15.2 is a subset of ASHRAE 15 and is a new standard covering the application of refrigerant-containing equipment such as AC equipment used in residential applications. ASHRAE 15.2 was introduced with the advent of proposed widespread A2L refrigerant use in residential applications. ASHRAE 15.2 is still undergoing development and is expected to be completed in 2021.

(266) **Comment(s):** We support the definition of “New Equipment” included in the 15-day language. Also, the 15-day language identifies the use of reclaimed refrigerants in factory charge. Commenter supports the exclusion of field charge. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. CARB acknowledges the support for these aspects of the Proposed Amendments.

(267) **Comment(s):** Commenter requests the VRV Heat Pump System reclamation percentages (15%, 15%, and 25%) be reduced. Specifically, the commenter believes that the 25 percent reclamation requirement for VRV systems in 2026 misapplied to this technology and remains too high. Low-GWP VRV technology already faces a significant delay in the introduction to the marketplace because current Codes and Standards do not address the technology and needs a level playing field with other cooling technologies. Also, there could be difficulty in obtaining reclaimed refrigerant in 2026. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. CARB staff worked with stakeholders through a transparent and public process to arrive at a technologically feasible timeline and percentages. An additional year was given for VRF (interchangeable with VRV) OEMs to address any concerns identified. Continued use of R-410A refrigerant will have a significant impact on HFC emissions that must be addressed for California to achieve its HFC emissions reductions mandates. The 2026 deadline but higher percentage reclaim requirement strikes the balance of giving VRFs more time while continuing to reduce HFCs. CARB also does not anticipate that there will be difficulty in obtaining reclaimed refrigerant in 2026. For more details, please see Agency Response to comment 67.

(268) **Comment(s):** For the “Effective Date” definition in Section 95374(c)(2)(D), VRV and chillers should receive an exception based on prior approval of building permits. VRV projects, like refrigeration systems, have long lead times and construction cycles. A commercial building design can take 1-5 years to plan, and accordingly designing a system around R-410A or an A2L refrigerant could significantly change the building layout and construction requirements. CARB provides for an exception for “refrigeration equipment” but does not provide the same for VRV or chillers. CARB should amend Section 95374(c)(2)(D) to provide for an Effective Date exception for all end uses in Table 3 of Section 95374(c). Without such an exception, there would be an unnecessary cost burden on a building owner to account for design and construction changes to the building. (Daikin, AHRI)

Agency Response: CARB staff made no changes based on the received comment. The approved permit exemption was allowed for new refrigeration equipment due to the regulation effective date of January 1, 2022. This effective date could have an impact on some refrigeration systems who

previously applied for and received permits to use high-GWP refrigerants before the Proposed Amendments are officially adopted. However, the effective date for AC equipment is January 1, 2025, and the effective date for VRF equipment is January 1, 2026, which will allow sufficient time for current permit planning to account for lower-GWP equipment and thus, a similar approved permit exemption is unnecessary.

- (269) **Comment(s):** For this rulemaking and for future rulemakings, we ask CARB to align its language on reclamation with that of U.S. EPA. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. CARB staff have endeavored to align language on reclamation with that of U.S. EPA. This is evident from CARB's definition of "*Certified Reclaimed Refrigerant*," which incorporates the federal specifications for reclaimed refrigerants. However, the R4 program is the first of its kind in the nation and requires additional provisions for enforceability.

- (270) **Comment(s):** CARB has provided clear growth rates for specific end uses, including 4 percent for AC and 10 percent for VRV. However, due to the uncertainty of supply, and the challenges of creating a strong new market for reclaimed refrigerants, a lower number should be applied for VRV products. Also, more accurate growth factor projections – in line with other AC equipment – should be used. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. The one-time growth rate for VRF equipment entered into California is 10 percent from 2018-2019 to 2023-2025. Therefore, the annual average growth rate is 2.5 percent from the last year of baseline (2019) to the first year of R4 Program compliance (2023). The annual growth rate is much lower than actual VRF shipment growth rates. The "*Variable Refrigerant Flow (VRF) Market Strategies Report*" published September 2019, by Northeast Energy Efficiency Partnerships, Inc. (NEEP) states, "Recent market reports have identified VRFs as the fastest growing technology in the HVAC market (>15 percent annual growth),"³⁹ which was added to the record. Thus, the one-time 10 percent growth rate in the shipment of VRF equipment used by CARB staff are quite reasonable, and very likely much lower than the actual growth rate in shipments.

- (271) **Comment(s):** CARB should provide a more explicit definition of "*Early Action Credits*," and the requirements for earning them. CARB should adopt an appropriate definition to allow for the shipment of DX equipment to locations outside of California as those markets are preparing for a similar refrigerant

³⁹ Northeast Energy Efficiency Partnerships Inc. (NEEP), *Variable Refrigerant Flow (VRF) Market Strategies Report* (September 2019). Available at: https://neep.org/sites/default/files/resources/NEEP_VRF%20Market%20Strategies%20Report_final5.pdf.

transition. Several states, including Washington and Florida, have updated their Codes and Standards to allow for the use of larger A2L refrigerant charge sizes. (Daikin)

Agency Response: CARB staff made changes based on the received comment. Early action credits are earned for each pound of refrigerant with a GWP less than 750 in equipment entered into commerce in California prior to the regulation effective date, with each pound of refrigerant equal to one pound of certified reclaimed R-410A refrigerant. CARB staff added the words "Other Air-conditioning" to Section 95376(a)(4)(C) to remove any question as to what equipment was covered by the Optional Early Action Credit.

To the extent that this commenter suggests giving early action credit for shipments of equipment to other states, CARB staff made no changes. The intent of the early action credit is to incentivize the early adoption of lower-GWP refrigerants in AC and VRF equipment in California prior to the regulation effective date, Codes and Standards permitting. Lower-GWP equipment sent to locations outside California will not count towards emissions reductions in California and therefore, credit could not be given to sales outside of California. For more discussion on Early Action Credit, please see Agency Response to comment 108.

(272) **Comment(s):** Early Action Credits should account for the actual volume of low-GWP refrigerants needed for the same performance level as an R-410A unit. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. In order to prevent inadvertently favoring one replacement refrigerant over another, the early action credit treats each pound of less than 750 GWP refrigerant (used in equipment shipped prior to the regulation effective date) equally with each pound of any compliant refrigerant counting as one pound of certified reclaimed R-410A refrigerant.

(273) **Comment(s):** CARB's 15-day language does not provide information as to whether there can be intra-company transfers of reclaimed refrigerants or Early Action Credits. (Daikin)

Agency Response: CARB staff made no changes based on the received comment. The certified reclaimed refrigerant requirements do not prohibit intra-company transfers of reclaimed refrigerants if they meet the requirements listed in the Proposed Amendment definition of "Certified Reclaimed Refrigerant." Hence, early action credits from an intra-company transfer are acceptable if the equipment with less than 750 GWP refrigerant enters into commerce in California and is not counted again by a separate entity (assuming it meets all standards).

- (274) **Comment(s):** The “*record of sale*” of a reclaimed refrigerant should be the only required documentation. (Daikin)

Agency Response: CARB staff made changes based on the received comment. As part of the recordkeeping requirements, the Proposed Amendment would allow such documentation. Under Section 95376 (recordkeeping requirements), OEMs “must maintain for five years and make available, upon request.... (3) Name and addresses of distributors or servicing companies to which equipment manufacturers first sold reclaimed refrigerant.” CARB staff removed the words “(where available)” and added the words “first” in front of “sold” and removed the word “or distributed” from that same sentence in Section 95376(d)(3). Under the R4 requirements, AC and VRF equipment manufacturers will be required to purchase and use certified reclaimed R-410A refrigerant in either new equipment or for servicing existing equipment. Equipment manufacturers must report to CARB the amount used for each of those purposes, as applicable. If manufacturers sell reclaimed R-410A for use in field charging or servicing, they must keep records of names and addresses of entities to whom the refrigerant was sold. The addition of “first” before “sold” clarifies the CARB seeks records of the first point of sale of reclaimed refrigerant made by the equipment manufacturers to distributors or servicing companies, as applicable. The removal of “or distributed” was necessary after reading through multiple stakeholder comments that indicated some do not have this information. For example, a manufacturer may not know the names and addresses of entities in the chain of sales. This change makes clear that the only information CARB seeks is the names and addresses of the first sale of the reclaimed refrigerant and if the manufacturer distributes, those names as well. The Proposed Amendments were not meant to add requirements on these AC and VRF manufacturers to gather records that they do not already have access to, so the change was necessary to clarify this aspect.

OEMs must comply with all recordkeeping requirements and all records identified in the Proposed Amendments must be kept.

- (275) **Comment(s):** We support the CARB HFC staff proposal and the subsequent December 10, 2020 board endorsement for the following transition sectors and dates for PTAC and RAC equipment (January 1, 2023), all other stationary AC equipment (January 1, 2025), and VRF equipment (January 1, 2026). However, it is critical that distributors, contractors, and inspectors be fully trained on the safe use, handling, and storage of A2L’s prior to any widespread market introduction into the “other stationary AC products” sector where charge volumes are currently restricted. (JCI)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the comment. Training modules have been launched by leading training organizations such as the North American Technician Excellence and the Air Conditioning Contractors of America.

Additionally, AHRI launched the Safe Refrigerant Transition Taskforce in 2020 to address barriers to the widespread adoption of A2L and other alternative refrigerant technologies including training, storage, and handling of A2Ls. Traditionally OEMs have also offered training to technicians and contractors in their networks – CARB expects that trend will continue.

- (276) **Comment(s):** Commenter supports the January 1, 2023 date for small charge PTAC and RAC but does not support earlier introduction of “the other stationary or VRF” sectors prior to the codes being updated within the State of California. CARB should ensure there are no potential loopholes (e.g. via a broad interpretation of the definition of residential dehumidifiers) whereby allowable charge volume increases are incorporated as updates to the 2022 California Mechanical Code (e.g. Title 24, Part 4) allowing for the premature installation of traditional split systems and packaged units that fall under the CARB category sector of “other stationary air conditioning equipment” prior to July 1, 2024, which is the expected effective date of the next revision of the California Mechanical Code. (JCI)

Agency Response: CARB staff made no change based on the received comment. The effective dates in stationary AC and VRF end-use categories is January 1, 2025 and January 1, 2026, which comes after expected updates to Codes and Standards (Cal. Code Regs., tit. 24, part 4). Please note, CARB’s proposed regulation does not make changes to the California Mechanical Code (Cal. Code Regs., tit. 24, part 4) as that is the purview of California Building Code officials. California Building Code officials also enforce the California Mechanical Code.

- (277) **Comment(s):** We actively engaged in and fully supports the 15–Day comments submitted by AHRI of which JCI has been and remains a long-standing member. (JCI)

Agency Response: CARB staff made changes based on the received comment. CARB staff responded to AHRI’s comments. See Agency Responses to Comment 109.

- (278) **Comment(s):** We seek clarity on the proposed requirement that OEMs commit to purchase or take ownership of at least 10 percent of the new refrigerant an OEM sells and installs in California between 2023 and 2024. As part of its normal course of business, we service business purchases or take ownership of various type of used refrigerants, including R-410A, from various sources which are ultimately collected and stored in large, bulk tanks. The recovery of this used refrigerant occurs at different times and from different sources throughout the year. We would like clarification that for any R-410A we have already recovered or subsequently reclaimed prior to the enactment of this rule, that we will be granted future credit towards the 10 percent commitments for its actual “use” in either new factory shipped equipment or for use in its aftermarket services business. Because this is a normal ongoing part of our services business and the sources and timing of the recovery of used

refrigerants vary; we feel it would be unfair to discount the actual use of such refrigerant. The actual use of any reclaimed R-410A refrigerant is just as critical to reducing HFC emissions as the recovery itself. It would be an undue administrative burden to provide detailed records of use for each individual recovery or sale. (JCI)

Agency Response: CARB staff made no changes based on the received comment. Regarding reclaim already in the possession of OEMs, the Proposed Amendments do not include a start date to begin the use of reclaimed refrigerant. It imposes an end date by which the reclaim refrigerant use requirement must be met. Therefore, reclaim already in possession of OEMs can be used to meet reclaim use requirements, as long as it meets the definition of "*Certified Reclaim Refrigerant*" as specified in the regulation.

(279) **Comment(s):** We support the following in the 15-day language relative to the Refrigerant Recovery, Reclaim, and Reuse Requirements (R4 Program): (A) maintaining the 10 percent reclaim use requirement using 2018-2019 baseline years. The scope of the 10 percent reclaim obligation should be no greater than actual use of refrigerant by the OEM and appreciates the certainty that a 2018-2019 baseline affords; (B) the permission to use reclaim sourced from outside the state of California. As there is not enough supply of reclaimed R-410A within the state of California now, nor projected to be available in 2023, to supply the demand from new AC equipment, the expanded sourcing is the only option for program viability; (C) while mandatory reclaim use is better directed toward the service and installer community for maximum environmental benefit, the concession to allow OEMs to use reclaim for service, in addition to use in new equipment, does provide greater flexibility than use in new equipment alone; and (D) The use of reclaim is not limited to equipment destined for the state of California. A California-only designation would add significant supply chain, transportation, and inventory costs. (Rheem)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the support of these aspects of the Proposed Amendments.

(280) **Comment(s):** Require OEMs to simply purchase or take ownership of reclaimed refrigerant. Requiring that manufacturers maintain records of reclaim use in new equipment or service is more complicated than necessary. CARB would achieve a straightforward compliance metric by simply tracking OEM acquisition of the reclaimed refrigerant. The recordkeeping requirement of number and type of units with reclaimed refrigerant sold reported by customer, in addition to receipts, purchase order, contracts, and agreements is burdensome and presents confidentiality concerns. As refrigerant is sourced by manufacturers in bulk, added to bulk storage tanks and used in large manufacturing lines, it is challenging to track individual units containing reclaim. Compliance can be easily ensured by tracking OEM acquisition of reclaimed refrigerant, and any further reporting of reclaim destination does little to verify program compliance

or effectiveness. Furthermore, the contracts and customer sales information associated with reclaim use is considered confidential business information that would result in competitive risk if made public. (Rheem)

Agency Response: CARB staff made changes based on the received comment. The record-keeping requirements have been clarified that OEMs must keep the “*estimated*” number and types of equipment distributed and the names and addresses of the distributors or servicing contractors in which the OEMs first sold the reclaimed refrigerant. The R4 Program reporting and record-keeping requirements do not require that the purchased reclaimed refrigerant be tracked and reported through its entire chain of custody. Only the first buyer of the reclaimed refrigerant needs to be recorded, which OEMs do keep. Selling or distributing reclaimed refrigerant to another entity is sufficient to comply with the R4 option: “Certified reclaimed R-410A refrigerant purchased by the (AC or VRF) manufacturer and used in the servicing of existing equipment.” The OEM does not have to directly use the reclaimed refrigerant, it can be sold or distributed to another entity who is presumably going to use the refrigerant in the servicing of existing equipment or in the field-charging of new equipment. OEMs can communicate this intent to use reclaimed refrigerant via purchase orders, contracts, or agreements with the purchasing entities.

To address confidentiality, CARB handles confidential data in the regular course of business across many different programs. Under the California Public Records Act, certain confidential business information and trade secrets are exempt from disclosure to the public. (See Gov. Code §§ 6254 and 6254.7.) Furthermore, CARB has regulations that specify what CARB does in the instance that a company claims confidentiality. (See Cal. Code Regs., tit.17 §§ 91000 et seq.)

- (281) **Comment(s):** The requirement that manufacturers attest that the certified reclaimed refrigerant is not being purchased, used, or counted to comply with any other government requirement(s), private or voluntary program(s), or any other credit(s) or incentive(s) is overreaching and could be counter to long-term program objectives. As local and federal programs evolve to promote responsible refrigerant handling and recovery, manufacturers should not be limited in participating where beneficial to market adoption. (Rheem)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 257.

- (282) **Comment(s):** RAC and PTAC/PTHP are categorized as residential and commercial products respectively. Does this categorization impact the R4 program in any way? (LG)

Agency Response: CARB staff made no changes based on the received comment. The R4 Program does not differentiate between residential and commercial AC equipment. AC equipment with a 750 GWP effective date of

January 1, 2023, is not eligible to use certified reclaimed refrigerant for credit towards the R4 Program obligation, including Room air-conditioners (RAC) and packaged terminal air-conditioners/package terminal heat pumps (PTAC/PTHP). The heading specifically says, "Reclaimed Refrigerant Use Requirements for Manufacturers of AC Equipment Subject to Effective Date of January 1, 2025" (subsection (a)) and 2026 for VRFs (subsection (b)). Hence, no equipment with a 750 GWP effective date of January 1, 2023 are included in the 2018 – 2019 baseline to determine R4 Program requirements for using certified reclaimed refrigerant; therefore, reclaimed refrigerant used in this equipment cannot be used to fulfill the R4 Program requirements. Additionally, AC equipment with a regulation effective date of January 1, 2023 are not eligible for "Early Action Credit" of using refrigerants with a GWP less than 750 prior to the January 1, 2025 regulation effective date for "Other Air-conditioning" and the January 1, 2026 regulation effective date for "VRFs." This is also clear from the headings, dates, as well as the GWP limits.

- (283) **Comment(s):** VRF OEM equipment manufactures will procure the reclaimed R-410A refrigerant from a U.S. EPA certified company and provide the records to CARB. Generally, a third-party vendor will distribute the refrigerant to the field physical locations. Can you confirm there is no need to document where this refrigerant container was shipped? (LG)

Agency Response: CARB staff made changes based on the received comment. CARB revised the language in a Second 15-Day Notice. Record-keeping requirements for the R4 Program require that records be kept of the names and addresses of distributors or servicing companies to which equipment manufacturers first sold or distributed reclaimed refrigerant. No records are required for the final destination of the reclaimed refrigerant.

- (284) **Comment(s):** Does CARB forecast any concerns that there might be a limited availability of R-410A refrigerant that is suitable for reclaiming process? (LG)

Agency Response: CARB staff made no changes based on the received comment. The R4 Program only requires a portion of the original equipment refrigerant charge, and not the entire charge or estimated lifetime emissions from the equipment and allows it to come from any geographic location as long as it meets the definition of "Certified Reclaimed Refrigerant."

- (285) **Comment(s):** Commenter appreciates CARB's adherence to the 10 percent reclaimed refrigerant requirement for AC and opposes the increased requirement for VRF equipment of 15 percent for 2023 and 2024, and 25 percent for 2025. We request that VRF have the same 10 percent reclaim goals as AC equipment, with 15 percent in 2025 only. Increasing the requirement seems unwarranted for VRF OEMs who are working to upgrade UL 60335-2-40 Edition 4 and ASHRAE 15 to solve remaining issues for this product. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. VRFs tend to use more refrigerant than AC systems due to multiple refrigerant lines used in the residence or building. Applying the same average annual leak rates for both AC and VRF equipment, results in greater emissions for a VRF system compared to an AC system due to the larger charge size VRFs have compared to AC systems with similar cooling capacities. The additional year given for VRF OEMs to continue using R-410A refrigerant will have a significant impact on HFC emissions that must be addressed in order for California to achieve its HFC emissions reductions goals.

