ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 82

[EPA–HQ–OAR–2014–0198; FRL–9910–19–OAR]

RIN 2060–AS18

Protection of Stratospheric Ozone: Change of Listing Status for Certain Substitutes Under the Significant New Alternatives Policy Program

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of proposed rulemaking.

SUMMARY: Pursuant to the U.S. Environmental Protection Agency's Significant New Alternatives Policy program, this action proposes to change the status of a number of substitutes that were previously listed as acceptable, based on information showing that other substitutes are available for the same uses that pose lower risk overall to human health and/or the environment. Specifically, this action proposes to modify the listings for certain hydrofluorocarbons in various end-uses in the aerosols, refrigeration and air conditioning, and foam blowing sectors. This action also proposes use conditions that would restrict the use of hydrofluorocarbons to those uses where there are not substitutes available or potentially available that reduce overall risk to human health and/or the environment. This action also proposes to change the status from acceptable to unacceptable for certain hydrochlorofluorocarbons being phased out of production under the Montreal Protocol on Substances that Deplete the Ozone Layer and Section 605(a) of the Clean Air Act.

DATES: Comments must be received on or before October 6, 2014. EPA is planning to hold a public hearing to take place on August 27, 2014, starting at 9 a.m. in Room 1153, EPA East (entrance from 1201 Constitution Avenue), Washington, DC and further information will be provided on EPA's Stratospheric Ozone Web site at *www.epa.gov/ozone/snap.*

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OAR–2014–0198, by one of the following methods:

- *www.regulations.gov.* Follow the on-line instructions for submitting comments.
- *Email: A-And-R-Docket@epa.gov.*
- *Mail:* Air and Radiation Docket, Environmental Protection Agency, Mail Code 6102T, 1200 Pennsylvania Ave. NW., Washington, DC 20460, Attention Docket ID No. EPA–HQ–OAR–2014–0198.
- *Hand Delivery:* EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC, Attention Docket ID No. EPA–HQ–OAR–2014–0198. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA–HQ–OAR–2014–0198. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *www.regulations.gov,* including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through *www.regulations.gov* or email. The *www.regulations.gov* Web site is an ''anonymous access'' system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to EPA without going through *www.regulations.gov,* your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional instructions on submitting comments, go to Section I.B. of the **SUPPLEMENTARY INFORMATION** section of this document.

Docket: All documents in the docket are listed in the *www.regulations.gov* index. Although listed in the index, some information is not publicly available, *i.e.,* CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically in *www.regulations.gov* or in hard copy at the Air and Radiation Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Air and Radiation Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: Rebecca von dem Hagen, Stratospheric Protection Division, Office of Atmospheric Programs, Mail Code 6205J, Environmental Protection Agency, 1200 Pennsylvania Ave. NW., Washington, DC 20460; telephone number (202) 343–9445; fax number (202) 343–2338, email address: *vondemhagen.rebecca@epa.gov.* Notices and rulemakings under EPA's Significant New Alternatives Policy (SNAP) program are available on EPA's Stratospheric Ozone Web site at *www.epa.gov/ozone/snap/regs.*

SUPPLEMENTARY INFORMATION:

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I. General Information

A. Executive Summary

This notice of proposed rulemaking would change the status of certain substitutes [1] previously found acceptable under the Significant New Alternatives Policy (SNAP) program. EPA is proposing to modify the listings from acceptable to unacceptable for certain hydrofluorocarbons (HFCs) and HFC blends in aerosol, foam blowing, and air conditioning and refrigerant end-uses where other alternatives are available or potentially available that pose overall lower risk. Per the guiding principle stated above, EPA is considering the intersection between the specific HFC or HFC blend and the particular end-use. This action does not propose that any specific HFCs be unacceptable across all sectors and end-uses. EPA is also not proposing that, for any specific sector, the only acceptable substitutes are HFC-free. EPA recognizes that both fluorinated (e.g., HFCs, hydrofluoroolefins (HFOs)) and non-fluorinated (e.g., hydrocarbons (HCs), carbon dioxide (CO_2)) substitutes are potentially acceptable. Instead, consistent with SNAP's history and Clean Air Act (CAA) Section 612, EPA is proposing these modifications based on the substitutes being considered, the SNAP criteria for evaluation, and the current suite of other available and potentially available substitutes.

EPA is proposing to modify the following listings by end-use:

(1) For aerosol propellants, we are proposing to list, as of January 1, 2016

- HFC–125 as unacceptable;
- HFC–134a as acceptable, subject to use conditions, allowing its use only in specific types of technical and medical aerosols (e.g. metered dose inhalers) (and prohibiting its use in consumer aerosols); and
- HFC–227ea as acceptable, subject to use conditions, allowing its use only in metered dose inhalers.

(2) For motor vehicle air conditioning systems in newly manufactured light-duty vehicles, we are proposing to list

- HFC–134a as unacceptable starting with model year (MY) 2021; and
- The refrigerant blends SP34E, R–426A (also known as RS–24), R–416A (also known as HCFC Blend Beta or FRIGC FR12), R–406A, R–414A (also known as HCFC Blend Xi or GHG–X4), R–414B (also known as HCFC Blend Omicron), HCFC Blend Delta (also known as Free Zone), Freeze 12, GHG–X5, and HCFC Blend Lambda (also known as GHG–HP) as unacceptable starting with MY 2017.

(3) For new and retrofit retail food refrigeration (including stand-alone equipment, condensing units, direct supermarket systems, and indirect supermarket systems) and new and retrofit vending machines, we are proposing to list, as of January 1, 2016

- The HFC blends R–507A and R–404A as unacceptable.

(4) For new and retrofit retail food refrigeration (including direct supermarket systems and indirect supermarket systems), we are proposing to list, as of January 1, 2016

- HFC–227ea, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, and R–434A as unacceptable.

(5) For new stand-alone retail food refrigeration and new vending machines, we are proposing to list, as of January 1, 2016

- HFC–134a and certain other HFC refrigerant blends as unacceptable.

(6) For foam blowing agents, we are proposing to list, as of January 1, 2017, except where allowed under a narrowed use limit,

- HFC–134a and blends thereof as unacceptable in all foam blowing end-uses;
- HFC–143a, HFC–245fa and HFC–365mfc and blends thereof, and the HFC blends Formacel B, and Formacel Z–6 as unacceptable in all foam blowing end-uses where they are currently listed as

[1] The terms ''substitutes'' and ''alternatives'' are used interchangeably.

acceptable, except for spray foam applications; and

- The HFC blend Formacel TI as unacceptable in all foam blowing end-uses where it is currently listed as acceptable.

In general, EPA is proposing modifications to the listings based on the SNAP program's comparative risk framework. The sections that follow provide the analyses supporting the proposed listing modifications and the dates when the modified listings would apply to users of these substitutes. In addition, EPA has prepared supporting documentation on this rule including market characterizations, analyses of costs associated with sector transitions, estimated benefits associated with the transition to alternatives, and potential small business impacts.[2] [3] [4] [5] [6] [7] [8] The emissions reductions from this proposed rule are estimated to be 31 to 42 million metric tons of carbon dioxide equivalent (MMTCO2eq) in 2020. These documents are available in the docket for commenters to review. EPA is planning to prepare a consolidated analysis document.

EPA is also proposing to modify the listings for hydrochlorofluorocarbon (HCFC)–141b, HCFC–142b, and HCFC–22, as well as blends that contain these substances, from acceptable to unacceptable in aerosols, foam blowing agents, fire suppression and explosion protection agents, sterilants, and adhesives, coatings and inks. These modifications reflect the existing regulations promulgated under CAA sections 605(a) and 610(d) codified at 40 CFR part 82 subparts A and C. The modified listings would take effect 60 days following issuance of a final rule promulgating this proposal.

B. Does this action apply to me?

Potential entities that may be affected by this proposed rule include:

TABLE 1—POTENTIALLY REGULATED ENTITIES BY NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM (NAICS) CODE

Category	NAICS Code	Description of regulated entities
Industry	238220	Plumbing, Heating, and Air Conditioning Contractors
Industry	324191	Petroleum Lubricating Oil and Grease Manufacturing
Industry	325199	All Other Basic Organic Chemical Manufacturing
Industry	325412	Pharmaceutical Preparation Manufacturing
Industry	325510	Paint and Coating Manufacturing
Industry	325520	Adhesive Manufacturing
Industry	325612	Polishes and Other Sanitation Goods
Industry	325620	Toilet Preparation Manufacturing
Industry	325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing
Industry	326140	Polystyrene Foam Product Manufacturing
Industry	326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing
Industry	333415	Air Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing
Industry	336211	Motor Vehicle Body Manufacturing
Industry	3363	Motor Vehicle Parts Manufacturing
Industry	339113	Surgical Appliance and Supplies Manufacturing
Retail	423620	Household Appliances, Electric Housewares, and Consumer Electronics Merchant Wholesalers
Retail	423740	Refrigeration Equipment and Supplies Merchant Wholesalers
Retail	44511	Supermarkets and Other Grocery (except Convenience) Stores
Retail	445110	Supermarkets and Other Grocery (except Convenience) Stores
Retail	445120	Convenience Stores
Retail	44521	Meat Markets
Retail	44522	Fish and Seafood Markets
Retail	44523	Fruit and Vegetable Markets
Retail	445291	Baked Goods Stores
Retail	445292	Confectionary and Nut Stores
Retail	445299	All Other Specialty Food Stores
Retail	4453	Beer, Wine, and Liquor Stores
Retail	446110	Pharmacies and Drug Stores
Retail	44711	Gasoline Stations with Convenience Stores
Retail	452910	Warehouse Clubs and Supercenters
Retail	452990	All Other General Merchandise Stores
Services	72111	Hotels (except Casino Hotels) and Motels
Services	72112	Casino Hotels
Retail	72241	Drinking Places (Alcoholic Beverages)
Retail	722513	Limited-Service Restaurants
Retail	722514	Cafeterias, Grill Buffets, and Buffets
Retail	722515	Snack and Nonalcoholic Beverage Bars

This table is not intended to be exhaustive, but rather a guide regarding entities likely to use the substitute whose use is regulated by this action. If you have any questions about whether this action applies to a particular entity,

[2] ICF, 2014a. Market Characterization of the U.S. Aerosols Industry. Prepared for the U.S. Environmental Protection Agency. May, 2014.

[3] ICF, 2014b. Market Characterization of the U.S. Foams Industry. Prepared for the U.S. Environmental Protection Agency. May, 2014.

[4] ICF, 2014c. Market Characterization of the U.S Commercial Refrigeration Industry. Prepared for the U.S. Environmental Protection Agency. May, 2014.

[5] ICF, 2014d. Market Characterization of the Motor Vehicle Air Conditioning Industry. Prepared for the U.S. Environmental Protection Agency. May, 2014.

[6] ICF, 2014f. Economic Impact Screening Analysis for Regulatory Options to Change Listing Status of High-GWP Alternatives. April, 2014.

[7] EPA, 2014. Climate Benefits of the SNAP Program Status Change Rule, June 2014.

[8] ICF, 2014g. Revised Preliminary Cost Analysis for Regulatory Options to Change Listing Status of High-GWP Alternatives. June 2014.

consult the person listed in the above section, **FOR FURTHER INFORMATION CONTACT**.

C. What should I consider as I prepare my comments for EPA?

1. Submitting Confidential Business Information (CBI)

Do not submit confidential information to EPA through *www.regulations.gov* or email. Clearly mark the part or all of the information that you claim to be CBI. For CBI information in a disk or CD–ROM that you mail to EPA, mark the outside of the disk or CD–ROM as CBI and then identify electronically within the disk or CD–ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

2. Tips for Preparing Your Comments

When submitting comments, remember to:

- Identify the rulemaking by docket number and other identifying information (subject heading, **Federal Register** date, and page number).
- Follow directions–The agency may ask you to respond to specific questions or organize comments by referencing a CFR part or section number.
- Explain why you agree or disagree; suggest alternatives and substitute language for your requested changes.
- Describe any assumptions and provide any technical information and/or data that you used.
- If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow for it to be reproduced.
- Provide specific examples to illustrate your concerns and suggest alternatives.
- Explain your views as clearly as possible, avoiding the use of profanity or personal threats.
- Make sure to submit your comments by the comment period deadline.

D. What acronyms and abbreviations are used in the preamble?

Below is a list of acronyms and abbreviations used in the preamble of this document:

ACGIH—American Conference of Governmental Industrial Hygienists
AIHA—American Industrial Hygiene Association
CAA—Clean Air Act
CAS Reg. No.—Chemical Abstracts Service Registry Identification Number
CBI—Confidential Business Information
CFC—Chlorofluorocarbon
CFR—Code of Federal Regulations
CH_4—Methane
CO_2—Carbon dioxide
CO_2eq—Carbon dioxide equivalent
DOE—United States Department of Energy
EIA—Environmental Investigation Agency-US
EO—Executive Order
EPA—United States Environmental Protection Agency
EU—European Union
FDA—United States Food and Drug Administration
FR—**Federal Register**
GHG—Greenhouse gas
Gt—Gigaton
GWP—Global warming potential
HC—Hydrocarbon
HCFC—Hydrochlorofluorocarbon
HFC—Hydrofluorocarbon
HFO—Hydrofluoroolefin
ICF—ICF International, Inc.
ICR—Information collection request
IGSD—Institute for Governance and Sustainable Development
IPCC—Intergovernmental Panel on Climate Change
MDI—metered dose inhaler
MVAC—Motor vehicle air conditioning
N_2—*Nitrogen*
NAICS—North American Industrial Classification System
NIOSH—United States National Institute for Occupational Safety and Health
NRDC—Natural Resources Defense Council
NTTAA—National Technology Transfer and Advancement Act
OEM—Original equipment manufacturer
ODP—Ozone depletion potential
ODS—Ozone-depleting substance
OMB—United States Office of Management and Budget
OSHA—United States Occupational Safety and Health Administration
PEL—Permissible exposure limit
PFC—Perfluorocarbons
ppm—Parts per million
PRA—Paperwork Reduction Act
REL—Recommended exposure limit
RFA—Regulatory Flexibility Act
SF_6— Sulfur hexafluoride
SNAP—Significant New Alternatives Policy
SRES—Special Report on Emissions Scenarios
TLV—Threshold limit value
TWA—Time-weighted average
UMRA—Unfunded Mandates Reform Act
VOC—Volatile organic compounds
WEEL—Workplace Environmental Exposure Limit

II. How does the SNAP program work?

A. What are the statutory requirements and authority for the SNAP program?

Section 612 of the Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (hereafter referred to as EPA or the Agency) to develop a program for evaluating alternatives to ozone-depleting substances. This program is known as the Significant New Alternatives Policy (SNAP) program. The major provisions of section 612 are:

1. Rulemaking

Section 612(c) requires EPA to promulgate rules making it unlawful to replace any class I (e.g., chlorofluorocarbon, halon, carbon tetrachloride, methyl chloroform, methyl bromide, and hydrobromofluorocarbon) or class II (e.g., hydrochlorofluorocarbon) substance with any substitute that the Administrator determines may present adverse effects to human health or the environment where the Administrator has identified an alternative that (1) reduces the overall risk to human health and the environment and (2) is currently or potentially available.

2. Listing of Unacceptable/Acceptable Substitutes

Section 612(c) requires EPA to publish a list of the substitutes that it finds to be unacceptable for specific uses and to publish a corresponding list of acceptable alternatives for specific uses. The list of ''acceptable'' substitutes is found at *www.epa.gov/ozone/snap/lists* and the lists of ''unacceptable,'' ''acceptable subject to use conditions,'' and ''acceptable subject to narrowed use limits'' substitutes are found in the appendices to 40 CFR part 82 subpart G.

3. Petition Process

Section 612(d) grants the right to any person to petition EPA to add a substance to, or delete a substance from, the lists published in accordance with section 612(c). The Agency has 90 days to grant or deny a petition. Where the Agency grants the petition, EPA must publish the revised lists within an additional six months.

4. 90-day Notification

Section 612(e) directs EPA to require any person who produces a chemical substitute for a class I substance to notify the Agency not less than 90 days before new or existing chemicals are introduced into interstate commerce for significant new uses as substitutes for a class I substance. The producer must also provide the Agency with the producer's unpublished health and safety studies on such substitutes.

5. Outreach

Section 612(b)(1) states that the Administrator shall seek to maximize the use of federal research facilities and resources to assist users of class I and II substances in identifying and

developing alternatives to the use of such substances in key commercial applications.

6. Clearinghouse

Section 612(b)(4) requires the Agency to set up a public clearinghouse of alternative chemicals, product substitutes, and alternative manufacturing processes that are available for products and manufacturing processes which use class I and II substances.

B. What are EPA's regulations implementing CAA section 612?

On March 18, 1994, EPA published the original rulemaking (59 FR 13044) which established the process for administering the SNAP program and issued EPA's first lists identifying acceptable and unacceptable substitutes in major industrial use sectors (40 CFR part 82, subpart G). These sectors are the following: Refrigeration and air conditioning; foam blowing; solvents cleaning; fire suppression and explosion protection; sterilants; aerosols; adhesives, coatings and inks; and tobacco expansion. These sectors comprise the principal industrial sectors that historically consumed the largest volumes of ozone-depleting substances (ODS).

C. How do the regulations for the SNAP program work?

Under the SNAP regulations, anyone who produces a substitute to replace a class I or II ODS in one of the eight major industrial use sectors must provide the Agency with notice and the required health and safety information on the substitute at least 90 days before introducing it into interstate commerce for significant new use as an alternative. 40 CFR 82.176(a). While this requirement typically applies to chemical manufacturers as the person likely to be planning to introduce the substitute into interstate commerce,[9] it may also apply to importers, formulators, equipment manufacturers, or end-users [10] when they are responsible for introducing a substitute into commerce. The 90-day SNAP review process begins once EPA receives the submission and determines that the submission includes complete and adequate data. 40 CFR 82.180(a). The CAA and the SNAP regulations, 40 CFR 82.174(a), prohibit use of a substitute earlier than 90 days after a complete submission has been provided to the Agency.

The Agency has identified four possible decision categories for substitute submissions: Acceptable; acceptable subject to use conditions; acceptable subject to narrowed use limits; and unacceptable.[11] 40 CFR 82.180(b). Use conditions and narrowed use limits are both considered ''use restrictions'' and are explained below. Substitutes that are deemed acceptable without use conditions can be used for all applications within the relevant end-uses within the sector and without limits under SNAP on how they may be used. Substitutes that are acceptable subject to use restrictions may be used only in accordance with those restrictions. Substitutes that are found to be unacceptable may not be used after the date specified in the rulemaking adding such substitute to the list of unacceptable substitutes.[12]

After reviewing a substitute, the Agency may determine that a substitute is acceptable only if certain conditions in the way that the substitute is used are met to ensure risks to human health and the environment are not significantly greater than other available substitutes. EPA describes such substitutes as ''acceptable subject to use conditions.'' Entities that use these substitutes without meeting the associated use conditions are in violation of section 612 of the Clean Air Act and EPA's SNAP regulations. 40 CFR 82.174(c).

For some substitutes, the Agency may permit a narrow range of use within an end-use or sector. For example, the Agency may limit the use of a substitute to certain end-uses or specific applications within an industry sector. The Agency requires a user of a narrowed use substitute to demonstrate that no other acceptable substitutes are available for their specific application. EPA describes these substitutes as ''acceptable subject to narrowed use limits.'' A person using a substitute that is acceptable subject to narrowed use limits in applications and end-uses that are not consistent with the narrowed use limit is using these substitutes in violation of section 612 of the CAA and EPA's SNAP regulations. 40 CFR 82.174(c).

The section 612 mandate for EPA to prohibit the use of a substitute that may present risk to human health or the environment where a lower risk alternative is available or potentially available [13] provides EPA with the authority to change the listing status of a particular substitute if such a change is justified by new information or changed circumstance.

The Agency publishes its SNAP program decisions in the **Federal Register**. EPA uses notice-and-comment rulemaking to place any alternative on the list of prohibited substitutes, to list a substitute as acceptable only subject to use conditions or narrowed use limits, or to remove a substitute from either the list of prohibited or acceptable substitutes.

In contrast, EPA publishes ''notices of acceptability'' to notify the public of substitutes that are deemed acceptable with no restrictions. As described in the preamble to the rule initially implementing the SNAP program (59 FR 13044; March 18, 1994), EPA does not believe that rulemaking procedures are necessary to list substitutes that are acceptable without restrictions because such listings neither impose any sanction nor prevent anyone from using a substitute.

Many SNAP listings include ''comments'' or ''further information'' to provide additional information on substitutes. Since this additional information is not part of the regulatory decision, these statements are not binding for use of the substitute under the SNAP program. However, regulatory requirements so listed are binding under other regulatory programs (e.g., worker protection regulations promulgated by the U.S. Occupational Safety and Health

[9] As defined at 40 CFR 82.104 ''interstate commerce'' means the distribution or transportation of any product between one state, territory, possession or the District of Columbia, and another state, territory, possession or the District of Columbia, or the sale, use or manufacture of any product in more than one state, territory, possession or District of Columbia. The entry points for which a product is introduced into interstate commerce are the release of a product from the facility in which the product was manufactured, the entry into a warehouse from which the domestic manufacturer releases the product for sale or distribution, and at the site of United States Customs clearance.

[10] As defined at 40 CFR 82.172 ''end-use'' means processes or classes of specific applications within major industrial sectors where a substitute is used to replace an ozone-depleting substance.

[11] The SNAP regulations also include ''pending,'' referring to submissions for which EPA has not reached a determination, under this provision.

[12] As defined at 40 CFR 82.172, ''use'' means any use of a substitute for a Class I or Class II ozone-depleting compound, including but not limited to use in a manufacturing process or product, in consumption by the end-user, or in intermediate uses, such as formulation or packaging for other subsequent uses. This definition of use encompasses manufacturing process of products both for domestic use and for export. Substitutes manufactured within the United States exclusively for export are subject to SNAP requirements since the definition of use in the rule includes use in the manufacturing process, which occurs within the United States.

[13] In addition to acceptable commercially available substitutes, the SNAP program may consider potentially available substitutes. The SNAP program's definition of ''potentially available'' is ''any alternative for which adequate health, safety, and environmental data, as required for the SNAP notification process, exist to make a determination of acceptability, and which the Agency reasonably believes to be technically feasible, even if not all testing has yet been completed and the alternative is not yet produced or sold.'' (40 CFR 82.172)

Administration (OSHA)). The ''further information'' classification does not necessarily include all other legal obligations pertaining to the use of the substitute. While the items listed are not legally binding under the SNAP program, EPA encourages users of substitutes to apply all statements in the ''further information'' column in their use of these substitutes. In many instances, the information simply refers to sound operating practices that have already been identified in existing industry and/or building codes or standards. Thus, many of the statements, if adopted, would not require the affected user to make significant changes in existing operating practices.

D. What are the guiding principles of the SNAP program?

The seven guiding principles of the SNAP program, elaborated in the preamble to the initial SNAP rule and based on section 612, are discussed below.

• *Evaluate substitutes within a comparative risk framework*

The SNAP program evaluates the risk of alternative compounds compared to available or potentially available substitutes to the ozone depleting compounds which they are intended to replace. The risk factors that are considered include ozone depletion potential as well as flammability, toxicity, occupational health and safety, and contributions to climate change and other environmental factors.

• *Do not require that substitutes be risk free to be found acceptable*

For substitutes to be found acceptable they must pose less risk than other substitutes, but they do not have to be risk free. Where risks of a substitute would otherwise be higher than other substitutes, EPA may find these alternatives acceptable subject to use conditions or narrowed use limits that would manage the risk.

• *Restrict those substitutes that are significantly worse*

EPA does not intend to restrict a substitute if it has only marginally greater risk. Drawing fine distinctions would be extremely difficult. The Agency also does not want to intercede in the market's choice of substitutes by listing as unacceptable all but a few substitutes for each end-use. Thus, the Agency will not list a potential substitute as unacceptable unless EPA determines that the substitute is significantly more harmful to human health or the environment than other available or potentially available alternatives.

