

Dated: May 2, 1995.

**Dennis Grams,**  
Regional Administrator.

Chapter I, title 40 of the Code of Federal Regulations is amended as follows:

**PART 52—[AMENDED]**

1. The authority citation for part 52 continues to read as follows:

**Authority:** 42 U.S.C. 7401-7671q.

**Subpart Q—Iowa**

2. Section 52.820 is amended by adding paragraph (c)(60) to read as follows:

**§ 52.820 Identification of plan.**

\* \* \* \* \*

(c) \* \* \*

(60) On May 5, 1994, the Director of the Iowa Department of Natural Resources submitted revisions to the State Implementation Plan (SIP) to update the state's incorporation by reference and conformity to various Federally approved regulations.

(i) Incorporation by reference.

(A) Revised rules, "Polk County Ordinance No. 132—Polk County Board of Health Rules and Regulations," effective December 2, 1993. This revision approves all articles in Chapter V, except for Article VI, Section 5-16(n) and (p), Article VIII, and Article XIII.

(ii) Additional material.

(A) None.

**PART 62—[AMENDED]**

1. The authority citation for part 62 continues to read as follows:

**Authority:** 42 U.S.C. 7401-7671q.

**Subpart Q—Iowa**

2. Section 62.3850 is amended by adding paragraph (b)(3) to read as follows:

**§ 62.3850 Identification of plan.**

\* \* \* \* \*

(b) \* \* \*

(3) Control of sulfur dioxide and sulfuric acid mist from sulfuric acid manufacturing plants in Polk County were adopted on October 26, 1993, and submitted on March 23, 1994.

\* \* \* \* \*

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**40 CFR Part 82**

[FRL-5219-1]

RIN 2060-AF99

**Protection of Stratospheric Ozone**

**AGENCY:** Environmental Protection Agency.

**ACTION:** Final rule.

**SUMMARY:** This final rule restricts or prohibits substitutes for ozone depleting substances (ODSs) under the U.S. Environmental Protection Agency (EPA) Significant New Alternatives Policy (SNAP) program. SNAP implements section 612 of the amended Clean Air Act of 1990 which requires EPA to evaluate and regulate substitutes for the ODSs to reduce overall risk to human health and the environment. Through these evaluations, SNAP generates lists of acceptable and unacceptable substitutes for each of the major industrial use sectors. The intended effect of the SNAP program is to expedite movement away from ozone depleting compounds while avoiding a shift into high-risk substitutes posing other environmental problems.

In this final rule, EPA is issuing decisions on the acceptability of certain substitutes proposed by the Agency on September 26, 1994 (59 FR 49108). To arrive at determinations on the acceptability of substitutes, the Agency completed a cross-media evaluation of risks to human health and the environment by sector end-use.

Public comments received regarding this rulemaking have been fully summarized and responded to in the relevant sector sections of this rule. Therefore, no separate comment response document has been developed to accompany this rulemaking. Copies of the eleven public comments received on the NPRM are available in the public docket supporting this final rule.

**EFFECTIVE DATE:** This rule is effective on July 13, 1995.

**ADDRESSES:** Materials relevant to the rulemaking are contained in Air Docket A-91-42, Central Docket Section, South Conference Room 4, U.S. Environmental Agency, 401 M Street, SW., Washington, DC 20460. The docket may be inspected between 8 a.m. and 5:30 p.m. weekdays. Telephone (202) 260-7549. As provided in 40 CFR part 2, a reasonable fee may be charged for photocopying.

**FOR FURTHER INFORMATION CONTACT:** The Stratospheric Ozone Information Hotline at 1-800-296-1996 between 10 a.m. and 4 p.m. Eastern Time or Sally Rand at (202) 233-9739 or fax (202) 233-9577, Substitutes Analysis and

Review Branch, Stratospheric Protection Division, 401 M Street, SW (6205J), Washington, DC 20460.

**SUPPLEMENTARY INFORMATION:**

- I. Background
- II. Section 612 Program
  - A. Statutory Requirements
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- III. Listing of Substitutes
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**I. Background**

On March 18, 1994, EPA promulgated a final rulemaking setting forth its plan for administering the SNAP program (59 FR 13044), and issued its initial list of decisions on the acceptability and unacceptability of a number of substitutes. Since the March 1994 rulemaking, EPA has continued to evaluate and approve substitutes as they are submitted to the program.