- (286) **Comment(s):** CARB provided clear growth rates for specific end uses, including 4 percent for AC and 10 percent for VRF. However, due to uncertainty of supply and the challenges of creating a strong new market for reclaimed refrigerants, a lower number should be applied. The more accurate growth factor projections in line with other AC equipment should be applied to VRF. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. The one-time growth rate for VRF/VRV equipment entered into California is 10 percent from 2018-2019 to 2023-2025. Therefore, the annual average growth rate is 2.5 percent from the last year of baseline (2019) to the first year of R4 Program compliance (2023). The annual growth rate is much lower than actual VRF/VRV shipment growth rates. The "Variable Refrigerant Flow (VRF) Market Strategies Report," dated September 2019 by Northeast Energy Efficiency Partnerships, Inc. (NEEP) states, "Recent market reports have identified VRFs as the fastest growing technology in the HVAC market (>15 percent annual growth)." The one-time 10 percent growth rate in the shipment of VRF/VRV equipment is quite reasonable, and very likely much lower than the actual growth rate in shipments. See NEEP report available at: https://neep.org/sites/default/files/resources/NEEP_VRF%20Market%20Strategies%20Report_final5.pdf.

- (287) **Comment(s):** Confusion remains as to which products will be allowed in the Codes and Standards in 2023. CARB needs to clarify which products will be allowed in the Codes and Standards in 2023. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. CARB is requiring self-contained sealed equipment including window/wall/room ACs, portable ACs, PTAC/PTHPs and residential dehumidifiers to use refrigerants with a GWP less than 750 by January 1, 2023. Existing California Building Codes (See Cal. Code Regs., tit. 24, part 4) and existing Safety Standards (UL 60335-2-40 and ASHRAE 15) permit the use of A2L refrigerants in small quantities in equipment that is certified in accordance with safety standards installed in accordance with the manufacturer's instructions. OEMs should refer to the relevant Codes and Standards for specific amounts of A2L refrigerant allowed in these equipment types. If there are specific equipment types that are unable to meet the requirements set forth in the

Codes and Standards, OEMs may apply for an extension to the 2023 date through the variance process, provided the requirements of the process are met.

- (288) **Comment(s):** CARB should allow for Optional Early Action Credit for Refrigerant with a GWP less than 750 used in new equipment entered into commerce in any state prior to January 1, 2025. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 108.

- (289) **Comment(s):** CARB should allow for Optional Early Action Credit for use of reclaimed refrigerant used prior to January 1, 2023. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. This already is allowed. Please see Agency response to comment 259. Reclaimed refrigerant purchased or obtained prior to the regulation effective date must meet other regulation requirements, including the definition of "*Certified Reclaimed Refrigerant*" in order to count towards fulfilling the R4 Program requirements.

- (290) **Comment(s):** Remove the mandate that OEMs attest that no reclaimed refrigerant is purchased, used, or counted to comply with any other government requirements. The AIM Act mandates are now under development and requirements are not yet clear. Other states may create mandates that conflict with the intent of the California regulation. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 257.

- (291) **Comment(s):** CARB should remove recordkeeping requirements to maintain documentation as to which specific equipment (number and types) are distributed containing certified reclaimed R-410A refrigerant. OEMs will pump reclaimed refrigerant into a tank and fill equipment possibly across various production lines. There may be no precise visibility around which equipment and types contain reclaimed refrigerant. There will be no way to create accurate records regarding which specific equipment contains some reclaimed refrigerant or how long reclaimed refrigerant volumes will be mixed in a bulk refrigerant tank. CARB seeks precise, auditable records of the refrigerant purchased or taken ownership of rather than guesses as to which equipment may contain varying amounts of reclaimed refrigerant. Companies simply will not have any visibility as to which equipment contains varying amounts of reclaimed refrigerants. We oppose prescriptive requirements beyond reporting the purchase or taking ownership of reclaimed refrigerant by OEMs. CARB's policies should be solely focused on creating and expanding the market for reclaimed refrigerant. Overly prescriptive regulations that increase cost,

increase burdens, and limit use will significantly reduce the environmental benefit and ultimately the success of the program. (AHRI)

Agency Response: CARB staff made changes based on the received comment. Clarifying text has been added to the Proposed Amendments through a Second 15-Day Notice. The R4 Program reporting and record-keeping requirements have been clarified that reporting and record-keeping only needs to include the “estimated” types and numbers of equipment containing reclaimed refrigerant.

- (292) **Comment(s):** It is imperative that CARB treat all reporting information as confidential business information and not publicly disclose as it may impact competitiveness and contain vital information regarding individual company supply chains and market share. (AHRI, Lennox)

Agency Response: CARB staff made no changes based on the received comment. CARB understands the concern and handles confidential data in the regular course of business across many different programs. CARB must follow the California Public Records Act regarding requests for information. However, under the California Public Records Act, certain confidential business information and trade secrets are exempt from disclosure to the public. (See Gov. Code §§ 6254 and 6254.7.) Also, CARB has regulations that specify what CARB does in the instance that a company claims confidentiality. (See Cal. Code Regs., tit.17 §§ 91000 et seq.) CARB recommends all OEMs properly identify CBI and trade secrets by properly labeling all documents that fall under these categories when they submit these documents to CARB.

- (293) **Comment(s):** The program should not limit the use of reclaimed refrigerant in only new equipment. If the program limits the use of reclaimed refrigerant to only new equipment, then the program will effectively end in 2025 and the program will have done nothing to create and grow the market for the servicing sector. If OEMs are allowed broader use in both application and geography, then a larger market will increase demand and drive the need for greater supply. Greater supply and demand reduce the cost of reclaimed and recycled refrigerant over time and thus creates a much larger environmental benefit.

The overly prescriptive program as currently designed, unnecessarily limits OEM’s viable options for reclaimed refrigerants and increases the demand and use of virgin refrigerant. This is simply short-sighted.

The concern that OEMs will destroy, or stockpile recycled refrigerant is unfounded. OEMs are not chemical wholesalers and have no desire to carry a multi-year inventory of chemicals. It simply isn’t their business model. There is a significant cost to purchasing an inventory of reclaimed and recycled refrigerants. Reclaimed and recycled refrigerants are a commodity that will be quickly deployed in the market, whether it be in new equipment or sold to contractors for servicing. Instead of sitting on an inventory of costly chemicals,

OEMs have every incentive to deploy the reclaimed and recycled refrigerant volume into the market as soon as possible.

If the desired outcome is to maximize environmental benefit, then CARB should strive to ensure the program is flexible, cost-effective and grows. If the desired outcome is to punish manufacturers and limit the program to 10 percent volume over two years, then the program should stand as currently designed.

We support additional time for meeting the reclaim commitment as this effort is meant to “kickstart” a national market for reclaimed and recycled refrigerants. In addition, in the near-term, until a market is well-established, reclaimed refrigerant is likely be the highest cost refrigerant that an OEM will hold in its inventory. The timing of the purchase of reclaimed refrigerant will be predicated on many variables specific to businesses strategies especially in the tumultuous period after the pandemic. The additional time also allows for accounting for the use of reclaimed refrigerant. (AHRI, Lennox)

Agency Response: CARB staff made no changes based on the received comment. The proposed regulation already states that reclaimed refrigerant use towards meeting the requirements of the R4 Program is not limited to new equipment, it can be used in the servicing of existing equipment. The assertion that the program is short sighted and punishes manufactures misstates the facts and history. After significant work with stakeholders, CARB has created a program that is cost effective and considers challenges and abilities. Regarding the national program, CARB is only creating a state program, not a national program, but understands the reference. In reference to stockpiling, this is a real issue that CARB is aware of. Stockpiling occurred during the CFC and HCFC phase downs. There is no reason to believe it will not occur in this instance as well. Therefore, the Proposed Amendments are drafted such that they are enforceable.

(294) **Comment(s):** We support the use of 2018 and 2019 as the basis for the total reclaim requirement and support extending the timing for meeting the reclaimed refrigerant requirement until July of 2025 for AC and July of 2026 for VRF. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. CARB staff appreciates the supportive comment.

(295) **Comment(s):** We have significant legal concerns about the breadth and scope of the February 19th proposal. On February 19, 2021, CARB’s workshop presentation suggested that proposed 15-day language would include provisions that are beyond the intended scope of the 45-day language. For example, at the CARB Board meeting in December 2020, the Board voted to implement a prohibition on the installation of stationary AC (other than small-charge sized products) that use refrigerant greater than 750 GWP starting on

January 1, 2025. In addition, the Board directed staff to generate 15-day language encouraging the use of certified reclaimed refrigerant. To this same policy end, the commenter had previously encouraged CARB to implement a ban on servicing equipment with virgin R-410A refrigerant, but CARB was not amenable to this suggestion because it required the input of stakeholders, including distributors and contractors, that had not been given adequate notice of potential obligations in the 45-day language. However, the February 19 proposal suggested that recordkeeping requirements could extend through the distribution chain—from OEMs to distributors and contractors—making the OEM a de facto regulatory body executing an *ultra vires* reclaim program. CARB expressly acknowledged that it was unauthorized to mandate distributor and contractor compliance in this rulemaking. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. These comments are outside the scope of this rulemaking, irrelevant, or not specifically directed at CARB’s proposed action or directed to the procedures followed by CARB in proposing or adopting the action, therefore, CARB is not required to respond. Some of these comments contain alternate proposals that are not subject to the 15-Day Notice and all of these comments pertain to the February workshop, not the language proposed during the comment periods, which is beyond the scope of the 15-Day Notice.

Clarifying facts are warranted, however, as CARB respectfully disagrees with some of the assertions made by the Commenter.

As to the assertion that CARB was not amenable to implement a ban on servicing equipment with virgin R-410A refrigerant “because it required the input of stakeholders, including distributors and contractors, that had not been given adequate notice of potential obligations in the 45-day language,” CARB has made significant efforts to work with stakeholders, including the commenter, to arrive at a proposal that is acceptable. The Administrative Procedure Act (APA) requires certain procedures, which CARB followed. There will be additional measures CARB must adopt to meet its HFC reduction mandates and will consider the service ban for future rulemakings, but that is not part of the current rulemaking. For a description of all stakeholder engagement, please see Agency Response to comment 47.

As for the assertion that “CARB expressly acknowledged that it was unauthorized to mandate distributor and contractor compliance in this rulemaking”— After reviewing the workshop webinar, CARB did not state nor imply it was “unauthorized” to mandate distributor and contractor compliance in this rulemaking. The workshop weblink is located here: [Registration \(gotowebinar.com\)](https://gotowebinar.com). The Proposed Amendments apply to “any person who sells, leases, rents, installs, uses, or otherwise enters into commerce, in the State of California, any product, equipment, material, or substance in end-uses listed in Table 1, Section 95374(a); Table 2, Section 95374(b); Table 3, Section 95374(c);

or Table 4, Section 95374(d) of this subarticle.” This includes contractors and distributors – they too must comply with the regulation. For example, it could be a violation for a distributor to ship non-compliant equipment into California post effective date. The language applying to distributors and contractors has applied since the inception of the regulation and is not a new requirement. A majority of the affirmative obligations lie with the OEMs (for example, reporting, recordkeeping, etc.).

Furthermore, the recordkeeping requirements do not make OEMs a de facto regulatory body executing an *ultra vires* reclaim program. *Ultra vires* refers to an act that goes beyond the scope or power permitted by the law (*Ultra Vires*, Black’s Law Dictionary, 11th ed. 2019). An agency acts *ultra vires* when it exceeds the scope of the agency’s statutory authority (*Water Replenishment District of Southern California v. City of Cerritos*, (2012) 135 Cal. Rptr. 3d 895, 903). That is, when an agency acts beyond the authority prescribed by Congress, its acts are *ultra vires* (*City of Arlington, Texas v. F.C.C.*, (2013) 133 S.Ct. 1863, 1869). Therefore, an agency acts improperly when its actions go beyond the scope of authority given to it by the Legislature. The Legislature has authorized CARB to adopt rules requiring operators of air pollution emission sources to take actions that the board decides is reasonable for the determination of amount of the source’s emission. (Health & Saf. Code § 41511). The Board is also authorized to take actions that are necessary to carry out its duties (Health & Saf. Code § 39600). This includes adoption of “standards, rules, and regulations.” (Health & Saf. Code § 39601). More specific, CARB was directed by the Legislature to “design emissions reductions measures to meet the statewide emissions limit for greenhouse gases . . .” (Health & Saf. Code § 38501). Here, CARB is not performing an *ultra vires* act by including recordkeeping requirements in the Proposed Amendments, it is acting within the scope of its authorities.

- (296) **Comment(s):** CARB’s recordkeeping requirements exceed its legal authority in two key ways: (1) the proposal purports to make OEMs legally responsible for the actions of an entity outside of its control. The February 19 proposal suggested that recordkeeping requirements could extend through the distribution chain—from OEMs to distributors and contractors—making the OEM a de facto regulatory body executing an *ultra vires* reclaim program. Third-party liability is de facto arbitrary decision-making. OEMs can only control what is in scope of their legal authority—once the product is distributed in commerce in the first instance, the OEM loses legal control and ownership, and CARB cannot require the OEM be aware or accountable of the downstream distribution channel, see e.g. 42 U.S.C. § 6291(16) (The Energy Policy and Conservation Act binds the OEM to regulations that attach to products that they manufacture and sell in the first instance—no requirements attach once a distributor owns the products; downstream enforcement lacks due process because OEMs cannot be accountable for what they do not control). (AHRI, Lennox)

Agency Response: CARB staff made no changes based on the received comments. These comments are outside the scope of this rulemaking, irrelevant, or not specifically directed at CARB’s proposed action or directed to the procedures followed by CARB in proposing or adopting the action, therefore, CARB is not required to respond as they reference the February 19th workshop, not the proposed regulatory language.

Regardless, to clarify, CARB revised the language to make clear that CARB is not requiring OEMs to report what their distributors do downstream. CARB only requests estimates for the number and types of equipment distributed containing certified reclaimed R-410A and only requires names and addresses of the distributors or servicing companies in which an OEM first sold the reclaimed refrigerant. CARB is not making the recordkeeping requirements extend through the distribution chain from OEM to distributor and contractors. Furthermore, this is not an ultra vires act for reasons explained in Agency Response to comment 295.

The reference to the February workshop does not comment on what was contained in the 15-Day Notice. The 15-Day Notice only requires OEMs to report the information that they collect in the regular course of doing business. These are the records for the first entity to which they sold or distributed certified reclaimed refrigerant. The only provision that requires OEMs to know where the products go is if the OEM wants to voluntarily participate in the Early Action Credit. This is not a requirement but a voluntary option. Please see Agency Response to comment 108.

Furthermore, this is not an “ultra vires” requirement. Please see Agency Response to comment 295 for the analysis.

- (297) **Comment(s):** The scope of the recordkeeping requirements implicate contractors and distributors, and any legal requirements extending beyond the OEM are beyond the scope of the initial proposal and require additional 45-day language. If CARB intends to issue 15-day language instead of 45-day language, the commenter supports requirements that attach exclusively to the verification that OEMs purchase or take ownership of 10 percent of certified reclaimed refrigerant. (AHRI, Lennox)

Agency Response: CARB staff made no changes based on the received comments. These comments address what was presented at the February workshop and not the 15-Day Notice and therefore, these comments are outside the scope of this rulemaking, irrelevant, or not specifically directed at CARB’s proposed action or directed to the procedures followed by CARB in proposing or adopting the action, so CARB is not required to respond. Regardless, CARB followed the Administrative Procedures Act in noticing the proposal—providing notice for the R4 Program in the 45-Day Notice and the specifics in the First 15-Day Notice and then again in a Second 15-Day Notice.

Furthermore, the reporting and recordkeeping requirements only apply to OEMs (apply to “any person who manufactures equipment”), so the comment is moot because the Proposed Amendments already do what the commenter asks regarding the recordkeeping and reporting requirements.

- (298) **Comment(s):** The definition of “*New Air-conditioning Equipment*” should not inadvertently add burdensome recordkeeping requirements for homeowners and technicians to estimate the cumulative replacement over a three-year period. It should be noted that OEMs cannot manage this as they have no visibility into this calculation. (AHRI, Lennox)

Agency Response: CARB staff made no changes based on the received comment. The commenter’s cited definition references the definition in the 45-Day Comments, not the 15-Day comments and is therefore outside the scope of the 15-Day Notice. Furthermore, the Proposed Amendments do not place any record-keeping requirements on homeowners.

- (299) **Comment(s):** To avoid confusion, a definition for “*New VRF Equipment*” should be added and used throughout the regulation, which should read:

“*New VRF Equipment*” means any VRF equipment or system that is one of the following:

- (1) First installed using new components, or used components, or a combination of new or used components; or
- (2) A refrigeration circuit in an existing system is modified such that the system has experienced cumulative replacements, within any three-year time period, of 75 percent or more. (AHRI, Lennox)

Agency Response: CARB staff made no changes based on the received comment. The revised definition for “*New Air-conditioning Equipment*” already addresses the comment. An existing system having more than one condenser or more than one evaporator, which includes VRF equipment, is only considered a “new” system if cumulative replacements within three years exceeds 75 percent or more of indoor evaporator units (by number), and 100 percent of air source or water source condensing units.

- (300) **Comment(s):** We support the concept of the variance process and asks that it be simplified. Our members have recently been impacted by supply chain disruptions due to the pandemic and severe weather (ice storms) in the deep south over the winter. A process for relief for matters outside of their control is welcome; however, the process should be simplified given the time needed to complete the currently defined forms and that these situations are normally emergency situations. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. The variance process in the Proposed Amendments is consistent with

other CARB regulations and enforcement policies and is designed to be a public process.

- (301) **Comment(s):** CARB should provide VRF and chiller equipment with an exception to the effective date as allowed for commercial refrigeration equipment related to permitted installations. These projects, like refrigeration systems, have long lead times and construction cycles. A commercial building design can take 1-5 years to plan and designing a system around HFC-410A or an A2L could significantly change the building layout and construction requirements. If this exception not put in place, it could add an unnecessary cost burden on the building owner for design and possible construction changes to the building. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. In Table 3, the effective date for new refrigeration equipment is January 1, 2022. The approved permit exemption was allowed for new refrigeration equipment because some facilities may already have received approved permits to use high-GWP refrigerants before the Proposed Amendments were officially adopted. However, the effective date for chillers of January 1, 2024, the effective date for AC equipment of January 1, 2025, and the effective date for VRF equipment of January 1, 2026, will allow sufficient time for current permit planning to account for lower-GWP equipment. Therefore, this same exemption is not necessary.

- (302) **Comment(s):** Regarding the Refrigerant Recovery, Reclaim, and Reuse Requirements (R4 Program), the requirement shall be met by AC manufacturers by using certified reclaimed R-410A refrigerant purchased and used in new equipment. At what point is the reclaimed refrigerant considered "used" by the OEM? If we purchase and add the refrigerant to a bulk refrigerant storage tank (which is both drawn from and refilled regularly), is the obligation fulfilled? (Rheem)

Agency Response: CARB staff made no changes based on the received comment. As given in Sections 95376(a)(4)(A) and 95376(a)(4)(B), reclaimed refrigerant must either be used in new equipment or for servicing existing equipment. Thus, reclaimed refrigerant is considered "used" when it is either added to new equipment or sold for use in servicing existing equipment or for field charging new equipment.