• *Evaluate risks by use*

Central to SNAP's evaluations is the intersection between the characteristics of the substitute itself and its specific end-use application. Section 612 requires that substitutes be evaluated by use. Environmental and human health exposures can vary significantly depending on the particular application of a substitute. Thus, the risk characterizations must be designed to represent differences in the environmental and human health effects associated with diverse uses. This approach cannot, however, imply fundamental tradeoffs with respect to different types of risk to either the environment or to human health.

• *Provide the regulated community with information as soon as possible*

The Agency recognizes the need to provide the regulated community with information on the acceptability of various substitutes as soon as possible. To do so, EPA issues notices or determinations of acceptability and rules identifying substitutes as unacceptable, acceptable to use conditions or acceptable subject to narrowed use limits in the **Federal Register**. In addition, we maintain lists of acceptable and unacceptable alternatives on our Web site, *www.epa.gov/ozone/snap.*

• *Do not endorse products manufactured by specific companies*

The Agency does not issue company-specific product endorsements. In many cases, the Agency may base its analysis on data received on individual products, but the addition of a substitute to the acceptable list based on that analysis does not represent an endorsement of that company's products.

• *Defer to other environmental regulations when warranted*

In some cases, EPA and other federal agencies have developed extensive regulations under other sections of the CAA or other statutes that address any potential environmental impacts that may result from the use of alternatives to class I and class II substances. For example, use of some substitutes may in some cases entail increased use of chemicals that contribute to tropospheric air pollution. The SNAP program takes existing regulations under other programs into account when reviewing substitutes.

E. What are EPA's criteria for evaluating substitutes under the SNAP program?

EPA applies the same criteria for determining whether a substitute is acceptable or unacceptable. These criteria, which can be found at § 82.180(a)(7), include atmospheric effects and related health and environmental impacts, ecosystem risks, consumer risks, flammability, and cost and availability of the substitute. To enable EPA to assess these criteria, we require submitters to include various information including ozone depletion potential (ODP), global warming potential (GWP), toxicity, flammability, and the potential for human exposure.

When evaluating potential substitutes, EPA evaluates these criteria in the following groupings:

• *Atmospheric effects*—The SNAP program evaluates the potential contributions to both ozone depletion and climate change. The SNAP program considers the ozone depletion potential and the 100-year integrated GWP of compounds to assess atmospheric effects.

• *Exposure assessments*—The SNAP program uses exposure assessments to estimate concentration levels of substitutes to which workers, consumers, the general population, and environmental receptors may be exposed over a determined period of time. These assessments are based on personal monitoring data or area sampling data if available. Exposure assessments may be conducted for many types of releases including:

(1) Releases in the workplace and in homes;

(2) Releases to ambient air and surface water;

(3) Releases from the management of solid wastes.

• *Toxicity data*—The SNAP program uses toxicity data to assess the possible health and environmental effects of exposure to substitutes. We use broad health-based criteria such as:

(1) Permissible Exposure Limits (PELs) for occupational exposure;

(2) Inhalation reference concentrations (RfCs) for non-carcinogenic effects on the general population;

(3) Cancer slope factors for carcinogenic risk to members of the general population.

When considering risks in the workplace, if OSHA has not issued a PEL for a compound, EPA then considers Recommended Exposure Limits from the National Institute for Occupational Safety and Health, Workplace Environmental Exposure Limits (WEELs) set by the American Industrial Hygiene Association, or Threshold Limit Values set by the American Conference of Governmental Industrial Hygienists. If limits for occupational exposure or exposure to the general population are not already established, then EPA derives these values following the Agency's peer reviewed guidelines. Exposure

information is combined with toxicity information to explore any basis for concern. Toxicity data are used with existing EPA guidelines to develop health-based limits for interim use in these risk characterizations.

• *Flammability*—The SNAP program examines flammability as a safety concern for workers and consumers. EPA assesses flammability risk using data on:

(1) Flash point and flammability limits (e.g. OSHA flammability/combustibility classifications);

(2) Data on testing of blends with flammable components;

(3) Test data on flammability in consumer applications conducted by independent laboratories; and

(4) Information on flammability risk mitigation techniques.

• *Other environmental impacts*—The SNAP program also examines other potential environmental impacts such as ecotoxicity and local air quality impacts. A compound that is likely to be discharged to water may be evaluated for impacts on aquatic life. Some substitutes are volatile organic compounds (VOCs). EPA also notes whenever a potential substitute is considered a hazardous or toxic air pollutant (under CAA sections 112 (b) and 202 (l)) or hazardous waste under the Resource Conservation and Recovery Act subtitle C regulations.

Over the past twenty years, the menu of substitutes has become much broader and a great deal of new information has been developed on many substitutes. Because the overall goal of the SNAP program is to ensure that substitutes listed as acceptable do not pose significantly greater risk to human health and the environment than other available substitutes, the SNAP criteria should be informed by our current overall understanding of environmental and human health impacts and our experience with and current knowledge about available and potentially available substitutes. Over time, the range of substitutes reviewed by SNAP has changed, and, at the same time, scientific approaches have evolved to more accurately assess the potential environmental and human health impacts of these chemicals and alternative technologies.

F. How are SNAP determinations updated?

Three mechanisms exist for modifying the list of SNAP determinations. First, under section 612(d), the Agency must review and either grant or deny petitions to add or delete substances from the SNAP list of acceptable or unacceptable substitutes. That provision allows any person to petition the Administrator to add a substance to the list of acceptable or unacceptable substitutes or to remove a substance from either list. The second means is through the notifications which must be submitted to EPA 90 days before introduction of a substitute into interstate commerce for significant new use as an alternative to a class I or class II substance. These 90-day notifications are required by section 612(e) of the CAA for producers of substitutes to class I substances for new uses and, in all other cases, by EPA regulations issued under sections 114 and 301 of the Act to implement section 612(c).

Finally, we interpret the section 612 mandate to find substitutes acceptable or unacceptable to include the authority to act on our own to add or remove a substance from the SNAP lists. In determining whether to add or remove a substance from the SNAP lists, we consider whether there are other available substitutes that pose a lower risk to human health and the environment. In determining whether to modify a listing of a substitute we consider new data not considered at the time of our original listing decision, including information on new substitutes and new information on substitutes previously reviewed.

G. What does EPA consider in deciding whether to modify a determination?

As described in this document and elsewhere, including in the original SNAP rulemaking published in the **Federal Register** on March 18, 1994 (59 FR 13044), section 612 of the CAA requires EPA to list as unacceptable any substitute substance where it finds that there are other substitutes currently or potentially available that reduce overall risk to human health and the environment. In addition to comparing the human health and environmental effects of other available or potentially available substitutes for the same end-uses, we also compare substitutes to the ozone-depleting substances being phased out under the *Montreal Protocol on Substances that Deplete the Ozone Layer* (Montreal Protocol) and under the CAA.

The original SNAP rule included submission requirements and presented the environmental and health risk factors that the SNAP program considers in its comparative risk framework. Environmental and human health exposures can vary significantly depending on the particular application of a substitute; therefore, EPA makes decisions based on the particular end-use where a substitute is to be used. EPA has, in many cases, found certain substitutes acceptable only for limited end-uses or subject to use restrictions.

In May 2013 EPA stated:

> *EPA recognizes that during the nearly two-decade long history of the SNAP program, new alternatives and new information about alternatives have emerged. To the extent possible, EPA considers new information and improved understanding of the risk factors for the environment and human health in the context of the available or potentially available alternatives for a given use.* (78 FR 29035)

It has now been about twenty years since the initial SNAP rule was promulgated. In that period, the menu of available alternatives has expanded greatly and now includes many substitutes with diverse characteristics and effects on human health and the environment. When the SNAP program began, the number of substitutes available for consideration was, for many end-uses, somewhat limited. While the SNAP program's initial comparative assessments of overall risk to human health and the environment were rigorous, often there were few substitutes to apply the comparative assessment. The immediacy of the class I phaseout often meant that SNAP listed class II ODS (i.e., HCFCs) as acceptable, recognizing that they too would be phased out and were only an interim solution. Other Title VI provisions such as the section 610 Nonessential Products Ban and the section 605 Use Restriction meant a listing under the SNAP program did not convey permanence.

Since EPA issued the initial SNAP rule in 1994, the Agency has issued 18 rules and 28 notices expanding the menu of options for all SNAP sectors and end-uses. Comparisons today are to a broader range of options—both chemical and non-chemical—than at the inception of the SNAP program. Industry experience with these substitutes has also grown during the history of the program. This varies by sector and by end-use.

In addition to an expanding menu of substitutes, developments over the past 20 years have improved our understanding of global environmental issues. With regards to that information, many of the substitute-specific actions proposed in this rule have undergone comparative assessments that consider our evolving understanding of climate change. GWPs and climate effects are not new elements in our evaluation framework, but along with all of our review criteria the amount and quality of information has expanded.

To the extent possible, EPA's ongoing management of the SNAP program considers new information and

improved understanding of the risk to the environment and human health. EPA previously has taken several actions revising listing determinations from acceptable or acceptable with use conditions to unacceptable based on information made available to EPA after a listing was issued. For example, on January 26, 1999, EPA listed the refrigerant known by the trade name MT–31 as unacceptable for all refrigeration and air conditioning end-uses. EPA previously listed this blend as an acceptable substitute in various end-uses within the refrigeration and air conditioning sector (June 3, 1997; 62 FR 30275). Based on new information about the toxicity of one of the chemicals in the blend, EPA subsequently removed MT–31 from the list of acceptable substitutes and listed it as unacceptable in all refrigeration and air conditioning end-uses (January 26, 1999; 64 FR 3861).

Another example of EPA revising a listing determination occurred in 2007 when EPA listed HCFC–22 and HCFC–142b as unacceptable for use in the foam sector (March 28, 2007; 72 FR 14432). These HCFCs, which are ozone depleting and subject to a global production phaseout, were initially listed as acceptable substitutes since they had a lower ODP than the substances they were replacing and there were no other available substitutes that posed lower risk at the time of EPA's listing decision. HCFCs offered a path forward for some sectors and end-uses at a time when substitutes were far more limited. In light of the expanded availability of alternative substitutes with lower overall risk to human health and the environment in specific foam end-uses, and taking into account the 2010 class II ODS phasedown step, EPA changed the listing for these HCFCs in these end-uses from acceptable to unacceptable. In that rule, EPA noted that continued use of these HCFCs would contribute to unnecessary depletion of the ozone layer and delay the transition to substitutes that pose lower overall risk to human health and the environment. EPA allowed existing users to continue use for a limited time to ensure that they could adjust their manufacturing processes to safely accommodate the use of other substitutes.

H. Where can I get additional information about the SNAP program?

For copies of the comprehensive SNAP lists of substitutes or additional information on SNAP, refer to EPA's Web site at *www.epa.gov/ozone/snap.* For more information on the Agency's process for administering the SNAP program or criteria for evaluation of substitutes, refer to the SNAP final rulemaking published March 18, 1994 (59 FR 13044), codified at 40 CFR part 82, subpart G. A complete chronology of SNAP decisions and the appropriate citations are found at *www.epa.gov/ozone/snap/chron.html.*

III. What actions and information related to greenhouse gases have bearing on this proposed decision to modify prior SNAP determinations?

GWP, along with other criteria, is a factor in the overall evaluation of alternatives under the SNAP program. During the past two decades, the general science on climate change and the potential contributions of greenhouse gases (GHGs) such as HFCs to climate change have become better understood.

On December 7, 2009, at 74 FR 66496, the Administrator issued two distinct findings regarding GHGs under section 202(a) of the Clean Air Act [14]:

- *Endangerment Finding:* the current and projected concentrations of the six key well-mixed greenhouse gases in the atmosphere — CO_2, methane (CH_4), nitrous oxide (N_2O), HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) — threaten the public health and welfare of current and future generations.
- *Cause or Contribute Finding:* the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

Like the ODSs they replace, HFCs are potent GHGs.[15] Though they represent a small fraction of the current total volume of GHG emissions, their warming impact is very strong because they can remain trapped in the atmosphere for up to 250+ years impacting climate change 20,000 times more powerfully than CO_2, and their emissions are projected to accelerate over the next several decades if left unregulated. In the United States, emissions of HFCs are increasing more quickly than those of any other GHGs, and globally they are increasing 10–15% annually.[16] At that rate, emissions are projected to double by 2020 and triple by 2030.[17] HFCs are rapidly accumulating in the atmosphere. The atmospheric concentration of HFC–134a, the most abundant HFC, has increased by about 10% per year from 2006 to 2012, and the concentrations of HFC–143a and HFC–125 have risen over 13% and 16% per year from 2007–2011, respectively.[18] [19]

Annual global emissions of HFCs are projected to rise to about 6.4 to 9.9 Gt CO_2eq in 2050 [20], which is comparable to the drop in annual GHG emissions from ODS of 8.0 GtCO_2eq between 1988 and 2010 (UNEP, 2011). By 2050, the buildup of HFCs in the atmosphere is projected to increase radiative forcing by up to 0.4 W m^2. This increase may be as much as one-fifth to one-quarter of the expected increase in radiative forcing due to the buildup of CO_2 since 2000, according to the IPCC's Special Report on Emissions Scenarios (SRES) (UNEP, 2011). To appreciate the significance of the effect of projected HFC emissions within the context of all GHGs, HFCs would be equivalent to 5 to 12% of the CO_2 emissions in 2050 based on the IPCC's highest CO_2 emissions scenario and equivalent to 27 to 69% of CO_2 emissions based on the IPCC's lowest CO_2 emissions pathway.[21] [22] Additional information concerning the peer-reviewed scientific literature and emission scenarios is available in the docket for this rulemaking.

[14] The relevant scientific and technical information summarized to support the Endangerment Finding and the Cause or Contribute Finding can be found at: *www.epa.gov/climatechange/Downloads/endangerment/Endangerment_TSD.pdf*

[15] IPCC/TEAP (2005) Special Report: Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons (Cambridge Univ Press, New York).

[16] UNEP 2011. HFCs: A Critical Link in Protecting Climate and the Ozone Layer. United Nations Environment Programme.

[17] Akerman, Nancy H. Hydrofluorocarbons and Climate Change: Summaries of Recent Scientific and Papers, 2013.

[18] Montzka, S.A.: HFCs in the Atmosphere: Concentrations, Emissions and Impacts, ASHRAE/NIST Conference 2012.

[19] NOAA data at *ftp://ftp.cmdl.noaa.gov/hats/hfcs/.*

[20] Velders, G. J. M., D. W. Fahey, J. S. Daniel, M. McFarland, S. O. Andersen (2009) The large contribution of projected HFC emissions to future climate forcing. *Proceedings of the National Academy of Sciences USA* 106: 10949–10954.

[21] HFCs: A Critical Link in Protecting Climate and the Ozone Layer. United Nations Environment Programme (UNEP), 2011, 36pp

[22] IPCC, 2013: Annex II: Climate System Scenario Tables [Prather, M., G. Flato, P. Friedlingstein, C. Jones, J.-F. Lamarque, H. Liao and P. Rasch (eds.)]. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IV. What petitions has EPA received requesting a change in listing status for substitutes with a high global warming potential?

A. Summary of Petitions

EPA received three petitions requesting EPA to modify certain acceptability listings of HFC–134a and HFC–134a blends. The first petition was submitted on May 7, 2010, by Natural Resources Defense Council (NRDC) on behalf of NRDC, the Institute for Governance and Sustainable Development (IGSD), and the Environmental Investigation Agency-US (EIA). The petition requested that EPA remove HFC–134a from the list of acceptable substitutes for ODS and move it to the list of unacceptable substitutes in multiple uses. The petitioners subsequently clarified that they were requesting this change for the use of HFC–134a in new passenger cars and light-duty trucks, non-medical aerosols, and for certain refrigeration and foam blowing end-uses. In support of their petition, the petitioners identified other substitutes for use in motor vehicle air conditioning (MVAC) and other sectors, and claimed that these other substitutes present much lower risks to human health and environment than HFC–134a.

On February 14, 2011, EPA found the petition complete for MVAC in new passenger cars and light-duty vehicles and determined it was incomplete for other uses of HFC–134a. EPA noted in its response that, at a future date, the Agency would initiate a notice-and-comment rulemaking in response to the one complete aspect of the petition, noting in particular that EPA would evaluate and take comment on many factors, including, but not limited to, the timeframe for introduction of newer substitutes for MVAC systems into the automotive market and potential lead time for manufacturers of motor vehicles to accommodate substitutes. This proposed rule responds to the aspect of that petition that we found complete.

On April 26, 2012, EPA received a petition from EIA. EIA stated that, in light of the comparative nature of the SNAP program's evaluation of substitutes and given that other acceptable substitutes are on the market or soon to be available, EPA should remove HFC–134a and HFC–134a blends from the list of acceptable substitutes for uses where EPA found CFCs and HCFCs to be nonessential under section 610 of the Act. EIA also requested that the schedule for moving HFC–134a and HFC–134a blends from the list of acceptable to unacceptable substitutes be based on the ''most rapidly feasible transitions to one or more of the'' acceptable substitutes for each use. The petitioner noted that initial approvals of HFC–134a for a number of end-uses occurred in the 1990s and were based on the assessment made then that (1) HFC–134a does not contribute to ozone depletion; (2) HFC–134a's GWP and atmospheric lifetime were close to those of other substitutes that had been determined to be acceptable for the end-uses; and (3) HFC–134a is not flammable, and its toxicity is low.[23] The petitioner stated that the analysis used in the listing decisions may have been appropriate in the 1990s but was no longer reflected accurately given the range of other available or potentially available substitutes at present.

In addition to petitioning EPA for action under SNAP, the petitioner requested that the section 610 Nonessential Products Ban be extended to HFC–134a and HFC–134a blends for aerosols and pressurized dispensers (including tire inflators); foam blowing agents; novelty products (including propelled plastic party streamers, web string, artificial snow, specialty paints and excrement ''poop'' freeze); noise horns (including marine safety noise horns, sporting event noise horns, personal safety noise horns, wall-mounted industrial noise horns used as alarms in factories and other work areas, and intruder noise horns used as alarms in homes and cars); foam and refrigerants in new domestic refrigerators and freezers and other retail stand-alone coolers and freezers; and cleaning fluids for noncommercial electronic, photographic, and other equipment.

On August 7, 2012, EPA notified the petitioner that this petition was incomplete. EPA and the petitioner have exchanged further correspondence that can be found in the docket. Although EPA has found the petition incomplete, EPA's action in this proposal may be considered responsive to certain aspects of the petitions given EPA is proposing to change the listing of certain HFCs used in aerosols and foams from acceptable to unacceptable for most uses, and proposing to place use conditions on the remaining aerosol uses.

A third petition was filed on April 27, 2012, by NRDC, EIA and IGSD. They requested that EPA:

- Remove HFC–134a from the list of acceptable substitutes for CFC–12 in household refrigerators and freezers and stand-alone retail food refrigerators and freezers;
- Restrict the sales of SNAP-listed refrigerants to all except certified technicians with access to service tools required under existing EPA regulations;
- Adopt a standardized procedure to determine the speed of transition from obsolete high-GWP HFCs to next-generation alternatives and substitutes;
- Remove, in addition to HFC–134a, all other refrigerants with 100-year GWPs greater than 150 from the acceptable substitutes list for household refrigerators and freezers and stand-alone retail food refrigerators and freezers.

On August 7, 2013, EPA found this petition to be incomplete. EPA and the petitioner have exchanged further correspondence that can be found in the docket. Although EPA has found the petition incomplete, EPA's action in this proposal may be considered responsive to certain aspects of the petition, given EPA is proposing to change the listing of HFC–134a from acceptable to unacceptable for new stand-alone retail food refrigerators and freezers, as well as changing the listing of a number of refrigerant blends with higher GWPs for new and retrofit stand-alone retail food refrigerators and freezers.

B. How Today's Action Relates to Petitions

This action primarily recognizes a call in the President's Climate Action Plan announced June 2013:

> To reduce emissions of HFCs, the United States can and will lead both through international diplomacy as well as domestic actions . . . Moving forward, the Environmental Protection Agency will use its authority through the Significant New Alternatives Policy Program to encourage private sector investment in low-emissions technology by identifying and approving climate-friendly chemicals while prohibiting certain uses of the most harmful chemical alternatives.

The Climate Action Plan also states ''to reduce emissions of HFCs, the United States can and will lead both through international diplomacy as well as domestic actions.'' This proposed rule is part of our domestic commitment to take action now and, by doing so, also supporting efforts to secure a global HFC phasedown. For the past five years, the United States, Canada, and Mexico have proposed an amendment to the Montreal Protocol to phase down the production and consumption of HFCs. Global benefits of the proposal would yield significant reductions of over 90 gigatons of carbon dioxide equivalent CO2eq through 2050. The United States,

[23] See, e.g., 60 FR at 31097.

the European Union, Japan and other countries are all taking actions that will promote the uptake of low-GWP alternatives and reduce use and emissions of high-GWP HFCs.

This proposal responds to the President's Climate Action Plan and also addresses certain aspects of the three petitions referred to above. First, this action responds to the one aspect of the three petitions that EPA found complete, namely petitioners' request that EPA change the listing of HFC–134a from acceptable to unacceptable in new MVACs. (See section V.B. in today's notice.) While EPA found all remaining issues in the three petitions incomplete with respect to the other end-uses, EPA has independently acquired sufficient information to address certain other requests made by the petitioners regarding listing high GWP HFCs as unacceptable. Specifically, based on our review of the aerosols, foams, and air conditioning and refrigeration sectors, we are proposing to revise the listings for a number of substitutes from acceptable to acceptable subject to use conditions, or unacceptable. (See sections V.A., V.C., and V.D. of today's notice.) These substitutes have high GWPs as compared with other available or potentially available substitutes in those end–uses and pose significantly greater risk overall to human health and the environment. EPA considers the intersection between the specific HFC or HFC blend and the particular end-use. This action does not propose that any specific HFC be unacceptable across all sectors and end-uses. EPA is also not proposing that, for any specific sector, the only acceptable substitutes are HFC-free. EPA recognizes that both fluorinated (e.g., HFCs, HFOs and non-fluorinated (e.g., HCs, CO_2) substitutes are potentially acceptable. Instead, consistent with SNAP's history and Clean Air Act (CAA) Section 612, EPA is proposing these modifications, and will consider future modifications, based on the substitutes being considered, the SNAP criteria for evaluation, and the current suite of other available and potentially available substitutes in specific sectors and end-uses.

EPA recently issued a proposed rule (July 9, 2014; 79 FR 38811) that would list as acceptable subject to use conditions a group of refrigeration and air-conditioning alternatives that have been submitted and reviewed under the SNAP program. That rule would enhance the SNAP menu of acceptable alternatives for a number of related end-uses by proposing to add several alternatives as acceptable subject to use conditions.

As noted previously, to date, EPA has considered approximately 400 alternatives. This level of development work serves as a clear demonstration of the efforts of industry to commercialize alternatives that continue to reduce overall risk and meet the needs of a wide range of consumers.

Throughout the process of our discussions with the regulated community on the SNAP related aspects of the President's Climate Action Plan, we have sought to convey our continued understanding of the role that certainty plays in enabling this robust development and uptake of alternatives. Unfortunately, some of the key strengths of the SNAP program, such as its chemical and end-use specific consideration, its multi criteria basis for action, and its petition process tend to militate against some measures that could provide more certainty, such as bright line cut offs. That being said we do believe that the proposals we are making today, and future proposals we may make, may provide some guidelines on how EPA intends to apply specific criteria in individual end-uses. In addition, we remain committed to continuing our outreach efforts and to sharing our thinking at the earliest moment practicable on any future actions we might consider. Finally, and as it relates to potential future actions that that EPA might consider under the SNAP program, the Agency continues to welcome comments and ideas on measures we might consider within the SNAP context to provide greater certainty to both producers and consumers in SNAP regulated industrial sectors.

V. What is EPA proposing for HFCs?

EPA is proposing to modify the listings from acceptable to unacceptable for certain HFCs and HFC blends in aerosol, foam blowing, and air conditioning and refrigerant end-uses where other alternatives are available or potentially available that pose overall lower risk. Per the guiding principle stated above, EPA is considering the intersection between the specific HFC or HFC blend and the particular end-use. This action does not propose that any specific HFCs be unacceptable across all sectors and end-uses. EPA is also not proposing that, for any specific sector, the only acceptable substitutes are HFC-free. EPA recognizes that both fluorinated (e.g., HFCs, HFOs) and non-fluorinated (e.g., HCs, CO_2) substitutes are potentially acceptable. Instead, consistent with SNAP's history and CAA Section 612, EPA is proposing these modifications based on the substitutes being considered, the SNAP criteria for evaluation, and the current suite of other available and potentially available substitutes.