**II. Section 612 Program**

*A. Statutory Requirements*

Section 612 of the Clean Air Act authorizes EPA to develop a program for evaluating alternatives to ozone-depleting substances. EPA is referring to this program as the Significant New Alternatives Policy (SNAP) program. The major provisions of section 612 are:

- *Rulemaking*—Section 612(c) requires EPA to promulgate rules making it unlawful to replace any class I (chlorofluorocarbon, halon, carbon tetrachloride, methyl chloroform, methyl bromide, and hydrobromofluorocarbon) or class II (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.

- *Listing of Unacceptable/Acceptable Substitutes*—Section 612(c) also requires EPA to publish a list of the substitutes unacceptable for specific uses. EPA must publish a corresponding list of acceptable alternatives for specific uses.

- *Petition Process*—Section 612(d) grants the right to any person to petition EPA to add a substitute to or delete a substitute 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 6 months.

- *90-day Notification*—Section 612(e) requires 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.

- *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.

- *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. Regulatory History

On March 18, 1994, EPA published the Final Rulemaking (FRM) (59 FR 13044) which described the process for administering the SNAP program and issued EPA's first acceptability lists for substitutes in the major industrial use sectors. These sectors include: refrigeration and air conditioning; foam blowing; solvent cleaning; fire suppression and explosion protection; sterilants; aerosols; adhesives, coatings and inks; and tobacco expansion. These sectors comprise the principal industrial sectors that historically consume large volumes of ozone-depleting compounds.

The Agency defines a "substitute" as any chemical, product, substitute, or alternative manufacturing process, whether existing or new, that could replace a class I or class II substance. Anyone who produces a substitute must provide the Agency with health and safety studies on the substitute at least 90 days before introducing it into interstate commerce for significant new use as an alternative. This requirement applies to chemical manufacturers, but may include importers, formulators or end-users when they are responsible for introducing a substitute into commerce.

### III. Listing of Substitutes

To develop the lists of unacceptable and acceptable substitutes, EPA conducts screens of health and environmental risks posed by various substitutes for ozone-depleting compounds in each use sector. The outcome of these risks screens can be found in the public docket, as described above in the **ADDRESSES** portion of this FRM.

Under section 612, the Agency has considerable discretion in the risk management decisions it can make in SNAP. The Agency has identified five possible decision categories: acceptable, acceptable subject to use conditions; acceptable subject to narrowed use limits; unacceptable; and pending. Acceptable substitutes can be used with no limits for all applications within the relevant sector end-use. Conversely, it is illegal to replace an ODS with a

substitute listed by SNAP as unacceptable. A pending listing includes substitutes for which the Agency has not received complete data or has not completed its review of the data.

After reviewing a substitute, the Agency may determine that a substitute is acceptable only if conditions of use are met to minimize risks to human health and the environment. Use of such substitutes in ways that are inconsistent with such use conditions renders these substitutes unacceptable.

Even though the Agency can restrict the use of a substitute based on the potential for adverse effects, it may be necessary to permit a narrowed range of use within a sector end-use because of the lack of alternatives for specialized applications. Users intending to adopt a substitute acceptable with narrowed use limits must ascertain that other acceptable alternatives are not technically feasible. Companies must document the results of their evaluation, and retain the results on file for the purpose of demonstrating compliance. This documentation shall include descriptions of substitutes examined and rejected, processes or products in which the substitute is needed, reason for rejection of other alternatives, e.g., performance, technical or safety standards, and the anticipated date other substitutes will be available and projected time for switching to other available substitutes. Use of such substitutes in applications and end-uses which are not specified as acceptable in the narrowed use limit renders these substitutes unacceptable.

As described in the final rule for the SNAP program (59 FR 13044), EPA believes that notice-and-comment rulemaking is required to place any alternative on the list of prohibited substitutes, to list a substitute as acceptable only under certain use conditions or narrowed use limits, or to remove an alternative from either the list of prohibited or acceptable substitutes.

EPA does not believe that rulemaking procedures are required to list alternatives as acceptable with no limitations. Such listings do not impose any sanction, nor do they remove any prior license to use a substitute. Consequently, EPA adds substitutes to the list of acceptable alternatives without first requesting comment on new listings. Updates to the acceptable and pending lists are published as separate notices in the **Federal Register**.