- (303) **Comment(s):** For the R4 Program, is the report of AC units filled from that bulk tank sufficient for recordkeeping? (Rheem)

Agency Response: CARB staff made no changes based on the received comment. The comment requests clarification and does not recommend any changes. However, a report of number and types of AC units filled from that bulk tank will be sufficient for partially fulfilling recordkeeping requirements. Additionally, OEMs must keep records to substantiate the purchase and use. For

the full list of recordkeeping requirements related to the R4 program, please see Section 95376(d).

- (304) **Comment(s):** Under the R4 Program, if an OEM is not servicing equipment directly, would the sale of reclaimed refrigerant to a downstream partner who sells/distributes AC equipment and refrigerant fulfill the OEM obligation? (Rheem)

Agency Response: CARB staff made no changes based on the received comment. The comment requests clarification and does not recommend any changes. However, the record of sale of reclaimed refrigerant to a downstream partner who sells/distributes AC equipment and refrigerant would count towards the OEM obligation of the R4 Program—OEMs must keep record to substantiate these sales. For the full list of recordkeeping requirements related to the R4 program, please see Section 95376(d).

- (305) **Comment(s):** Under the R4 Program, would that downstream partner need to provide documentation that the refrigerant was used for service? (Rheem)

Agency Response: CARB staff made no changes based on the received comment. The comment requests clarification and does not recommend any changes. However, the downstream partner would not need to provide documentation that the refrigerant was used for service. However, the OEMs must retain records of sale and provide them to CARB upon request. For the full list of recordkeeping requirements related to the R4 program, please see Section 95376(d).

- (306) **Comment(s):** Under the R4 Program, can we assume that AC unit sales to California-based wholesalers/distributors constitutes “entered into commerce in California” for the Early Action Credit? (Rheem)

Agency Response: CARB staff made no changes based on the received comment. Yes, AC unit sales to California-based wholesalers/distributors does constitute “entered into commerce in California.” OEMs must keep records to substantiate these sales as specified in Section 95376(d).

- (307) **Comment(s):** Does the use of reclaimed refrigerant to charge newly constructed piping networks built as part of new installations of new VRF equipment count towards fulfilling the annual reclaim use requirement. (2050 Partners).

Agency Response: CARB staff made no changes based on the received comment. The use of reclaimed refrigerant to charge newly constructed piping networks built as part of new installations of new VRF equipment does count towards fulfilling R4 Program requirements. The Proposed Amendments state that reclaimed refrigerant may be used in “new equipment,” which does not limit the use of reclaimed refrigerant to only factory-charged equipment. The reclaimed refrigerant may be used in the field to service existing equipment, or to charge newly constructed equipment and refrigerant piping.

(308) **Comment(s):** What are the due dates for the reports and once you get those, can we begin tracking the certified reclaimed refrigerant amounts in 2022, 2023, 2024 and 2025? (LG)

Agency Response: CARB staff made no changes based on the received comment. The due dates for the R4 Program reports for AC OEMs is July 1, 2023 (initial baseline report), July 1, 2024 (first annual report), and July 1, 2025 (final annual report); (2) the due dates for the R4 Program reports for VRF OEMs are July 1, 2023 (initial baseline report), July 1, 2024 (first annual report), July 1, 2025 (second annual report), and July 1, 2026 (final annual report). OEMs can begin tracking once the Proposed Amendments become law.

(309) **Comment(s):** Regarding the R4 program for VRF systems, can you send me the formulas for calculating the VRF 2018, 2019 baseline years? (LG)

Agency Response: CARB staff made no changes based on the received comment. Under Section 95376(b), VRF manufacturers shall determine the number of pounds of certified reclaimed R-410A refrigerant use required as follows:

(1) Use the following equation to determine baseline average pounds per year:

- Baseline Average Pounds of Refrigerant in 2018 and 2019 = $[(\text{pounds in VRF equipment entered into California in 2018} + \text{pounds in VRF equipment entered into California in 2019}) \div 2]$.

(2) Applying the calculated baseline average pounds per year, determine the number of pounds of certified reclaimed R-410A refrigerant use required annually, using the following equations:

- Annual Reclaim Use Requirement for 2023 = $[(15\% \times \text{average pounds per year calculated in (b)(1)}) \times 1.10 \text{ (a one-time growth factor of 10\%)}]$.
- Annual Reclaim Use Requirement for 2024 = $[(15\% \times \text{average pounds per year calculated in (b)(1)}) \times 1.10 \text{ (a one-time growth factor of 10\%)}]$.
- Annual Reclaim Use Requirement for 2025 = $[(25\% \times \text{average pounds per year calculated in (b)(1)}) \times 1.10 \text{ (a one-time growth factor of 10\%)}]$.

(310) **Comment(s):** Regarding the R4 program for VRF systems, what kinds of records do you want for the pounds of certified reclaimed refrigerants and are you thinking PDF files or ledger of pounds and dates? Would excel format suffice? (LG)

Agency Response: CARB staff made no changes based on the received comment. The Proposed Amendments do not specify a format to determine the pounds of certified reclaimed refrigerants (PDF, ledger, excel) so CARB will rely

on OEMs to submit adequate documentation. OEMs must submit adequate documentation that fulfills the requirements listed in Sections 95376(c) and (d). CARB staff will work with stakeholders to help develop reporting templates as part of compliance assistance efforts and to provide consistency, but these templates will not be mandated.

- (311) **Comment(s):** Regarding the R4 program for VRF systems, does the geographic location need to be documented? (LG)

Agency Response: CARB staff made no changes based on the received comment. The comment is vague, but to clarify, reclaimed R-410A must meet the definition of "Certified Reclaimed Refrigerant" as set forth in Section 95373. There are no additional requirements for documenting the geographic location.

- (312) **Comment(s):** Regarding the R4 program for VRF systems, is there a possibility for reclaiming certified refrigerant when it contains more than 15 percent virgin, and would there be an effective weight reduction to the total? (LG)

Agency Response: CARB staff made no changes based on the received comment. In the definition for "Certified Reclaimed Refrigerant," Section (3) states the requirements of maximum percent of new (virgin) refrigerant: "*Contains no greater than fifteen percent (15%) new (virgin) refrigerant by weight to meet specifications in 40 C.F.R., Part 82, Subpart F, Appendix A (Specifications for Refrigerants) (January 1, 2017). The certified reclaimer must have documentation that supports it has not exceeded the maximum allowable virgin refrigerant content.*"

- (313) **Comment(s):** Regarding the R4 program for VRF systems, were there any concerns that there might be limited availability of R-410A refrigerant that can be reclaimed? (LG)

Agency Response: CARB staff made no changes based on the received comment. By requiring only a portion of original equipment refrigerant charge and allowing reclaimed refrigerant from outside California, CARB does not anticipate shortages of available reclaimed R-410A refrigerant. In fact, reclaim refrigerant supply is expected to increase as U.S. EPA implements a national HFC phasedown, mandated by national legislation under AIM Act. A phasedown in production of HFCs will enhance the recovery, recycle and reuse of HFC refrigerants including R-410A in existing systems.

- (314) **Comment(s):** Will room air conditioners (RAC) that are self-contained type units or Packaged Terminal Heat Pump (PTHP) that are self-contained type using less than 750 GWP refrigerants count for this Early Action Credit? (LG)

Agency Response: CARB staff made no changes based on the received comment. The early action credit only applies to AC equipment with a

regulation effective date of January 1, 2025, and for VRFs, a regulation effective date of January 1, 2026. All other AC equipment with a regulation effective date of January 1, 2023 are not eligible for the "early action credit," even if less than 750 GWP refrigerants are used in equipment before January 1, 2023. Many of the small AC equipment are already allowed to use A2L refrigerants with a GWP less than 750.

- (315) **Comment(s):** Since RAC and PTHP are categorized as residential and commercial products, does that categorization impact the R4 program in any way? (LG)

Agency Response: CARB staff made no changes based on the received comment. The categorization of AC equipment as residential or commercial does not impact the R4 program. Certified reclaimed refrigerant for the R4 Program may be used in new equipment and to service existing equipment, regardless of the size of the AC, heat pump, or VRF. Reclaimed refrigerant can be used in residential and commercial equipment and will still count towards the new use or servicing requirement. As stated in Agency Response to comment 314, AC equipment with a regulation effective date of January 1, 2023 are not eligible for "early action credit" for using refrigerants with a GWP less than 750 prior to January 1, 2023.

- (316) **Comment(s):** The AC equipment manufacture will procure the reclaimed R-410A refrigerant from a U.S. EPA certified company, and provide the records to CARB, a third-party vendor will actually distribute the refrigerant to the field. Can you confirm there is no need to know where the distribution takes place in the field? (LG)

Agency Response: CARB staff made no changes based on the received comment. The OEM must keep records and be able to report where they received the certified reclaimed refrigerant, and where it was first sold for use to (or if it was used in the factory). The third-party vendor does not need to report where the distribution of the refrigerant took place in the field. However, OEMs claiming early action credit will need to be able to prove that the equipment actually came into California.

- (317) **Comment(s):** Regarding the availability of certified reclaimed R-410A refrigerant, what offsets can be realized if in certain months of the year there is a shortage of available product. Will there be a document to note that shortage? (LG)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Responses to comments 67 and 313.

- (318) **Comment(s):** I would like to request clarification on the following paragraph from page 5 of the Notice and subsequent paragraphs:

“California building codes and standards will not be revised to allow A2L refrigerants in most types of AC equipment in California until after the original effective date of January 1, 2023, and at the earliest by July 1, 2024, based on the existing building code adoption process and timeline.”

We are manufacturer reps for an HVAC manufacturing company looking to move forward with the transition to A2L refrigerant. The HVAC manufacturing changeover would occur on some of their products before 2023/2024 dates as shown in the above paragraph on page 5. These initial HVAC units would be less than 65,000 BTUh (nominal 5 tons or less) less than 13 lbs. of A2L refrigerant per unit. Will the sale of A2L refrigerant HVAC units be allowed in California prior to the stated dates and are there rules/ restrictions/ limitations associated with the approval to sell? To me page 5 is not clear to approval or requirements/limitations, etc. What is the maximum the amount of A2L refrigerant that the HVAC unit would be allowed to hold or not to exceed a specific quantity of A2L refrigerant per HVAC unit for immediate production and sale in California? (Geary Pacific Corp.)

Agency Response: CARB staff made no changes based on the received comment. Existing Codes and Standards permit the use of A2L refrigerants in small quantities in listed equipment installed in accordance with the manufacturer’s instructions. Existing building codes do not allow A2Ls in some other equipment types but there are discussions and proposals being considered at the regional and national level to revise the codes to allow for A2Ls in most, if not all, AC equipment types. The changes are expected to take place in 2024. Because of this, CARB changed the effective dates to 2025 (AC) and 2026 (VRFs) to provide some room for modifications to the Codes and Standards. Furthermore, the Proposed Amendments do not require use of A2Ls, it only prohibits use of refrigerants with certain GWP limits. OEMs are allowed to choose the types of refrigerants they want to use in the equipment. Please refer to the relevant Codes and Standards for specific amounts of A2L refrigerant allowed for specific equipment types.

(319) Comment(s): We support the proposed 10 percent reclaim refrigerant requirements as reasonable and effective and will foster improved refrigerant management practices and likely provide environmental benefits beyond the 10 percent compliance requirement. We also support the decision to allow for the sourcing and use of the reclaim outside of the State of California so that additional costs and GHG penalties are not incurred.

We also find 2018 and 2019 to be representative volume, pre-pandemic sales years for AC units; using these dates ensures undisputable volume targets that prevents inaccurate forecast or manipulation via manufacturers “dry charging” systems prior to 2023 and 2024. First Tuesday forecasts that it will be at least 2023 before the housing market reaches pre-pandemic levels. Using 2018 and

2019 as the basis for the program avoids manipulation, while using the recent and predictable data of a healthy market. In addition, we support extending the timing for meeting the reclaimed refrigerant requirement until July of 2025 for AC and July of 2026 for VRF. We support additional time for meeting the reclaim commitment as this effort is meant to “kickstart” a national market for reclaimed refrigerants. In addition, in the near-term, until a market is well-established, reclaimed refrigerant is likely be the highest cost refrigerant that an OEM will hold in its inventory. The timing of the purchase of reclaimed refrigerant will be predicated on many variables specific to businesses strategies especially in the tumultuous period after the pandemic. The additional time also allows for accounting for the use of reclaimed refrigerant. (Lennox)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the support of these aspects of the Proposed Amendments.

- (320) **Comment(s):** CARB should allow for Optional Early Action Credit for Refrigerant with a GWP less than 750 used in new equipment entered into commerce in any state prior to January 1, 2025. CARB has a unique opportunity to lead and influence other states by encouraging nationwide early action. Early action in advance of the AIM Act in other states simply will not take place if California limits any incentive for early action elsewhere. The federal transition under the AIM Act is likely to occur on January 1, 2025 as recommended in the HVACR industry petition. Currently low GWP AC units are not in demand anywhere in the country today. While California Codes and Standards are not likely to be in place until mid-2024, other states allow the use of HFC refrigerants today. California has an opportunity to incentivize manufacturers into early action in other states by transitioning to low GWP refrigerants in states where building codes allow it, such as Florida, Washington, and Texas. These states represent significant volume and an opportunity to move the market toward lower GWP alternatives well in advance of 2025. There is significant additional environmental benefit if California does not limit or discourage early action in other states. (Lennox)

Agency Response: CARB staff made no changes based on the received comment. The intent of the early action credit is to incentivize the early adoption of lower-GWP refrigerants in AC and VRF equipment in California prior to the regulation effective date, Codes and Standards permitting. Lower-GWP equipment sent to locations outside California will not count towards emissions reductions in California.

- (321) **Comment(s):** Strike the requirement that OEMs attest that reclaimed refrigerant is not being purchased, used, or counted to comply with any other government requirements as AIM Act mandates are now under development and requirements are not yet clear. Other states could also create mandates that may conflict with the intent of the California regulation. At this time, there is no clarity as to potential future regulations that may take shape around the country

or by the federal government. Alternately, industry could develop voluntary agreements with other agencies. This prescriptive California-centric requirement discourages industry from supporting additional regulation which reduces the environmental benefit - the stated purpose of this program.

A successful reclaim program will jump-start the supply, demand, availability, and market viability of reclaimed refrigerants. CARB should not be overly prescriptive but rather encourage innovative solutions to grow the market for reclaimed refrigerants. (Lennox)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 257.

(322) **Comment(s):** Due to more stringent data privacy laws; information OEMs are legally able to provide may be limited or redacted. (Lennox)

Agency Response: CARB staff made no changes based on the received comment. OEMs must provide the information required in the Proposed Amendments. However, CARB has long history handling confidential information and works with regulated entities to identify and protect confidential information. Please see Agency response to comment 280.

(323) **Comment(s):** CARB should remove recordkeeping requirements to maintain documentation as to which specific equipment (number and types) are distributed containing certified reclaimed R-410A refrigerant. Depending on how an OEM chooses to fulfill against the requirements of the program, this could be impossible to accomplish. If an OEM chooses to fulfill their requirement by using only reclaimed refrigerant, then this requirement can be achieved. If the OEM mixes reclaimed refrigerant with new refrigerant in a bulk tank to charge new equipment the OEM will have no visibility to the amount or the specific equipment where the reclaimed refrigerant was actually used. OEMs will pump reclaimed refrigerant into a factory bulk tank. The reclaimed refrigerant may or may not be mixed with new refrigerant. If finished goods are charged with refrigerant (new, reclaimed or a mixture) the manufacturer will have no quantifiable measure of which equipment and types of equipment contain which percentage of reclaimed refrigerant. There is no way to account for which specific equipment contains some reclaimed refrigerant. (Lennox)

Agency Response: CARB staff made changes based on the received comment. See Agency Response to comment 274.

(324) **Comment(s):** The January 1, 2023 compliance date for commercial and industrial portable AC units does not account for the time that is needed for redesigning these products to use lower-GWP refrigerants and certifying them to the requisite UL standards. (Denso)

Agency Response: CARB staff made no changes based on the received comment. Applicable Codes and Standards already allow lower-GWP refrigerants, including refrigerants with an A2L classification, for portable AC units. Additionally, the U.S. EPA SNAP Program permits the use of lower-GWP A2L refrigerants in portable ACs.

- (325) **Comment(s):** Delaying the compliance date for commercial and industrial portable AC units to January 1, 2025 instead of January 1, 2023 will not affect California’s HFC reduction mandates. (Denso)

Agency Response: CARB staff made no changes based on the received comment. The AC sector is one of the largest sources of HFC emissions in California and CARB has determined that regulating the GWP of refrigerant used in all types of AC equipment is necessary for CARB to meet its legislatively mandated HFC reduction targets.

- (326) **Comment(s):** The regulation’s effective date of January 1, 2023 for all AC equipment to use refrigerants with a GWP less than 750 will place an enormous stress as well as cost on the manufacturers who supply our AC equipment which will in turn fall upon us as well as our customers. The price of materials to manufacture and purchase this equipment has already increased vastly just within the last year while many of us are still recovering from the effects of COVID upon our state. (Mota)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Responses to comments 35 and 248. Applicants may use the variance process to apply for an extension of the effective date provided all conditions of the application process are met. CARB will evaluate all applications for variance on a case-by-case basis. Please see Agency Response to comment 232 for a discussion of the variance process.

- (327) **Comment(s):** Generally, the timeline for a redesign is easily 5+ years. Rushing the process could result in potential recalls and equipment that fails to meet previous standards which in turn will place more burden and cost on the consumers who are the residents of California, to whom we are aiming to help. (Mota)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Responses to comments 35 and 248. The Proposed Amendments does not rush the process of redesign, given that most AC equipment was granted a two-year delay in the HFC prohibition dates. Smaller equipment with a January 1, 2023, prohibition date already meets Codes and Standards allowing them to use A2L refrigerants with a GWP less than 750. CARB has been in active engagement with HVAC equipment stakeholders since 2017 to discuss and develop the Proposed Amendments. In CARB’s “Short-Lived Climate Pollutant Strategy,” CARB clearly signaled its intent to prohibit new AC systems using refrigerants with a GWP of 750 or greater (page 94, section “High-GWP

Refrigerant Prohibitions in New Stationary Systems;" report available at: <https://ww2.arb.ca.gov/resources/documents/slcp-strategy-final>).

Similarly, in CARB's November 2017 "California's 2017 Climate Change Scoping Plan," CARB re-signaled its intent to prohibit new AC systems with refrigerant GWP of 750 or greater (page 72, report available at: <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2017-scoping-plan-documents>).