EPA is proposing to modify the following listings by end-use:

(1) For aerosol propellants, we are proposing to list, as of January 1, 2016

- HFC–125 as unacceptable;
- HFC–134a as acceptable, subject to use conditions, allowing its use only in specific types of technical and medical aerosols (e.g. metered dose inhalers) (and prohibiting its use in consumer aerosols); and
- HFC–227ea as acceptable, subject to use conditions, allowing its use only in metered dose inhalers.

(2) For motor vehicle air conditioning systems in newly manufactured light-duty vehicles, we are proposing to list

- HFC–134a as unacceptable starting with model year MY 2021; and
- The refrigerant blends SP34E, R–426A (also known as RS–24), R–416A (also known as HCFC Blend Beta or FRIGC FR12), R–406A, R–414A (also known as HCFC Blend Xi or GHG–X4), R–414B (also known as HCFC Blend Omicron), HCFC Blend Delta (also known as Free Zone), Freeze 12, GHG–X5, and HCFC Blend Lambda (also known as GHG–HP) as unacceptable starting with MY 2017.

(3) For new and retrofit retail food refrigeration (including stand-alone equipment, condensing units, direct supermarket systems, and indirect supermarket systems) and new and retrofit vending machines, we are proposing to list, as of January 1, 2016

- The HFC blends R–507A and R–404A as unacceptable.

(4) For new and retrofit retail food refrigeration (including direct supermarket systems and indirect supermarket systems), we are proposing to list, as of January 1, 2016

- HFC–227ea, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, and R–434A as unacceptable.

(5) For new stand-alone retail food refrigeration and new vending machines, we are proposing to list, as of January 1, 2016

- HFC–134a and certain other HFC refrigerant blends as unacceptable.

(6) For foam blowing agents, we are proposing to list, as of January 1, 2017, except where allowed under a narrowed use limit,

- HFC–134a and blends thereof as unacceptable in all foam-blowing end-uses;
- HFC–143a, HFC–245fa and HFC–365mfc and blends thereof, and the HFC blends Formacel B, and Formacel Z–6 as unacceptable in all foam blowing end-uses where they are currently listed as acceptable, except for spray foam applications; and

• The HFC blend Formacel TI as unacceptable in all foam blowing end-uses where it is currently listed as acceptable.

In general, the dates in this proposal for modifying the SNAP listings are based on information concerning the availability of alternatives with lower overall risk to human health and the environment for the end-uses considered. EPA is requesting comment on the proposed dates. As noted in the Regulatory Flexibility Act discussion in section IX of this preamble, EPA would like information on technical challenges that may exist. EPA is particularly interested in information concerning the supply of substitutes in sufficient quantities to meet the dates proposed in this action. EPA notes that several of the end-uses could be broken down further. EPA could consider adopting temporary narrowed use limits for a specific application of an end-use if the Agency determined that substitutes would be available for all but that specific application as of a particular date. For other applications in that end-use, the rule would list the substitute as unacceptable as of that date. For the specific application at issue, the rule could contain both a temporary narrowed use limit with an expiration date and a listing as unacceptable upon the expiration of the narrowed use limit. While the temporary narrowed use limit was in place, only persons using a substitute in the end-use for that specific application would be considered to not be in violation of section 612 of the CAA and EPA's SNAP regulations (40 CFR 82.174(c)). In addition, any such end user would need to comply with the requirement to analyze and document that there are no other alternatives that are technically feasible for their specific end-use. To support the adoption of a temporary narrowed use limit for a specific application of an end-use in the final rule, commenters should explain why other alternatives would not be available for the specific application of that end-use and for what period of time.

In determining whether to modify the listing decisions for substitutes based on whether other alternatives are available that pose lower risk to human health and the environment, we considered, among other things: scientific findings, information provided by the Technology and Economic Assessment Panel that supports the Montreal Protocol, journal articles, submissions to the SNAP program, the regulations and supporting dockets for other EPA rulemakings, presentations and reports presented at domestic and international conferences, and materials from trade associations and professional organizations. The materials on which we have relied may be found in the docket for this action. Key references are highlighted in section IX of today's notice.

A. Aerosols

1. Background

The SNAP program provides listings for two aerosol end-uses: propellants and solvents. Aerosols typically use a liquefied or compressed gas to propel active ingredients in liquid, paste, or powder form. In the case of duster sprays used to blow dust and contaminants off of surfaces, the propellant is also itself the active ingredient. Some aerosols also contain a solvent, which may be used in manufacturing, maintenance and repair to clean off oil, grease, and other soils.

Historically, a variety of propellants and solvents have been available to formulators. HCs (e.g., propane, isobutane) and compressed gases (e.g., CO_2, N_2, N_2O, compressed air) have long been used as propellants. Prior to 1978, the aerosol industry predominantly used CFCs. CFCs were excellent propellants because of their ability to produce a fine spray, their non-flammability, their ability to be stored under low pressure, and their low reactivity with other ingredients. In 1978, in response to evidence regarding depletion of the earth's ozone layer, the United States banned CFC propellants. These regulations did not address HCFCs or solvent uses. For example, CFC–113 and methyl chloroform continued to be used as solvents in aerosols and HCFCs continued to be used.

Many consumer products that previously used CFC propellants were reformulated or replaced with a variety of alternatives, including not-in-kind substitutes, such as pump sprays or solid and roll-on deodorants. Aerosol propellant substitutes included HCFCs, HCs, HFCs, compressed gases, and oxygenated organic compounds. HCFCs are controlled substances under the Montreal Protocol and subject to regulation under the CAA including a phaseout of production and import under section 605(b)-(c) and use restrictions under section 605(a).

In 1993, EPA issued regulations that implemented CAA section 610's Congressionally mandated ban on the sale and distribution or offer for sale and distribution of certain non-essential products containing ozone-depleting substances (40 CFR Part 82 Subpart C). All aerosol products and pressurized dispensers containing, or manufactured with, CFCs and HCFCs—except those specifically exempted by the regulations—are banned from sale and distribution in interstate commerce in the United States. As a result of the Nonessential Products Ban, most aerosol products have been using low-GWP alternatives with no ozone depletion potential since the early 1990s.

2. Aerosols today

Following the 1994 ban on the sale and distribution of aerosols using HCFCs, HCFC propellants were replaced with a range of alternatives including HFCs (e.g., HFC–134a, HFC–152a), HCs, compressed gases, and not-in-kind alternatives. HCFC solvents were replaced by HFC–43–10mee, HFC–365mfc, HFC–245fa, HCs, oxygenated organic compounds, hydrofluoroethers (HFEs), and *trans*-dichloroethylene (typically blended with an HFC or HFE to reduce flammability of the formulation). Other acceptable low-GWP fluorinated compounds include HFOs. HFO–1234ze(E) is in use and under development for use in the aerosol industry as a propellant for manufacturing aerosol products. EPA regulations issued pursuant to CAA section 605 prohibit the use of HCFC–22 and HCFC–142b for manufacturing aerosol products. 40 CFR 82.15(g). EPA has proposed regulations addressing the use after January 1, 2015 of other HCFCs in aerosol products (e.g., HCFC–225ca/cb), as well as other provisions related to the phaseout of HCFCs under section 605 of the CAA (December 24, 2013; 78 FR 78072).

The United States aerosol industry manufactures aerosol products in the following three categories: (1) Consumer aerosols, (2) technical aerosols, and (3) medical aerosols. Consumer aerosols includes products for personal and household use. Examples include personal care products, such as: Cosmetics, hairspray, body sprays, and deodorants; automotive products such as tire inflators, auto lubricants, and brake cleaners; noise horns and safety horns; animal repellants; spray adhesives with various applications; household cleaning products; hand-held spray paint cans; eyeglass and keyboard dusters; consumer freeze sprays (e.g. chewing gum or excrement removal); air fresheners; food dispensing products; and novelty aerosols (e.g., artificial snow, plastic string, noise makers, and cork poppers).

Technical aerosols are aerosol products for sale and use solely in commercial and industrial applications, not for normal day-to-day consumer use or medical use. Technical aerosols includes industrial cleaners (e.g.,

electronic contact cleaners, brake cleaners, flux removers, degreasers); pesticides (e.g., certain wasp and hornet sprays, aircraft insecticides); a subset of dusters (e.g., for photographic negatives, semiconductor chip manufacture, specimens for observation under electron microscope); and spinnerette lubricant/cleaning sprays. Technical aerosols also includes other miscellaneous products such as industrial spray paints and document preservation sprays.

Medical aerosols are for sale and use for medical purposes and include, but are not limited to, products regulated by the U.S. Food and Drug Administration (FDA). Medical aerosols include metered dose inhalers for the treatment of asthma and chronic obstructive pulmonary disease, calamine spray, anti-fungals, wart treatments, wound care sprays, freeze or coolant spray for pain relief, spray-on ''liquid'' bandages, and products for removing bandage adhesives.

Some aerosols could be considered under more than one of the categories described above. For example, insect sprays include products with both commercial and consumer applications. The commercial application would include insect sprays used by utility power line workers around high tension power lines (i.e., a technical aerosol) and the consumer use would include residential household insect repellant commonly sold to homeowners (i.e., a consumer aerosol). Another example is freeze sprays which may be either consumer aerosols (e.g., food freeze sprays, animal waste sprays) or medical aerosols (e.g., wart removers, pain relievers).

Most of the demand for consumer aerosols in the United States is concentrated within household consumer products. This category has the highest production volume, reporting a 2.4% increase from 2010 to 2011 (CSPA 2012). The NAICS code that includes many personal care products (325620) is the highest grossing NAICS category of those that EPA has identified as manufacturing consumer aerosols (ICF 2014a). Some of the dominant consumer aerosols includes air fresheners, deodorants, household cleaners, and hairspray.

3. What is EPA proposing concerning aerosols?

Today's action addresses HFCs in propellants in aerosols. EPA is proposing to modify the listings for HFC–125, HFC–134a and HFC–227ea as of January 1, 2016 as follows:

- EPA is proposing to change the listing for the aerosol propellant HFC–125 from acceptable to unacceptable.
- We are proposing to list the aerosol propellant HFC–134a as acceptable, subject to use conditions allowing its use only in the following: Cleaning products for removal of grease, flux and other soils from electrical equipment or electronics; lubricants for electrical equipment or electronics; sprays for aircraft maintenance; pesticides for use near electrical wires, in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants; mold release agents; lubricants and cleaners for spinnerettes for synthetic fabrics; duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, and specimens under electron microscopes; document preservation sprays; metered dose inhalers for the treatment of asthma, chronic obstructive pulmonary disease, allergic rhinitis, and other diseases where aerosols can be used for systemic delivery through lung, nose, or other organs; wound care sprays; topical coolant sprays for pain alleviation; and products for removing bandage adhesives from skin.
- EPA is also proposing to list HFC–227ea as acceptable, subject to use conditions, allowing its use only in metered dose inhalers.

a. What other alternatives are available?

EPA is proposing to change the listing decisions for HFC–125, HFC–134a, and HFC–227ea as of January 1, 2016 because safer alternatives (i.e., chemical compounds and technological options) are available or potentially available that reduces the overall risk to human health and the environment. Other substitutes listed as acceptable propellants include HFC–152a, HFO–1234ze(E), butane, propane, isobutane, CO_2 and other compressed gases, and dimethyl ether (DME). In addition, technological options include not-in-kind alternatives such as finger/trigger pumps, powder formulations, sticks, rollers, brushes, and wipes. These alternatives have GWPs ranging from zero to 124 compared with HFC–134a's GWP of 1,430, HFC–227ea's GWP of 3,220 and HFC–125's GWP of 3,500.[24] All of these alternatives have an ODP of zero, are relatively low in toxicity, and are capable of remaining below their respective exposure limits when used as aerosol propellants. In addition to GWP and climate impacts, some of the other environmental and health attributes that the SNAP program considers that differ for these alternatives include impacts on local air quality and flammability. For example, butane, propane, isobutane, and DME are VOCs as well as being flammable. Butane, propane, isobutane, and DME are defined as VOCs under CAA regulations (see 40 CFR 51.100(s)) addressing the development of state implementation plans (SIPs) to attain and maintain the national ambient air quality standards; thus, these propellants are subject to federal, state, and local regulation that may prevent their use as a propellant in aerosols in some states and counties that have nonattainment areas for ground-level ozone. HFC–125, HFC–134a, HFC–227ea, HFC–152a, HFO–1234ze(E), and the compressed gases CO_2 and N_2 are not defined as VOCs under these regulations and their use is expected to have negligible impact on ground-level ozone levels.

i. Consumer Aerosols

For consumer aerosols, there are three alternatives with lower GWPs that meet other environmental regulatory requirements: HFC–152a, which has a GWP of 124; HFO–1234ze(E) with a GWP of 6; and CO_2 with a GWP of 1. All three have GWPs significantly lower than those of the HFCs proposed to be unacceptable or subject to use conditions (range of GWPs from 1430 to 3500 for HFC–134a, HFC–227ea and HFC–125). These three substitutes also provide a range of performance based on vapor pressure, which is important because it affects the ability to propel the necessary ingredients out of the aerosol container. The vapor pressures of HFO–1234ze(E), HFC–152a, and CO_2 at 20 °C are 422 kPa, 510 kPa, and 5776 kPa, respectively.

ii. Technical Aerosols

Technical aerosols sometimes need to meet more rigorous requirements for selection because of performance demands that do not exist for most consumer aerosols. For example, nonflammable aerosols are needed for use on energized electrical circuits, where sparking can create a fire or explosion hazard. Of the different acceptable alternatives, the nonflammable options at room temperature include HFC–125, HFC–134a, HFC–227ea, HFO–1234ze(E) and compressed gases including CO_2 and N_2. At slightly higher temperatures (30 °C or 85 °F), HFO–1234ze(E) exhibits lower and higher flammability limits and

[24] GWP values cited in this proposal are from the IPCC Fourth Assessment Report (AR4) unless stated otherwise. Where no GWP is listed in AR4, GWP values shall be determined consistent with the calculations and analysis presented in AR4 and referenced materials.

could catch fire under specific conditions of concentration and in the presence of a high energy spark or flame. Some aerosol product formulators have expressed concern that the lower vapor pressure of HFO–1234ze(E) and the significantly higher vapor pressure of CO_2 and other compressed gases may not provide adequate performance in propelling contents of a can or in remaining within the can for technical aerosols. For comparison, the vapor pressures of HFO–1234ze(E), HFC–134a, and CO_2 at 20 °C are 422 kPa, 655 kPa, and 5776 kPa, respectively.

The conditions under which technical aerosols are often used requires non-flammability and/or specific vapor pressure be met. Based on the information available today, EPA believes it is necessary to continue to allow for HFC–134a to be used for certain technical spray applications because of these technical limitations. We are therefore proposing to list HFC–134a as acceptable subject to use conditions which would limit use to those specific applications.

HFC–134a is the propellant with the lowest GWP that can consistently meet the technical aerosol performance requirements, other environmental regulatory requirements, and is nonflammable. EPA considered whether HFC–227ea or HFC–125 should be continue to be listed as acceptable for any specific uses. However, both these HFCs have significantly higher GWPs than HFC–134a (HFC–227ea's GWP is 3220 and HFC–125's GWP is 3500). Moreover, EPA is not aware of the use of HFC–227ea in technical aerosols. Similarly, EPA is not aware of any significant use of HFC–125 in technical aerosols. Neither HFC–227ea nor HFC–125 provides greater reduction in health or environmental risk than HFC–134a.

iii. Medical Aerosols

EPA is proposing to list HFC–134a and HFC–227ea as acceptable subject to use conditions which specify that these two HFCs are acceptable for metered dose inhalers (MDIs) to ensure that there is no confusion about the ability to continue to use these HFCs in these medical aerosols. In addition, we are proposing to list HFC–134a as acceptable subject to use conditions for wound care sprays, for topical coolant sprays for pain alleviation and for products for removing bandage adhesives from skin. For medical aerosols, there are special needs for safety and low toxicity. Furthermore, in order for a substitute to be available for use in medical devices, it must first be reviewed and approved by the FDA. FDA has approved medications for use in metered dose inhalers using HFC–134a and HFC–227ea as propellants, as well as some not-in-kind dry powder medications.

FDA has not approved medications for MDIs or other medical aerosols using HFC–125. EPA is aware of some medical aerosols that are currently using hydrocarbons or DME as the propellant, as well as not-in-kind alternatives; these medical aerosols include antifungals, calamine sprays, freeze sprays for wart removal, and liquid bandages (ICF, 2014a). EPA has insufficient information that alternatives other than HFC–134a are available as propellants in wound care sprays; topical coolant sprays for pain alleviation; and products for removing bandage adhesives from skin. Therefore, we cannot conclude that these are available alternatives with less overall risk to human health and the environment than HFC–134a. For these reasons, we are proposing to list HFC–227ea as acceptable subject to a use condition limiting its use to MDIs and to list HFC–134a as acceptable subject to use conditions limiting its use to MDIs and the other medical uses listed above.

HFC–125 has a GWP of 3,500, which is higher than the GWP of all other alternatives that are available for use as aerosol propellants (HFC–227ea has a GWP of 3220; HFC–134 has a GWP of 1430; HFO–1234ze(E) has a GWP of 6). Like HFC–134a, HFC–227ea, CO_2 and HFO–1234ze(E), it is VOC-exempt, nonflammable and low in toxicity. When EPA listed HFC–227ea as acceptable (May 22, 1998; 63 FR 28251), EPA noted that it was doing so despite the relatively high GWP of this compound, because it fit a specialized application, metered dose inhalers, where other substitutes were not available that would provide acceptable performance.

EPA's proposed approach to restricting the use of HFC–134a and HFC–227ea only to manufacturing certain specific types of aerosol products is modeled upon the Nonessential Product Ban exemptions for ODS in subpart C of 40 CFR part 82. A difference between that ban and the proposed use conditions is that the Nonessential Products Ban addressed the *sale and distribution* or offer for sale and distribution of aerosol products in interstate commerce, whereas this proposal addresses the propellants that may be *used in manufacturing* aerosol products.

Today, EPA is proposing to list HFC–125 as unacceptable, HFC–227ea as acceptable subject to use conditions allowing its use only for MDIs and HFC–134a as acceptable subject to use conditions allowing its use only for specific technical and medical aerosols, including MDIs. We request comment on this approach to modifying the listings of these three HFCs. We also request comment on whether any of the proposed technical aerosol uses of HFC–134a should not be allowed or whether there are additional uses that should be added to the list of allowed uses under the use conditions. Through this action, EPA is not intending to alter the listing as acceptable for HFC–227ea and HFC–134a for metered dose inhalers. EPA is seeking comment on the additional medical and technical aerosol uses of HFC–134a.

b. What other approaches is EPA considering?

EPA is considering two approaches to changing the listings for aerosols and seeks comments on both. The first, as discussed above, is to find HFC–125 unacceptable and find HFC–227ea and HFC–134a acceptable subject to use conditions, where the use conditions specify a list of allowed uses or product types that may continue to use these HFCs (e.g., metered dose inhalers for both HFCs, insect sprays used near high tension power lines for HFC–134a). A second approach we are considering is to find HFC–125 unacceptable and to find HFC–134a acceptable subject to narrowed use limits in technical and medical aerosols and HFC–227ea subject to narrowed use limits in metered dose inhalers. Narrowed use limits are considered ''use restrictions'' and are explained above. In this case, only persons using HFC–227ea in metered dose inhalers or using HFC–134a in technical or medical aerosols would be considered to not be in violation of section 612 of the CAA and EPA's SNAP regulations (40 CFR 82.174(c)). The terms ''technical aerosol'' and ''medical aerosol'' would apply to the types of aerosols described above in section 2. ''Aerosols today.'' Under the narrowed use limits, a manufacturer or other user intending to use the substitute could only use HFC–134a in manufacturing a technical or medical aerosol, or HFC–227ea in manufacturing a metered-dose inhaler, after ascertaining that other alternatives are not technically feasible. The user also would be required to document their evaluation. 40 CFR 82.180(b)(3).

Advantages to the proposed approach of specifying the allowed uses are that the list is clear about which products are allowed to use HFC–134a or HFC–227ea, both for users and for EPA. In addition, because EPA is specifying the uses in advance, end-users would not be

required to perform an evaluation and would not be required keep paperwork to document their evaluation, thereby reducing regulatory burden. A potential advantage of setting narrowed use limits is that it may encourage a larger number of manufacturers and users to evaluate alternatives and potentially identify more uses where HFC–134a is not required. Further, establishing narrowed use limits may allow greater flexibility if there are additional types of technical or medical aerosol products with performance or safety constraints requiring HFC–134a that EPA has not identified in this proposal. EPA requests comment on these two approaches to modifying the listings of HFC–134a and HFC–227ea as aerosol propellants.

c. When would the modified listings apply?

EPA is proposing January 1, 2016 as the date on which the listings for HFC–125, HFC–134a and HFC–227ea would be modified. Thus products manufactured on or after January 1, 2016 in contravention of the unacceptable or acceptable subject to use conditions listing for these substitutes could not be used.

We are proposing this date because we believe it is expeditious but will allow sufficient time after this proposed rule for end users to make the transition to alternatives. Based on the information available to EPA today and on various discussions with industry representatives. EPA believes that formulators and packagers of aerosols can make the necessary changes within this timing (ICF, 2014a; Honeywell, 2014). In most cases, EPA believes it will take approximately six months for the necessary changes to be made. This timing would provide the affected aerosol manufacturers and packagers sufficient time to change and test formulations and, to the extent necessary, to change the equipment in their factories.

To prevent stranded inventory, we are proposing that products manufactured prior to January 1, 2016 using these propellants, could be still be sold, imported, exported, and used by the end user after January 1, 2016. This would avoid the possibility that end users would need to dispose of a usable product, including the potential for improper releases of the content into the environment.

d. On which topics is EPA requesting comment?

EPA requests comment on the proposal to change the listing for the following aerosol propellants: HFC–125 from acceptable to unacceptable; HFC–134a from acceptable to acceptable, subject to use conditions allowing its use only in: cleaning products for removal of grease, flux and other soils from electrical equipment or electronics; lubricants for electrical equipment or electronics; sprays for aircraft maintenance; pesticides for use near electrical wires, in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants; mold release agents; lubricants and cleaners for spinnerettes for synthetic fabrics; duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, and specimens under electron microscopes; document preservation sprays; metered dose inhalers for the treatment of asthma, chronic obstructive pulmonary disease, allergic rhinitis, and other diseases where aerosols can be used for systemic delivery through lung, nose, or other organs; wound care sprays; topical coolant sprays for pain alleviation; and products for removing bandage adhesives from skin; and HFC–227ea from acceptable to acceptable, subject to use conditions, allowing its use only in metered dose inhalers.

EPA also received suggestions from the aerosol industry to consider an exception to allow the use of HFC–134a in additional categories of aerosol products. EPA is not proposing to include these categories, either because we are aware of existing products in these categories using low GWP propellants, or because we have insufficient information indicating that the use of HFC–134a is necessary for these categories of products because other substitutes that pose lower risk are not currently or potentially available. These categories include: component freeze sprays, tissue freezes, refrigeration system flushes, portable safety horns for use in marine and industrial applications, tire inflators, and personal defense sprays. We are aware of low-GWP formulations already on the market today for defensive sprays and tissue freezes. These formulations may use flammable and/or non-flammable propellants. We request information on why available substitutes other than HFC–134a are not and cannot be used in these categories of products, including information on why flammability may be a concern or not in the product category; whether other alternative propellants with lower GWP in place of HFC–134a have been tested in these products; and what results of those tests have shown about the technical feasibility and/or safety of the other alternative propellants.

Finally, we request comments on modifying the listings as of January 1, 2016. We request commenters include specific information on whether it would be technically feasible for end-users to transition by January 1, 2016, and, if not, what steps are necessary for manufacturers to switch to other alternatives and how long those steps are expected to take.