Parts A. through C. below present a detailed discussion of the substitute listing determinations by major use sector. Tables summarizing listing

decisions in this final rule are in the Appendix A. The comments contained in the Appendix A provide additional information on a substitute. Since comments are not part of the regulatory decision, they are not mandatory for use of a substitute. Nor should the comments be considered comprehensive with respect to other legal obligations pertaining to the use of the substitute. However, EPA encourages users of acceptable substitutes to apply all comments in their use of these substitutes. In many instances, the comments simply describe sound operating practices that have already been identified in existing industry and/or building-code standards. Thus, many of the comments, if adopted, would not require significant changes in existing operating practices for the affected industry.

### A. Refrigeration and Air Conditioning

#### 1. Overview

The refrigeration and air conditioning sector includes all uses of class I and class II substances to produce cooling, including mechanical refrigeration, air conditioning, and heat transfer. Please refer to the final SNAP rule (59 FR 13044) for a more detailed description of this sector.

The refrigeration and air conditioning sector is divided into the following end-uses:

- Commercial comfort air conditioning;
- Industrial process refrigeration systems;
- Industrial process air conditioning;
- Ice skating rinks;
- Uranium isotope separation processing;
- Cold storage warehouses;
- Refrigerated transport;
- Retail food refrigeration;
- Vending machines;
- Water coolers;
- Commercial ice machines;
- Household refrigerators;
- Household freezers;
- Residential dehumidifiers;
- Motor vehicle air conditioning;
- Residential air conditioning and heat pumps;
- Heat transfer;
- and
- Very low temperature refrigeration.

In addition, each end-use is divided into retrofit and new equipment applications. EPA has not necessarily reviewed substitutes in every end-use for this FRM.

EPA has modified the list of end-uses for this sector for this SNAP update. EPA added a new end-use, very low temperature refrigeration. Substitutes

for this end-use had been reviewed since the final rule, and therefore were added to the August 26, 1994 Notice. Please refer to the final SNAP rule (59 FR 13044) for a detailed description of end-uses other than these. EPA may continue to add other end-uses in future SNAP updates.

a. Heat Transfer

As discussed above, this end-use includes all cooling systems that rely on a fluid to remove heat from a heat source to a cooler area, rather than relying on mechanical refrigeration to move heat from a cool area to a warm one. Generally, there are two types of systems: systems with fluid pumps, referred to as recirculating coolers, and those that rely on natural convection currents, known as thermosyphons.

b. Very Low Temperature Refrigeration

Medical freezers, freeze-dryers, and other small appliances require extremely reliable refrigeration cycles. These systems must meet stringent technical standards that do not normally apply to refrigeration systems. They usually have very small charges. Because they operate at very high vapor pressures, and because performance is critically affected by any charge loss, standard maintenance for these systems tends to reduce leakage to a level considerably below that for other types of refrigeration and air conditioning equipment.

c. CFC-13, R-13B1, and R-503 Industrial Process Refrigeration

This end-use differs from other types of industrial refrigeration only in that extremely low temperature regimes are required. Although some substitutes may work in both these extremely low temperatures and in systems designed to use R-502, they may be acceptable only for this end-use because of global warming and atmospheric lifetime concerns. These concerns are discussed more fully below.

2. Response to Comments

a. Use conditions for automotive refrigerants. Two commenters requested changes in the information proposed for labels to be placed on automobiles retrofitted to use alternative refrigerants. They explained that label space is constrained and requested that the statements related to the ozone-depleting nature of automotive refrigerants be deleted. EPA agrees that the proposed statements were too cumbersome. This FRM shortens the relevant phrase for ozone-depleting refrigerants and eliminates the phrase for non-ozone-depleting refrigerants.

One commenter stated that EPA does not have the authority to require unique fittings and labels for automotive retrofits. In fact, EPA believes its broad mandate under SNAP does provide the authority. One important goal of the SNAP program is to ease the transition away from ozone-depleting substances. As the number of acceptable alternatives increases, the likelihood of contaminating the supply of recycled CFC-12 increases. EPA believes the fitting and label requirements will help protect consumers and the environment by preserving the purity of recycled CFC-12. The requirements will also help ensure that clear information exists about the contents of motor vehicle air conditioning systems. In addition, EPA has received a petition requesting a requirement for fittings and labels. Several commenters strongly supported EPA's efforts to reduce the risks of cross-contamination of various alternatives. Therefore, this FRM retains the fitting and label provisions from the NPRM.