- (328) **Comment(s):** Any policies necessary to enable local sourcing should be implemented such that the allowance for reclaimed refrigerant from U.S. certified reclaimers assets outside the country will be allowed for use. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. The sourcing of reclaimed refrigerant is not limited to California, as long as it meets the definition of "*Certified Reclaimed Refrigerant*" set forth in the regulatory text.

- (329) **Comment(s):** 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, an opportunity for circumvention of the requirements is created and disadvantages entities which are compliant. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. The Proposed Amendments require use of "*Certified Reclaimed Refrigerant*" to fulfill the R4 Program requirements. This definition includes a provision that the refrigerant must be from a U.S. EPA-certified reclaimer, who must follow stringent guidelines on the procurement, reclaiming, and distribution of the refrigerant they recover and reclaim. This concern is noted, and CARB will monitor to ensure there are no deceptive practices.

- (330) **Comment(s):** We are concerned about the Proposed Amendments with regards to whole-home dehumidifiers. CARB should treat whole-home dehumidifiers similarly to small central AC units and delay the implementation date to January 1, 2025, which is the effective date for central AC units. (RPC)

Agency Response: CARB staff made changes based on the received comment. Please see Agency Response to comment 263.

(331) Comment(s): CARB should change the effective date of whole-home dehumidifiers from 2023 to 2025. SNAP Rule 23, which covers small central AC units and whole-home dehumidifiers was only just published. By setting a different date for whole-home dehumidifiers compared to central AC units, CARB would be burdening whole-home dehumidifier manufacturers. While the Codes and Standards permits AC equipment and dehumidifiers with small amounts of alternative refrigerants, the U.S. EPA SNAP Program only permits flammable refrigerants for room ACs and not dehumidifiers (SNAP Rule 19)⁴⁰ published in 2015). This indicates that the federal government only intended to allow units covered under UL 484,⁴¹ which does not include dehumidifiers. UL 474⁴² is the relevant standard for whole-home dehumidifiers. SNAP Rule 23 was only recently published by the federal government. SNAP Rule 23 permits flammable refrigerants for equipment covered under UL 60335-2-40, which includes all other HVAC equipment and dehumidifiers not covered by UL 484. (RPC)

Agency Response: CARB staff made changes based on the received comment. Please see Agency Response to comment 263. U.S. EPA approves refrigerants for use in end-use sectors based on applications submitted by applicants. Refer to U.S. EPA's website for the submission process for listing an acceptable refrigerant - www.epa.gov/snap/submit-snap-substitute.com. U.S. EPA has a 90-day review process for evaluating completed application for refrigerants. Per SNAP Rule 19, U.S. EPA permits flammable refrigerants in room ACs not based on what was covered under the scope of UL 484, but rather based on the application submitted for the end-use, in this case room ACs.

(332) Comment(s): Product design timelines must be considered so the January 1, 2023 effective date may over-compress schedules and be difficult if not impossible for manufacturers not currently producing units that use A2L refrigerants. Though flammable refrigerants have recently been allowed in central AC systems, there is no guarantee that products will be available and ready for their use. Home appliance development time varies by organization, but the product development lifecycle will typically range from 1.5 to 5 years depending on the type of product, scale of the firm, and scope of the necessary facility modifications and approvals (such as upgrading fire systems and any

⁴⁰ SNAP Rule 19 was adopted as a final rule in 80 Fed. Reg. 19454 (Apr. 10, 2015), which is incorporated by reference.

⁴¹ UL 484 is the UL safety standard for room ACs, which is incorporated by reference. UL 484 is going to become an obsolete standard by January 1, 2024 and will be superseded by UL 60335-2-40, which is the new standard for all types of air-conditioning equipment, heat pumps and dehumidifiers. Between now and when UL 484 sunsets, equipment manufacturers can certify their equipment to the requirements of either UL 484 or the newer UL 60335-2-40. UL 60335-2-40 was developed in an effort to harmonize international standards with national standards.

⁴² UL 474 is an obsolete UL safety standard for dehumidifiers. UL 60335-2-40 is currently the relevant safety standards for dehumidifiers.

necessary local approvals required to do so). COVID-19 has had an impact on component availability and all new products will have to be safety certified and have performance independently tested/verified; each of these endeavors can easily take 3-4 months under normal circumstances. (RPC)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 43.

- (333) **Comment(s):** CARB should change the effective date of whole-home dehumidifiers from 2023 to 2025. There are currently no compliant products available on the market for whole-home dehumidifiers. A 2023 effective date will leave consumers with no choice for products. They may rely on foreign suppliers or stockpile older models, which would counter CARB's goals. (RPC)

Agency Response: CARB staff made no changes based on the received comment. This is a technology forcing and accelerating regulation so even if compliant products do not currently exist, CARB anticipates that they will exist prior to the effective date of the Proposed Amendments, which is January 1, 2025 for whole-home dehumidifiers. Please see Agency Response to comment 263.

- (334) **Comment(s):** CARB should change the effective date of whole-home dehumidifiers from 2023 to 2025. There are currently no Energy Star compliant, i.e., higher energy efficiency, whole-home dehumidifiers that use lower-GWP refrigerants. Requiring a 2023 date risks eliminating energy efficient models from the marketplace and switching to lower efficiency products, which will result in higher GHG emissions. (RPC)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 263.

- (335) **Comment(s):** Meeting the 2023 date for whole-home dehumidifiers may not be possible because that timeline does not consider product redesign timelines. Additionally, the 2023 effective date may not be feasible because of the impact of COVID-19 on component availability, lead times and staff availability. Another complicating factor is the time required for performance tests of products and certification of products to applicable safety standards. (RPC)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 263.

B-2. Refrigeration

- (336) **Comment(s):** A food processor or food distributor has a large facility with multiple coolers and freezers all being cooled using standard commercially available HFC condensing units (ranging from 5 HP to 40 HP) feeding evaporators in the coolers and freezers. If the user adds individual coolers and

freezers in the same facility will the new refrigeration systems using HFC like R-448a need to be under 50 lbs. charge each? Or if the user adds expands the individual coolers and freezers in the same facility will the new refrigeration systems using HFC like R-448a need to be under 50 lbs. charge each? (RESCO)

Agency Response: CARB staff made no changes based on the received comment. The comment requests clarification but recommends no changes. CARB's rules do not *require* system charge to be less than 50 pounds. Some rules affect only systems greater than 50 pounds and some end-users may reduce the system charge to below 50 pounds as a way to avoid being subject to the Proposed Amendments. Broadly speaking, the Proposed Amendments sets different rules for refrigeration systems being installed in new facilities and existing facilities. The rule for all new facilities is the same regardless of end-use: Starting January 1, 2022, in all "new facilities," any systems containing more than 50 pounds of refrigerant must have a GWP less than 150.

A "new facility" is defined as: (A) New construction; (B) an existing facility not previously used for cold storage, retail food refrigeration, commercial refrigeration, industrial process refrigeration; or (C) an existing facility used for cold storage, retail food refrigeration, commercial refrigeration, or industrial process refrigeration; with a replacement of 75 percent or more of evaporators (by number) and, 100 percent of compressors racks, and 100 percent of condensers.

The rules for existing facilities vary by end-use and the rules may or may not apply to systems below 50 pounds depending on end-use. For an existing industrial processing facility (this includes food processing), starting January 1, 2022, a new system containing more than 50 pounds of refrigerant is prohibited from using refrigerants with GWP greater than 2,200. R-448A has a GWP of 1,387 so it is acceptable for use even in systems larger than 50 pounds in existing industrial process refrigeration facilities. Note that this applies to direct expansion systems such as condensing units. The GWP limit for chillers used in industrial process refrigeration are different and are given in Table 3 of the proposed Regulation Order. Chillers do not have a 50-pound limit, so all chillers will be subject to the listed prohibitions after the effective date.

- (337) **Comment(s):** Delay the regulations for at least one year. The refrigeration industry- suppliers, refrigeration contractors, technicians and parts wholesalers do not appear to be ready to meet the requirements for refrigerated storage systems in California unless R-448a or R-449A equipment is allowed. You may not be aware that 2021 is turning out to be a banner year for the refrigeration equipment industry due to the slow down during 2020 due to COVID. This is resulting in ship dates that used to be 6-8 weeks extending 16 – 18 weeks – and in some cases 12 – 14 weeks now getting close to 30 weeks. This demand is resulting in significant parts shortages for the OEMs and is now showing up at refrigeration wholesalers as well as significant price increases – up to 12 percent to 15 percent for equipment. This is putting extra load on the engineering

departments to find alternate parts, which takes them away from working on alternate refrigeration systems to HFC. At the same time, this increase in demand is creating extra load on local building authorities causing permit delays of up to 4 months. Based on the above coupled with the new regulations for 2022 it may leave many projects in limbo because they did not get permitted by the end of 2021 or the equipment does not get manufactured in 2021. (RESCO)

Agency Response: CARB staff made no changes based on the received comment. New refrigerated facilities that have building permits before the effective date of January 1, 2022 are exempt from the 150 GWP limit. This exemption was included specifically to provide relief to facilities whose project planning and execution was well underway while the regulation was being finalized. Further, as part of the Proposed Amendments, CARB has established a new variance process. Regulated entities facing unforeseen delays caused by force majeure events may use the variance process to apply for an extension, provided they meet all the requirements of the variance process.

- (338) **Comment(s):** The terms ‘Appliance’ and ‘device’ and ‘machine’ and ‘equipment package’ are used in definitions (e.g., ‘appliance’ in Industrial Process Refrigeration, but ‘device’ in Refrigeration Equipment, and ‘machine’ and ‘equipment package’ in Chiller) but it is not clear how these concepts are meant to be different. Please either clarify the intended difference among ‘appliance’ and ‘device’ and ‘machine,’ or use one of these terms consistently throughout the document. (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. Where possible, CARB definitions were aligned with definitions from U.S. EPA, U.S. DOE, and national standard-setting bodies. This, as the commenter indicates, has resulted in some variations in the terminology when referring to different refrigeration equipment types. CARB clarifies that, when it comes to refrigeration systems, the terms “appliance,” “device,” “equipment,” and “machine” are used interchangeably.

- (339) **Comment(s):** In the modified text, the definition of *New Facility* is revised to include ice rinks. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. CARB clarifies that one part of a three-part definition was edited to indicate that it also includes ice rinks, because it was initially left out of the 45-day notice. As part of the 45-day notice, CARB proposed a 150 GWP limit for new ice rinks, and a 750 GWP limit for existing ice rinks replacing their old systems. Under the Proposed Amendments, CARB has employed this dual approach for all refrigeration systems across different end-use sectors, such as supermarkets and grocery stores (retail food), industrial process refrigeration and cold storage. Please see Agency Response to comment 160.

The definition of "New Facility" determines which facilities will have to comply with the 150 GWP limit, and is as follows:

"New Facility" means, for any refrigeration end-uses listed in Table 3, Section 95374(c); and refrigeration end-uses listed in Table 4, Section 95374(d), any of the following: (1) New construction; (2) an existing facility not previously used for cold storage, retail food refrigeration, commercial refrigeration, industrial process refrigeration, or ice rinks; or (3) an existing facility used for cold storage, retail food refrigeration, commercial refrigeration, or industrial process refrigeration; with a replacement of 75 percent or more of evaporators (by number) and, 100 percent of compressors racks, and 100 percent of condensers.

As evident from part (1) above, all newly constructed facilities including ice rinks are considered to be new facilities. Part (2) of the definition above was also intended to include all types of new refrigeration facilities, including ice rinks. This part indicates that if an existing building not previously used as a refrigerated facility is converted to one, it will be considered to be a new facility for the purposes of the regulation and become subject to the 150 GWP limit. This is because an existing non-refrigerated building that gets fully re-purposed to become an ice rink is not very different from a newly constructed building. The end-user has the same flexibility to choose the location and type of refrigeration system because there is no old system to replace or integrate with the new. Thus, these types of new facilities are able to adopt very low-GWP refrigerants relatively easily. But because part (2) of the definition did not list ice rinks out explicitly, some commenters expressed confusion during the 45-Day period. To make clear, CARB added the term "ice rinks" to part (2) of the definition above as part of the 15-day changes.

(340) Comment(s): We would like to confirm our understanding that seasonal or temporary outdoor ice rinks would not be considered a "new facility" under this definition. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. CARB's Proposed Amendments only apply to stationary refrigeration systems. As given in Section 95373 of the proposed regulatory order, "Stationary" means the system meets at least one of the following conditions: (1) Installed in a building, structure or facility; (2) attached to a foundation, or if not attached, will reside at the same building, structure or facility for more than twelve consecutive months; or (3) located permanently at the same facility for at least two consecutive years and operates at that facility a total of at least 90 days each year. Seasonal or temporary outdoor rinks that do not meet any of the three above conditions will not be subject to the regulation.

(341) Comment(s): 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 GWP less than 150. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. The requirement for new ice rinks to use refrigerants with a GWP less than 150 was included in the 45-Day notice. As part of the 15-Day notice, the only change made was a clarifying edit to one part of definition of "New Facility." For more details, please see Agency Response to comment 340. To the extent that this comment and subsequent comments by this commenter opposes the 150 GWP limit for new ice rinks, they are outside the scope of the 15-Day Notice. Similar comments were addressed as received during the 45-day comment period. Please see Agency Responses to comments in 160 and 161.

- (342) **Comment(s):** 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)

Agency Response: CARB made no changes based on the received comment. While this comment is outside the scope of the 15-Day Notice, similar comments were addressed as received during the 45-day comment period. Please see Agency Responses to comments 173 and 174.

- (343) **Comment(s):** We oppose the requirement that new ice rinks, according to the revised definition of "new facility," would be required to utilize a refrigerant with a GWP less than 150 due to patents on use of CO₂ (granted patent US10690389 and pending applications US2012055182, 2020200459, US2012247148, US2012073319, US2016245575). A 150 GWP limit will create an anti-competitive environment within industry, limiting options for rink owns and operators, proposed impact of limiting options. (Chemours)

Agency Response: CARB made no changes based on the received comment. While this comment is outside the scope of the 15-Day Notice, similar comments were addressed as received during the 45-day comment period. Please see Agency Responses to comments 182 and 183.

- (344) **Comment(s):** The proposed limit of GWP less than 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 facilities to comply with the 150 GWP regulation was decided upon without opportunities for full stakeholder engagement and discussion. (Chemours)

Agency Response: CARB made no changes based on the received comment. While this comment is outside the scope of the 15-Day Notice, similar comments were addressed as received during the 45-day comment period. Please see Agency Response to comment 173.

- (345) **Comment(s):** The recently proposed change to the regulation, reducing the GWP to less than 150 for new facility, did not have sufficient review and comment from industry partners or the ice rink owner community. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. However, similar comments were addressed during the 45-day comment period. Please see Agency Responses to comments 173 and 174.

- (346) **Comment(s):** 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. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. However, similar comments were addressed during the 45-day comment period. Please see Agency Responses to comments 174 and 179.

- (347) **Comment(s):** The proposed (less than) 150 GWP limit in New Facility significantly and unnecessarily restricts refrigeration system equipment options for this application. (Chemours)

Agency Response: CARB made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. However, similar comments were addressed during the 45-day comment period. Please see Agency Response to comment 181.

- (348) **Comment(s):** The 150 GWP for ice rinks eliminates the possibility of synergies such as standardized common air conditioning and ice rink refrigeration platforms that could provide environmental, logistical, electronic controls, serviceability, training, refrigerant management, financial advantages, and efficiencies. (Chemours)

Agency Response: CARB made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Response to comment 187.

- (349) **Comment(s):** Other technologies available for ice rinks with less than 150 GWP introduces complexities and costs that could create safety and/or financial viability issues. Of note, is the U.S. 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 the threshold for ammonia reporting (500 lbs.) compared to non-ammonia refrigerants (10,000 lbs.). (Chemours)

Agency Response: CARB staff made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Response to comment 177.

- (350) **Comment(s):** Reducing the GWP limit for ice rinks from 750 to 150 for ice rinks notably excludes refrigeration 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. (Chemours)

Agency Response: CARB made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Response to comments 160 and 161.

- (351) **Comment(s):** 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." (Chemours)

Agency Response: CARB made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Response to comment 191.

- (352) **Comment(s):** A GWP limit of 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. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice and therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Response to comment 184.

- (353) **Comment(s):** A GWP limit of 750 proposal aligns with the current proposal for AC equipment and allows for system design efficiencies across equipment used for the ice plants and building HVAC. (Chemours)

Agency Response: CARB made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Response to comment 186.

(354) **Comment(s):** 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. (Chemours)

Agency Response: CARB made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Response to comment 189.

(355) **Comment(s):** CARB should return the GWP limit for New Facility ice rinks to 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. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Responses to comments 160, 161 and 173.

(356) **Comment(s):** CARB should reconsider its rule to require a 150 GWP limit for ice rinks in 2024. (Trane)

Agency Response: CARB made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Responses to comments 160, 161 and 173.

(357) **Comment(s):** A 150 GWP limit for chillers in new ice rinks introduces safety risks and could increase emissions through efficiency loss. The only proven technology that complies with a 150 GWP limit for chillers in new ice rinks involves the use of ammonia, which is not widely used or allowed in ice rinks and HVAC today due to safety concerns. While it might be feasible to implement a CO₂ system, the reduced efficiency due to high ambient temperatures more than offsets any CO₂e emission reduction gains from the lower GWP. (Trane)

Agency Response: CARB staff made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the

45-day comment period. Please see Agency Response to comment 181. Advanced technological solutions are commercially available to help address any potential energy efficiency issues associated with CO₂ systems in high ambient temperatures.

- (358) **Comment(s):** 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. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. This comment is outside the scope of the 15-Day Notice; therefore, CARB is not required to respond. Similar comments were addressed during the 45-day comment period. Please see Agency Response to comment 189.

B-3. Chillers

- (359) **Comment(s):** The chilled leaving fluid temperatures in Table 3 of Section 95374(c) should be modified to reduce the potential for chillers with higher GWP refrigerant be used in AC applications. The proposed definitions of specific end-uses are confusing and creates the opportunity for chillers with higher GWP refrigerants to be placed into commerce. In Table 3 the specific end-use definitions for the air-conditioning (AC) and industrial process refrigeration (IPR) chillers should be modified to eliminate this confusion. Using the temperatures proposed in Table 3 to delineate the specific end-uses creates an opportunity for IPR chillers with R-134a to be used in typical AC chiller applications. To solve this risk, modify the temperatures for each specific end-use. (Carrier)

Agency Response: CARB staff made changes based on the received comment. For AC chillers, CARB's intent was always to place a GWP limit of 750. The temperature ranges were intended for classifying IPR chillers and were introduced based on stakeholder comments that low temperature chillers used for IPR cannot comply with the 750 GWP limit due to feasibility challenges. Since AC chillers and the highest temperature IPR chillers will be subject to the same 750 GWP limit starting January 1, 2024, they were combined and placed in the same row in Table 3. Even though CARB did not accept the commenter's recommendation of changing the temperature ranges, based on the concern raised by the commenter, CARB staff modified Table 3 in Section 95374(c) to provide more clarity on GWP limits and conditions that apply to chillers used for AC and IPR. The table now clearly states that all chillers used for AC have a GWP limit of 750, while the GWP limits for IPR chillers vary from 750 to 2,200, depending on the temperature of the chilled secondary fluid leaving the chiller.