B. Motor Vehicle Air Conditioning for Newly Manufactured Light-Duty Motor Vehicles

1. Background

MVAC systems cool passenger cars, light duty trucks, buses, and rail vehicles. CFC–12 refrigerant was historically used in MVAC systems. HFC–134a replaced CFC–12 in new equipment in the early 1990s. Today, HFC–134a is the dominant refrigerant used in light-duty vehicles worldwide. When EPA found HFC–134a acceptable in MVAC for light duty vehicles in 1994 (March 18, 1994; 59 FR 13044), the Agency stated:

> HFC–134a does not contribute to ozone depletion. HFC–134a's GWP and atmospheric lifetime are close to those of other alternatives which have been determined to be acceptable for this end-use. However, HFC–134a's contribution to global warming could be significant in leaky end-uses such as MVACs. EPA has determined that the use of HFC–134a in these applications is acceptable because industry continues to develop technology to limit emissions. In addition, the number of substitutes available for use in MVACs is currently limited. HFC–134a is not flammable and its toxicity is low.

This analysis was consistent with the information available in 1994. Since that time, four additional substitutes have been added to the list of substitutes that are acceptable subject to use conditions for light duty vehicles. As described more fully below, if these other substitutes are used in systems designed consistent with the prescribed use conditions, they pose significantly lower risk to human health and the environment than HFC–134a. EPA is therefore proposing to remove HFC–134a from the list of acceptable substitutes for new light-duty vehicles' MVAC systems and add it to the list of unacceptable substitutes.

Since 1994, additional alternatives for MVACs have been listed as acceptable subject to use conditions.[25] Three of these alternatives—HFO–1234yf, HFC–152a, and carbon dioxide (R–744)—are non-ozone depleting like HFC–134a and have low GWPs compared to HFC–134a. HFC–152a has a GWP of 124, HFO–1234yf has a GWP of 4, and R–744 (by

[25] Listed at 40 CFR part 82, subpart G.

definition) has a GWP of 1 while HFC–134a has a GWP of 1,430. R–744 is nonflammable, HFO–1234yf and HFC–152a are flammable, but are subject to use conditions that address flammability concerns. All three substitutes are subject to use restrictions that ensure exposure limits that protect against adverse health effects will not be exceeded and all three are VOC exempt.

At the time EPA listed HFC–134a as acceptable, the agency was not aware of any vehicle manufacturer, MVAC supplier, or chemical producer considering HFO–1234yf as a refrigerant. Today, HFO–1234yf is in use in MVAC systems in approximately nine [26] models in the United States by several manufacturers of light-duty vehicles. EPA expects additional models will be introduced using HFO–1234yf systems over the next several years.

To date, at least one global manufacturer of light-duty vehicles has announced their intention to commercialize vehicles using R–744 in MVAC systems later this decade.[27] In the mid-1990s, EPA became aware that R–744 systems might be a feasible alternative in this application, but the state of research and development indicated that it was not yet available because a design had not yet been developed that would allow safe use in MVAC systems in light duty vehicles. Nearly 20 years later, EPA is still not aware of current commercial use of R–744 in MVAC systems. However, significant research and development is occurring in order to ensure R–744 can be used safely in MVAC systems.

In addition to HFO–1234yf, HFC–152a, and R–744, EPA is aware of ongoing research and development which could ultimately result in future listings of additional alternatives for MVAC systems. One chemical producer indicated their intent to seek SNAP approval for another low-GWP alternative that is a blend with a GWP below 150.[28]

There are also other blends which EPA has listed as acceptable or acceptable subject to use conditions. None of these are currently used by the original equipment manufacturers (OEMs). Several of these previously listed substitutes have GWPs that are significantly higher than the GWPS for HFO–1234yf, HFC–152a, and R–744 and higher overall risk than these other three substitutes. EPA is proposing to list as unacceptable the following substitutes in addition to HFC–134a: SP34E (GWP of 1300), R–426A (also known as RS–24) (GWP of 1508), R–416A (also known as HCFC Blend Beta or FRIGC FR12) (GWP of 1015) and the HCFC blends, R–406A, R–414A (also known as HCFC Blend Xi or GHG–X4), R–414B (also known as HCFC Blend Omicron), HCFC Blend Delta (also known as Free Zone), Freeze 12, GHG–X5, and HCFC Blend Lambda (also known as GHG–HP), with GWPs ranging from 1480 to 2340 and ODPs ranging from 0.012 to 0.056. For simplicity, we refer to these substitutes as ''the refrigerant blends'' in the following discussion.

2. What is EPA proposing regarding use of HFC–134a and use of refrigerant blends in MVAC systems for newly manufactured light-duty motor vehicles?

EPA is proposing to list HFC–134a as unacceptable for use in MVAC systems in newly manufactured light-duty vehicles beginning with MY 2021. We are proposing MY 2021 because that is the time by which all light-duty vehicle models can be redesigned to safely use MVAC systems using other available refrigerants. As explained above, three alternatives on the SNAP list of acceptable substitutes subject to use conditions —HFC–152a, R–744, and HFO–1234yf—have significantly lower GWPs than HFC–134a. All three of these lower-GWP alternatives are non-ozone depleting and are subject to use restrictions that ensure exposure limits that protect against adverse health effects will not be exceeded. All three are VOC exempt. HFO–1234yf and HFC–152a are flammable, but are subject to use conditions that address flammability concerns. R–744 is not flammable. Because HFC–134a has a significantly higher GWP than HFC–152a, R–744, and HFO–1234yf and because the risks posed by these three refrigerants are addressed through use conditions, we are proposing to list HFC–134a as unacceptable. However, because the three refrigerant alternatives pose lower risk than HFC–134a only if used consistent with the established use conditions, in deciding when the unacceptability determination should apply, we considered the date by which automobile manufacturers will be able to redesign all vehicle models (including design of the MVAC systems) consistent with the use conditions.

EPA is proposing to list the refrigerant blends SP34E, R–426A, R–416A, R–406A, R–414A (also known as HCFC Blend Xi or GHG–X4), R–414B (also known as HCFC Blend Omicron), HCFC Blend Delta (also known as Free Zone), Freeze 12, GHG–X5, and HCFC Blend Lambda (also known as GHG–HP) as unacceptable beginning in MY 2017 for use in MVAC systems in newly manufactured light-duty motor vehicles. Since these refrigerant blends are not currently in use in any MVAC systems in light-duty vehicles, we believe it is appropriate for the unacceptability determination to apply to model year vehicles currently being designed. Further, all but the first two of these blends have ODPs, and all have significantly higher GWPs than other alternatives such as HFC–152a, HFO–1234yf, and CO_2.

EPA has previously examined when automobile manufacturers may be able to transition their fleets to lower GWP refrigerants in its rules to extend the greenhouse gas and fuel economy standards for model year (MY) 2017–2025 light-duty vehicles. 77 FR 62624, 62807–810 (October 15, 2012); see also 75 FR 25325, 25431–32 (May 7, 2010) (discussing the same issue for MY 2012–2016 light duty vehicles). EPA and the National Highway Traffic Safety Administration jointly issued these rules on August 28, 2012. Over the lifetime of the MY 2017–2025 light-duty vehicles (passenger cars, light-duty trucks, and medium-duty passenger vehicles), these rules are projected to save approximately 4 billion barrels of oil and 2 billion metric tons of GHG emissions, with societal net benefits up to $451 billion. 77 FR 62629. The standards build off those set in April 2010 for MY 2012–2016 light-duty vehicles, which are projected to save approximately 1.85 billion barrels of oil and 962 million metric tons of GHG emissions over the lifetime of the affected vehicles, with societal net benefits of up to $192 billion. 75 FR 25347. EPA projects that the entire light-duty vehicle fleet will meet a target of 163 grams of carbon dioxide equivalent (CO_2eq) per mile in MY 2025 (or 54.5 mpg if the automotive industry meets the target exclusively through fuel efficiency improvements).

When refrigerants leak from current motor vehicle air conditioning systems, they contribute to overall GHG emissions. Using lower GWP refrigerants can significantly reduce the climate impact of these emissions. Given the increasing availability of lower-GWP chemicals suitable for this purpose and systems that can use them, as well as increasing requirement for lower-GWP refrigerants in Europe,[29] EPA based the light-duty GHG standards

[26] *http://www.autonews.com/article/20131230/OEM01/312309996/warming-to-the-idea.*

[27] Daimler, 2014

[28] Mexichem statement during motor vehicle stakeholder meeting December 6, 2013

[29] Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 (EU MAC Directive). Available at: *http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006L0040:EN:HTML.*

for MYs 2017–2025 in part on an expected gradual transition to lower-GWP refrigerants. Thus, in setting the level of the standards, EPA projected that the industry will make the full transition to lower-GWP refrigerants over the period of time spanning between MY 2017 and MY 2021, and the level of the standard in each of these model years reflects a projected 20 percent increase in substitution in each model year and complete transition by MY 2021. 77 FR 62720/2–3. In support of the assumption of this multi-year transition, the Light-Duty GHG rule for MYs 2017–2025 includes an extensive discussion of the refrigerant substitute availability and technical feasibility of transitioning the fleet. 77 FR 62720; 62807–810.

At the time the Light Duty GHG rule was promulgated, EPA (and other entities) voiced concerns with the potential supply of HFO–1234yf, but today production plans for the refrigerant appear to be in place to make it available in volumes that meet current and projected domestic auto industry demand, consistent with the projections in the Light Duty GHG rulemaking. Multiple production facilities are now producing HFO–1234yf, and recently another global chemical producer announced plans to produce HFO–1234yf by 2017. Moreover, some automotive manufacturers are developing systems that can safely use other substitutes, including R–744, and continued progress is likely given the EU's implementation of the MAC Directive. If some global light-duty motor vehicle manufacturers use R–744, additional volumes of HFO–1234yf that would have been used by those manufacturers will then become available. Therefore, there also appears to be sufficient supply to meet demand domestically and abroad, including in the European Union, during this time frame.

In addition to considering when the supply of alternative refrigerants would be sufficient to transition the entire light duty vehicle fleet, EPA necessarily also considered when vehicle manufacturers could design systems for safe use of these alternatives consistent with the regulatory use conditions.[30] EPA considered the practices used by the auto manufacturing industry in introducing new technologies into their vehicles. For each vehicle model, manufacturers establish a ''redesign'' (or product development) cycle over which they plan any significant technological changes to that vehicle. Between the major redesign model years, they may make only minor ''refresh'' changes. Redesign cycles vary by model and by manufacturer and average about 5 model years in duration. (See 77 FR 62712 and 75 FR 25407, 25451 for a more detailed discussion of this practice.) At any point in time, a manufacturer may have some vehicles at or approaching a major redesign point and others that are earlier in their product cycle.

In the final rule establishing light-duty vehicle GHG standards for MYs 2017–2025, EPA assumed that the transition to alternative refrigerants would generally occur during manufacturer model redesigns and used the overall typical industry redesign cycle of 5 model years to estimate how the expected industry-wide transition to new refrigerants might occur. For analytical purposes, and based on information available at the time, we projected that the transition would occur from MY 2017 until MY 2021. EPA recognizes there have been some early adopters. The transition began in a small number of MY 2013 vehicles and is increasing in MY 2014 but has been relatively limited to date.[31] While some may maintain that early adoption equates to a faster overall transition, EPA notes that early adoption remains limited and therefore we continue to view our projection of full transition not occurring until MY 2021 as reasonable.

Although there may be some limited ability to switch a vehicle model to an MVAC system using a low GWP refrigerant in between redesign periods, most model types will require significant hardware changes that may only be possible during a redesign. HFO–1234yf, for example, has measurably lower efficiency than that of HFC–134a, usually requiring hardware changes and/or changes to overall air conditioning system design and layout.[32] [33] This contrasts with the case of the transition in the 1990s from CFC–12 to HFC–134a, where the systems had similar coefficients of performance and manufacturers were able to switch many vehicles mid-cycle. Vehicles that require relatively more cooling capacity will be more dependent on a redesign cycle for a transition to HFO–1234yf since the specifications for hardware would need to be revisited. Most manufacturers have ''locked-in'' their planned product designs out to MY 2016, MY 2017, or even MY 2018. If any of these manufacturers have not planned to implement alternative refrigerant systems in these late model year vehicles, the next design cycle opportunity to make a change would be unlikely to occur until MY 2021 (or even MY 2022). In addition, at least one manufacturer has stated that it plans on using R–744 (CO_2) systems. R–744 systems require significantly more complex redesign and hardware and would need to occur during product redesign, not product refresh given its pressure is significantly different than HFC–134a. These systems are currently in prototype phase, and there are significant technical hurdles yet to overcome. Given EPA's understanding, above, of the supply of the alternative refrigerants and the redesign cycle for MVAC systems, EPA is proposing to list HFC–134a as unacceptable for new MVAC systems beginning with MY 2021 because this is the time by which all light-duty vehicle models can be redesigned to safely use MVAC systems with alternative refrigerants.

As a cross-check, EPA explored whether vehicles and MVAC systems designed consistent with the use conditions for the three alternative refrigerants might be available earlier than MY 2021, evaluating (but not proposing) MYs 2017 and 2019. MY 2017 is the date included in the petition described above and in the EU MAC Directive. Since most motor vehicle manufacturers will seek a global vehicle design platform, selecting the same date as the date in the EU MAC Directive has some weight. MY 2019 is an intermediate date between MYs 2017 and 2021.

The agency believes it is necessary for MVAC system redesigns for many vehicles to occur during a design cycle to safely use the substitute refrigerants, as just explained. Manufacturers are currently designing or have ''locked in'' designs for vehicles several model years into the future. The information currently before the Agency thus indicates that it would not be

[30] As previously noted, HFO–1234yf, R–744 and HFC–152a are all listed as acceptable subject to use conditions and many of the use conditions address the design of systems to account for the flammability or exposure.

[31] Nelson, Gabe ''Automakers' switch to new refrigerant will accelerate with EPA credits, European mandate'' Automobile News, December 30, 2013. *http://www.autonews.com/article/20131230/OEM01/312309996/warming-to-the-idea.*

[32] Weissler, Paul, ''A/C Industry Faces Challenges From Daimler R–1234yf Issue, Explores Other Options,'' Automotive Engineering International, April 2, 2013.

[33] One manufacturer informed EPA in a meeting that hardware changes were necessary or likely when shifting from a HFC–134a to a HFO–1234yf system, including the following: compressor oil and/or compressor changes, possible A/C piping modification due to the change in valve shape, and, in the vehicle manufacturing plant, additional refrigerant charging process changes. (EPA Memorandum: ''Notes from Meeting with Nissan Concerning Alternative Refrigerant Transition'', Tad Wysor, April 2014.) Other manufacturers made similar statements to EPA.

technically feasible for manufacturers to safely transition all vehicles from HFC–134a MVACs by MY 2017. EPA is not proposing the MY 2019 date for the same reasons. However, we solicit comment on whether all manufacturers would be able to safely transition all vehicles away from HFC–134a MVAC systems by MY 2017 or MY 2019.

We also considered whether a MY later than MY 2021 should be the appropriate time for use of HFC–134a in MVAC systems in new vehicles to be listed as unacceptable. In recent meetings with the major trade associations for the auto industry (the Alliance and Global Automakers) as well as with meetings with several individual manufacturers, industry representatives indicated that some of them may have a relatively small number of vehicle models that will not have had the opportunity for an engineering redesign by MY 2021. They also indicated that there may be technical barriers for certain models that would require longer product design cycles if the systems were to use substitute refrigerants. However, we do not have sufficient non-confidential information to conclude that systems capable of using alternative refrigerant safely will not be ''currently or potentially available''—within the meaning of section 612 (c)(2) of the Act—until after MY 2021. EPA requests comments on changing the status of HFC–134a in a model year later than MY 2021 (such as MY 2025), including specific information supporting claims that a transition by MY 2021 would not be technically feasible because specific model vehicles cannot be redesigned to safely use alternative refrigerants by MY2021. For the reasons explained earlier, EPA believes safer alternatives will be available by MY 2021.

Based on the information before the Agency, EPA is thus proposing to modify the listing of HFC–134a to unacceptable as of MY 2021 for light duty vehicles, while seeking comment on MYs 2017, 2019, and MYs later than 2021.[34]

EPA is not proposing changes that would alter the ability to service existing motor vehicles designed to use HFC–134a. Such a change could strand the installed base of equipment or force retrofits to other refrigerants. In order to safely use most MVAC refrigerants, the vehicle design as well as the MVAC design may need to be modified in order to ensure the refrigerant can be used safely. For that reason, the three low-GWP refrigerants that currently are listed as acceptable in new MVACs—HFO–1234yf, HFC–152a, and R–744–are not listed as acceptable to retrofit a system designed to use a different refrigerant.

Once MVAC systems are designed and installed with lower GWP substitutes, they will likely need to be serviced. Some stakeholders have expressed a concern that the price differential between HFO–1234yf and HFC–134a provides an economic incentive to replace HFO–1234yf with HFC–134a during servicing. See 77 FR 62807. Two sets of regulations under title VI of the CAA make it clear that doing so is unlawful. First, the SNAP regulations prohibit using a substitute refrigerant to 'top-off' a system that uses another refrigerant. Second, the original refrigerant must be recovered in accordance with regulations issued under section 609 of the CAA prior to charging with a substitute (40 CFR 82.34). Thus, the recycling and recovery regulations prohibit adding a new refrigerant to the system without first recovering the refrigerant already in the system. Therefore, it is not permissible to add HFC–134a to an MVAC system that contains HFO–1234yf, as may well occur if a consumer were to service his or her own car's A/C system without refrigerant recovery equipment. In addition, the SNAP listings for HFO–1234yf and HFC–134a require the use of unique fittings for each alternative refrigerant. Using an adapter or deliberately modifying a fitting to use a different refrigerant is a violation of these use conditions.

EPA seeks comments on changing the listing of SP34E, R–426A, R–416A, R–406A, R–414A (also known as HCFC Blend Xi or GHG–X4), R–414B (also known as HCFC Blend Omicron), HCFC Blend Delta (also known as Free Zone), Freeze 12, GHG–X5, and HCFC Blend Lambda (also known as GHG–HP) to unacceptable for use as refrigerants in air conditioning systems for newly manufactured light-duty motor vehicles beginning with MY 2017 and changing the listing of HFC–134a to unacceptable beginning with MY 2021.

3. Would this action affect EPA's light duty vehicle rule?

Today's proposal, should EPA adopt it, will have no direct effect on the MY 2017–2025 light duty vehicle GHG standards. Those standards are established by rule and EPA is not reopening that rule in this proceeding. We do note, however, that today's proposal is relevant to one of the compliance flexibilities in the light duty vehicle standards. The light duty vehicle standards do not require any specific means of compliance. Manufacturers thus have the flexibility to either switch refrigerants or to comply with the standards by other means. The light duty standards do provide that manufacturers can generate credits from use of alternative refrigerants with lower GWPs than that of HFC–134a through MY 2025, and the ability to generate and use those credits towards compliance with the light duty standards will not change if this action is finalized as proposed. See 77 FR 62804–809. (As noted above, the level of the standard reflects the assumption of 100% substitution by MY 2021). Even though a manufacturer may choose to comply with the light duty standard by a strategy not involving refrigerant substitution, in MY 2021, this proposed rule, if finalized, would still require the manufacturer to use an MVAC designed for a refrigerant other than HFC–134a.

C. Retail Food Refrigeration and Vending Machines

1. Background

Retail food refrigeration, an end-use within the SNAP program that is also considered a subset of the broader term ''commercial refrigeration,'' is characterized by storing and displaying, generally for sale, food and beverages at different temperatures for different products (e.g., chilled and frozen food). The designs and refrigerating capacities of equipment vary widely. Vending machines are another subset of commercial refrigeration considered as a separate end-use within the SNAP program due to differences in where such equipment is placed and the additional mechanical and electronic components required to accept payment, provide the selected product, and prevent theft or damage from vandalism.

Retail food refrigeration is composed of three main categories of equipment: Stand-alone equipment; condensing units; and supermarket systems, the latter often in designs referred to as multiplex or centralized refrigeration systems. Stand-alone equipment consists of refrigerators, freezers, and reach-in coolers (either open or with doors) where all refrigeration components are integrated and, for the smallest types, the refrigeration circuit is entirely brazed or welded. These systems are charged with refrigerant at the factory and typically require only an electricity supply to begin operation.

[34] Typically, regulations promulgated under CAA Title VI have applied to specified calendar years, However, because the MVAC system used is so closely related to vehicle design, we have used MY for purposes of this proposed rule. Model years cover almost two calendar years, beginning after January 1 of the previous calendar year and ending on January 1 of the following calendar year.

Condensing units exhibit refrigerating capacities ranging typically from 1 kW to 20 kW (0.3 to 5.7 refrigeration tons). They are composed of one (and sometimes two) compressor(s), one condenser, and one receiver assembled into a single unit, which is normally located external to the sales area. This equipment is connected to one or more nearby evaporator(s) used to cool food and beverages stored in display cases and/or walk-in storage rooms. Condensing units are commonly installed in convenience stores and specialty shops such as bakeries and butcher shops.

Typical supermarket systems are known as multiplex or centralized systems. They operate with racks of compressors installed in a machinery room; different compressors turn on to match the refrigeration load necessary to maintain temperatures. Two main design classifications are used: Direct and indirect systems. In the United States, direct systems are the most widespread. At least 70 percent of supermarkets in the United States use centralized direct expansion (DX) systems to cool their display cases.[35] The refrigerant circulates from the machinery room to the sales area, where it evaporates in display-case heat exchangers, and then returns in vapor phase to the suction headers of the compressor racks. The supermarket walk-in cold rooms are often integrated into the system and cooled similarly, but an alternative option is to provide a dedicated condensing unit for a given storage room. Another type of supermarket design, often referred to as a distributed refrigeration system, uses an array of separate compressor racks located near the display cases rather than having a central compressor rack system. Each of these smaller racks handles a portion of the supermarket load, with 5–10 such systems in a store.

Indirect supermarket designs include secondary loop systems and cascade refrigeration. Indirect systems use a chiller or other refrigeration system to cool a secondary fluid that is then circulated throughout the store to the cases. Compact chiller versions of an indirect system rely on a lineup of 10–20 units, each using small charge sizes. As the refrigeration load changes, more or fewer of the chillers are active. Compact chillers are used in a secondary loop system whereby the chillers cool a secondary fluid that is then circulated throughout the store to the display cases. Each compact chiller is an independent unit with its own refrigerant charge, reducing the potential for refrigerant to be released from leaks or catastrophic failures. Cascade systems use a compressor to raise the low-temperature coolant from low-temperature conditions up to an intermediate temperature while a separate refrigerant system uses a different refrigerant to condense the coolant. Each system within the cascade design contains its own refrigerant charge allowing the use of different refrigerants in each system. This application has generally used a low-GWP refrigerant, specifically carbon dioxide (R–744), in the low-temperature system, with a variety of refrigerants in the medium-temperature system.

Refrigerant choices depend on the refrigerant charge, the temperature required, and energy efficiency, among other things. In addition to regulations pursuant to the SNAP program, other federal or local regulations may also affect refrigerant choice. For instance, regulations from the OSHA may restrict or place requirements on the use of some refrigerants, such as ammonia (R–717). Building codes from local and State agencies may also incorporate limits on the amount of particular refrigerants used. There are and will continue to be a number of factors that retailers must consider when selecting the refrigerant and operating system design. While a number of approaches exist, there is no uniformly accepted holistic analysis of the multiple factors, which include the following: Energy efficiency; system performance; potential impact on community safety; ambient temperatures; potential risk to personal safety; cost; and minimization of direct and indirect environmental impacts. EPA recognizes that these and other factors mean there will be a range of options, and the ultimate selection remains with the owner and operator of the system.

Acceptable non-HFC substitutes in use today for new multiplex systems include R–717 and R–744. These can be used alone or in combination with other refrigerants in other parts of the equipment, depending on the equipment and its design (e.g., a secondary-loop contains one refrigerant while the primary loop contains a different refrigerant). For stand-alone refrigeration equipment, propane (R–290) is listed as acceptable subject to use conditions, and EPA has also proposed that the hydrocarbon blend R–441A and isobutane (R–600a) be listed as acceptable subject to use conditions (July, 9, 2014; 79 FR 38811). The Agency also has proposed elsewhere that these three hydrocarbon refrigerants be listed as acceptable subject to use conditions for vending machines (July, 9, 2014; 79 FR 38811). Other substitutes, such as blends of saturated HFCs already listed as acceptable under SNAP, are currently in use in the United States, while HFOs and blends containing HFOs are being developed and tested but have not yet been submitted to the SNAP program for review.