Several commenters expressed concern that listing a refrigerant acceptable or acceptable subject to use conditions implies that it is effective in all systems, that it is compatible with existing equipment, and that it will not affect system life. EPA believes the purpose of the SNAP program is to review the human health and environmental implications of alternatives and not to ensure the effectiveness of new refrigerants or the long-term viability of equipment. Certainly the SNAP lists should serve as a useful reference to the user community. However, one of the guiding principles of the SNAP program is to let the market decide whether there exists a "best" alternative.

Several commenters asked EPA to require a label for flammable non-automotive refrigerants. EPA will consider this idea when reviewing future submissions.

b. HCFC Blend Beta and R-401C. Several commenters expressed concern that these blends contain flammable substances. As discussed in the NPRM, testing has shown that HCFC Blend Beta and R-401C are not flammable and do not become flammable through fractionation. Several other acceptable refrigerants contain hydrocarbons and other flammable components, which can add to a blend's effectiveness. If these components are present in small enough amounts, the blends are nonflammable.

Several commenters raised the issue of selective absorption of flammable components by the lubricant. They are concerned that over time, the oil will

concentrate the flammable hydrocarbon, possibly yielding a flammable mixture in the system. EPA is not aware of any data validating this claim. However, should information become available, EPA invites a petition to review its decision on HCFC Blend Beta.

Several commenters expressed concern that HCFC Blend Beta and R-401C contain class II compounds, HCFC-22 and HCFC-124, respectively. While these compounds do contribute to ozone depletion, EPA controls their production under the accelerated phaseout. As in the stationary end-uses, EPA believes the HCFCs have a role as transitional refrigerants. Until the end of production, HCFCs can help ease the switch away from the CFCs by providing additional alternatives.

Several commenters suggest that using blend refrigerants will not reduce the cost of retrofitting existing cars to use HFC-134a. Using other refrigerants may help reduce these costs for some range of models. However, even if it were possible to devise a reliable measure of cost reductions for individual cars, EPA's primary interest is the human health and environmental issues associated with a refrigerant. The market will determine any substitute's success based on cost.

c. R-403B and R-405A. Several commenters requested that EPA consider other factors besides global warming potential (GWP) and lifetime and approve R-403B and R-405A, which contain high concentrations of perfluorocarbons (PFCs), as substitutes for R-502 and CFC-12, respectively. EPA considers energy savings, flammability, and toxicity, in addition to ozone depletion potential and global warming potential, in its SNAP review. The PFCs as a class have extremely long lifetimes and very high GWPs. In addition to potential global warming caused by PFCs, their lifetimes mean that any unanticipated effects would be irreversible. These factors are significantly higher than those of any other class of refrigerants. Although the average GWP of a blend may be lower than that of the individual components, when released to the atmosphere the components act independently. Thus, the PFCs' high GWP and long lifetime will have the same impact as if they had been released as pure substances. In accordance with the SNAP guiding principles, EPA does not intend to make fine distinctions. However, the lifetime and GWP of PFCs pose higher overall risk than the other available substitutes.

Several commenters point out that because R-403B contains HCFC-22, intentional venting is already prohibited under section 608, and therefore

emissions would be minimal. This claim ignores the substantial leakage emissions from nearly all refrigeration equipment, and especially retail food and industrial refrigeration systems.

One commenter expressed concern that EPA was forcing industry to use R-402A, another refrigerant deemed acceptable under SNAP. EPA disagrees, as it has already listed several other alternatives for R-502, including R-404A, R-407A, R-407B, R-408A, and R-507. The commenter also stated that using refrigerants other than R-403B would result in the production of an untenable amount of contaminated oil requiring special handling under RCRA. Exemptions exist for CFC-contaminated oil, and the volumes involved would be absorbed easily into the existing used oil infrastructure.

One commenter stated that EPA had departed from its usual listing of PFCs as acceptable subject to narrowed use limits, and requested that EPA include R-403B in the same category. However, EPA has only found PFCs acceptable where no other alternative is feasible from a technical or safety perspective. A large number of other acceptable substitutes exist for R-502 that contain substances with much lower GWPs and shorter lifetimes. Thus, this FRM promulgates the unacceptability determinations for R-403B and R-405A.

However, two commenters requested that EPA consider grandfathering existing uses of R-403B. In two specific cases, EPA determined that grandfathering is appropriate: Industrial process refrigeration and refrigerated transport. These cases are explained in detail in the section discussing R-403B.

d. Perfluorocarbons (PFCs). One commenter requests that EPA not impose a narrowed use limit on PFCs used in heat transfer applications. The commenter further suggests that this designation is inconsistent with previous narrowed use limits imposed in other sectors. The commenter also indicated that EPA has already received ample proof of several applications where PFCs are the only viable alternatives.