Based on this comment, CARB staff also identified and corrected a typographical error. Table 3 has temperatures in both Fahrenheit and Celsius. The -10 degrees Fahrenheit was incorrectly stated as being equivalent to -26 degrees Celsius. This has been corrected to -23 degrees Celsius.

- (360) **Comment(s):** CARB presented multiple options in their presentation in February 2021. Option B on slide 24 – “the temperature of the cooled fluid leaving the evaporator,” is closer to the initial intent of the Commenter’s October 2020 proposal but is not a definition for evaporator temperature. Commenter would further ask that CARB consider using either chilled fluid leaving temperature or chiller fluid leaving temperature to clarify that the designation is based on the designed chilled fluid temperature leaving the equipment. Commenter suggests this change be made to the table itself to avoid confusion. This would remove any ambiguity with the evaporator temperature mid or dew point, without incorrectly defining evaporator temperature. (AHRI)

Agency Response: CARB staff made changes based on the received comment. As part of the second 15-day changes, the language in Table 3 was modified to read “*Chillers (new) designed for chilled fluid leaving the chiller at temperatures*” followed by the temperature values or ranges. For more details, please see Agency Response to comment 205.

- (361) **Comment(s):** During the February 19, 2021 public meeting, CARB posed a question surrounding the definition of “*evaporator temperature*” as used to support classification of IPR chillers. CARB should consider the evaporator fluid leaving temperature as the determining factor for IPR and cold storage chillers. The design evaporator fluid leaving temperature was intended to be the chilled fluid temperature leaving the chiller and not the evaporator temperature. The term evaporator temperature does not have a specific industry definition especially with the development of high glide refrigerants. Bubble, mid, or dew point would need to be specified to truly define evaporator temperatures, but this was not the intent of the initial proposal for chiller GWP thresholds and would potentially change based on pressure or refrigerant. (AHRI)

Agency Response: CARB staff made changes based on the received comment. Please see Agency Response to comment 205.

- (362) **Comment(s):** “Chilled fluid temperature leaving the evaporator” is not a standard definition that can be used to define chiller application. We recommend CARB modify to “the chilled liquid temperature leaving the chiller.” Leaving the evaporator implies the refrigerant temperature, which can vary based on the type of refrigerant and the refrigerant state leaving the evaporator. Making these changes will eliminate this confusion. (Carrier)

Agency Response: CARB staff made changes based on the received comment as it pertains to replacing the word “*evaporator*” with “*chiller*” in Table 3. For

details, please see Agency Response to comment 205. However, CARB staff did not replace the term "fluid" with "liquid." For more details, please see Agency Response to comment 364 below.

- (363) **Comment(s):** The definition for evaporator temperature in chillers should be changed to reference the liquid leaving the chiller instead of leaving the evaporator. The evaporator implies the refrigerant temperature, which may vary based on the type of refrigerant and the refrigerant state leaving the evaporator. (Carrier)

Agency Response: CARB staff made changes based on the received comment. To clarify, there is no definition of "evaporator temperature" in the Proposed Amendments. The requirement is stated directly in Table 3. Please see Agency Response to comment 205.

- (364) **Comment(s):** The term fluid is too broad and can refer to a gas or liquid. The term fluid should be changed to liquid. (Carrier, Daikin, Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The term secondary "fluid" is commonly used for the heat exchange media in chillers, so CARB staff did not exchange the word "fluid" for "liquid." While "fluid" is a broad term that encompasses both liquids and gases, the chiller definition in the regulatory text was written such that it is closely aligned with the U.S. EPA's description of equipment types and end-uses under the SNAP Program. However, in response to other comments and for clarity, CARB staff modified the language in Table 3 as part of a Second 15-Day Notice to make it clear that the temperature ranges refer to secondary fluid and not the refrigerant, which should address the comment.

- (365) **Comment(s):** CARB should change the low end of the chiller temperature range from -50°F to -58°F. This distinction is important as with a -58°F minimum temperature of the refrigerant temperature there is typically a 10°F difference between the evaporator temperature and the fluid temperature leaving the evaporator, so the fluid leaving a -58°F evaporator would be -48°F. For good refrigeration machine design using R-410a refrigerant, the evaporator refrigerant temperature should be designed for -58°F or higher, yielding a leaving fluid temperature of -48°F or higher. The concern here is that a -58°F fluid leaving temperature would require an evaporator refrigerant temperature of -68°F, which would yield 3 pounds per square inch (psi) of vacuum, which would not be good practice for chiller operation. Due to this concern, and the intent to use chilled fluid leaving temperature and not evaporator refrigerant temperature, we request CARB use -50°F and not -58°F. (AHRI)

Agency Response: CARB did not make changes based on the received comment. The lowest end of the chiller temperature range was set such that the very low temperature refrigeration end-uses were exempt from the chiller GWP

prohibitions due to stakeholder concerns about feasibility. The temperature ranges were set based on wide stakeholder input including the commenter. Furthermore, -58 °F (or -50 °C) broadly aligns with the European Union's F-gas regulation's threshold for very low temperature refrigeration, which industry is already familiar with. The commenter's request of changing the lowest temperature threshold to -50 °F would exempt more chillers from the 2,200 GWP limit and allow them to use very high GWP refrigerants like R-507 and R-404A. The comment lacks substantiating information to support the proposed change - it is unclear whether the technical limitations of current HFC-based chiller design described by the commenter are insurmountable, for example, by improving system design aspects such as using a more efficient heat exchanger.

Additionally, chillers for very low temperature applications can use ultra-low-GWP refrigerants like CO₂ and ammonia - these refrigerants have GWP values of 1 and zero, respectively, well below the permissible limit of 2,200. Finally, end-users who cannot use any of the available refrigerants can apply for an exemption through the variance process provided they meet all the requirements listed in the regulatory text. All variance requests will be reviewed on a case-by-case basis.

- (366) **Comment(s):** Continuing the use of older equipment is often a more environmentally friendly strategy than disposing of older equipment and replacing it with new equipment. Therefore, it is important that this regulation support the concept of older equipment being sold on from one end user to another (i.e., as second hand or used equipment), or from an end user back to the OEM for refurbishment, and perhaps upgrades, and then on to another end user (i.e., as refurbished equipment). (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. Only equipment that meets the definition of "new" that has a date of manufacture on or after the effective date will be subject to the prohibitions for new equipment. "Date of Manufacture" is defined for different equipment types in Section 95373. The Proposed Amendments do allow the continued use of older equipment if no more than 75 percent of the compressors, condensers, or evaporators are replaced within any three-year time frame. CARB staff note that some existing equipment are subject to requirements under the Proposed Amendments, for example, the weighted-average GWP and GHGp targets for existing retail food refrigeration listed in Section 95374 (d), Table 4 of the regulatory text.

- (367) **Comment(s):** In Table 3 there is no Celsius conversion nor "°F" indication for the upper bound (i.e., '35') of the Chiller with GWP greater than 1,500 refrigerant entry such as was done for the 2,200 entry. Also, there is a misspelling of 'Celsius' in the definitions for Low Temperature Refrigeration System and Medium Temperature Refrigeration System. (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. These comments address what was presented at the 45-Day Notice and not the First 15-Day Notice and therefore, these comments are outside the scope of the 15-Day Notice, irrelevant, or not specifically directed at CARB's proposed action or directed to the procedures followed by CARB, so CARB is not required to respond. It should be noted that while these errors were present in the proposed regulation order posted in the 45-Day Notice, they were corrected in the First 15-Day Notice before it was posted on May 13, 2021.

- (368) **Comment(s):** The term "New Chiller" is defined, but that term is not used, *per se*, in Table 3 (i.e., the term used in Table 3 is "Chiller (new)"). Please change the entries in Table 3 to the effect of "New Chillers" for better clarity and legal certainty... likewise with "Air-conditioning Equipment (new)." (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. These comments address what was presented at the 45-Day Notice and not the First 15-Day Notice and therefore, these comments are outside the scope of the 15-Day Notice, irrelevant, or not specifically directed at CARB's proposed action or directed to the procedures followed by CARB, so CARB is not required to respond. Furthermore, the language and format in Table 3 matches that of the other tables which were present in the regulation before the amendment. For uniformity, the format across all tables was kept consistent. Stakeholders are familiar with the format since U.S. EPA uses similar language in their SNAP rules.

- (369) **Comment(s):** The current wording supports this concept in the definitions for New Chiller and New Refrigeration Equipment by means of the phrase "First Installed," implying that a "second install" (i.e., equipment that has already undergone first install in California) is not considered to be "new." However, this is a rather difficult rationale to work through, particularly where a chiller might be embedded in other equipment, in which case "installed" is ambiguous as it could refer to the installation of the other equipment or installation of the chiller in the other equipment. (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. These comments address what was presented at the 45-Day Notice and not the First 15-Day Notice and therefore, these comments are outside the scope of the 15-Day Notice, irrelevant, or not specifically directed at CARB's proposed action or directed to the procedures followed by CARB, so CARB is not required to respond. The terminology in the definition conveys the intent that the first time a chiller or refrigeration equipment is installed in a location on or after the effective date, then it will be subject to the prohibitions listed in Table 3. The resale of old equipment and subsequent re-installation of that equipment is not considered "new" for the purposes of this regulation. However, the definition is clear that first installed using new or used components, or a combination of those components classifies as first installed, or if existing chiller equipment is modified

such that the capacity has increased through the addition of motor-bearing components or the system has experienced cumulative replacement within three-years of its motor-bearing components that exceeds 50 percent of the capital cost of replacing all the motor-bearing components in the entire chiller. Also, the term "chiller" is defined, which indicates what is meant by "chiller," as opposed to "other equipment."

- (370) **Comment(s):** The definition of "*Refrigeration Equipment*" includes industrial process refrigeration and cooling (not using a chiller). However, the body of the exception excludes industrial process refrigeration that contains 50 pounds or less refrigerant without prejudice. IPR appears to be excluded whether it contains a chill[er] or not. Further, the exception references IPR in Table 3, and in Table 3 Chillers are indicated (by means of the table Section heading) as, in effect, a type of IPR. It seems clear the intention is that the scope of the exception should extend to chillers, but again the conceptual misalignment between Chiller, Industrial Process Refrigeration, and Refrigeration Equipment is confusing. (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The "refrigeration equipment" definition was presented in the 45-Day Notice, not the 15-Day Notice and are therefore, outside the scope of the 15-Day Notice. CARB staff made no changes based on the received comment. CARB staff clarify that the 50-pound limit does not apply to chillers. The chiller prohibitions were part of SB 1013 which does not have a 50-pound limit. This is clear from Table 3 where chillers do not contain a 50-pound threshold under the "specific end-use," whereas refrigeration equipment does.

B-4. Definitions

- (371) **Comment(s):** CARB should amend the definition of "*Chillers*" as follows: "Chiller" means a water or heat transfer ~~fluid~~ liquid-chilling or liquid-heating equipment package custom built in place, or a factory-made and prefabricated assembly of one (1) or more compressors, condensers, and evaporators, with interconnections and accessories including controls, designed for the purpose of cooling or heating water or a heat transfer ~~fluid~~ liquid. A chiller is a machine specifically designed to make use of a vapor compression refrigeration cycle or absorption refrigeration cycle to transfer heat from a cold water or heat transfer ~~fluid~~ liquid circulating system to the air, a heat transfer ~~fluid~~ liquid, or other heat exchange media. Chillers can be water-cooled, liquid-cooled, air-cooled, or evaporatively cooled, or adiabatically cooled. ~~Chillers include but are not limited to rotary chillers, centrifugal chillers, and positive displacement chillers, including reciprocating, scroll, and screw chillers. Chillers using the vapor compression refrigeration cycle utilize but are not limited to the following types of compressors: centrifugal, screw, scroll, rotary, and reciprocating.~~ For the purpose of this regulation, "chiller" includes those used for comfort cooling, space and area cooling, or industrial process cooling. A chiller used for

refrigeration in a retail food facility is considered an indirect type of "supermarket system." (Daikin)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 362.

- (372) **Comment(s):** CARB should revise the definition of "New Chiller" to mean "(1) First installed and put into service after the effective date given in the table and comprised of using new or used "..."" "Note: used chiller equipment or a used chiller system in those specific end-use sectors that was first installed and put into service before the given effective date and which has not been modified after the effective date to the extent indicated in (2). are not considered to be "new." (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 368.

- (373) **Comment(s):** In the "New Chiller" definition, it is not clear why "motor-bearing" components includes evaporators, compressors, and condensers. "Motor-bearing" more directly implies a friction control device – a ball bearing assembly or similar (e.g., the type of items found from a search of 'motor bearing components' on Google). Perhaps "motor-bearing" was meant in the sense of bearing on the selection of motor size? Please express this in an alternate way so the general type of components intended is more clearly understood by "lay" readers of the regulation. (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The "new chiller" definition was presented in the 45-Day Notice, not the First 15-Day Notice and is therefore, outside the scope of the First 15-Day Notice so CARB is not required to respond. However, CARB chose the term "motor-bearing" to be consistent with existing U.S. EPA descriptions of refrigeration, AC, and other cooling equipment and was arrived at after working closely with stakeholders.

- (374) **Comment(s):** It seems in the definitions of new equipment, "...installed using new or used..." the "using" is meant in the sense of "comprised of," but this could also be misunderstood as something like "how connections are made to the equipment." Please consider making the following changes: For New Chiller, "(1) First installed and put into service after the effective date given in the table and comprised of using new or used..." And if feasible, add an explanatory (i.e., non-normative) note to the definition to the effect of "Note: used chiller equipment or a used chiller system in those specific end-use sectors that was first installed and put into service before the given effective date and which has not been modified after the effective date to the extent indicated in (2), are not considered to be new." For New Refrigeration Equipment, "(A) First installed and put into service after the effective date given in the table and

comprised of using new or used...(2) Any refrigeration equipment in a new facility that is first installed and put into service after the effective date given in the table and comprised of using new or used..." (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The "new AC," "new facility," and "new chiller" definitions were presented in the 45-Day Notice, not the First 15-Day Notice and is therefore, outside the scope of the First 15-Day Notice so CARB is not required to respond. However, adding the words "and put into service" after "first installed" will result in confusion. Based on stakeholder input, refrigeration systems can be installed at one time but turned on or put into service later. The equipment becomes subject to the regulation based on the date of installation. Further, the definitions of the new equipment were added solely for the purpose of identifying the actions and changes that will make a piece of equipment subject to the regulation if those changes occur on or after the effective date. Therefore, adding the clause "after the effective date" is extraneous text that is unnecessary.

(375) **Comment(s):** In the definition for "*Refrigeration Equipment*" there is a reference in the last sentence to "industrial process refrigeration and cooling." This is not a defined concept. Change this phrase to simply "industrial process refrigeration." (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The words "and cooling" refers to industrial processes used for cooling rather than freezing. In general, "cooling" is a self-explanatory term and is included in the definition of "*Industrial Process Refrigeration*" as well.

(376) **Comment(s):** We support CARB's alignment with DOE's definition of dehumidifier as it ensures consistency across federal and state regulations. However, CARB does not distinguish between portable and whole-home dehumidifiers, which the DOE does. We request that CARB modify the regulatory text to adopt additional DOE definitions from 10 C.F.R. § 430.2, particularly the definition for whole-home dehumidifiers and modify the definition of "*Residential Dehumidifier*" to include "portable." (RPC)

Agency Response: CARB staff made changes based on the received comment. The word "*portable*" has been added to the definition of "*Residential Dehumidifier*." Please see Agency Response to comment 263.

(377) **Comment(s):** CARB should revise the following definitions:

- "*Foam System*" means a multipart liquid material that expands when mixed to form a foam solid or flexible substance in which thin films of material separates pockets of gas."

- "Foam" means a product material with a cellular structure formed from a solid or flexible substance in which thin films of material separate pockets of gas and formed via the foaming process of a foam system using in a variety of materials that undergo hardening via a chemical reaction or phase transition." (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The "foam" and "foam system" definitions were presented in the 45-Day Notice, not the First 15-Day Notice and are therefore, outside the scope of the 15-Day Notice and CARB is not required to respond. However, CARB staff worked closely with foam industry representatives to develop foam definitions understandable to industry, end-users, and the regulatory agency. The exceptions to the foam requirements are based upon U.S. EPA SNAP Rules 20 and 21, and CARB will keep the wording the same as before to remain in alignment with the SNAP rules.

- (378) **Comment(s):** There are no components available for the larger dehumidifiers that are compatible with the lower-GWP refrigerants (R-32, R-454B and others). It is anticipated that these components will be available to meet the January 1, 2025 timeline for most AC equipment. We request CARB to take into consideration the supply chain and lack of components available for the larger dehumidifiers. (Therma-Stor)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 263.

- (379) **Comment(s):** CARB should adopt the definitions from 10 C.F.R. § 430.2 moving forward. (RPC)

Agency Response: CARB staff made no changes based on the received comment. CARB has already incorporated the 10 C.F.R. § 430.2 definition for a consumer "dehumidifier" into the Proposed Amendments' definition for "Residential Dehumidifier." For the purposes of the Proposed Amendments, there is no need for the multiple definitions of dehumidifier as used in 10 C.F.R. § 430.2, which pertains to energy efficiency regulations promulgated by U.S. DOE.

- (380) **Comment(s):** CARB should delete portable air-conditioner from the definition of "Other Air-conditioning" or "Other Air-conditioning Equipment" and adopt definitions for single-duct and dual-duct portable ACs, similar to how U.S. DOE and the California Energy Commission (CEC) are regulating portable air conditioners (i.e., spot coolers) differently from residential portable air conditioners. (Denso)

Agency Response: CARB staff made no changes based on the received comment. While the U.S. DOE and the CEC regulate appliances on the basis on energy performance and may make distinctions based on factors that affect energy performance, CARB is regulating the refrigerant contained within those

appliances. CARB has maintained consistency with the U.S. DOE definitions where feasible and with the U.S. EPA end-use sectors defined in the SNAP Program where feasible. In this instance, the commenter has provided insufficient technical justification to demonstrate that refrigerant choice significantly impacts configurations of portable AC.

- (381) **Comment(s):** The “*New Facility*” definition refers to, “any refrigeration end-uses listed in Table 3...and refrigeration end-uses listed in Table 4...” and the New Chiller definition refers to “any chiller equipment or chiller system end-use sectors listed in Table 3...;” and Table 3 and Table 4 have headings for both “General End-Use” and “Specific End-Use;” However it is only under the “Specific End Use” heading that the ‘XXXX (new)’ terms appear. Therefore, there is some misalignment between the tables and the definitions. For greater alignment with the tables and greater clarity and legal certainty, please change these definitions to “any refrigeration specific end-uses listed in Table 3...any refrigeration specific end-uses listed in Table 4...” and “any chiller equipment or chiller system specific end-use sectors listed in Table 3...,” respectively. (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The “*new facility*” and “*new chiller*” definitions were presented in the 45-Day Notice, not the 15-Day Notice and are therefore, outside the scope of the 15-Day Notice. CARB has reviewed the table headings and sub-headings and determined that they clearly communicate the intended end-uses. They align with the previous SNAP Program, which the regulated community is already familiar.