The most commonly-used HFCs and HFC blends in retail food refrigeration include HFC–134a, R–404A, R–407A, R–422D, and R–507A. HFC–134a is a non-ozone depleting chemical with the chemical formula $C_2H_2F_4$. It is used in a variety of air-conditioning and refrigeration end-uses, including motor vehicle air conditioners, home appliances (such as refrigerator-freezers), vending machines and building air-conditioning chillers. It is also used in other sectors such as foam blowing and aerosol propellants. HFC–134a has a GWP of 1,430.

R–404A is a non-ozone depleting blend of refrigerants HFC–125, HFC–143a, and HFC–134a with GWPs of 3,500, 4,470, and 1,430 respectively. R–404A's GWP is about 3,920 based on the 44/52/4 mass percentages of the three HFCs contained in the blend. R–404A is currently acceptable for a variety of medium- and low-temperature refrigeration applications including retail food refrigeration equipment such as food display and storage cases; vending machines; cold storage warehouses; commercial ice machines; refrigerated transport; and industrial process refrigeration.

R–407A is a non-ozone depleting blend of refrigerants HFC–32, HFC–125 and HFC–134a with GWPs of 675, 3,500, and 1,430 respectively. R–407A's GWP is about 2,100 based on the 20/40/40 mass percentages of the three HFCs contained in the blend. R–407A is acceptable for a variety of medium- and low-temperature refrigeration applications including retail food refrigeration equipment such as food display and storage cases; cold storage warehouses; commercial ice machines; refrigerated transport; and industrial process refrigeration. R–407A is not currently on the SNAP lists of acceptable or unacceptable refrigerants for vending machines.

R–422D is a non-ozone depleting blend of refrigerants HFC–125, HFC–134a, and R–600a with GWPs of 3,500, 1,430, and 8 (GE, 2008) respectively. R–422D's GWP is about 2,700 based on the approximate 65.1/31.5/3.4 mass percentages of the two HFCs and one hydrocarbon contained in the blend. R–422D is acceptable for a variety of medium- and low-temperature

[35] *http://www2.epa.gov/greenchill/advanced-refrigeration.*

refrigeration applications including retail food refrigeration equipment such as food display and storage cases; cold storage warehouses; commercial ice machines; refrigerated transport; and industrial process refrigeration. R–422D is most commonly used to retrofit existing systems such as those operating on HCFC–22 and is less likely to be used in manufacturing new equipment.

R–507A (also designated as R–507) is a non-ozone depleting blend of refrigerants HFC–125 and HFC–143a which have GWPs of 3,500 and 4,470, respectively. R–507A's GWP is about 3,990 based on the 50/50 mass percentages of the two HFCs contained in the blend. R–507A is acceptable for a variety of medium- and low-temperature refrigeration applications including in retail food refrigeration equipment such as food display and storage cases; cold storage warehouses; refrigerated transport; and industrial process refrigeration.

2. What is EPA proposing for new and retrofit retail food refrigeration (condensing units and supermarket systems)?

EPA is proposing to change the listing for nine HFC blends for new and retrofit retail food refrigeration equipment from acceptable to unacceptable as of January 1, 2016. These nine blends are R–404A, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A and R–507A. EPA is not aware of any significant use in the United States of the blends R–407B, R–421B, R–428A or R–434A in retail food refrigeration equipment. In addition, EPA is proposing to change the listing of HFC–227ea in new retail food refrigeration equipment from acceptable to unacceptable.[36] These ten refrigerants have GWPs ranging from 2,730 to 3,985. They are nonflammable. They contain compounds that are exempt from the definition of ''VOC,'' with the exception of small amounts of R–290 and R–600a in five of the blends, and thus are not expected to contribute significantly to smog. These refrigerants are relatively low in toxicity, and practices common in the refrigeration industry ensure that their workplace exposure limits are not exceeded. These practices include adhering to those specified in the material safety data sheets and others common in the commercial refrigeration industry. Applicable workplace exposure limits for the compounds comprising these refrigerants—HFC–32, HFC–125, HFC–134a, HFC–143a, HFC–227ea, R–290 and R–600a—include Workplace Environmental Exposure Limits (WEELs) of 1000 ppm on an 8-hour time-weighted average (TWA) from the American Industrial Hygiene Association (AIHA); a manufacturer's recommended occupational exposure limit of 1000 ppm (8-hr TWA); a permissible exposure limit (PEL) of 1000 ppm (8-hr TWA) from the Occupational Safety and Health Administration (OSHA) and a recommended exposure limit (REL) of 800 ppm (10-hr TWA) from the National Institutes for Occupational Safety and Health (NIOSH).

EPA believes there are several HFC and non-HFC substitutes that provide lower overall risk than the refrigerants EPA is proposing to list as unacceptable and that are currently used in commercial refrigeration. For both new and retrofit equipment, acceptable refrigerants that pose less risk to human health and the environment include HFC–134a, R–407A, R–407C, R–407F, R–417A, R–421A, R–422B, R–424A, R–426A, and R–438A. Additionally, in new retail food refrigeration, three other substitute refrigerants are listed as acceptable: R–717 vapor compression with secondary loop, R–410A, and R–744.

a. New Condensing Units and Supermarket Systems

EPA is proposing to change the listing of the following refrigerants from acceptable to unacceptable in new retail food refrigeration equipment (condensing units and supermarket systems) as of January 1, 2016: HFC–227ea, R–404A, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A, and R–507A. These refrigerants have GWPs ranging from approximately 2,730 to 3,985. Two of these refrigerants, R–404A and R–507A, are currently in extensive use in the retail food refrigeration market. EPA is also aware of some use of R–422A and R–422D in retrofit situations only, not in new equipment. We are not aware of the use of any of the other six refrigerants in retail food refrigeration, although we seek comment on such use.

Other acceptable alternatives that pose lower risk are also in use in the various types of retail food refrigeration equipment. For condensing unit systems, R–407C and R–407F are in use in the United States, and R–744 and HCs are being used in limited demonstration trials in Europe and elsewhere. The GWP for R–407C (a blend of HFC–32, HFC–125, and HFC–134a) is about 1,770, and R–407F (another blend of HFC–32, HFC–125, and HFC–134a) has a GWP of about 1,820. As a comparison, R–404A has a GWP of 3,920, R–507A has a GWP of 3,990, and the other refrigerants proposed unacceptable have GWPs ranging from 2,730 to 3,985.

For multiplex rack systems, substitutes R–407A, R–407F, and R–744 are all currently in use in the United States and can be used more safely than the substances that EPA is proposing to list as unacceptable. These substitutes have GWPs ranging from 1 to 2,110. In addition, testing is underway with HCs and HFC/HFO blends, though these refrigerants have not been submitted to SNAP for review in this application. Each of these four substitutes as well as other substitutes in development with lower GWPs have zero ODP and are safe for the ozone layer. R–407A, R–407F, and R–744 all have toxicity lower than or comparable to the refrigerants proposed unacceptable. None of the three examples that would remain on the acceptable list is flammable, and none is considered a VOC.

b. Retrofit Condensing Units and Supermarket Systems

EPA is proposing to change the listing of the following refrigerants from acceptable to unacceptable in retrofit retail food refrigeration equipment (condensing units and supermarket systems) as of January 1, 2016: R–404A, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A, and R–507A. We are aware of four of these nine refrigerants being used to retrofit retail food equipment: R–404A, R–507A, R–422A, and R–422D. We are not aware of any use of the other five refrigerants to retrofit retail food refrigeration equipment but seek comment on any such use. This action would not apply to servicing existing equipment designed for these nine refrigerants or to equipment that had been retrofitted to use those refrigerants before January 1, 2016. For instance, systems retrofitted to R–404A or R–507A prior to January 1, 2016, would be allowed to continue to operate and to be serviced using those refrigerants.

For condensing units and supermarket systems, where retrofits are common, blends such as R–407A and R–407F have become the norm for retrofits, rather than the four identified in the previous paragraph. The blends R–407A and R–407F have zero ODP and GWPs of 2,107 and 1,825, respectively. Other zero-ODP refrigerants that are currently listed as acceptable for use as retrofits in retail food refrigeration include HFC–134a, R–407C, R–417A, R–421A, R–422B, R–426A and R–427A and they have GWPs ranging from 1,430 to 2,630, lower than the GWPs of the other nine blends we are proposing as

[36] EPA has not previously found HFC–227ea acceptable as a retrofit refrigerant in this end-use.

unacceptable, which have GWPs ranging from 2,729 to 3,985.

An unacceptability listing for these nine blends in retrofitted equipment could primarily affect the many stores that operate using HCFC–22, but also those using CFC–12, R–502, and several HCFC-containing blends such as R–401A, R–402A and R–408A. This is because as EPA reduces or eliminates the production and import of ODSs, stores will have less material to meet service demands. While the ODS phaseout does not require owners to retrofit their equipment, a decrease in the availability of virgin material may in turn lead operators of those stores to consider retrofits, although under our proposal certain refrigerants would not be acceptable. For instance, some stores currently using HCFC–22 may choose to retrofit as the production and import of HCFC–22 is phased down and eventually phased out by 2020 per 40 CFR 82.16. EPA recently proposed HCFC–22 allowance allocations for the 2014–2019 time period (December 24, 2013; 78 FR 78071). Some have questioned whether finding certain refrigerants unacceptable for retrofit might provide an incentive to stores to continue to operate with the ODS they are currently using for longer than they might otherwise plan, and we seek comment on this question. In response to this question, we note that many retail chains have been able to minimize the impact of the HCFC–22 phasedown by maintaining their own stockpile of HCFC–22, for instance by recovering from stores that are decommissioned or retrofitted and using such supplies in stores that continue to operate with HCFC–22. We also note that some service is being performed with reclaimed material, with over four million pounds of HCFC–22 being reclaimed every year since at least 2000, and over seven million pounds every year since 2006.[37] While we don't know how this reclaim market will change in the future, recent history shows that the market is using reclaimed material in addition to limited newly-produced supplies that are being reduced by the phaseout.

Regardless of the continued supply of HCFC–22, we believe that the majority of retrofits are planned for reasons other than the supply of the refrigerant currently in-use, for instance during planned maintenance overhauls or when upgrading to more energy efficient equipment. We also see that many retrofits are already directed towards lower-GWP blends such as R–407A and R–407F instead of R–404A and R–507A, as mentioned above. Further, we believe that other options, given the multi-year history of their successful use, are sufficient to meet the various features—such as capacity, efficiency, materials compatibility, cost and supply—that affect the choice of a retrofit refrigerant.[38]

3. What is EPA proposing for new and retrofit stand-alone equipment?

a. New Stand-Alone Equipment

EPA is proposing to change the listing for HFC–134a and other refrigerants for new stand-alone retail food refrigeration equipment from acceptable to unacceptable as of January 1, 2016. These other refrigerants are FOR12A, FOR12B, HFC–227ea, IKON B, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407A, R–407B, R–407C, R–407F, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–426A, R–428A, R–434A, R–437A, R–438A, R–507A, RS–24 (2002 formulation), RS–44 (2003 formulation), SP34E, and THR–03. These refrigerants have GWPs ranging from approximately 600 up to approximately 3,990.

Acceptable substitutes in new stand-alone equipment include R–744 and R–290. EPA recently proposed to find R–600a and R–441A acceptable subject to use conditions in new stand-alone equipment (July 9, 2014; 79 FR 38811). These existing and potential substitutes have GWPs ranging from 1 to 8 compared to HFC–134a with a GWP of 1,430, R–404A with a GWP of approximately 3,920, and R–507A with a GWP of approximately 3,990. None of the substitutes currently listed or proposed for listing as acceptable has an ODP. While R–290, R–600a, and R–441A are VOCs, EPA's analysis indicates that their use as refrigerants in this end-use would not significantly affect meeting national ambient air quality standards. At the time we listed R–290 as acceptable subject to use conditions, we analyzed the potential air quality impacts of emissions of these VOCs and did not find this potential risk to the environment to be significant (ICF, 2014e).[39] We have likewise proposed to exempt R–600a and R–441A used in stand-alone equipment from the venting prohibition (July 9, 2014; 79 FR 38811). These three substitutes are also flammable; however, the use conditions specified (or proposed for R–600a and R–441A) would ensure that they do not pose greater risk than any of the substitutes currently listed as acceptable in new stand-alone equipment.[40] None of the refrigerants currently listed as acceptable or that we have proposed to add to the list of acceptable substitutes presents significant human health toxicity concerns or other ecosystem impacts. Apart from R–290 and R–744, those refrigerants listed acceptable for new stand-alone equipment either contain an HCFC (and are addressed in Section VI below) and/or do not appear to be in production.

We understand that R–290 is already in use globally, including in the United States, and that R–600a is in use outside of the United States as well as in test market trials in the United States. We believe that these two refrigerants can satisfy the vast majority of the current market for use in stand-alone equipment. We note that there may be a need to modify the equipment design in order to meet the use conditions for R–290 and the proposed use conditions for R–600a and R–441A (July 9, 2014; 79 FR 38811). Because there are other substitutes that pose lower risk, we are proposing to change the listing to unacceptable for new stand-alone equipment of the following refrigerants: FOR12A, FOR12B, HFC–134a, HFC–227ea, IKON B, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407A, R–407B, R–407C, R–407F, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–426A, R–428A, R–434A, R–437A, R–438A, R–507A, RS–24 (2002 formulation), RS–44 (2003 formulation), SP34E, and THR–03.

b. Retrofit Stand-Alone Equipment

EPA is proposing to change the listing for R–404A and R–507A from acceptable to unacceptable as retrofit refrigerants for stand-alone equipment as of January 1, 2016. This action would not apply to servicing existing equipment designed for those refrigerants or to equipment retrofitted to use those refrigerants before January 1, 2016. For instance, equipment retrofitted to R–404A or R–507A prior to January 1, 2016, would be allowed to continue to operate using those refrigerants.

[37] The latest data on refrigerant reclamation can be found on EPA's Web site at: *www.epa.gov/spdpublc/title6/608/reclamation/recsum.pdf.*

[38] For example, see CCAC 2012.

[39] EPA has proposed to exempt R–290 in stand-alone retail food refrigeration equipment from the venting prohibition found at 40 CFR 82.154 (78 FR 21871).

[40] The risks due to the flammability of these refrigerants in this end-use were analyzed in the SNAP rule finding them acceptable subject to use conditions (December 20, 2011; 76 FR 78832) and docket (Docket ID No. EPA–HQ–OAR–2009–0286) and information is found in a SNAP proposed rule signed June XX, 2014 and docket (EPA–HQ–OAR–2013–0748).

While we do not believe retrofits are common in stand-alone retail food refrigeration equipment, a number of refrigerants are listed as acceptable for this purpose. For equipment still operating using ozone-depleting refrigerants, we believe there are options available other than R–404A and R–507A that present lower overall risk to human health and the environment that are available. Our analysis indicates that other options such as HFC–134a can be used to retrofit stand-alone units.

4. What is EPA proposing for new and retrofit vending machines?

a. New Vending Machines

EPA is proposing to change the listing for HFC–134a and other refrigerants for new vending machines from acceptable to unacceptable as of January 1, 2016. These other refrigerants are FOR12A, FOR12B, IKON B, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407C, R–410A, R–410B, R–417A, R–421A, R–422B, R–422C, R–422D, R–426A, R–437A, R–438A, R–507A, RS–24 (2002 formulation), and SP34E. These refrigerants have GWPs ranging from approximately 600 up to approximately 3,990.

Acceptable existing substitutes with lower GWPs that pose less risk to human health and the environment in this end-use include R–744, which is currently being used in this end-use. In addition, EPA recently proposed to find R–600a, R–290 and R–441A acceptable subject to use conditions in new vending machines (July 9, 2014; 79 FR 38811). We note that some redesign would be required to meet the use conditions set for all three of these substitutes—R–600a, R–290 and R–441A— in the recent proposal (July 9, 2014; 79 FR 38811).

These four substitutes (R–744 and the three proposed hydrocarbons) have GWPs ranging from 1 to 8 compared to HFC–134a with a GWP of 1,430, R–404A with a GWP of approximately 3,920, and R–507A with a GWP of approximately 3,990. None of these substitutes currently listed or proposed for listing as acceptable has an ODP. While the HCs (R–441A, R–600a and R–290) are VOCs, EPA's analysis indicates that their use as refrigerants in this end-use would not significantly affect meeting national ambient air quality standards. (ICF 2014e).[41] These three substitutes are also flammable; however, the proposed use conditions for these three substitutes would ensure they do not pose greater risk than substitutes that are already listed as acceptable (July 9, 2014; 79 FR 38811). None of the substitutes currently listed or proposed to be listed as acceptable present significant human health toxicity concerns or other ecosystem impacts. Hence, we find that R–290, R–600a and R–441A are potentially available and present a lower overall risk to human health and the environment than HFC–134a and the other refrigerants proposed to be listed as unacceptable in new vending machines.

For new vending machines, EPA has found R–744 acceptable without use conditions. While the vast majority of vending machines using non-ODS refrigerant currently use HFC–134a, units are now being manufactured to use R–744. At least one major global buyer of vending machines is committed to transitioning all of their new U.S.-placed equipment to R–744.[42] Given the large market share that this company holds, it is likely that R–744 components and units are already or will shortly become a viable option for all vending machine OEMs and purchasers.

Given the zero ODP and low GWP of R–744 and the other hydrocarbons that EPA has proposed to find acceptable subject to use conditions in vending machines, the use conditions that we have proposed to establish for the hydrocarbon refrigerants, and the fact that the risks based on other factors such as toxicity are not greater than for HFC–134a, we propose to change the listing of HFC–134a and the alternatives listed in the first paragraph of this section to unacceptable in new vending machines.

b. Retrofit Vending Machines

EPA is proposing to change the listing for R–404A and R–507A from acceptable to unacceptable as retrofit refrigerants for vending machines operating on CFC–12, HCFC–22, and blends containing HCFCs, as of January 1, 2016. This action would not apply to servicing existing equipment designed for those refrigerants or to equipment that had been retrofitted to use those refrigerants before January 1, 2016, including those systems previously using ozone-depleting refrigerants such as HCFC–22. For instance, systems retrofitted to R–404A or R–507A prior to January 1, 2016, would be allowed to continue to operate using those refrigerants.

Under our proposal, the following refrigerants would remain acceptable for retrofitting vending machines: FOR12A, FOR12B, HFC–134a, IKON A, IKON B, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–407C, R–417A, R–417C, R–421A, R–422B, R–422C, R–422D, R–426A, R–437A, R–438A, RS–24 (2002 formulation), SP34E, and THR–02. These refrigerants have GWPs from approximately 50 to approximately 3,100, while the two refrigerants proposed unacceptable, R–404A and R–507A, have GWPs of 3,922 and 3,985, respectively. In this respect, these two refrigerants present a higher risk to human health and the environment. Looking at the other SNAP criteria, we find that those refrigerants remaining acceptable present similar risk to human health and the environment: they are nonflammable, they are not VOCs, and they do not exhibit significant human health toxicity concerns or other ecosystem impacts. Hence, we believe these options present lower overall risk to human health and the environment than R–404A and R–507A.

5. When would the listings change?

Through this action, we are proposing that all listing changes that apply within commercial refrigeration would occur on the same date—January 1, 2016. Looking at the intersection between the end-use and the alternatives EPA believes that changing the listings as of January 1, 2016, allows sufficient opportunity for any planned new installations or manufacturing equipment lines in these end-uses to be redesigned to use a substitute to the refrigerants we are proposing to find unacceptable. We also believe that this date would allow any plans for future retrofits to these blends to be reconsidered, given the multiple other substitutes that would remain acceptable. For many years other refrigerants such as R–407A and R–407F that would remain on the acceptable lists pursuant to our proposal have been gaining market share in supermarket applications, in both new equipment and as retrofit fluids.[43] As part of this market expansion, manufacturers have developed equipment to use them, and that equipment is available to buyers now. In addition, many companies have implemented these other refrigerants, in both new construction and as retrofits, and have built up the skills, knowledge and experience to more fully utilize these refrigerants in a timeframe that would accommodate January 1, 2016 as

[41] EPA has proposed to exempt R–290 (propane) R–600a (isobutane) and R–441A in vending machines from the venting prohibition found at 40 CFR 82.154 (78 FR 21871).

[42] The Coca-Cola Company has identified carbon dioxide as its HFC-free refrigerant of choice for new equipment (Coca Cola, 2012).

[43] ICF, 2014c. Market Characterization of the U.S Commercial Refrigeration Industry. Prepared for the U.S. Environmental Protection Agency. May, 2014.

the date of unacceptability. For stand-alone equipment and vending machines, new equipment is being installed using refrigerants that are acceptable or are proposed acceptable with use conditions, including R–744, R–290 and R–600a.[44] EPA requests comment on this proposed date. EPA is also interested in information concerning the supply of substitutes in sufficient quantities to meet a domestic transition within the proposed timeframe.

6. Applicability To Service of Existing Equipment

As noted above, EPA is not proposing to alter the ability to service existing retail food refrigeration equipment or vending machines with the refrigerant they contain as of January 1, 2016. We recognize the value of the currently installed appliances and are not seeking to shorten their useful lifetime. EPA also recognizes that servicing for existing equipment is often accomplished with recovered and recycled refrigerants.

EPA seeks comments on allowing for the continued servicing of the existing retail food refrigeration equipment and vending machines with the refrigerant they contain as of January 1, 2016.

7. Energy Efficiency Consideration

Energy efficiency has not historically been a criterion by which a refrigerant is analyzed under the SNAP program, and it is not used as one of the criteria in this proposal. However, EPA recognizes that the energy efficiency of particular models of equipment is a significant factor when choosing commercial refrigeration equipment. We also recognize that the energy efficiency of any given piece of equipment is in part affected by the choice of refrigerant and the particular thermodynamic and thermophysical properties that refrigerant possesses.

Throughout the phaseout of ozone-depleting substances, EPA has seen the energy efficiency of refrigeration and air-conditioning equipment increase, despite changing refrigerant options. In some cases, this was because new chemicals were developed that possessed unique properties that allowed high energy efficiency levels to be obtained. In addition, technological improvement in equipment designs and controls has increased energy efficiency. Although today's proposal would eliminate some refrigerant choices, we do not believe it would have a detrimental effect on this trend in increased energy efficiency. In fact, there are multiple case studies available that highlight the energy efficiency gains achieved by some of the low-GWP refrigerants, such as R–744, R–290 and R–600a, that are available or potentially available for the end-uses addressed in this proposal. We welcome additional information and comment on improved energy efficiency associated with switching refrigerants.

For instance, in supermarket refrigeration, a theoretical analysis (Emerson 2014) examined the energy use of R–407A and R–410A, both of which would remain acceptable under this proposal, against that of R–404A, which would be listed as unacceptable. Although this analysis found that both blends would see a 3.6% to 6.7% drop in efficiency in the low-temperature part of the store (e.g., frozen food, ice cream), they would achieve a 4.3% to 13.3% increase in the medium-temperature part of the store (e.g., meat, dairy products, chilled prepared food). Given that supermarkets have significantly larger use of medium-temperature equipment, the net effect would be for the alternatives to use less energy than R–404A. This manufacturer's analyses showed similar increases in energy efficiency compared to R–404A in supermarkets and stand-alone equipment for a variety of low-GWP refrigerants that are not yet listed under SNAP but are in development.

While that manufacturer's analysis showed slightly higher energy consumption than R–134a in theoretical calculations for stand-alone equipment, other results with actual equipment have shown otherwise. For instance, in stand-alone equipment, one user reported that ''HC freezers are significantly more energy-efficient and use a natural hydrocarbon refrigerant with lower global warming potential than the HFC refrigerants commonly used in US freezers'' (Ben and Jerry's, 2014). Likewise, for vending machines, one purchaser has indicated that while introducing over one million units using R–744, they have increased the energy efficiency of their cooling equipment over 40% since 2000, many years after they adopted HFC–134a (Coca-Cola, 2014).