- (382) **Comment(s):** In the definition for “*Refrigeration Equipment*,” there is a reference in the last sentence to “industrial process refrigeration and cooling.” “Industrial process cooling” is not a defined concept. Change this phrase to simply “industrial process refrigeration.” (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The “*Refrigeration Equipment*” definition was presented in the 45-Day Notice, not the 15-Day Notice and are therefore, outside the scope of the 15-Day Notice. However, in the definition for “*Refrigeration Equipment*,” the phrase “industrial process refrigeration and cooling” is understood to include cooling equipment used in industrial process refrigeration. “Industrial Process Refrigeration” is defined in the regulation. Keeping the words “and cooling” does not alter the meaning of the sentence in any way.

- (383) **Comment(s):** The definition for “*Industrial Process Refrigeration*” is confusing in that it appears to assert in the last two sentences that there can Industrial Process Refrigeration using a chiller and Industrial Process Refrigeration not using a chiller, but only the definition of chiller includes the idea of a machine making used of a vapor compression refrigeration cycle or absorption refrigeration cycle,

so how can Industrial Process Refrigeration equipment be understood as potentially containing a prohibited substance if it does not contain a chiller? Where else is the prohibited substance expected to be? Please clarify the set of definitions to remove this seeming contradiction. (Tokyo)

Agency Response: CARB staff made no changes based on the received comment. The definition for "*Industrial Process Refrigeration*" was presented in the 45-Day Notice, not the 15-Day Notice and are therefore, outside the scope of the 15-Day Notice. A chiller is defined as equipment where the refrigerant is used for cooling a heat transfer fluid (for example, water), which then cools the air, product, or processes. This is different from direct systems where the refrigerant directly cools the air, product, or processes. Thus, not all refrigeration systems are chillers. While chillers are commonly used for industrial process refrigeration, direct systems are also used.

- (384) **Comment(s):** The definition of "*Certified Reclaimed Refrigerant*" should be updated to maximize the use of reclaimed refrigerant by allowing for the use of reclaimed refrigerant that cannot be brought to proper blend concentrations using no more than 15 percent new refrigerant. Specifically, it should add the following provision: "Any reclaimed refrigerant that contains more than 15 percent and up to 50 percent new refrigerant would be discounted to 50 percent reclaim." (AHRI, Lennox)

Agency Response: CARB staff made no changes based on the received comment. CARB defines "*certified reclaimed refrigerant*" similar to the commenters. However, CARB does not accept recommended section 4, "Any reclaimed refrigerant that contains more than 15 percent new refrigerant would be discounted to 50 percent reclaim." Further diluting the reclaimed refrigerant with new refrigerant may have a negative effect on the reclamation rate of used R-410A because new R-410A is abundant while reclaimed R-410A is less abundant. One of the main intentions of the R4 Program is to increase the reclamation of R-410A from AC equipment at the end of the equipment lifetime, so the commenter's proposal would be contrary to the intent of the Proposed Amendments.

- (385) **Comment(s):** Does the definition of "*Variable Refrigerant Flow (VRF) or Variable Refrigerant Volume (VRV)*" include any VRV/VRF regardless of whether it is single-phase or three-phase, and regardless of its capacity? (Daikin)

Agency Response: CARB staff made no changes based on the received comment. The definition of VRF does not include any reference to electrical phase (single phase or three phase), and does not include any reference to capacity, therefore, the VRF definition includes VRFs of all electrical phases and capacities. Note that during the 45-Day Public Comment period, the definition of "*Variable Refrigerant Flow (VRF) or Variable Refrigerant Volume (VRV)*" has been simplified to "*Variable Refrigerant Flow (VRF)*," with the revised definition

stating that “*Variable Refrigerant Flow (VRF)*” includes “*Variable Refrigerant Volume (VRV)*.”

- (386) **Comment(s):** We would like to thank the CARB team for working with us and reviewing our concerns. (Therma-Stor)

Agency Response: CARB staff made no changes based on the received comment. CARB staff thanks the commenter for their supportive comment.

- (387) **Comment(s):** We support CARB’s mission to improve air quality and reduce GHG emissions. (RPC)

Agency Response: CARB staff made no changes based on the received comment. CARB staff thanks the commenter for their supportive comment.

B-5. Other Comments

- (388) **Comment(s):** The “*Approved Building Permit*” exemption for refrigeration equipment should be extended to all “*new equipment*” listed in Table 3, rather than just limiting it to refrigeration equipment. (JRAIA)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 212.

- (389) **Comment(s):** CARB should not reward irresponsible companies that did not take the phase-out date seriously. By delaying AC HFC regulations until 2025, CARB would give foot-dragging companies and those that would block progress on Codes and Standards bodies an unfair competitive advantage over responsible companies who invested in alternatives to meet the agreed 2023 deadline. Delaying this would send an unfortunate signal to industry that CARB will bend to the laggards’ demands, not once, but time after time. (IGSD)

Agency Response: CARB staff made no changes based on the received comment. The two-year delay of regulations for most AC equipment has been addressed in the 45-Day comments. Please see Agency Responses to comments 31, 32, 35, and 56.

- (390) **Comment(s):** As a result of CARB's hard work and careful response to all comments, we understand that comments from many stakeholders are reflected in a balanced manner. (JRAIA)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the supportive comment.

C. Comments Received During the Second 15-Day Notice Period

C-1. Air-Conditioning and the R4 Program

- (391) **Comment(s)**: We support the addition of the word "portable" to the definition of "*residential dehumidifier*." This will be sufficient to differentiate the dehumidifiers we manufacture for permanent installation into residential, commercial, industrial, and agricultural facilities from the portable dehumidifiers typically purchased by individual consumers from big box retailers and installed without the need for code compliance. (Madison)

Agency Response: CARB staff made no changes in response to the received comment. CARB appreciates the supportive comment.

- (392) **Comment(s)**: Based on current U.S. EPA rule (40 C.F.R.), there is no refrigerant which are GWP below 750 for residential dehumidifier. If CARB has already recognized that some refrigerant A2L grade (for example R-32) are under process of U.S. EPA approval and it will be completed before 2023, it is no problem. But if there is no U.S. EPA process, then for the residential dehumidifier, the effective date of 2023 shall be subject to 2025 or after U.S. EPA approval. (LG)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Responses to comments 46 and 263.

- (393) **Comment(s)**: CARB should create an early safe harbor determination of impossibility which would in effect extend the compliance deadline for dehumidifiers using R-410a until one year from the date that the U.S. EPA approves the use of R-32 or other low GWP refrigerants authorized in SNAP Rule 19 and SNAP Rule 23 for use in dehumidifiers or until the dates published in the terms, whichever is the latest. It is currently unclear whether U.S. EPA has authorized commercially viable lower-GWP refrigerants (i.e., R-32) for use in Dehumidifiers. Under SNAP, U.S. EPA maintains separate lists of approved refrigerants for Residential Dehumidifiers, Residential and Light Commercial AC Equipment, and Industrial Process Equipment. To date, U.S. EPA has not specifically approved for these three product categories refrigerants the AC Industry is moving towards (those approved under SNAP Rule 19 or SNAP Rule 23). Under the current list of acceptable substitutes for "*Residential Dehumidifiers*," there is only one substitute which has an ODP and a GWP below 750. This refrigerant, R-513A, is a medium-pressure refrigerant designed as a replacement for R-134A instead of R-410A. R-513A is not an "available" substitute for R-410A, which is a high-pressure refrigerant used in dehumidifiers. We have identified no commercially viable design solutions (i.e., available compressors, metering devices of the size/type needed for

dehumidifier applications) current on the market that are designed to use R-513A. (RPC)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Responses to comments 46 and 263.

- (394) **Comment(s):** CARB should allow manufacturers to begin fulfilling their 2023-2024 obligation to use reclaimed refrigerant as soon as possible (i.e., prior to January 1, 2023) and explicitly state such in the regulatory text. (Rheem)

Agency Response: CARB staff made no changes in response to the received comment. See Agency Response to comment 64.

- (395) **Comment(s):** We appreciate the allowance of reclaimed R-410A in existing equipment, which provides the flexibility necessary to make a reclaim program a success. (Trane)

Agency Response: CARB staff made no changes in response to the received comment. CARB appreciates the supportive comment.

- (396) **Comment(s):** The optional early action credit should include the use of reclaimed R-410A in new or existing equipment prior to 2023. (Trane)

Agency Response: CARB staff made no changes in response to the received comment. The Optional Early Action Credit is different from early compliance with the reclaim use requirements. For details, please see Agency Response to comment 64.

- (397) **Comment(s):** We support the 10 percent commitment to use certified reclaimed refrigerant during this interim period and requests clarification to ensure that OEMs can receive credit for any certified reclaimed R-410A used - either in new equipment or in service - during the 2022-2025 period. (JCI)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 64.

- (398) **Comment(s):** We support the reclamation goals of the HFC Rule and would prefer to take early action to use reclaimed R-410A rather than delay the use of reclaimed refrigerant until January 1, 2023. Allowing early action also ensures we will have access to at least some volume of reclaim refrigerant that might not otherwise be available. (JCI)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 64.

(399) **Comment(s):** CARB should remove the attestation mandate that OEMs attest to no reclaimed refrigerant being purchased, used, or counted to comply with any other government requirements. (AHRI, Carrier, JCI, Rheem)

Agency Response: CARB staff made no changes in response to the received comment. This comment is outside the scope of the Second 15-Day Notice, so CARB is not required to respond. However, please see Agency Response to comment 257.

(400) **Comment(s):** As a part of this determination of impossibility, CARB should adopt the position that an exemption from the compliance date will not increase the overall risk to human health or the environment. If compressor-driven dehumidifiers were prohibited from the marketplace due to the U.S. EPA's delay in authorizing alternative high-pressure refrigerants, consumers would turn either to inefficient ACs with a dehumidification mode that use refrigerants approved under the SNAP rules, or to less-efficient (but still authorized) desiccant dehumidifiers. (RPC)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Responses to comments 46 and 263.

(401) **Comment(s):** CARB should measure whether or not U.S. EPA granted approval of any viable A2L refrigerant be the earliest of: (a) the date upon which the U.S. EPA notifies CARB in writing that, despite the absence of a specific discussion of dehumidifiers in SNAP Rule 19 and SNAP Rule 23, that the agency interprets those rules as extending to similarly sized and installed dehumidifiers; (b) the date the U.S. EPA publishes any determination of acceptability in the Federal Register for the appropriate end-use; or (c) the date U.S. EPA publishes an affirmative clarification in the Federal Register on the topic in response to comments about any proposed rulemakings, on any matter. (RPC)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Responses to comments 46 and 263.

(402) **Comment(s):** We recommend that California enact legislation that ensures that reclaimed refrigerants are consumed within a reasonable time frame, e.g., one year from date of acquisition, by their responsible parties. (A-Gas)

Agency Response: CARB staff made no changes in response to the received comment. The California Legislature enacts legislation. CARB adopts regulations in line with its statutory authority. Regarding consumption of reclaimed refrigerant, industry has indicated that refrigerant purchased for use does get used and there is no reason or incentive to store reclaimed refrigerant.

(403) **Comment(s):** This proposal is inconsistent with the initial intent of the California Cooling Act, where reclaimed refrigerants are to be consumed for the purpose of delivering environmental benefit for the State of California. By allowing material to be sold without a requirement to validate its consumption, the State is not offsetting emissions. Simply tracking the sale of reclaimed material does not ensure consumption and, consequently, benefit to the environment. (A-Gas)

Agency Response: CARB staff made no changes in response to the received comment. The California Cooling Act (Senate Bill 1013, Health & Saf. Code § 39734) was adopted to backstop industry from switching to harmful HFCs as a result of the *Mexichem Decision*, which partially vacated some of the SNAP rules. The California Cooling Act does not have any legal mandates regarding reclaimed refrigerant—Health and Safety Code Section 39734 adopts SNAP prohibitions, both Rules 20 and 21, Appendix U and V, into State law. Nor does the California Cooling Act require any offset of emissions. In addition, Senate Bill 1383 (Health & Saf. Code § 39730.5), which requires a 40 percent reduction in HFC gases below 2013 levels by 2030, does not require an offset or reclamation, but rather a reduction in the gases itself. Hence, the reclaim requirements do not violate or conflict with the intent of either statute.

(404) **Comment(s):** The majority of the reclaimed R-410A produced in the United States today is sold into the equipment servicing sectors and associated distribution channels. Allowing this material to simply be re-allocated to support a California emissions reduction program does not provide for additionality, as it only serves to shift distribution in the current reclaimed R-410A marketplace. (A-Gas)

Agency Response: CARB staff made no changes in response to the received comment. The intent of the R4 Program is to incentivize greater recovery of R-410A from equipment during service and retiring at the end of their useful lifetime, thus reducing emissions from servicing and end-of-life losses.

(405) **Comment(s):** The State of California has included the requirements of 40 C.F.R. Part 82, in its definition of "*Certified Reclaimed Refrigerant*." This qualification should be subject to a mandatory certification process. A failure to include this in the final rule increases the risk of introducing excess virgin material into the program. (A-Gas)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Responses to comments 85 and 92.

(406) **Comment(s):** We continue to affirm our support of CARB's emissions reduction program. To produce the environmental benefits mandated by the California legislature, CARB must develop a robust refrigerant management program that provides a verifiable process for providing reclaimed R-410A in California. (A-Gas)

Agency Response: CARB staff made no changes in response to the received comment. CARB appreciates the supportive comment.

- (407) **Comment(s):** We greatly appreciate CARB expanding the program to allow for the use of reclaimed refrigerant to service equipment. This change will initiate practices that are sustainable long after 2025 allowing the program to have an over-sized positive impact in encouraging proper reclamation of refrigerant. Allowing OEMs broader options will increase demand and drive the need for greater supply. Greater supply and demand will reduce the cost of reclaimed and recycled refrigerant over time and will create larger environmental benefits. (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. CARB appreciates the supportive comment.

- (408) **Comment(s):** This change will create an oversized environmental benefit potentially creating a national legacy for the California R4 Program and enhance the implementation of the AIM Act. (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. CARB appreciates the supportive comment.

- (409) **Comment(s):** CARB should allow for Optional Early Action Credit for use of reclaimed refrigerant used prior to January 1, 2023. (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 259.

- (410) **Comment(s):** CARB should allow for Optional Early Action Credit for Refrigerant with a GWP less than 750 used in new equipment and entered commerce in any state prior to January 1, 2025. (AHRI, Carrier, Rheem)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 108.

- (411) **Comment(s):** Remove the attestation requirement because there is simply no way of knowing what potential future regulations and voluntary programs may take shape around the country or by the federal government in the form of regulations or industry voluntary agreements with other agencies. This California-centric requirement discourages industry from supporting additional regulation and voluntary programs which reduces the environmental benefit and thereby undermines the stated purpose of this program. (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 257.

(412) **Comment(s):** We would like to understand whether CARB has considered the legality of the attestation requirement. (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. The comment is vague and ambiguous as it is unclear what is meant by "legality" and provides no recommendations with which CARB can respond. It is also outside the scope of the Second 15-Day Notice, so CARB is not required to respond. Please see Agency Responses to comments 40, 65, 257, and 295 for discussion of the Attestation requirement, authority, and legality discussions.

(413) **Comment(s):** We recommend removing recordkeeping requirements related to specific equipment (number and types) as unwieldy and unnecessary. (AHRI, JCI, Rheem)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 280.

(414) **Comment(s):** At their factories, HVAC OEMs will pump reclaimed refrigerant into a bulk tank and fill equipment possibly across various production lines. Once the reclaimed refrigerant is mixed with the newly produced refrigerant, it is impossible to know precisely which equipment and types contain reclaimed refrigerant. Thus, it will be impossible for OEMs to create accurate records regarding which specific equipment contains some reclaimed refrigerant or how long reclaimed refrigerant volumes will be mixed in a bulk refrigerant tank. (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 280.

(415) **Comment(s):** If CARB deems some recordkeeping to be necessary regarding the use of the reclaimed refrigerant, it should be limited to the dates and volume of certified reclaimed refrigerant used to charge new equipment or placed into the aftermarket to service existing equipment. (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Responses to comments 274 and 280.

(416) **Comment(s):** The definition of "*Certified Reclaimed Refrigerant*" should be updated to maximize the use of reclaimed refrigerant by allowing for the use of reclaimed refrigerant that cannot be brought to proper blend concentrations using no more than 15 percent new refrigerant. Add "any reclaimed refrigerant that contains more than 15 percent and up to 50 percent new refrigerant would be discounted to 50 percent reclaim." (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 86.

(417) **Comment(s):** The definition of "*Certified Reclaimed Refrigerant*" should be modified to allow for the inclusion of no greater than twenty-five percent (25 percent) new (virgin) refrigerant by weight to meet specifications in 40 C.F.R., Part 82, Subpart F, Appendix A (Specifications for Refrigerants) (January 1, 2017). Alternatively, CARB should allow for the use of reclaimed refrigerant that cannot be brought to proper specification using 25 percent or less new (virgin) refrigerant. Any reclaimed refrigerant that contains more than 25 percent and up to 50 percent new refrigerant would be discounted and classified as 50 percent reclaim. (FluoroFusion)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 86.

(418) **Comment(s):** CARB should treat all reporting information as confidential business information. (AHRI)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 292.

(419) **Comment(s):** We support the proposed modification to split AC chillers from IPR chillers in table 3; modifying the language to clarify that it is the temperature of the chilled liquid leaving the chiller that designates the specific end-use; and the addition of the words "or sold for use" to Section 95376(c)(2)(C)(2). (Carrier)

Agency Response: CARB staff made no changes in response to the received comment. CARB appreciates the supportive comment.

(420) **Comment(s):** The change to the reporting requirements more closely aligns with the distribution of refrigerant in commerce and will help accelerate the use of reclaim in service. (Carrier)

Agency Response: CARB staff made no changes in response to the received comment. CARB appreciates the supportive comment.

(421) **Comment(s):** 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 phased own regulations, creates an opportunity for

circumvention of the requirements and disadvantages entities which are compliant. (Chemours)

Agency Response: CARB staff made no changes in response to the received comment. Please see Agency Response to comment 83.

C-2. Chillers

(422) **Comment(s):** We appreciate the clarification that chillers' temperature ranges apply to the chilled fluid leaving the chiller. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the supportive comment.

(423) **Comment(s):** We appreciate staff's consideration of stakeholder comments submitted on the First 15-Day Notice language released May 13, 2021. We support the proposed modification to split AC chillers from IPR chillers in table 3. (Carrier)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the supportive comment.

(424) **Comment(s):** We support modifying the language to clarify that it is the temperature of the chilled liquid leaving the chiller that designates the specific end-use. (Carrier)

Agency Response: CARB staff made no changes based on the received comment. CARB appreciates the supportive comment.