Finally, we note that energy efficiency is influenced, but not determined, by the refrigerant. As new products are designed for the use of particular refrigerants, manufacturers have the opportunity to change designs to take advantage of a given refrigerant's characteristics. The redesign and development phase is also an opportunity to improve other components that will affect the overall efficiency of the equipment, such as the use of more efficient motors and compressors, improved heat exchangers, better controls, improved insulation (e.g., on display cases) and sealing (for products with doors), more efficient lighting, etc.

The United States Department of Energy (DOE) has promulgated, under separate rulemaking and separate authority, energy efficiency requirements for several types of commercial refrigeration equipment, including products that would be affected by this proposal. While EPA's proposal would limit the choice of refrigerant a manufacturer could use in new equipment, EPA notes that such equipment would still be subject to the DOE requirements and would normally need to meet the standards set.[45] As discussed above, EPA does not believe this proposal would prevent compliance with the DOE rules, and we note that many compliant models are already commercially available that do not use the refrigerants EPA has proposed as unacceptable. EPA requests comment on the effects this proposal would have on the energy efficiency of the commercial refrigeration end-uses addressed and in particular the effect, if any, this proposal would have on meeting applicable DOE standards.

8. What other options is EPA considering?

EPA is considering but is not proposing to change the listing for several other substitutes in retail food refrigeration. We are seeking comment on these substitutes.

a. New and Retrofit Condensing Units and Supermarket Systems

When analyzing supermarket retail food refrigeration systems, as an alternative to changing the listing to unacceptable for HFC–227ea, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, and R–434A, we are considering setting a use restriction to limit the charge size of these chemicals allowed to be used in condensing units and supermarket systems. Supermarkets could use systems employing one of the

[44] *Ibid.*

[45] Refrigeration equipment in the applicable covered equipment class would still be subject to DOE's standards, regardless of the refrigerant that the equipment uses. If a manufacturer believes that its design is subjected to undue hardship by a regulatory standard prescribed by DOE (in contrast to one that is statutorily prescribed by Congress), the manufacturer may petition DOE's Office of Hearing and Appeals (OHA) for exception relief or exemption from the standard pursuant to OHA's authority under section 504 of the DOE Organization Act (42 U.S.C. 7194), as implemented at subpart B of 10 CFR part 1003. OHA has the authority to grant regulatory relief from a standard promulgated by DOE on a case-by-case basis if it determines that a manufacturer has demonstrated that meeting the standard would cause hardship, inequity, or unfair distribution of burdens.

many advanced refrigeration designs currently deployed in the United States, such as distributed refrigeration, secondary-loop, and cascade designs. To set the charge size limit, EPA is considering the charge size limit that is necessary, but not fully sufficient, to achieve a Gold-Level Store Certification under EPA's GreenChill Store Certification Program.[46] That specification requires that the store must achieve an average HFC refrigerant charge equal to or less than 1.25 pounds of refrigerant per MBTU/hr total evaporator heat load.[47]

For new equipment, one reason we are considering a use restriction requiring a small charge is to limit the amount of high-GWP refrigerant that would be emitted in a catastrophic event. However, given the high GWP of these refrigerants compared to other refrigerants that are available in these end-uses, we do not believe that use with a small charge size adequately addresses the greater risk they pose. Further, we recognize that using a lower-GWP refrigerant, such as R–407A or R–407F, is also possible in small-charge systems, and several stores are operating with such systems today.

For retrofits, two primary factors lead us to consider a use restriction for a small charge size in place of listing the substitutes as unacceptable. First, there are many different supermarket systems in operation with ozone-depleting refrigerants today, and there may be some concern that not all could be retrofitted with the lower-GWP blends, i.e., whether there truly are alternatives ''available'' for the purpose. As to this concern, we reflect on three points. First, based on the regulations phasing out CFCs in 1996, equipment using CFCs today would be at least 18 years old, beyond the typical average lifetime.[48] Because it is typical to retire older equipment before newer equipment, it is likely that many stores using those refrigerants would be decommissioned, or the refrigeration systems would be replaced rather than retrofitted. Second, we do not see an impediment in the continued operation of stores currently using refrigerants proposed unacceptable for new and/or retrofit equipment (see section 6 above). We know that some stores have systems that continue to use CFC–12 and/or R–502, the production and import of which was phased out in 1996, and believe the same long equipment lifetimes can be achieved, if desired, with equipment installed prior to January 1, 2016, using the refrigerants we propose as unacceptable. Finally, where retrofits to refrigerants that are not proposed as unacceptable have occurred, the industry has been able to achieve acceptable capacity and efficiency levels. All these factors point to the ability of industry to make business decisions on which stores to decommission or retrofit and when to do so while maintaining their operations without the need to rely on the refrigerants we are proposing as unacceptable.

Second, some have questioned whether removing options from the list of acceptable retrofit substitutes might present a perverse incentive for stores with older systems (more likely to leak) to continue use of ozone-depleting refrigerants, primarily HCFC–22 but also CFC–12, R–502, and multiple blends containing HCFCs, rather than retrofit or replace those systems with a new refrigerant. While production and import of HCFC–22 and all other HCFCs used in the acceptable retrofit blends are capped, the stores using them would continue to leak ozone-depleting refrigerants into the atmosphere. The additional refrigerant that they would need to service that leaky equipment might not have been produced in the first place if the demand was not there. Nonetheless, given the tight controls on production and import of ozone-depleting refrigerants, we believe the market will determine where those limited supplies are directed and where a store may retrofit to a refrigerant other than those proposed to be listed as unacceptable.

EPA requests comments on both concerns addressed above, particularly the availability of substitutes able to work with the design of existing systems that might be retrofitted, and the possible perverse incentives an unacceptable listing might bring to continue to operate older, less efficient, and/or leakier ODS systems. EPA also requests comments on the specified charge size limit and how it would be met in both new and retrofit retail food refrigeration (condensing units and supermarket systems) if EPA were to propose a use restriction rather than take final action by listing some or all of these refrigerants as unacceptable for condensing units and supermarket systems.

b. New Stand-Alone Equipment and Vending Machines

For new stand-alone retail food refrigeration equipment and vending machines, we are considering maintaining the acceptability status of HFC–134a and blends with a lower GWP—FOR12A, FOR12B, IKON A, IKON B, SP34E, THR–02, and THR–03—subject to a use restriction. One reason to maintain the acceptability of these refrigerants, in particular HFC–134a, would be to allow niche applications to continue to use the primary refrigerant employed in these end-uses while new low-GWP substitutes are developed.

For new vending machines, we are considering whether substitutes other than HFC–134a are available for low-temperature refrigeration applications, for instance, for ice-cream novelty or microwavable frozen-food vending machines and, if not, whether to establish a use restriction that HFC–134a could only be used in vending machines designed for, and maintaining, an internal temperature of 32 °F (0 °C) or below. However, we believe that the availability of R–744, which is listed as acceptable, and the availability of HCs, which we have proposed to list as acceptable, do not support such an action. We are requesting comment on the viability of these substitutes in low-temperature applications. Further, we are asking for comment on the supply of components designed for R–744, hydrocarbons, or other potential substitutes for use in low-temperature vending machines and how that supply might affect the ability of manufacturers to continue to provide such equipment to meet these applications and customers' requirements including energy efficiency goals.

For new stand-alone equipment, we note that HCs pose additional challenges related to their flammability. Some stand-alone retail food refrigeration appliances utilizing HCs have required design changes, and our use conditions require meeting specific charge size limits, raising questions of the viability of HCs in all larger applications within this end-use. EPA is considering adding a use restriction limiting the use of HFC–134a and the blends mentioned to only larger-sized units, while finding it unacceptable in smaller-sized units. To determine the dividing line between ''small'' and ''large'' units, we are considering options such as the number of doors within a single unit, the refrigeration capacity of the unit, and the interior volume.

[46] Additional information on GreenChill is available at *http://www2.epa.gov/greenchill/.*

[47] In addition to reaching this HFC charge size limit, stores must use only non-ozone-depleting refrigerants and must meet a store-wide annual refrigerant emissions rate of no more than 15% in order to be certified at the Gold level.

[48] For example, IPCC 2006 indicates that the average lifetime of medium and large commercial refrigeration equipment is between seven and 15 years.

Although we are considering this option, we are not proposing it because we feel other options exist to design units using other less harmful alternatives, even in large stand-alone units. The SNAP acceptability listing for R–744 in stand-alone equipment does not include a restriction on charge size or any other use condition. We also recognize the ability to apply separate refrigeration circuits within a given cabinet; for instance one circuit with up to 150 grams of R–290 to cool a portion of the unit and a second circuit with up to 150 grams of R–290 to cool the rest of the unit. Such dual-circuit designs might be particularly effective if different parts of the unit are used for different products that require different temperature conditions or have different refrigeration loads.

EPA seeks comments on this option and particularly on how one would determine what size of a unit could not use substitutes that would remain on the acceptable list under this proposal or that we have recently proposed be added to the acceptable list; where the dividing line would be drawn; and how such a use restriction could avoid unintended consequences such as the over-sizing of units to allow the use of HFC–134a.

EPA believes that R–744, an acceptable option for both new stand-alone retail food refrigeration equipment and new vending machines, and R–290, an acceptable substitute for new stand-alone retail food refrigeration equipment and proposed as acceptable for new vending machines, could satisfy the vast majority of new equipment in these end-uses. However, we seek additional information and studies that would help us understand whether certain designs (e.g., 3-door and other large retail food refrigeration stand-alone equipment) could meet the charge size limit in the case of R–290. We also seek information regarding whether certain applications (e.g., low-temperature vending machines) could be effective while maintaining current energy efficiency levels in the case of R–744.

c. Retrofit Stand-Alone Equipment and Vending Machines

EPA has proposed to find R–404A and R–507A unacceptable for retrofits in both stand-alone equipment and vending machines. EPA is considering also changing the acceptability status of several other refrigerants to unacceptable. Under this option, we would change the status of the following refrigerants from acceptable to unacceptable in retrofit retail food refrigeration (stand-alone equipment): KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407A, R–407B, R–407C, R–407F, R–417A, R–417C, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–426A, R–427A, R–428A, R–434A, R–437A, R–438A, R–507A, RS–24 (2002 formulation), and RS–44 (2003 formulation). Likewise, this option would change the status of the following refrigerants from acceptable to unacceptable in retrofit vending machines: KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407C, R–417A, R–417C, R–421A, R–422B, R–422C, R–422D, R–426A, R–437A, R–438A, R–507A, and RS–24 (2002 formulation). The refrigerants in these two lists have GWPs that range from 1,505 to 3,985.

These refrigerants have higher GWPs than HFC–134a, which would remain acceptable for retrofits, and in this respect pose a higher risk to human health and the environment. Similar to HFC–134a, these other refrigerants do not pose increased risk due to toxicity, flammability, ODP and ecological effects. EPA believes that HFC–134a would be the most likely refrigerant to be used to retrofit stand-alone equipment and vending machines still operating on ozone-depleting refrigerant. EPA questions whether the other refrigerants listed above would serve any retrofit need, and whether finding them unacceptable would reduce overall risk to human health and the environment. EPA believes some existing vending machines and stand-alone equipment still use class I ozone-depleting refrigerants such as CFC–12 and R–502 and that even more equipment continues to use class II ozone-depleting refrigerants, primarily HCFC–22. Other than HFC–134a, we do not believe there are substitutes that would likely be used for most of this equipment for purposes of retrofitting.

We seek comment on the option of finding other substitutes, in addition to R–404A and R–507A, unacceptable as retrofit refrigerants in vending machines and stand-alone retail food refrigeration equipment. In particular, we are interested in an assessment of the existing stock of equipment operating with ozone-depleting refrigerants, the likelihood that they will require a retrofit before being replaced with a new unit, and the substitute(s) that could be and are likely to be used.

d. Status of R–404A and R–507A in Other End-Uses

Considering the high GWP of R–404A, R–507A, and some of the other blends proposed as unacceptable, EPA is considering finding them unacceptable in several other end-uses, besides retail food refrigeration and vending machines, such as cold storage rooms and warehouses, ice machines, refrigerated transport, and industrial process refrigeration. We believe that the substitutes that are being used in retail food refrigeration, such as R–407A and R–407F, would be theoretically viable in these other end-uses too, given that the operational characteristics of such equipment, such as temperature to be maintained, are similar. Those two substitutes, and others, have been found acceptable in the four end-uses mentioned. In addition, low-GWP substitutes have been found acceptable under SNAP for some of these end-uses, and research is underway in the others. For example, for the industrial process refrigeration end-use, R–744, R–717, and several HCs have been found acceptable. For cold storage warehouses, R–744 is acceptable for new equipment, and R–717 is in widespread use. R–744 for refrigerated transport and HCs for ice machines have been tested and, although not yet listed under SNAP, are being used outside the United States. In these two end-uses, the list of acceptable refrigerants is similar to that for supermarket applications, spanning a wide range of GWPs. Several HFC blends with GWPs considerably lower than those of R–404A and R–507A are being used in retail food refrigeration, especially in supermarkets and, as stated above, are acceptable in the four end-uses mentioned; however, we have limited knowledge of their use in these other end-uses. For that reason, we have not proposed finding R–404A and R–507A unacceptable in these other end-uses.

EPA requests comment on the use and viability of both low-GWP refrigerants (e.g., R–744, R–717, and HCs) and other HFC-blends (e.g., R–407A and R–407F) and the possibility of listing R–404A, R–507A, and other high-GWP blends unacceptable in any or all of these four end-uses—cold storage warehouses, ice machines, refrigerated transport, and industrial process refrigeration. EPA also solicits comments on the feasibility of the proposed deadlines and whether earlier or later dates would be more appropriate.

D. Foam Blowing Agents

EPA is proposing to change the listings from acceptable to unacceptable beginning January 1, 2017, except where allowed under a narrowed use limit, for HFC–134a and blends thereof in all foam blowing end-uses, and for HFC–365mfc, HFC–245fa and blends thereof for all foam blowing end-uses except spray foam applications. Specific end-uses and applications include: (1) Rigid

polyurethane appliance foam; (2) flexible polyurethane; (3) rigid polyurethane: commercial refrigeration, and sandwich panels; (4) rigid polyurethane (slabstock and other); (5) rigid polyurethane and polyisocyanurate laminated boardstock; (6) integral skin polyurethane; (7) polystyrene (extruded sheet); (8) polystyrene: extruded boardstock and billet; (9) polyolefin; and (10) phenolic insulation board and bunstock. In addition, EPA is proposing to change the listings from acceptable to unacceptable for the following foam blowing agents in the following end-uses as of January 1, 2017: (1) Formacel B in polystyrene (extruded boardstock and billet); (2) Formacel TI in rigid polyurethane appliance foam, rigid polyurethane (spray, commercial refrigeration, and sandwich panels), rigid polyurethane slabstock, integral skin polyurethane, polystyrene extruded sheet and polyolefin; (3) Formacel Z–6 in rigid polyurethane appliance foam, rigid polyurethane (commercial refrigeration, and sandwich panels), rigid polyurethane slabstock, polystyrene (extruded boardstock and billet), integral skin polyurethane, and polystyrene extruded sheet; and (4) HFC–143a in phenolic insulation board and bunstock.

1. Background

Foams are plastics (such as polyurethane or polystyrene) that are manufactured using blowing agents to create bubbles or cells in the material's structure. The foam plastics manufacturing industries, the markets they serve and the blowing agents used are extremely varied. The range of uses includes building materials, appliance insulation, cushioning, furniture, packaging materials, containers, flotation devices, filler, sound proofing and shoe soles. Some foams are rigid with cells that still contain the foam blowing agent, which can contribute to the foam's ability to insulate. Other foams are open-celled, with the foam blowing agent escaping at the time the foam is blown, as for flexible foams.

Historically, a variety of foam blowing agents have been used for these applications. CFCs and HCFCs were typically used given their favorable chemical properties. CFCs and HCFCs are controlled substances under the Montreal Protocol and subject to regulation under the CAA including a phaseout of production and import under section 604 for CFCs and section 605(b)–(c) for HCFCs and use restrictions on HCFCs under section 605(a). The regulations implementing section 610 of the CAA include a ban on sale or distribution of foam products blown with class I and class II ODS: however, for foam products containing a class II ODS, the ban is subject to an exception for foam insulation products as defined at 40 CFR 82.62.

The SNAP program has found acceptable a variety of non-ODS blowing agents, including HFCs (e.g., HFC–134a, HFC–245fa, HFC–365mfc), hydrocarbons, carbon dioxide, water, and methyl formate. In addition, low-GWP fluorinated compounds in use include HFO–1234ze(E) and *trans*-1-chloro-3,3,3-trifluoroprop-1-ene (Solstice 1233zd(E)).

Blowing agents are approved on an end-use basis. The SNAP program considers the following end-uses:

a. Rigid polyurethane (appliance foam) includes insulation foam in domestic refrigerators and freezers.

b. Rigid polyurethane (spray, commercial refrigeration, and sandwich panels) includes buoyancy foams, insulation for roofing, wall, pipes, metal doors, vending machines, coolers, and refrigerated transport vehicles.

c. Rigid polyurethane (slabstock and other) includes insulation for panels and pipes.

d. Rigid polyurethane and polyisocyanurate laminated boardstock includes insulation for roofing and walls.

e. Flexible polyurethane includes foam in furniture, bedding, chair cushions, and shoe soles.

f. Integral skin polyurethane includes car steering wheels, dashboards, and shoe soles.

g. Polystyrene (extruded sheet) includes foam for packaging and buoyancy or flotation.

h. Polystyrene (extruded boardstock and billet) includes insulation for roofing, walls, floors, and pipes.

i. Polyolefin includes foam sheets and tubes.

j. Phenolic insulation board and bunstock includes insulation for roofing and walls.

2. What is EPA proposing for foam blowing agents?

EPA is proposing to change the listings from acceptable to unacceptable for HFC–134a, HFC–245fa, HFC–365mfc, and any blends containing these blowing agents for all foam end-uses and applications except for spray foam as of January 1, 2017. In addition, we propose to change the listings from acceptable to unacceptable for the following foam blowing agents in the following end-uses: (1) Formacel B in polystyrene (extruded boardstock and billet); (2) Formacel TI in rigid polyurethane appliance foam, rigid polyurethane (spray, commercial refrigeration, and sandwich panels), rigid polyurethane slabstock, integral skin polyurethane, polystyrene extruded sheet and polyolefin; (3) Formacel Z–6 in rigid polyurethane appliance foam, rigid polyurethane (commercial refrigeration, and sandwich panels), rigid polyurethane slabstock, polystyrene (extruded boardstock and billet), integral skin polyurethane, and polystyrene extruded sheet; and (4) HFC–143a in phenolic insulation board and bunstock, all as of January 1, 2017—that is, it would be prohibited to blow foam using these blowing agents for these uses beginning January 1, 2017. In addition, we propose that it would be prohibited to import closed cell foam products or products containing closed cell foam that contain any of the blowing agents listed as unacceptable. EPA is also seeking comment on whether the Agency should consider use of the foam blowing agent to apply to open cell foam and products containing open cell foam, and in particular what would be the legal basis for doing so. Finally, we are providing a limited exception to the date when the unacceptability determinations apply for certain military and space applications where there is documentation that additional time is required to complete qualification testing.

a. What other foam blowing agents are being used?

Various foam blowing agents have been historically used. The opportunity to use hydrocarbons (HCs), CO_2, and water in the 1990s for a range of foam blowing applications in the United States has allowed many foam blowing end-uses and applications to transition from ODS, thus reducing the end-uses that rely on HCFCs or HFCs. HCs have been a low-GWP and cost-effective alternative available for large parts of the foam sector, particularly in flexible polyurethane foam, polystyrene sheet foam, polyurethane slabstock foam, polyurethane and polyisocyanurate laminated boardstock, phenolic, and polyolefin foams. HCs also are used in most of the other end-uses, but less extensively than in these six end-uses. However, flammability of foam blowing agents, including HCs, can be a concern, particularly for spray foam applications.

Over the past ten years both fluorinated and non-fluorinated alternatives have expanded both the list of options for specific foam uses and the foam uses in which these alternatives are now used has also grown. A number of new foam blowing agents with low GWPs have been introduced during the

past several years. Many end users have indicated interest in these newer alternatives, often to improve energy efficiency of the foam products manufactured with the foam blowing agent. Production volumes for some of these newer substitutes are expanding rapidly to keep pace with growing demand. For example, HFO–1234ze(E) and *trans*-1-chloro-3,3,3-trifluoroprop-1-ene have recently been listed as acceptable. HFO–1336mzz(Z) is currently under review by EPA as a substitute foam blowing agent. These newer substitutes, which do not raise the flammability concerns of HCs, may prove appropriate for end-uses where flammable agents raise safety concerns. The process and timing for retooling facilities that use the blowing agents or that incorporate the foam product into another product will vary depending on the substitute selected. In some cases, manufacturing facilities such as household refrigerator manufacturers have already begun the testing of and transitioning to lower-GWP substitutes for foam blowing.

b. What are the health and environmental impacts of the substitute foam blowing agents?

i. Proposed Unacceptable Agents

The HFCs that we are proposing to find unacceptable have GWPs ranging from 794 for HFC–365mfc to 4470 for HFC–143a, which is significantly higher than the GWPs of other acceptable substitutes. The HFC blends that we are proposing to find unacceptable have GWPs that vary depending on the specific composition; the range of GWPs for blends are 140 to 1500 for Formacel B, 1330 to close to 1500 for Formacel TI, 370 to 1290 for Formacel Z–6, 740 to 1030 for blends of HFC–365mfc with at least 4% HFC–245fa, and 900 to 1100 for commercial blends of HFC–365mfc with 7 to 13% HFC–227ea and the remainder HFC–365mfc. All of the HFCs and HFC blends that we are proposing to find unacceptable consist of compounds that are non-ozone-depleting and are VOC-exempt. Toxicity is not a significant concern for these alternatives because they may be used for blowing foam consistent with required or recommended workplace exposure limits. For example, HFC–134a, HFC–143a, and HFC–245fa can be used consistent with their respective AIHA WEELs of 1000 ppm, 1000 ppm, and 200 ppm (8-hr TWA) in the foam end-uses where they are acceptable. Of the foam blowing agents that we propose to be unacceptable, some are nonflammable (HFC–134a, HFC–245fa, Formacel TI, blends of HFC–365mfc with at least 4% HFC–245fa, and commercial blends of HFC–365mfc with 7 to 13% HFC–227ea and the remainder HFC–365mfc), while others are flammable (HFC–365mfc and HFC–143a). The HFC blends Formacel B and Formacel Z–6 may be flammable depending on the exact composition, with the less flammable or nonflammable formulations having higher GWPs, in some cases as high as 1300 to 1500.

In addition to the GWP of foam blowing agents, another potential climate impact from foam blowing agents is the insulation value of the blown foam. This may matter for rigid insulation foams, where the foam blowing agent may add more or less insulation value to rigid polyurethane appliance foam; rigid polyurethane spray, commercial refrigeration and sandwich panels; rigid polyurethane slabstock and other foam; polystyrene extruded boardstock and billet; rigid polyurethane and polyisocyanurate laminated boardstock; and phenolic insulation board and bunstock. A foam with better overall insulation value can reduce indirect greenhouse gas emissions from power plants if the foam insulation results in greater energy efficiency and less need for heating or cooling. Some studies have indicated that hydrocarbons and CO_2 may provide less insulation value to an insulation foam, pound for pound, than HFCs. Recent information on some of the newer fluorinated foam blowing agents with low GWPs, such as HFO–1234ze(E) and *trans*-1-chloro-3,3,3-trifluoroprop-1-ene, indicates these foam blowing agents provide comparable or greater insulation value than their HCFC and HFC predecessors and therefore may be of interest to companies considering transition to more energy-efficient options. In addition, even a foam blowing agent that provides less insulation value may still not impact the foam's overall energy efficiency where thicker foam is used. Because of the variety of foam blowing agents available in each end-use, we believe that there are sufficient options that will not have an adverse impact on indirect greenhouse emissions.

ii. Rigid Polyurethane Appliance Foam

For rigid polyurethane appliance foam, saturated light HCs (C3–C6 [49]), CO_2, vacuum panels, water, ecomate™, Exxsol blowing agents, methyl formate, HFO–1234ze(E), and *trans*-1-chloro-3,3,3-trifluoroprop-1-ene are acceptable alternatives (in-kind and not-in-kind) with GWPs that range from zero to seven. Toxicity is not a significant concern for these alternatives because they may be used for blowing appliance foam consistent with required or recommended workplace exposure limits. With the exception of HCs and Exxsol blowing agents, these alternatives contain compounds that are exempt from the definition of VOC. Of the alternatives listed above, only *trans*-1-chloro-3,3,3-trifluoroprop-1-ene contains chlorine and has measurable ODP. Its ODP of 0.00024 to 0.00034 [50] [51] is roughly one order of magnitude higher than the ODP of HFC–134a which is considered to have zero ODP.[52] *Trans*-1-chloro-3,3,3-trifluoroprop-1-ene's impact on global atmospheric ozone abundance is expected be statistically insignificant.[53] Of the various options listed in this paragraph, ecomate™, Exxsol blowing agents, HCs, and methyl formate are flammable, and the others are nonflammable. The hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–134a, Formacel TI, HFC–245fa, HFC–365mfc, and Formacel Z–6 have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

iii. Flexible Polyurethane

For flexible polyurethane used for foam furniture, bedding, chair cushions, shoe soles and other applications, acceptable substitutes include acetone, saturated light HCs (C3–C6), Exxsol blowing agents, CO_2, ecomate™ (i.e., methyl formate), HFC–152a, and water with GWPs ranging from zero to 124. Of the substitutes listed for flexible polyurethane, all have an ODP of zero. Toxicity is not a significant concern for these substitutes because they may be used for blowing flexible polyurethane foam consistent with required or recommended workplace exposure limits. With the exception of HCs and Exxsol blowing agents, these substitutes contain compounds that are exempt

[49] These are hydrocarbons with three to six carbons, including propane, butane, isobutane, pentane, isopentane, cyclopentane, and hexane.

[50] Wang D., Olsen S., Wuebbles D. 2011. ''Preliminary Report: Analyses of tCFP's Potential Impact on Atmospheric Ozone.'' Department of Atmospheric Sciences. University of Illinois, Urbana, IL. September 26, 2011.

[51] Patten and Wuebbles, 2010. ''Atmospheric Lifetimes and Ozone Depletion Potentials of *trans*-1-chloro-3,3,3-trichloropropylene and *trans*-1,2-dichloroethylene in a three-dimensional model.'' *Atmos. Chem. Phys.,* 10, 10867–10874, 2010.

[52] Wang et al., 2011. *Op. cit.*

[53] Wang et al., 2011. *Op. cit.*

from the definition of VOC. Of the various options listed in this paragraph, ecomate™, Exxsol blowing agents, HFC–152a, and hydrocarbons are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–134a, HFC–245fa, and HFC–365mfc have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

iv. Rigid Polyurethane Spray Foam

For rigid polyurethane spray foam, which includes insulation for roofing, wall, pipes, and buoyancy, acceptable substitutes include HFC–245fa, commercial blends of HFC–365mfc and HFC–227ea, containing 7% to 13% HFC–227ea and the remainder HFC–365mfc, blends of HFC–365mfc and at least 5% HFC–245fa, CO_2, water, Exxsol blowing agents, ecomate™, HFO–1234ze(E), and *trans-1*-chloro-3,3,3-trifluoroprop-1-ene, with GWPs ranging from zero to 1100. Toxicity is not a significant concern for these alternatives because they may be used for spray foam consistent with required or recommended workplace exposure limits. With the exception of Exxsol blowing agents, these substitutes contain compounds that are exempt from the definition of VOC. Of the substitutes listed above, only *trans-1*-chloro-3,3,3-trifluoroprop-1-ene has an ODP, and as discussed above for rigid polyurethane appliance foam, its impact on global atmospheric ozone abundance is expected be statistically insignificant.

Flammability is of particular concern in spray foam applications, in part because they are applied onsite in pressurized equipment with spray guns, sometimes in proximity to hot, flammable substances such as tar. The alternative manufacturers have developed training to assist end-users in addressing the flammability hazards of the flammable compounds in this end-use (Exxsol blowing agents and ecomate™); however, these alternatives have limited, if any, use in spray foams in the United States.[54] [55] Flammability risks are more difficult to mitigate than in most other foam applications because, unlike in a factory setting, it is unlikely that ventilation can be provided that removes flammable vapors and maintains them below the lower flammability limit, and it is not practical to make all electrical fixtures explosion proof when applying spray foam in place in a residential building. Thus, EPA is proposing to find HFC–134a and blends thereof and Formacel TI unacceptable in this application. We are proposing that HFC–245fa; commercial blends of HFC–365mfc and HFC–227ea, containing 7% to 13% HFC–227ea and the remainder HFC–365mfc; and blends of HFC–365mfc and at least 5% HFC–245fa remain acceptable in spray foam because these three nonflammable foam blowing agents reduce overall risk compared to the available flammable alternatives. The three HFC blends that remain acceptable reduce overall risks to human health and the environment compared to HFC–134a and Formacel TI in this application because they have lower GWPs.

v. Rigid Polyurethane Used in Commercial Refrigeration and Sandwich Panels

For rigid polyurethane used in commercial refrigeration and sandwich panels, which includes insulation for roofing, wall, metal doors, vending machines, coolers, buoyancy, and refrigerated transport vehicles, acceptable alternatives include saturated light HCs (C3–C6), ecomate™, CO_2, water, Exxsol blowing agents, methyl formate, HFO–1234ze(E), and *trans*-1-chloro-3,3,3-trifluoroprop-1-ene with GWPs ranging from zero to seven. Toxicity is not a significant concern for these alternatives because they may be used for blowing foam for commercial refrigeration and sandwich panels, consistent with required or recommended workplace exposure limits. With the exception of hydrocarbon, and Exxsol blowing agents, these substitutes contain compounds that are exempt from the definition of VOC. Of the substitutes listed above, only *trans*-1-chloro-3,3,3-trifluoroprop-1-ene has an ODP and as discussed above for rigid polyurethane appliance foam, its impact on global atmospheric ozone abundance is expected to be statistically insignificant. Of the various substitutes listed in this paragraph, ecomate™, Exxsol blowing agents, formic acid, hydrocarbons, and methyl formate are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In these applications, HFC–134a, HFC–245fa, HFC–365mfc, Formacel Z–6 and Formacel B have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

vi. Rigid Polyurethane Slabstock and Other Foam

For rigid polyurethane slabstock and other foam, saturated light HCs (C3–C6), CO_2, water, ecomate™, Exxsol blowing agents, methyl formate, HFO–1234ze(E), and trans-1-chloro-3,3,3-trifluoroprop-1-ene are acceptable alternatives with GWPs that range from zero to seven. Toxicity is not a significant concern for these alternatives because they may be used for blowing slabstock foam consistent with required or recommended workplace exposure limits. With the exception of HCs and Exxsol blowing agents, these alternatives contain compounds that are exempt from the definition of VOC. Of the alternatives listed above, only trans-1-chloro-3,3,3-trifluoroprop-1-ene has an ODP, and as discussed above for rigid polyurethane appliance foam, its impact on global atmospheric ozone abundance is expected be statistically insignificant. Of the various options listed in this paragraph, ecomate™, Exxsol blowing agents, HCs, and methyl formate are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–134a, Formacel TI, HFC–245fa, HFC–365mfc, and Formacel Z–6 have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

vii. Rigid Polyurethane and Polyisocyanurate Laminated Boardstock

For rigid polyurethane and polyisocyanurate laminated boardstock, saturated light HCs (C3–C6), CO_2, water, ecomate™, Exxsol blowing agents, methyl formate, HFC–152a, HFO–1234ze(E), and trans-1-chloro-3,3,3-trifluoroprop-1-ene are acceptable alternatives with GWPs that range from zero to 124. Toxicity is not a significant concern for these alternatives because they may be used for blowing laminated boardstock consistent with required or recommended workplace exposure limits. With the exception of HCs and Exxsol blowing agents, these

[54] UNEP, 2013. Report of the Technology and Economic Assessment Panel, Volume 2: Decision XXIV/7 Task Force Report, Additional Information on Alternatives to ODS. September, 2013.

[55] UNEP, 2010. Report of the Rigid and Flexible Foams Technical Options Committee, 2010 Assessment. This document is accessible at *http://ozone.unep.org/Assessment_Panels/TEAP/Reports/FTOC/FTOC-2010-Assessment-Report.pdf.*

alternatives contain compounds that are exempt from the definition of VOC. Of the alternatives listed above, only trans-1-chloro-3,3,3-trifluoroprop-1-ene has an ODP and as discussed above for rigid polyurethane appliance foam, trans-1-chloro-3,3,3-trifluoroprop-1-ene's impact on global atmospheric ozone abundance is expected be statistically insignificant. Of the various options listed in this paragraph, ecomate™, Exxsol blowing agents, HCs, and methyl formate are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–134a, HFC–245fa, and HFC–365mfc have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

viii. Polystyrene Extruded Sheet

For polystyrene extruded sheet, acceptable substitutes include saturated light hydrocarbons (C3–C6), CO_2, water, Exxsol blowing agents, ecomate™ (methyl formate), and HFC–152a. These substitutes have GWPs ranging from 1 to 124. Toxicity is not a significant concern for these alternatives because they may be used for blowing extruded polystyrene foam consistent with required or recommended workplace exposure limits. With the exception of HCs and Exxsol blowing agents, these substitutes contain compounds that are exempt from the definition of VOC. Of the substitutes listed above in this paragraph, all have an ODP of zero. Of the various substitutes listed in this paragraph, ecomate™, Exxsol blowing agents, HFC–152a, and HCs are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–134a, HFC–245fa, HFC–365mfc, Formacel TI and Formacel Z–6 have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

ix. Polystyrene Extruded Boardstock and Billet

For polystyrene extruded boardstock and billet, acceptable substitutes include saturated light hydrocarbons (C3–C6), CO_2, water, Exxsol blowing agents, ecomate™ (methyl formate), HFC–152a, and HFO–1234ze(E). These substitutes have GWPs ranging from 1 to 124. Toxicity is not a significant concern for these alternatives because they may be used for blowing extruded polystyrene foam consistent with required or recommended workplace exposure limits. With the exception of HCs and Exxsol blowing agents, these substitutes contain compounds that are exempt from the definition of VOC. Of the substitutes listed above in this paragraph, all have an ODP of zero. Of the various substitutes listed in this paragraph, ecomate™, Exxsol blowing agents, HFC–152a, and HCs are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–134a, HFC–245fa, HFC–365mfc, Formacel B and Formacel Z–6 have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

x. Integral Skin Polyurethane

In integral skin polyurethane, which includes foam in car steering wheels, dashboards, and shoe soles, substitutes include acetone, saturated light HCs (C3–C6), CO_2, water, Exxsol blowing agents, methyl formate, ecomate™, HFO–1234ze(E), HFC–152a, and trans-1-chloro-3,3,3-trifluoroprop-1-ene. These substitutes have GWPs ranging from zero to 124. Toxicity is not a significant concern for these alternatives because they may be used for blowing integral skin polyurethane foam consistent with required or recommended workplace exposure limits. With the exception of HCs and Exxsol blowing agents, these substitutes contain compounds that are exempt from the definition of VOC. Of the substitutes listed above, only trans-1-chloro-3,3,3-trifluoroprop-1-ene has an ODP and as discussed above for rigid polyurethane appliance foam, its impact on global atmospheric ozone abundance is expected be statistically insignificant. Of the various substitutes listed in this paragraph, acetone, methyl formate, ecomate™, Exxsol blowing agents, HFC–152a, and hydrocarbons are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–134a, HFC–245fa, HFC–365mfc, Formacel TI, and Formacel Z–6 have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

xi. Polyolefin Foam

For polyolefin foam, saturated light HCs (C3–C6), CO_2, water, ecomate™, Exxsol blowing agents, methyl formate, HFC–152a, blends of HFC–152a and saturated light HCs, HFO–1234ze(E), and trans-1-chloro-3,3,3-trifluoroprop-1-ene are acceptable alternatives with GWPs that range from zero to 124. Toxicity is not a significant concern for these alternatives because they may be used for blowing polyolefin foam consistent with required or recommended workplace exposure limits. With the exception of HCs, HC blends, and Exxsol blowing agents, these alternatives contain compounds that are exempt from the definition of VOC. Of the substitutes listed above in this paragraph, all have an ODP of zero. Of the various options listed in this paragraph, ecomate™, Exxsol blowing agents, HCs, and methyl formate are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–134a, Formacel TI, HFC–245fa, HFC–365mfc, and Formacel Z–6 have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

xii. Phenolic Insulation Board and Bunstock

In phenolic insulation board and bunstock, which includes insulation for roofing and walls, acceptable substitutes include saturated light HCs (C3–C6),), CO_2, 2-chloropropane, water, Exxsol blowing agents, ecomate™, HFO–1234ze(E), and HFC–152a. These substitutes have GWPs ranging from 1 to 124. Toxicity is not a significant concern for these alternatives because they may be used for blowing phenolic foam consistent with required or recommended workplace exposure limits. With the exception of 2-chloropropane, hydrocarbons, and Exxsol blowing agents, these substitutes contain compounds that are exempt from the definition of VOC. Of the substitutes listed above in this paragraph, all have an ODP of zero. Of the various substitutes listed in this paragraph, 2-chloropropane, ecomate™, Exxsol blowing agents, HFC–152a, and HCs are flammable, and the others are nonflammable. The flammability hazards of the flammable compounds in this end-use can be adequately

addressed in the process of meeting OSHA regulations and fire codes. In this end-use, HFC–143a, HFC–134a, HFC–245fa, and HFC–365mfc have significantly higher GWPs than the other available substitutes mentioned above in this paragraph, thereby increasing overall risks to human health and the environment.

For the foam end-uses listed above, both fluorinated and non-fluorinated substitutes are being used today in the U.S.; EPA recognizes that the formulator and systems house will consider other criteria including toxicity, flammability, and local air quality. However, given the range of substitutes available, we believe that there are other alternatives available for formulators or systems houses that pose less risk for human health and the environment than the HFCs and HFC blends proposed to be listed as unacceptable.

c. How does EPA propose to regulate foams and products containing foams?

EPA is proposing to regulate foam blowing agents contained in the cells of closed cell foams and proposes to consider these foams and products containing them to be subject to the proposed unacceptability determinations, as well as the use of the foam blowing agent in manufacturing those products. Section 612(c) of the Clean Air Act refers to ''replacing'' ODS with substitutes. In the case of the foam blowing agent sector, we have previously interpreted unacceptability determinations as referring solely to replacing the foam blowing agent and have not interpreted the SNAP lists to apply to products made with foam. Thus, an unacceptable foam blowing agent may not be used in or imported into the United States. However, products made with unacceptable foams blown overseas may be imported. For example, refrigerators containing appliance foam blown with the unacceptable blowing agent HCFC–141b may still be imported into the United States, even though the SNAP program has listed HCFC–141b as an unacceptable foam blowing agent (September 30, 2004 at 69 FR 58269). Under this interpretation of our SNAP regulations if this proposal becomes final the foam blowing agents we are proposing to find unacceptable would be prohibited from being used or imported into the United States, but foam products or products containing foam, such as appliances or furniture made with these unacceptable foam blowing agents, could be imported.

In this rule, EPA is proposing to adopt a different interpretation for closed cell foams that would result in prohibiting both import and manufacture of products made with the blowing agents proposed to be unacceptable. This approach would have an effect similar to the earlier nonessential product ban for products containing unacceptable foam blowing agents, prohibiting import and distribution of such products. For closed cell foams, the blowing agents are retained in cells after the foam is blown and provide insulation value. Foam blowing end-uses that contain closed-cell foams include rigid polyurethane appliance foam; rigid polyurethane: Spray, commercial refrigeration, and sandwich panels; rigid polyurethane (slabstock and other); rigid polyurethane and polyisocyanurate laminated boardstock; polystyrene (extruded sheet); polystyrene: extruded boardstock and billet; polyolefin; and phenolic insulation board and bunstock. Foam blowing end-uses containing open cell foams include flexible polyurethane and integral skin polyurethane. In comparison, in open cell foams, the blowing agent is not retained and would have escaped prior to import. Thus, an open cell product blown with an unacceptable foam blowing agent (or products containing such an open cell foam) would not contain any of that agent when imported in the United States whereas a closed cell product would still retain some of the foam blowing agent. EPA is proposing and is seeking comment on whether the Agency should consider use of the foam blowing agent to apply to products with closed cell foam since the product still contains at least some of the foam blowing agent and thus is replacing other foam blowing agents. EPA is also seeking comment on whether the Agency should consider use of the foam blowing agent to apply to open cell foam and products containing open cell foam, and in particular on what would be the legal basis for doing so.

d. When would the listings change?

Through this action, EPA is proposing to change the listings for foam blowing agents as of January 1, 2017. Based on information concerning the timeframes from past transitions, EPA believes this date allows sufficient opportunity to redesign for a different foam blowing agent. However, EPA is seeking comment on changing the listings as of January 1, 2016. The foam industry was able to convert from HCFC–142b and HCFC–22 to other acceptable substitutes between EPA's proposed unacceptability determination in November 2005 and its final determination in March 2007, which specified that existing users of the unacceptable HCFCs must transition by March 1, 2008, for most uses. EPA also provided an additional 18 months for this transition for marine flotation foam, to September 1, 2009, and allowed until January 1, 2010, for a transition away from HCFC–22 and HCFC–142b in extruded polystyrene foam boardstock (March 28, 2007; 72 FR 14432). EPA is requesting comment on using January 1, 2017 as the date on which foam must not be blown using HFC–134a, HFC–365mfc, HFC–245fa, HFC–143a and blends thereof, or Formacel B, Formacel TI, and Formacel Z–6. We are also seeking comment on whether a transition could be completed by January 1, 2016. In particular, we request comment on whether these dates would be sufficient time for the transition where the foam product is incorporated into a larger product (e.g., commercial refrigeration foam used in transport refrigeration), and whether there are any specific foam end-uses or applications that may require additional time and, if so, how long and why. Based on this information, EPA could consider grandfathering options for foam blowing agents in specific end-uses or could provide a different date for use to be unacceptable.

e. Narrowed Use Limits for Military or Space- and Aeronautics-Related Applications

EPA is proposing an exception to the proposed unacceptability determination for HFC and HFC blend foam blowing agents for military or space- and aeronautics-related applications. EPA is also proposing that the narrowed use limit would expire on January 1, 2022. Under a narrowed use limit, the end user for a military or space- and aeronautics application would need to ascertain that other alternatives are not technically feasible and document the results of their analysis. See 40 CFR 82.180(b)(3). For the military, there are several unique performance requirements related to weapon systems that require extensive testing prior to qualifying alternatives for HFC-containing foams. While the vast majority of applications for foams are anticipated to be able to transition to acceptable alternatives by the proposed January 1, 2017 date, in a very small number of cases, the timeframes associated with testing and qualifications for weapon systems could take longer. In addition, some of the lower-GWP alternatives may not be available at this time in certain specialty applications with unique military requirements such as undersea; aerospace; and chemical, biological, and radiological warfare systems. In the case of space- and aeronautics-related

applications, HFCs are used in numerous applications, including certain mission-critical applications such as foam blowing for which appropriate substitutes have not yet been identified. Past experience indicates that transitions away from CFC- and HCFC-blown foams in similar applications took several years due to the challenging operational environment and the lengthy requalification process associated with human-rated space flight systems.

Under the acceptable for narrowed use limits category, users of a restricted agent within the narrowed use limits category must make a reasonable effort to ascertain that other substitutes or alternatives are not technically feasible. Users are expected to undertake a thorough technical investigation of alternatives to the otherwise restricted substitute. Although users are not required to report the results of their investigations to EPA, users must document these results, and retain them in their files for the purpose of demonstrating compliance.

Under a narrowed use limit, the end user for a military or space- and aeronautics- related application would need to ascertain that other alternatives are not technically feasible and document the results of their analysis. See 40 CFR 82.180(b)(3). Documentation should include descriptions of:

- Process or product in which the substitute is needed;
- Substitutes examined and rejected;
- Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or
- Anticipated date other substitutes will be available and projected time for switching.

EPA is seeking comment on this proposed narrowed use limitation for military or space- and aeronautics-related applications In addition, EPA is also seeking comment on the timeframe for this narrowed use limitation, recognizing that if all alternatives are not qualified in advance of 2022, the Agency may need to revisit and adjust the end date.

f. Summary

EPA seeks comments on changing the listings for the proposed foam end-uses. In particular, EPA is interested in whether there are specific uses other than spray foam that require the use of HFC–134a, HFC–365mfc, HFC–245fa, and blends thereof, or the blends Formacel B, Formacel TI, or Formacel Z–6 for reasons of fire safety or technical feasibility. We request comment on whether closed cell foam products and products containing closed cell foams should be subject to the unacceptability determinations, which under our current interpretation would otherwise only apply to the use of the foam blowing agent. We also seek comment on whether the Agency should consider use of the foam blowing agent to apply to open cell foam and products containing open cell foam, and in particular what would be the legal basis for doing so. EPA also requests comment on whether the proposed date provides an appropriate length of time for transition and whether there should be different dates for certain foam end-uses due to technical challenges that may exist for some foam end-uses but not all. EPA is also interested in information concerning the supply of substitutes in sufficient quantities to meet a domestic transition in the timeframe proposed in this action. EPA also takes comment on the proposed exception for military or space- and aeronautics-related applications as described above.

VI. What is EPA proposing for HCFCs?

EPA is proposing to modify the listings for three HCFCs in certain end-uses because the three HCFCs are subject to the use restrictions in CAA section 605(a) and EPA's implementing regulations at 40 CFR part 82 subpart A. Additionally, the nonessential products ban under CAA section 610 also restricts sale and distribution of certain products containing or manufactured with these three HCFCs. We believe it is important that the SNAP listings not indicate that these HCFCs may be used when another program under title VI of the CAA would prevent such use. Thus, we are proposing to align the requirements. The HCFCs addressed in this rule are listed as acceptable or acceptable subject to use conditions in the aerosols, foam blowing agents, fire suppression and explosion protection agents, sterilants, and adhesives, coatings and inks sectors. This in addition to the proposed unacceptability of HCFC-containing refrigerants in MVAC systems (see section V.B. of this preamble).

A. What are the proposed modifications to the listings for the three HCFCs and in which end-uses?

EPA is proposing to modify the listings for HCFC–141b, HCFC–142b, and HCFC–22, as well as blends that contain these substances, from acceptable to unacceptable in all sectors [56] except refrigeration and air conditioning. EPA is not addressing HCFC use for refrigeration and air conditioning because CAA section 605(a) and our implementing regulations allows for continuing use of HCFCs to service equipment. We are proposing that the listings would be modified 60 days following issuance of a final rule promulgating this proposal.

B. Why is EPA modifying the listings for HCFCs?

EPA is proposing to modify the listings for these three HCFCs and blends containing these HCFCs to align the SNAP listings with other Title VI regulations, specifically section 605 and its implementing regulations at 40 CFR part 82 subpart A and section 610 and its implementing regulations at 40 CFR part 82 subpart C.

1. Alignment of SNAP Listings for the Three HCFCs With Regulations Implementing CAA Sections 605 and 610

CAA Section 605(a) explicitly prohibits the introduction into interstate commerce or the use of any class II substance as of January 1, 2015, unless such substance:

(1) Has been used, recovered, and recycled;

(2) is used and entirely consumed (except for trace quantities) in the production of other chemicals;

(3) is used as a refrigerant in appliances manufactured prior to January 1, 2020; or

(4) is listed as acceptable for use as a fire suppression agent for nonresidential applications in accordance with section 612(c).

Through rulemaking, EPA accelerated to January 1, 2010, the prohibitions on use and introduction into interstate commerce for HCFC–141b, HCFC–22, and HCFC–142b that has not been used, recovered, and recycled. See 40 CFR 82.15(g). With respect to refrigeration and air conditioning uses, EPA's implementing regulations prohibit the use and introduction into interstate commerce of these HCFCs, unless used, recovered, and recycled, in equipment manufactured on or after January 1, 2010. EPA's proposal to modify the listings for HCFC–141b, HCFC–22, and HCFC–142b, including blends that contain these HCFCs, in various applications is consistent with the accelerated dates contained in our implementing regulations and covers end-uses where these HCFCs have previously been listed as acceptable as aerosols, refrigerants, foam blowing agents, fire suppressants, cleaning solvents, sterilants, and adhesives, coatings and inks.