(425) **Comment(s):** For IPR chillers, we request that the lowest temperature in the table be changed from -58 °F to -50 °F due to technical limitations. According to the commenter, a -58 °F fluid leaving temperature would require an evaporator refrigerant temperature of -68 °F, which would yield 3 psi of vacuum, which would not be good practice for chiller operation. (AHRI)

Agency Response: CARB staff made no changes based on the received comment. Please see Agency Response to comment 365.

(426) **Comment(s):** For IPR chillers, it is important for CARB to stay consistent with U.S. EPA and retain the unique industrial refrigeration definition and accommodations. U.S. 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." We also recommend that CARB provide flexibility and provide an exemption for IPR below -58 °F. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. CARB's definition of industrial process refrigeration is broadly aligned with the U.S.EPA's description of the end-use. Additionally, CARB's IPR is also aligned with other CARB's Refrigerant Management Program regulation. Please see Agency Response to comment 365. Additionally, CARB clarifies that the prohibitions in Table 3, Section 95374(c), do not apply to any end-uses used for *Very Low Temperature Refrigeration or Cooling*, which is defined as a refrigeration or cooling system that maintains temperatures below -58 degrees Fahrenheit (-50 degrees Celsius), including but not limited to, medical and laboratory freezers, specialized industrial process cooling applications, and extreme temperature environmental testing.

- (427) **Comment(s):** For chillers used in AC, 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. (Chemours)

Agency Response: CARB staff made no changes based on the received comment. U.S.EPA already lists several refrigerants with GWP values less than 750 as acceptable for use in AC chillers.⁴³ However, end-users who cannot use any available refrigerants can use the variance process provided they meet all the requirements listed in the regulatory text. All variance requests will be reviewed on a case-by-case basis.

D. Non-substantive Changes After Comment Period and Further Explanations

- (428) **"Air Pollution Control Officer" Definition.** CARB added "(air district)" to the definition of "Air Pollution Control Officer." The term "Air District" was included to make sure that the terms from "Air Pollution Control Officer" or "APCO," both air quality management district and air pollution control district, which are collectively referred to as "Air District" is clear. Because Air Districts may enforce this regulation, it is important for the regulated industry to understand what CARB means by "Air District" – that CARB means both air quality management district and air pollution control district. This is non-substantive because the definition is already in existence in the regulation.
- (429) **"Certified Reclaimed Refrigerant" Definition.** Each reclaimer is required by U.S. EPA to certify that the refrigerant will be reprocessed to the specifications set forth in 40 C.F.R. Part 82, Subpart F, Appendix A. The "Certified Reclaimed Refrigerant" definition incorporates 40 C.F.R. Part 82, Subpart F, Appendix A

⁴³ Refrigerants listed as acceptable for use in chillers by the U.S.EPA is available here: <https://www.epa.gov/snap/substitutes-chillers>.

(Specifications for Refrigerants) (January 1, 2017), with the purpose of to ensure reclaimed refrigerant meets the specifications for use in new and existing refrigeration and air conditioning equipment. It is essentially a refrigerant "purity" standard that looks at multiple things, such as acidity, etc. It does not have any requirements related to how much virgin refrigerant is added. Subsection (1) says the refrigerant must meet the purity standard; subsection (2) says reclaimers must conduct testing to meet those standards so they can prove it; and subsection (3) limits the amount of virgin refrigerant that there is – which is different from purity. It references the same standard because the virgin refrigerant must also meet the purity standard. CARB used the existing standard because it has been around since the 1990's (amended in 2017, which is the latest version) and industry is familiar with this standard.

- (430) "Change in Ownership" Definition. The terms "own, owner, owning, and owned" are used throughout the regulation and "Change in Ownership" is a relevant term in this regulated sector since many of these businesses are sold/bought frequently, so it goes to the overall understanding of the Proposed Amendments. Also, this is the exact definition from the RMP regulation. Industry is aware of this definition from other state regulations relevant to them. This is a common practice in this regulated community, and it is important for company weighted average GHG targets as it could change the targets.
- (431) "Commercial Ice Machine" Definition. The terms "ice machine" and "ice maker" are used synonymously. SNAP calls it "ice machine" and "ice maker" both - and DOE calls it "ice maker" – but industry knows and understands both terms and that they are used interchangeably. See 80 Fed. Reg. 42902 (July 20, 2015), 10 CFR § 431.132. The term "artificially" means ice that is not naturally produced.
- (432) "Date of Manufacture" Definition. The term "Built-up" is a common industry term that is self-explanatory. This is something that is built up, which is different from for example, a refrigerator that comes assembled and ready to plug in.
- (433) "Full Charge" Definition. The terms "Full Charge," "Optimal Charge," and "Critical Charge" are used interchangeably by industry. The extra terms are used to ensure that the intent of this definition is clear because industry uses them interchangeably. Also, the use of the word, "or" means that these three terms can be used interchangeably, so as to not have to rewrite each of them over and over. Also, this term is defined in the RMP regulation. This ensures consistency across regulations affecting the same industry.
- (434) "Industrial Process Refrigeration" Definition. CARB staff made changes to the first sentence. This is a technical definition of IPR that means to cool process streams, in industrial processes, that are complex. However, the long sentence can be broken up into two sentences. CARB placed a period after the word

"applications" and removed the word "and," replacing it with "These" This non-substantive change does not change the rights, responsibilities and requirements, but rather, makes the requirements flow better.

- (435) "Metered Dose Inhaler" Definition. The term "Medical Dose Inhaler" is used interchangeable with "Metered Dose Inhaler." Both terms are used here to ensure that the intent of this definition is clear. Also, the use of the word, "or" means that these terms can be used interchangeably, so as to not have to rewrite each of them over and over. The federal statute and regulation use both. See 42 U.S.C. § 7671 and 40 C.F.R. § 82.3.
- (436) "New Air-Conditioning Equipment," "New Chiller," and "New Refrigeration" Definitions. The term "New" for air-conditioning, chiller, and refrigeration end-uses is used in the Tables, with the term "(new)" beside each of the categories to indicate where new. This format was used to stay consistent with the existing federal SNAP requirements. However, to clarify, CARB added "New" in front of the end-use headings in the Tables – Air-Conditioning, Chiller, and Refrigeration to ensure the definitions are actually used and understood. This non-substantive change does not change the rights, responsibilities and requirements because all end-use categories have "(new)" designation anyway (so industry knows it is new), but rather, makes the requirements flow better. See section 95374, Table 3, and section 95374, Table 4.
- (437) "Refrigerated Food Processing and Dispensing Equipment" Definition. The language in this definition "chilled and frozen beverages (carbonated and non-carbonated, alcoholic and nonalcoholic); frozen custards, gelato, ice cream, Italian ice, sorbets and yogurts; milkshakes, "slushies" and smoothies, and whipped cream" are provided as examples of equipment based on the products that the equipment produces.
- (438) "Rigid Polyurethane Appliance Foam" Definition. CARB uses the term "domestic" instead of "residential." This is existing text taken exactly from the federal SNAP regulation. CARB intends to use the same terminology so as to keep consistent, where feasible. See 80 Fed. Reg. 42923 (July 20, 2015), 40 C.F.R. Part 82.
- (439) "Variable Refrigerant Flow System" Definition. CARB moved the quotation marks outside the word "system" in the first sentence as the quotation marks in the wrong location caused the definition to read "system within a system." CARB also placed the VRV definition up front, like the other definitions to maintain consistency. This is important because these terms are used interchangeably by the industry. This non-substantive change does not change the rights, responsibilities and requirements as no substantive words are removed, but rather, makes the requirements flow better and improves readability.

- (440) “Weighted-average GWP” Definition. CARB staff deleted the following sentences from the equation because they were defined elsewhere or included elsewhere and therefore, duplicative and unnecessary:

Refrigeration equipment with more than 50 pounds of refrigerant will be included in the calculation.

GWP is the 100-year GWP value of the refrigerant, refrigerant blend, or heat transfer fluid.

Refrigerant is a specific type of refrigerant, refrigerant blend, or heat transfer fluid, including but not limited to hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs), hydrofluorocarbons (HCFCs), hydrofluoroolefins (HFOs), carbon dioxide (CO₂), ammonia, water, glycol, and other heat transfer fluids.

This non-substantive change does not change the rights, responsibilities and requirements as no substantive words are removed that were not already contained elsewhere, but rather, makes the equation flow better and improves readability.

- (441) Section 95375 “Requirements” Title. CARB changed the title from “Requirements” to “Prohibitions, Exceptions, Registration, Recordkeeping, Reporting, Labeling, and Disclaimer Requirements” to further provide an identifier regarding what types of requirements are within this section. This non-substantive change does not change the rights, responsibilities and requirements as it clarifies the types of requirements only to improve readability.
- (442) Effective Date. Throughout, CARB uses the term “Effective Date” in the regulation. CARB struck the words “effective date in this subarticle” and replaced them with “January 1, 2022” in several locations to make clear that the “effective date” for those specific provisions was referring to the effective date of the regulation, which is January 1, 2022. This non-substantive change does not change the rights, responsibilities and requirements as the term “of this subarticle” specified the effective date of the regulation. All other effective dates are specified in Tables 1 through 4.
- (443) Section 95375(a)(4)(B) Attestation Requirement. CARB indicated that all attestations should be sent according to section 95378, subsections (c)(3) through (c)(7), which was confusing and unclear. CARB added in the email location where the regulated community can send the attestations (specifically, HFCREDUCTION@ARB.CA.GOV). This non-substantive change does not change the rights, responsibilities and requirements of the regulated community as the previous cross-reference required submittal to this email address. This just

removes the cross-reference, making it easier for the regulated community to know where to submit the attestations.

- (444) "Aerosols – Propellants End-Uses" Headings. Section 95375(b)(2)(B) and (C) both contained the heading "Aerosols – Propellants End-Uses," which was the same. CARB changed section 95375, subsection (b)(2)(B) to "Aerosols – Propellants End-Uses (HFC-134a)" and subsection (b)(2)(C) to "Aerosols – Propellants End-Uses (Other)" to differentiate different headings between the two sections – the difference being one heading is for HFC-134a and the other heading is for HFC-227ea and blends of HFC-227ea and HFC-134a for MDIs. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community because it is only headings. Rather, it clarifies the different headings between the two subsections to improve readability.
- (445) "Unless otherwise prohibited by State regulation" Sentence. Section 95375, subsection (b)(2)(B) contained the sentence "[u]nless otherwise prohibited by State regulation." CARB struck the sentence as it is clear that a regulated entity needs to comply with all regulations. For example, if the Proposed Amendments allowed a certain refrigerant to be used that another regulation prohibited, the regulated community would be prohibited from using that refrigerant because a separate law prohibits it. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community because they already must comply with other regulatory requirements.
- (446) Grams. In section 95375(c)(4)(A)2, and section 95375(d)(2)(A)2, CARB added the word "grams" as CARB always intended to allow the measurement of grams for the refrigerant charge size and in fact, this is included in the definition of "Charge Size" so has always been allowed. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community but rather, makes clear the intention of the regulation, which was always there in the definition of "Charge Size."
- (447) Standard Format. In sections 95375(c)(4)(A)(3) and 95375(d)(2)(A)3, CARB struck the term "standard format." CARB makes clear that it is the four-digit year of manufacture (e.g., 2020) and this is sufficiently clear. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community but rather, removes extraneous language.
- (448) Registration Requirements. Section 95375(d)(5) requires facilities to register certain information. The RMP regulation also to register the same information in R3. The difference is RMP requires entities with systems over 50 pounds with **greater than 150 GWP** to register certain information with the R3 database and the Proposed Amendments requires these entities to now report similar information related to systems over 50 pounds with **below 150 GWP**. Because the equipment being reported is different, this is not the exact same

requirement. CARB staff changed the words “that use” to “with” in section 95375(d)(5)(A), to improve readability and flow. The sentence now reads “Refrigerant systems containing more than 50 pounds of refrigerant ~~that use~~ with a GWP less than 150, including . . .” This non-substantive change does not change the rights, responsibilities and requirements of the regulated community as both versions state the same thing, it is just one reads better grammatically.

- (449) Spreadsheets. In section 95375(d)(7)(F), CARB added “any available” before the word “spreadsheet.” Calculations are enough if there are no spreadsheets. Most regulated entities use spreadsheets due to their convenience, but where a regulated entity does not, spreadsheets would not be required. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community it merely clarifies CARB’s intent to only require spreadsheets where available.
- (450) Section 95376(c). CARB staff removed the word “must” as it was superfluous and did not add anything. The sentence now reads “An Initial Baseline Report with self-certification shall be submitted by July 1, 2023 and ~~must~~ include . . .” The word “shall” is sufficient. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community it merely removes an extra word that was not necessary.
- (451) Reclaimed Refrigerant. In section 95376(d)(3), CARB staff meant “reclaimed refrigerant” as some manufacturers sell the refrigerant without equipment in addition to the equipment containing the refrigerant.
- (452) Section 95377(d). CARB struck the sentence “including violations of any condition imposed pursuant to section 95378” but inserted a sentence in the Variance section to make clear to the regulated community that violation of Variance conditions is a violation of section 95377. Specifically, CARB added in section 95378, subsection (e) that “Section 95377 shall apply to violations of any variance condition.” This is important to put the regulated community on notice that when a Variance is granted, the applicant must comply with the conditions granted. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community because it merely moves the language that was previously in section 95377 to 95378.
- (453) Effect of Noncompliance. CARB staff added in the words “greenhouse gas emissions related to” in section 95378(b)(2)(B) so the sentence now reads “*The Applicant has used best efforts to anticipate and address any force majeure event and any potential noncompliance, including minimizing any adverse effects **of the greenhouse gas emissions** related to noncompliance.*” If someone is approved for a Variance, it typically means that they will be using a substance with higher GWP and therefore, with greater GHG emissions. Applicants need to minimize the effects of increased GHG emissions related to using noncompliant

substances. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community because it merely clarifies that the adverse effects are GHG emissions and complies with the requirements of Senate Bill 1013 (Lara, Stat. of 2018, ch. 375)(SB 1013). Specifically, SB 1013 allows CARB to modify certain existing effective dates if CARB determines that it (1) reduces the overall risk to human health or the environment; and (2) reflects the earliest date that a substitute is currently or potentially available. See Health & Saf. Code 39734 (d).

- (454) Ownership Status. CARB staff added “(e.g., parent, subsidiary)” after the term “ownership status” in section 95378(c)(1) to identify examples of what CARB meant. The ownership status is a common term that is commonly understood in the regulated community. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community but rather, provides examples.
- (455) Application for Variance. CARB staff removed the word “Rationale with” from section 95378(c)(1)(F)2 as subsection (c)(1)(E) asks for the explanation and description (i.e., the rationale), and (c)(1)(F)1 asks for clear and convincing evidence; and (c)(1)(F)2 ask for the documentation. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community because it removes a redundancy.
- (456) Supporting Documentation. The term “supporting documentation” in section 95378(c)(1)(F)2, is meant to be broad as it could be many things depending on the type of variance being sought and the circumstances surrounding the event. For example, if there is a wildfire that has consumed a production plant, it may be an Emergency Order issued by the State of California or the President of the United States. It could be photographs, news articles, etc. Hence, CARB made no changes in response to this comment as CARB did mean to leave it broad.
- (457) Expediently. CARB changed the word “expeditiously” to the word “timely” in section 95378(c)(1)(G) as “timely” is a more accurate word. What CARB means is the applicant must describe their efforts to comply with their requirements. The word “timely” better describes what CARB seeks – that a company did not sit on the requirements until the last moment but was actually taking steps to fulfill the requirements in the regulation. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community but rather, more accurately describes what steps the regulated community must take – timely steps.
- (458) Large Portion of Revenue. In section 95378(c)(1)(J), CARB meant to keep the term “loss of a large portion of the revenue” broad as it is very fact specific related to each regulated entity and what this means will change depending on each applicant’s individual circumstances. It is more than mere loss of revenue.

However, what would constitute a “large portion” of that revenue will mean different things to different companies and CARB will rely on these companies to help identify whether it is a large portion or not.

- (459) Emission Factors. CARB staff made changes to the last sentence in sections 95378(c)(1)(K) and 95378(c)(1)(M). These changes were made to clarify what CARB means by the term emission factors including the charge and leak rate used over the average lifetime of the equipment, system or product. CARB does this by cross-referencing existing law (40 C.F.R. 82.152), its own definitions (refrigerant and charge size), by using laymen terms that are understood by people generally, and also by using terms that are understood by the regulated community. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community because it cross-references requirements that are already law.

Specifically, CARB staff modified the last sentence of section 95378(c)(1)(K) and the second to last sentence is section 95378(c)(1)(M) as follows:

Applicant must include all calculations used to calculate GHG emissions estimates, ~~and use CARB approved including emission factors (i.e., charge size as defined in section 95373, leak rate as defined by 40 C.F.R. section 82.152 and refrigerant used over its average lifetime of the equipment, system, or product).~~

Also important in determining GHG quantifications are factors in the preceding sentences in sections 95378(c)(1)(K) and 95378(c)(1)(M) as it describes what CARB means by emission factors. Specifically, it states:

This includes quantification of the direct GHG emissions resulting from refrigerant leaks or HFC emissions and indirect GHG emissions resulting from energy use (where applicable), with all calculations, based on the average lifetime of the equipment or product that will continue to use prohibited substances.

It is important to understand what CARB means by GHG emissions. Per the definition in section 95373 of the Proposed Amendments, “Greenhouse Gas” or “GHG” means “carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), nitrogen trifluoride (NF₃) sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and other fluorinated gases.” The term “emissions” is a common term that is generally understood to mean released or emitted. Direct emissions are a result of the annual leaks and leaks at the end-of-life of the equipment, system. or product. Indirect GHG emissions (where applicable) are emissions associated with the generation of electricity for the energy used to power the equipment, system, or product. To simplify, CARB means how much GHGs are emitted, either directly or indirectly. To find the answer, CARB considers a few different numbers, including:

- Charge Size: Section 95373 of the Proposed Amendments defines “Charge” or “Refrigerant Charge” to mean the amount of refrigerant by mass contained in a refrigeration system. Charge is generally measured in grams, ounces, pounds, or kilograms. This simply means how much refrigerant is in the equipment, system, or product. This is a well understood industry term and commonly used by the regulated community. This information may be found in manufacturer specifications or on the equipment, system, or product itself.
- Average Lifetime of the Equipment: The average lifetime of the equipment or product is generally understood to mean how long the equipment or product will be used or operated. For example, a refrigeration system may have an average lifetime of 15-20 years. Please see the “expected emission benefits” in the Executive Summary of the ISOR. Emissions occur annually, while in use, because a percentage of refrigerant leaks due to multiple factors. At the end of the average lifetime of the equipment, the equipment is retired, i.e., commonly referred to as the end-of-life of the equipment. When the equipment, system or product is retired or reaches its end-of-life, emissions may occur. Both the annual and end-of life emissions are relevant when talking about the emissions associated with the “average lifetime” of the equipment, system, or product. This term is generally understood by the regulated community.
- Leak Rate. The term “leak rate” is a well understood industry term and commonly used by the regulated community. Leak Rate is defined in 40 C.F.R. § 82.152 as:

The rate at which an appliance is losing refrigerant, measured between refrigerant charges. The leak rate is expressed in terms of the percentage of the appliance's full charge that would be lost over a 12-month period if the current rate of loss were to continue over that period. The rate must be calculated using one of the following methods. The same method must be used for all appliances subject to the leak repair requirements located at an operating facility.