[56] These three HCFCs have previously been listed as unacceptable in several, but not all, SNAP sectors.

Section 605(a) complements section 610, which prohibited the sale and distribution, as well as offer for sale and distribution, in interstate commerce of aerosol products and pressurized dispensers containing a class II substance (i.e., HCFCs), and plastic foam products containing or manufactured with a class II substance, with limited exceptions.[57] This statutory prohibition took effect on January 1, 1994. Consequently, most foams and aerosols have not used HCFCs since 1994.

Recognizing that other HCFCs are not yet subject to the use and interstate commerce prohibitions in section 605 and 40 CFR 82.15(g), EPA is not proposing to change the SNAP listings for HCFCs other than HCFC–141b, –142b, and –22 and blends containing those substances at this time. EPA may revisit the acceptability of other HCFCs in a later rulemaking as appropriate.

2. Anticipated Effects

EPA does not anticipate that these changes will have a significant effect on the use of HCFC–141b, –142b, and –22 since existing regulations limit the use of these three HCFCs (unless used, recovered, and recycled) in almost all end-uses in the United States (see 40 CFR 82.15(g)). For the sectors addressed in this rulemaking, EPA is not aware of anyone using recovered, recycled or reclaimed HCFC–22, HCFC–141b and HCFC–142b. In addition, as a result of the use restrictions in CAA section 605 and 40 CFR 82.15(g), as well as the sale and distribution restrictions on certain products containing or manufactured with these substances in CAA section 610 and 40 CFR part 82 subpart C, most sectors have taken significant steps to transition to non-ODS substitutes. For example, HCFCs in aerosol applications have been replaced by HCs, HFO–1234ze, roll-ons, pump sprays, and HFC–152a, excluding some niche technical applications that still rely on HCFCs not addressed in this action. HCFCs in foam blowing agents have largely been replaced by, among other things, methyl formate, HCs, Solstice–1233zd(E), and carbon dioxide; any remaining HCFC use in this sector is limited to HCFCs not addressed in this action. For these reasons, we believe it is technically feasible for sources to comply with the proposed changes to the listings for these three HCFCs within 60 days of a final rule issued consistent with this proposal.

[57] Section 610(d) contains certain exceptions and also authorizes EPA to grant exceptions in specific circumstances. For the complete list of exceptions, see EPA's implementing regulations at 40 CFR part 82, subpart C.

EPA seeks comment on its proposal to modify the listings for HCFC–141b, –142b, –22, and blends containing these substances. EPA is particularly interested in comments on both the scope of the proposed modifications and the timing.

VII. Do SNAP requirements apply to exports and imports?

The requirements of the SNAP program apply to both exports and imports. EPA understands that some manufacturers may be interested in whether the listing decisions, if finalized as proposed, would apply to their products. EPA has previously responded to comments about the applicability of the SNAP program to products destined for export. Most recently, in a final rule issued December 20, 2011, EPA responded to a comment concerning whether appliances manufactured for export should be allowed to have larger charge sizes than those being sold in the United States (and thus not have to comply with the use conditions being established in that rule). EPA stated that:

Under section 612 of the Clean Air Act, the SNAP program is applicable to any person introducing a substitute into interstate commerce. Interstate commerce is defined in 40 CFR 82.104(n) as: The distribution or transportation of any product between one state, territory, possession or the District of Columbia, and another state, territory, possession or the District of Columbia, or the sale, use or manufacture of any product in more than one state, territory, possession or the District of Columbia. The entry points for which the product is introduced into interstate commerce are the release of a product from the facility in which the product was manufactured, the entry into a warehouse from which the domestic manufacturer releases the product for sale or distribution, and at the site of United States Customs clearance. This definition applies to any appliances produced in the United States, including appliances that will be exported. (76 FR 78846)

Therefore, EPA concluded that the same use conditions apply to appliances being exported.

The range of sectors and end-uses covered by the SNAP program varies. Some end-uses, such as the refrigeration and air conditioning sector, includes appliances charged by OEMs and appliances typically field-charged. Some appliances charged by OEMs are hermetically sealed and other appliances are not. Furthermore, these appliances differ from products such as aerosols or foams because of the potential for servicing the appliances throughout their use. Some manufacturers of motor vehicle air conditioners identified a potential concern that there may be a lack of servicing infrastructure for low-GWP alternatives in markets outside the U.S. EPA recognizes that the transition to alternatives may occur at a different pace in different global markets. For example, the European Union is planning to transition to low-GWP alternatives for MVACs in 2017 which is several years earlier than what EPA is proposing. However, other countries have not indicated any specific plan to transition to low-GWP alternatives for MVACs. If finalized as proposed, HFC–134a would be listed as unacceptable in model year 2021 and the unacceptability listing would include MVACs that will be exported.

EPA applies the SNAP requirements equally to imports and exports. However, EPA understands the concerns for proper infrastructure for servicing appliances in markets outside the U.S. EPA believes there is ample time between now and model year 2021 for such infrastructure to be established. EPA welcomes comments and specific information on this topic.

VIII. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order (E.O.) 12866 (58 FR 51735, October 4, 1993), this action is a ''significant regulatory action.'' It raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under E.O. 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

EPA conducted an analysis [58] that considered the economic impacts of this proposed rule on small entities, as further discussed in the section C below. The analysis also considered that, specific to refrigerants used in air conditioning systems for newly manufactured light-duty vehicles, there are considerable environmental benefits of a transition to alternative refrigerants and there are costs associated with those substitutions. Based on recent information in manufacturers' product

[58] ICF International. Economic Impact Screening Analysis for Regulatory Options to Change Listing Status of High-GWP Alternatives, 2014.

plans, a limited number of manufacturers may have been planning to meet the GHG standards but still continue to use HFC–134a beyond MY 2021 for a limited number of their models. However, we believe there is time for any such manufacturers to make appropriate adjustments. These manufacturers could incur costs attributable to this proposal (representing the proposed requirement to cease use of HFC–134a by MY 2021), but there would be environmental benefits in the form of increased reductions of GHG emissions from MVAC systems which would not otherwise occur, assuming these manufacturers also continue with their plans to achieve the reductions by means other than substitution of MVAC refrigerant.

B. Paperwork Reduction Act

This action does not impose any new information collection burden. This proposed rule is an Agency determination. It contains no new requirements for reporting. The Office of Management and Budget (OMB) has previously approved the information collection requirements contained in the existing regulations in subpart G of 40 CFR part 82 under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* and has assigned OMB control number 2060–0226. This Information Collection Request (ICR) included five types of respondent reporting and recordkeeping activities pursuant to SNAP regulations: Submission of a SNAP petition, filing a SNAP/TSCA Addendum, notification for test marketing activity, recordkeeping for substitutes acceptable subject to use restrictions, and recordkeeping for small volume uses. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR Chapter 15.C.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice-and-comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the Agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions. For purposes of assessing the impacts of this rule on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration's (SBA) regulations at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After conducting an analysis [59] that considered the economic impacts of this proposed rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. The requirements of this proposed rule with respect to HFCs, if finalized as proposed, would impact manufacturers of some consumer and technical aerosol products, retail food refrigeration equipment, vending machines, motor vehicles, and products containing phenolic, polyisocyanurate, polyolefin, polyurethane, and polystyrene foams. The requirements of this proposed rule with respect to HCFCs, if finalized as proposed, would affect manufacturers of aerosols, foams, solvent cleaning, fire suppression, and adhesives, coatings, and inks. This rule's provisions do not create enforceable requirements for refrigeration and air conditioning technicians, but they would indirectly affect technicians servicing motor vehicle air conditioning systems, retail food refrigeration equipment, and vending machines where the technician, rather than the refrigeration or AC equipment owner, purchases servicing equipment for different refrigerants. EPA expects these indirect impacts on technicians are minimal, because the transitions to different refrigerants required by this rule are already occurring due to other regulations (e.g., light duty vehicle GHG rule) and corporate social responsibility initiatives (e.g., Consumer Goods Forum pledge concerning HFC refrigerants), and because many of the still-acceptable alternatives are already used for these refrigeration or air conditioning equipment types. Further, most acceptable HFC refrigerant blends can be recovered and serviced using equipment that service technicians already own. In some uses, there is no significant impact of the proposed rule because the substitutes proposed to be prohibited are not widely used (e.g., use of HFC–134a as a propellant in consumer aerosol products, use of HFC–134a as a foam blowing agent in various polyurethane foams). A significant portion of the businesses regulated under this rule are not small businesses (e.g., car manufacturers, appliance manufacturers). About 500,000 small businesses could be subject to the rulemaking, although more than 99% of small businesses subject to this proposed rulemaking would be expected to experience zero compliance costs. EPA continues to be interested in the potential impacts of the proposed rule on small entities and welcomes comments on issues related to such impacts, in particular technical challenges, including time to transition, that may exist for some small entities but not all.

[59] ICF International. Economic Impact Screening Analysis for Regulatory Options to Change Listing Status of High-GWP Alternatives, 2014.

D. Unfunded Mandates Reform Act

This action contains no Federal mandates under the provisions of Title II of the Unfunded Mandate Reform Act of 1995 (UMRA), 2 U.S.C. 1531–1538 for State, local, or tribal governments or the private sector. This action imposes no enforceable duty on any State, local, or tribal governments. The enforceable requirements of this proposed rule related to prohibiting certain substitutes, including HFC–134a, R–404A and R–507A, would require new equipment to be manufactured using other available options but would not require changes to existing equipment that is already manufactured or purchased. Thus, this rule is not subject to the requirements of sections 202 and 205 of the UMRA. This action is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. This regulation applies directly to facilities that use these substances and not to governmental entities.

E. Executive Order 13132: Federalism

This action does not have Federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. This regulation applies directly to facilities that use these substances and not to governmental entities. Thus, Executive Order 13132 does not apply to this action. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicits comments on this proposed action from State and local officials.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have tribal implications, as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive Order 13175. EPA specifically solicits additional comment on this proposed action from tribal officials.

G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks

This action is not subject to Executive Order 13045 (62 FR 19885, April 23, 1997) because it is not economically significant as defined in E.O. 12866, and because the Agency does not believe the environmental health or safety risks addressed by this action present a disproportionate risk to children. This proposed rule restricts the use of certain substitutes that have greater overall risks for human health and the environment, primarily due to their high global warming potential. The reduction in GHG emissions would provide climate benefits for all people, including benefits for children and future generations. The public is invited to submit comments or identify peer-reviewed studies and data that assess effects of early life exposure to the alternatives addressed in this action.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This action is not a ''significant energy action'' as defined in Executive Order 13211, (66 FR 28355 (May 22, 2001)) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Aerosol uses are not related to the supply, distribution, or use of energy. For the end-uses that are related to energy effects such as refrigeration and air conditioning, a number of alternatives are available to replace those refrigerants that are proposed as unacceptable in this action; many of the alternatives are as energy efficient or more energy efficient than the substitutes being proposed as unacceptable. Thus, we have concluded that this rule is not likely to have any adverse energy effects.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (''NTTAA''), Public Law 104–113, (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards. This proposed rule does not involve technical standards.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (E.O.) 12898 (59 FR 7629 (Feb. 16, 1994)) establishes Federal executive policy on environmental justice. Its main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States. EPA has determined that this proposed rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income population. This proposed rule, if finalized, would prohibit a number of substances with ODPs or high GWPs. The reduction in ODS and GWP emissions would assist in restoring the stratospheric ozone layer and provide climate benefits.

IX. References

This preamble references the following documents, which are also in the Air Docket at the address listed in Section I.B.1. Unless specified otherwise, all documents are available electronically through the Federal Docket Management System, Docket # EPA–HQ–OAR–2014–0198.

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List of Subjects in 40 CFR Part 82

Environmental protection, Administrative practice and procedure, Air pollution control, Incorporation by reference, Recycling, Reporting and recordkeeping requirements, Stratospheric ozone layer.

Dated: July 9, 2014.

Gina McCarthy,

Administrator.

For the reasons stated in the preamble, EPA proposes to amend 40 CFR part 82 as follows:

PART 82—PROTECTION OF STRATOSPHERIC OZONE

■ 1. The authority citation for part 82 continues to read as follows:

Authority: 42 U.S.C. 7414, 7601, 7671–7671q.

Subpart G—Significant New Alternatives Policy Program

■ 2. Amend Subpart G by adding Appendix U to read as follows:

Appendix U to Subpart G of Part 82—Unacceptable Substitutes and Substitutes Subject To Use Restrictions Listed in the [DATE OF PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] Final Rule, Effective [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER].

TABLE 1—AEROSOLS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Propellants	HFC–125	Unacceptable as of January 1, 2016	HFC–125 has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 354–33–6 and it is also known by the name 1,1,1,2,2-pentafluoropropane. HFC–125 has a high GWP of 3,500. Other substitutes are available for this end-use with lower overall risk to human health and the environment. Products using this propellant that are manufactured prior to January 1, 2016 may be sold, imported, exported, distributed and used after that date.
Propellants	HCFC–22 and HCFC–142b.	Unacceptable effective [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE]	Use or introduction into interstate commerce of virgin HCFC–22 and HCFC–142b for aerosols is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A. These propellants have ozone depletion potentials of 0.055 and 0.065, respectively.
Solvents	HCFC–141b	Unacceptable effective [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE]	Use or introduction into interstate commerce of virgin HCFC–141b for aerosols is prohibited as of January 1, 2015 under EPA's regulations at 40 CFR part 82 subpart A. HCFC–141b has an ozone depletion potential of 0.11.

TABLE 2—SUBSTITUTES ACCEPTABLE SUBJECT TO USE CONDITIONS

End-use	Substitute	Decision	Use conditions	Further information
Propellants	HFC–134a	Acceptable subject to use conditions.	As of January 1, 2016, acceptable only for use in: • Metered dose inhalers for the treatment of asthma and chronic obstructive pulmonary disease, allergic rhinitis, and other diseases where aerosols can be used for systemic delivery through lung, nose, or other organs • cleaning products for removal of grease, flux and other soils from electrical equipment or electronics • lubricants for electrical equipment or electronics • sprays for aircraft maintenance • pesticides for use near electrical wires or in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellantsmold release agents • lubricants and cleaners for spinnerettes for synthetic fabrics • duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, and specimens under electron microscopes • document preservation sprays • wound care sprays topical coolant sprays for pain alleviationproducts for removing bandage adhesives from skin.	HFC–134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811–97–2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC–134a has a relatively high GWP of 1,430. Use is allowed for the specified uses because of the greater technical and safety demands in these applications compared to other aerosol applications. It is prohibited to use aerosol products other than those specified here using HFC–134a that are manufactured on or after January 1, 2016. Aerosol products using this propellant that are manufactured prior to January 1, 2016 may be sold, imported, exported, distributed and used after that date.

TABLE 2—SUBSTITUTES ACCEPTABLE SUBJECT TO USE CONDITIONS—Continued

End-use	Substitute	Decision	Use conditions	Further information
Propellants	HFC–227ea ..	Acceptable subject to use conditions.	As of January 1, 2016, acceptable only for use in metered dose inhalers for the treatment of asthma and chronic obstructive pulmonary disease.	HFC–227ea has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 431–89–0 and it is also known by the name 1,1,1,2,3,3,3-heptafluoropropane. HFC–227ea has a relatively high GWP of 3,220. Use is allowed for metered dose inhalers because of the greater technical and safety demands in this application compared to other aerosol applications. It is prohibited to use aerosol products other than metered dose inhalers using HFC–227ea that are manufactured on or after January 1, 2016. Aerosol products using this propellant that are manufactured prior to January 1, 2016 may be sold, imported, exported, distributed and used after that date.

TABLE 3—REFRIGERATION AND AIR CONDITIONING—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Retail food refrigeration (new and retrofit).	R–404A	Unacceptable as of January 1, 2016.	R–404A is a blend, by weight, of 44% HFC–125, 4% HFC–134a, and 52% HFC–143a. It has a high GWP of approximately 3,920. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Retail food refrigeration (new and retrofit).	R–507A	Unacceptable as of January 1, 2016.	R–507A is a blend, by weight, of 50% HFC–125 and 50% HFC–143a. It has a high GWP of approximately 3,990. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Retail food refrigeration (condensing units and supermarket systems)(new).	HFC–227ea, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A.	Unacceptable as of January 1, 2016.	These refrigerants have GWPs ranging from 2,729 to 3,607. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Retail food refrigeration (condensing units and supermarket systems)(retrofit).	R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A.	Unacceptable as of January 1, 2016.	These refrigerants have GWPs ranging from 2,729 to 3,607. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Retail food refrigeration (stand-alone units only) (new only).	HFC–134a	Unacceptable as of January 1, 2016.	HFC–134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811–97–2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC–134a has a relatively high GWP of 1,430. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Retail food refrigeration-(stand-alone units only) (new only).	FOR12A, FOR12B, HFC–227ea, IKON B, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–407A, R–407B, R–407C, R–407F, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–426A, R–428A, R–434A, R–437A, R–438A, RS–24 (2002 formulation), RS–44 (2003 formulation), SP34E, THR–03.	Unacceptable as of January 1, 2016.	These refrigerants have GWPs ranging from approximately 550 to 3,607. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Vending machines (new and retrofit).	R–404A	Unacceptable as of January 1, 2016.	R–404A is a blend, by weight, of 44% HFC–125, 4% HFC–134a, and 52% HFC–143a. It has a GWP of approximately 3,920. Other substitutes are available for this end-use with lower overall risk to human health and the environment.

TABLE 3—REFRIGERATION AND AIR CONDITIONING—UNACCEPTABLE SUBSTITUTES—Continued

End-use	Substitute	Decision	Further information
Vending machines (new and retrofit).	R–507A	Unacceptable as of January 1, 2016.	R–507A is a blend, by weight, of 50% HFC–125 and 50% HFC–143a. It has a GWP of approximately 3,990. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Vending machines (new only).	HFC–134a	Unacceptable as of January 1, 2016.	HFC–134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811–97–2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC–134a has a relatively high GWP of 1,430. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Vending machines (new only).	FOR12A, FOR12B, IKON B, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–407C, R–410A, R–410B, R–417A, R–421A, R–422B, R–422C, R–422D, R–426A, R–437A, R–438A, RS–24 (2002 formulation), SP34E.	Unacceptable as of January 1, 2016.	These refrigerants have GWPs ranging from approximately 550 to 3,085. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	HFC–134a	Unacceptable as of Model Year (MY) 2021.	HFC–134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811–97–2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC–134a has a relatively high GWP of 1,430. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	R–406A, R–414A (HCFC Blend Xi, GHG–X4), R–414B (HCFC Blend Omicron), HCFC Blend Delta (Free Zone), Freeze 12, GHG–X5, HCFC Blend Lambda (GHG–HP).	Unacceptable as of MY 2017.	These refrigerants all contain HCFCs. They have GWPs ranging from 1,480 to 2,340 and ODPs ranging from 0.012 to 0.056. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	R–416A (FRIGC FR–12, HCFC Blend Beta).	Unacceptable as of MY 2017.	This blend has a relatively high GWP of approximately 1,080 and an ODP of approximately 0.008. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	SP34E	Unacceptable as of MY 2017.	This blend has a relatively high GWP of approximately 1,410. Other substitutes are available for this end-use with lower overall risk to human health and the environment.
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	R–426A (RS–24, new formulation).	Unacceptable as of MY 2017.	This blend has a relatively high GWP of approximately 1,510. Other substitutes are available for this end-use with lower overall risk to human health and the environment.

TABLE 4—FOAM BLOWING AGENTS—SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

End-use	Substitute	Decision	Narrowed use limits	Further information
Rigid Polyurethane: Appliance.	HFC–134a, HFC–245fa, HFC–365mfc and blends thereof; Formacel TI, and Formacel Z–6.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.

TABLE 4—FOAM BLOWING AGENTS—SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS—Continued

End-use	Substitute	Decision	Narrowed use limits	Further information
Rigid Polyurethane: Spray.	HFC–134a and Formacel TI.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Rigid Polyurethane: Commercial Refrigeration and Sandwich Panels.	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Flexible Polyurethane.	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Rigid Polyurethane: Slabstock and Other.	HFC–134a, HFC–245fa, HFC–365mfc and blends thereof; Formacel TI, and Formacel Z–6.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock.	HFC–134a, HFC–245fa, HFC–365mfc and blends thereof.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.

TABLE 4—FOAM BLOWING AGENTS—SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS—Continued

End-use	Substitute	Decision	Narrowed use limits	Further information
Polystyrene: Extruded Sheet.	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof, Formacel TI, and Formacel Z–6.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Polystyrene: Extruded Boardstock and Billet.	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof, Formacel B, and Formacel Z–6.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Integral Skin Polyurethane.	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Polyolefin	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Phenolic Insulation Board and Bunstock.	HFC–143a, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof.	Acceptable Subject to Narrowed Use Limits.	Acceptable until January 1, 2022 only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or • Anticipated date other substitutes will be available and projected time for switching.

TABLE 5—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further Information
All	Blends of HCFC–141b	Unacceptable effective [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE].	HCFC–141b has an ozone depletion potential of 0.11 under the Montreal Protocol. EPA previously found HCFC–141b unacceptable in all foam blowing end-uses (appendix M to subpart G of 40 CFR part 82). HCFC–141b has an ODP of 0.11.

TABLE 5—UNACCEPTABLE SUBSTITUTES—Continued

End-use	Substitute	Decision	Further Information
Polyolefin	HCFC–22, HCFC–142b, and blends thereof.	Unacceptable effective [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE].	Use or introduction into interstate commerce of virgin HCFC–22 and HCFC–142b for foam blowing is prohibited after January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A unless used, recovered, and recycled. These compounds have ozone depletion potentials of 0.055 and 0.065 respectively under the Montreal Protocol.
Rigid Polyurethane: Appliance.	HFC–134a, HFC–245fa, HFC–365mfc and blends thereof; Formacel TI, and Formacel Z–6.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Rigid Polyurethane: Spray	HFC–134a and Formacel TI.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Rigid Polyurethane: Commercial Refrigeration and Sandwich Panels.	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Flexible Polyurethane	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Rigid Polyurethane: Slabstock and Other.	HFC–134a, HFC–245fa, HFC–365mfc and blends thereof; Formacel TI, and Formacel Z–6.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock.	HFC–134a, HFC–245fa, HFC–365mfc and blends thereof.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Polystyrene: Extruded Sheet	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof, Formacel TI, and Formacel Z–6.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Polystyrene: Extruded Boardstock and Billet.	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof, Formacel B, and Formacel Z–6.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Integral Skin Polyurethane	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Polyolefin	HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment Other substitutes are available for this end-use with lower overall risk to human health and the environment, including lower GWP.
Phenolic Insulation Board and Bunstock.	HFC–143a, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof.	Unacceptable as of January 1, 2017 except where allowed under a narrowed use limit.	Other substitutes are available for this end-use with lower overall risk to human health and the environment, including GWP.

TABLE 6—FIRE SUPPRESSION AND EXPLOSION PROTECTION AGENTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Total Flooding	HCFC–22	Unacceptable effective [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE].	Use or introduction into interstate commerce of virgin HCFC–22 for total flooding fire suppression and explosion protection is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A. This chemical has an ozone depletion potential of 0.055.

TABLE 7—STERILANTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Sterilants	Blends containing HCFC–22.	Unacceptable effective [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE].	Use or introduction into interstate commerce of virgin HCFC–22 for sterilants is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A. HCFC–22 has an ozone depletion potential of 0.055.

TABLE 8—ADHESIVES, COATINGS AND INKS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Adhesives, coatings and inks.	HCFC–141b and blends thereof.	Unacceptable effective [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE].	Use or introduction into interstate commerce of virgin HCFC–141b for adhesives, coatings and inks is prohibited as of January 1, 2015 under EPA's regulations at 40 CFR part 82 subpart A. This chemical has an ozone depletion potential of 0.11.

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