(1) *Annualizing Method.*

- (i) Step 1. Take the number of pounds of refrigerant added to the appliance to return it to a full charge, whether in one addition or if multiple additions related to same leak, and divide it by the number of pounds of refrigerant the appliance normally contains at full charge;
- (ii) Step 2. Take the shorter of the number of days that have passed since the last day refrigerant was added or 365 days and divide that number by 365 days;

(iii) Step 3. Take the number calculated in Step 1 and divide it by the number calculated in Step 2; and
 (iv) Step 4. Multiply the number calculated in Step 3 by 100 to calculate a *percentage*. This method is summarized in the following formula:

(2) *Rolling Average Method.*

(i) Step 1. Take the sum of the pounds of refrigerant added to the appliance over the previous 365-day period (or over the period that has passed since the last successful follow-up verification test showing all identified leaks in the appliance were repaired, if that period is less than one year);

(ii) Step 2. Divide the result of Step 1 by the pounds of refrigerant the appliance normally contains at full charge; and

(iii) Step 3. Multiply the result of Step 2 by 100 to obtain a percentage. This method is summarized in the following formula:

$$\text{Leak rate} = \frac{\text{pounds of refrigerant added over past 365 days (or since the last successful follow-up verification test showing all identified leaks in the appliance were repaired, if that period is less than one year)}}{\text{pounds of refrigerant in full charge}} \times 100\%$$

(% per year)

(460) Negative Impacts. In section 95378(c)(1)(L), what CARB means by “negative impacts” is broad (i.e., there could be emissions associated with selling noncompliant HFCs into California and there may be other non-emission risks, such as toxicity). SB 1013 allows CARB to modify certain existing effective dates if CARB determines that it (1) reduces the overall risk to human health or the environment; and (2) reflects the earliest date that a substitute is currently or potentially available. See Health & Saf. Code 39734 (d). In order to determine the “overall” risk to human health and the environment, CARB must determine what the negative impacts are going to be as a result of granting the variance. To determine the overall risk, CARB must identify the worst-case scenario if the variance is granted.

(461) Document Submission Method. In section 95376(c)(3), CARB staff added “to CARB at HFCREDUCTION@ARB.CA.GOV after the word “electronically.” CARB also clarified in section 95375(a)(4)(B) that the location for sending the foam attestations is the HFCREDUCTION@ARB.CA.GOV email. Also, in section 95378(c)(3), CARB staff meant for electronic submittal to be the main form of submittal and added an address as a voluntary option that was not mandatory. However, to remove any confusion, CARB staff removed section 95378, subsections (c)(4) and (c)(5) and renumbered the remaining paragraphs because these sections were voluntary, not mandatory. This non-substantive change does not change the rights, responsibilities and requirements of the regulated

community and the allowance of a mail copy is not mandatory and the prohibition against verbal submissions is generally understood throughout the regulation.

- (462) Cease to be Effective. Subsection (e)(2) states that the variance shall cease to be “effective” - meaning it is not effectively doing what it is meant to do, which in turn, may increase risk to human health. If that is the case, then subsection (f)(2) is the mechanism that CARB has to either revoke or modify the Executive Order.
- (463) Decision. In section 95378(g)(1), CARB uses the term “decision.” The term “decision” is common terminology that is generally understood to mean a determination made by CARB’s Executive Officer. This includes any decision related to the variance – it could be a decision to not approve the variance, a decision to modify the Executive Order, or a decision to revoke the Executive Order. To make this point clear, CARB modified section 95378, subsection (g)(1) to change the word “the” to “an” before “Executive Officer’s” and added in the words “made pursuant to section 95378” after the word “decision. This non-substantive change does not change the rights, responsibilities and requirements of the regulated community because it does not add any requirements or take any away. It merely makes clear the intent of the regulation, which is to allow the regulated community to petition for review of the Executive Officer’s decisions related to the Variance.

E. Comments Beyond the Scope of this Rulemaking

E-1. Comments Beyond the Scope of this Rulemaking Received During the 45-Day Comment Period and at the Board Hearing

CARB staff made no changes based on the comments received below. These comments are outside the scope of the 45-Day Notice, not submitted during the comment period, irrelevant, or not specifically directed at CARB’s proposed action or directed to the procedures followed by CARB in proposing or adopting the action, therefore, CARB is not required to respond. Some of these comments contain alternate proposals for reducing HFC emissions beyond the scope of this rulemaking. CARB looks forward to engaging with stakeholders on potential future measures.

- (464) Comment(s): CARB should regulate refrigerant systems in an approach similar to cap-and-trade or renewable energy portfolio standards, measuring emissions and the cap by decreasing every two years and requiring stores to purchase allowances for current emissions. Use of natural refrigerants could be allocated allowances for sale. Revenues from the auction could be granted or loaned to stores in disadvantaged communities. (350 Humboldt).
- (465) Comment(s): Refrigerated display case manufacturers now must comply with the commercial refrigeration equipment standards published by the DOE. The DOE energy standards have had a large impact in pushing end users to install doors on the medium temperature cases that historically have not included the.

This reduces the amount of refrigerant needed as well as reducing energy demands. (350 Humboldt)

- (466) **Comment(s):** CARB should consider a new rulemaking after the current one to reduce refrigerant leaks and address end-of-life emissions. (EIA)
- (467) **Comment(s):** Training of contractors should be periodic and standardized across the state and could serve as a model for the rest of the nation. (JCI)
- (468) **Comment(s):** Incentives are needed to support the transition the natural refrigerants for AC and spur local manufacturing and innovation. (shecco)
- (469) **Comment(s):** CARB to date has ignored the comments from the fire safety community. (Dodds)
- (470) **Comment(s):** CARB had the opportunity over the 14 years since the passing of AB 32 to be a world leader in F-gas emission reduction generally and HFC mitigation in particular. While we have truly missed the boat in too many cases and this proposal does not go far enough and has many weaknesses, it is important to move forward with this proposal now. (Meggs)
- (471) **Comment(s):** The reason for these failings is in large part the lack of opportunity for staff within the agency to voice concerns and address weaknesses in CARB strategies. I will detail a broad initiative to help prevent these agency weaknesses, which limited our progress on this and many other critical climate needs during open comment later today, a new initiative tentatively named the CARB Staff Protection Act. The initiative proposes: (a) provide a guaranteed mediation opportunity for staff seeking conflict resolution; (2) provide a trusted third-party reporting and mediation opportunity to resolve internal agency accountability issues; and (3) adopt a requirement that new hires and existing staff demonstrate ongoing understanding of and a track record of support for the Agency's mission. (Meggs)
- (472) **Comment(s):** Proposed changes to Clean Vehicle Rebate Project (CVRP). We do not support this year's proposed plug-in electric hybrid vehicle (PHEV) range increase and support a planned increase of PHEV range. (AAI).⁴⁴

E-2. Comments Beyond the Scope of this Rulemaking Received During the First 15-Day Comment Period

CARB staff made no changes based on the comments received below. These comments are either outside the scope of the First 15-Day Notice, not submitted during the comment period, unrelated to changes made during in the First 15-Day

⁴⁴ Mistakenly submitted to HFC 2020 Rulemaking docket, later submitted to correct docket for December 2020 Board Item 20-13-7 "Public Meeting to Consider the Proposed Fiscal Year 2020-2021 Funding Plan for Clean Transportation Incentives."

Notice, or not specifically directed at CARB's proposed action or directed to the procedures followed by CARB in proposing or adopting the action, therefore, CARB is not required to respond.

- (473) **Comment(s):** In Table 1, the criteria related to foams has been modified to focus on 'Foam Systems Used to Manufacture' certain types of foams. Because of this change, the prohibitions are now on a foam system "equipment or product" entered into commerce in the State of California after the effective date, rather than on the foam itself. However, there now seems to be an insufficient link between the new definition of 'foam' and the existing definition of 'foam system.' Suggestions: (a) modify the definition of "Foam System" as follows: "Foam System" means a multipart liquid material that expands when mixed to form a foam solid or flexible substance in which thin films of material separate pockets of gas;" and (b) modify the definition of "Foam" as follows: "Foam" means a product material with a cellular structure formed from a solid or flexible substance in which thin films of material separate pockets of gas and formed via a the foaming process of a foam system using in a variety of materials that undergo hardening via a chemical reaction or phase transition." It seems now the exceptions (e.g., § 95375(b)(2)) remain worded as exceptions to prohibitions on certain foams themselves rather than exceptions to prohibitions on foam systems. (Tokyo)

E-3. Comments Beyond the Scope of this Rulemaking Received During the Second 15-Day Comment Period

CARB staff made no changes based on the comments received below. These comments are either outside the scope of the Second 15-Day Notice, not submitted during the comment period, unrelated to changes made during in the Second 15-Day Notice, or not specifically directed at CARB's proposed action or directed to the procedures followed by CARB in proposing or adopting the action, therefore, CARB is not required to respond.

- (474) **Comment(s):** 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. (Chemours)
- (475) **Comment(s):** 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 GWP less than 150. (Chemours)
- (476) **Comment(s):** 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. The commenter 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. (Chemours)

- (477) **Comment(s):** The ice rink proposal should be returned to the original proposal of GWP less than 750 for new ice rink end use applications based on the following science and facts: (a) new U.S. patent grant on use of CO₂ for an ice-playing surface; (b) industry considerations, including planning that has already occurred; (c) the climate benefits of systems with <750; (d) stakeholder engagement and discussions that were had during previous meetings and workshops; (e) industry did not have enough time to review and comment; (f) lack of independent third party studies on the financial impacts of the change; (g) technology factors, such as synergies, complexities, costs, safety, financial viability; (h) exclusion of factory-built and sealed units; (g) limiting GWP runs counter to ASHRAE; (i) the need for regulatory alignment with Canada; (j) unique challenges in ice rink applications. (Chemours)
- (478) **Comment(s):** A 150 GWP Limit for chillers in new ice rinks introduces safety risks and could increase emissions through efficiency loss. We encourage CARB to reconsider its definition of new equipment and its rule to require a 150 GWP limit for ice rinks in 2024. (Trane)
- (479) **Comment(s):** This request is to extend the start time of the new regulations for at least one if not two years as the refrigeration industry – manufacturers, suppliers, refrigeration contractors, technicians and parts wholesalers are not ready to meet the requirements for refrigerated cold storage systems using CO₂, Ammonia or A2L refrigerants in California for the small and medium sized food processors, distributors and wineries who have been using HFC air-cooled 5, 10, 20, 30 and 40 TR systems. (RESCO)
- (480) **Comment(s):** The A2L refrigerants under 150 GWP that are allowed are partially flammable and probably need building code revisions to be usable in California and may need UL listings. (RESCO)
- (481) **Comment(s):** The suppliers of the refrigeration equipment specifically for CO₂ and Ammonia equipment which require water for refrigerant condensing are focused on the larger projects for the large food processors, distributors, and wineries. (RESCO)
- (482) **Comment(s):** California is in a drought situation and only allowing the natural refrigerants that will require water for condenser cooling and not allowing HFC refrigerants that can be air-cooled used even at the higher ambient temperatures California is now seeing, seems counterproductive at this time. (RESCO)
- (483) **Comment(s):** R-448 and R-449 refrigerants are designed to be used in refrigeration systems without ever being replaced. They only affect the atmosphere if a system leak occurs which should only happen if a system is not properly built and maintained. (RESCO)

- (484) **Comment(s):** Many refrigeration contractors are still unaware of the pending CARB regulations with many users totally in the dark. (RESCO)
- (485) **Comment(s):** A very small number of contractors have people trained on CO₂. This is very important especially for the systems that are designed for transcritical operation - close to 1,800 psi operation on the high side. (RESCO)
- (486) **Comment(s):** COVID significantly impacted the refrigeration industry in 2020 and is still impacting numerous suppliers today including those located outside the U.S., with some having to shut down their facilities if any workers are diagnosed with COVID. (RESCO)
- (487) **Comment(s):** 2021 is turning out to be a banner year for the HFC refrigeration equipment industry – the producers of the 5 to 40 TR systems – due to the slow down during 2020 due to COVID. This is resulting in ship dates that used to be 6-8 weeks extending now to 20 to 24 weeks, and in some cases 12 to 14 weeks, getting close to 30 weeks. (RESCO)
- (488) **Comment(s):** This demand is resulting in significant parts shortages for the HFC manufacturer's and is showing up at refrigeration wholesalers as well as significant price increases – up to 20 to 25 percent for equipment this year. This is putting extra load on the engineering departments – many still working remotely - to find alternate parts or suppliers, which takes them away from working on alternate refrigeration systems to HFC. (RESCO)
- (489) **Comment(s):** At the same time, this increase in demand is creating extra load on local building authorities causing many months permit delays. It appears that some ongoing projects may not get permitted and some not completely manufactured in time to meet the January 1, 2022 date resulting in some legal issues. (RESCO)
- (490) **Comment(s):** Many CO₂ equipment suppliers are now committed with ship dates not available till the second quarter of next year. (RESCO)
- (491) **Comment(s):** This new regulation could affect the quality of the “Cold Chain” one of the major economic strengths of the USA in being able to deliver cold edible food to the consumer safely and consistently from all suppliers. (RESCO)
- (492) **Comment(s):** CO₂ and Ammonia systems are not readily available and economically built to meet these low-capacity systems requirements especially in dense population areas. R-448A or R-449A equipment meets these requirements and therefore needs to be allowed to be used in 2022 and into 2023. (RESCO)
- (493) **Comment(s):** The meaning of 'any geographic location' is not clarified. CARB should clarify the following points: (a) can reclaimer outside the U.S. be certified

by U.S. EPA; and (b) is the sale of equipment with refrigerants reclaimed outside the U.S. allowed? (LG)

- (494) **Comment(s):** CARB should harmonize the requirements for variable refrigerant flow VRF equipment with other air conditioning equipment at 10 percent for 2023, 2024, and with 15 percent in 2025 only. (AHRI)
- (495) **Comment(s):** More accurate growth factor projections, in line with other AC equipment should be applied to VRF. CARB provided growth rates for specific end uses, including 4 percent for AC and 10 percent for VRF. However, due to uncertainty of supply and the challenges of creating a strong new market for reclaimed refrigerants, a lower number should be applied. (AHRI)
- (496) **Comment(s):** The definition of "New Air-conditioning Equipment" should not inadvertently add burdensome recordkeeping requirements for homeowners and technicians. Adding a charge limit to the three-year replacement requirement would address this issue. It should be noted that OEMs cannot manage this as they have no visibility into this calculation. (AHRI)
- (497) **Comment(s):** The definition of "New Air Conditioning Equipment" should add "containing less than 25 pounds of refrigerant charge" to subsections (2) and (3). (AHRI, Trane)
- (498) **Comment(s):** We support the concept of the variance process and ask CARB to simplify the variance process and to clarify the responsibility for the requested variance. It should consider timing to complete the defined forms and the emergency nature of these situations. (AHRI)
- (499) **Comment(s):** It should be clarified that the entity that has responsibility for the issue should request the variance - an end-user, an OEM or the HFC supplier- depending on the situation. It would be helpful to add that clarification as there are compliance obligations for the submitter to compensate for GHG emissions. (AHRI)
- (500) **Comment(s):** CARB should provide VRF and chiller equipment with an exception to the effective date as allowed for commercial refrigeration equipment related to permitted installations. (AHRI)
- (501) **Comment(s):** We support the modified prohibition dates identified in this notice. The January 1, 2023, prohibition date for room/wall/window air conditioning equipment, PTACs, PTHPs, portable AC equipment, and residential dehumidifiers(new) should be contingent upon adoption of the updated Codes and Standards. (Chemours)
- (502) **Comment(s):** The definition of reclaimed refrigerant should 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 HFCs according to the AIM Act. If this definition is not modified, we anticipate an increase of imported refrigerant that is misrepresented as being reclaimed. (Chemours)

- (503) **Comment(s):** The proposal, as currently drafted, allows for HFC material to be recovered from "any geographic location," which, presumably includes locations outside of the United States. Therefore, the proposal would allow a U.S. EPA Certified Reclaimer to establish reclamation operations outside of the United States, recover HFC refrigerants internationally, and then provide those materials to OEMs with international manufacturing operations. Such a program creates a loophole that runs the risk of introducing counterfeit reclaim (i.e., virgin material). Without a plan by the State of California to administer the integrity of such a program, this proposed language has the potential to undermine the original intent of the California Cooling Act. (A-Gas)
- (504) **Comment(s):** Is there a date by which medical lab/scientific appliances need to be converted from HFCs to non GWP refrigerants? (Marvel Refrigeration)
- (505) **Comment(s):** An inquiry on the effective dates of the new CARB rules for commercial refrigeration systems that contain more than 50 pounds of refrigerant. Starting on January 1, 2022, there is a 150 GWP limit for systems in newly constructed and fully remodeled facilities. For a proposed development for a new grocery store and a fully remodeled grocery store, does the effective date of January 1, 2022, apply to projects that submit for a building permit prior to that date? Or is the effective date tied to the date that the equipment is ordered from the manufacturer? (City of Pasadena)
- (506) **Comment(s):** We have been working recently with a number of cold storage customers that have multiple locations within California and around the country. They have used a variety of refrigerants, and have new installations planned. I was wondering if any similar initiatives have been worked on or are being considered for this sector that may parallel what has been done with the Food Retailers, establishing a "fleet GWP average" initiative, etc.? This may be a smaller sector, however these sites have often very large refrigerant charges. I was just wondering if anything was in the works that we should make our customers aware of in assisting them with future planning. (CoolSys)
- (507) **Comment(s):** My understanding is that for major remodels or new stores, we must use refrigerants with GWPs of less than 150 beginning on January 1, 2022. My question is regarding this date, does this mean the manufacturing date of the equipment, or installation of the equipment? (Accutherm Refrigeration)

(508) **Comment(s):** I have a customer who is currently adopting CO₂ systems in some of their stores and is very actively trying to switch his other stores over to CO₂. This customer is also very active and works with us closely to make sure that his stores are leak-tight and are running properly, making all attempts to mitigate leaks. While they are attempting to switch over all possible stores to CO₂, the conversion is a lengthier and more intensive one. Our current concern is one store in particular, which they cannot afford to shut down for a CO₂ conversion, but is in need of a remodel, with cases and evaporators already ordered for a R-448A system. If we were to move forward with an R-448A system, would it have to have plans through plan check by January 1, or be manufactured by January 1, or be installed by January 1? (Accutherm Refrigeration)

IV. Peer Review

Health and Safety Code Section 57004 sets forth requirements for peer review of identified portions of rulemakings proposed by entities within the California Environmental Protection Agency, including CARB. Specifically, the scientific basis or scientific portion of a proposed rule may be subject to this peer review process. CARB determined that this rulemaking does not contain scientific basis or a scientific portion subject to peer review, and thus no peer review as set forth in Health and Safety Code Section 57004 was or needed to be performed.