EPA believes the PFCs may be the only viable substitutes for specific types of existing heat transfer equipment. For example, as listed in the SNAP FRM, uranium enrichment plants are already an acceptable use for PFCs. This user has already demonstrated that no other substitute would work. EPA agrees with the commenter that for existing equipment, sufficient evidence exists that no substitutes other than PFCs exist. Thus, EPA is allowing the use of PFCs in retrofit and existing system designs only.

For new equipment designs, however, EPA believes other alternatives may well exist. Therefore, for new equipment designs, users must conduct a study to determine that no other alternative is feasible. Note that users need only retain the analysis for their own records; no submission of information to EPA is required.

If EPA were to grant unconditional acceptability, there would be no requirement for users to examine other substitutes before adopting PFCs. EPA has articulated the view that, because of their high GWPs and very long lifetimes, PFCs must remain alternatives of last resort; in other words, their use should be limited to those areas where no other means exist to replace ODS. While the niche market for PFCs in heat transfer applications may be small, EPA has a strong interest in restricting its growth. As discussed above, PFCs have extremely long lifetimes and high GWPs. EPA strongly encourages manufacturers to devise other means of replacing the ODS used in heat transfer.

The commenter also objects to EPA's description of PFCs as agents of last resort. EPA maintains that for new heat transfer equipment, systems should use PFCs only where no other alternatives will work. For the reasons described in the paragraph above, this FRM retains the original language.

However, EPA agrees with the commenter's request to provide additional guidance about the types of systems that may require PFCs. EPA has included specific examples in the listing for PFCs.

The commenter also objected to EPA's reference to future rulemakings under section 608 of the Clean Air Act. EPA agrees and has removed the reference.

The commenter further believes EPA should grant acceptance to the use of PFCs in several specific end-uses, rather than issuing a narrowed use limit determination for heat transfer as a whole. The commenter cites as an example the listing of PFCs as acceptable for use in uranium enrichment plants. EPA believes that heat transfer systems bear enough similarity to be included under one end-use. The substitutes list should not be complicated by too many subcategories which would result in significant redundancy. The distinction between retrofit and new use will allow existing equipment to use non-ODS substitutes while still restricting the design of new systems that would use PFCs. For the reasons stated above, EPA believes it is important to place such a restriction on the design of new systems. However, even within new use, the narrowed use limit is intended to allow the use of an

otherwise unacceptable substitute in cases where nothing else is feasible from a safety or technical perspective.

The commenter also expresses a belief that EPA should not include heat transfer systems within the refrigeration and air conditioning sector. EPA disagrees and has already issued a final applicability determination that Vaportran transformers are appliances that fall under regulations issued under section 608 of the Clean Air Act. While heat transfer is not refrigeration in the thermodynamic sense of moving heat from a cool area to a warm one, it is a process aimed at temperature control.

The commenter further notes that EPA indicated that the refrigeration and air conditioning sector includes all mechanical and non-mechanical refrigeration, air conditioning, and heat transfer. The commenter believes this statement causes confusion by neglecting to define "non-mechanical refrigeration." EPA's intention was to include alternative processes that do not use a refrigerant in the strictest sense, such as evaporative cooling or absorption cycle machinery. The term "mechanical" is intended to refer to compressor-drive vapor compression cycle systems. However, EPA agrees that the statement in the NPRM was confusing and has removed the reference to non-mechanical refrigeration in this FRM.

e. Hydrocarbon Blend B. One commenter requested that EPA find Hydrocarbon Blend B acceptable based on several reports. EPA had previously reviewed the bulk of these reports and found them insufficient to demonstrate the safety of this substitute. In addition, the statement that Hydrocarbon Blend B has a high ignition point is misleading. This blend readily ignites at room temperature in the presence of a spark or a flame. No report has supported the notion that this blend must be heated to very high temperatures before it will propagate a flame. As stated in the SNAP FRM on March 18, 1994, EPA requires a comprehensive, scientifically valid risk assessment if a refrigerant is flammable, and no such study has been performed. EPA therefore maintains its position that Hydrocarbon Blend B is unacceptable as a substitute for CFC-12 in automobiles and several other end-uses.

### 3. Substitutes for Refrigerants

Substitutes fall into eight broad categories. Seven of these categories are chemical substitutes used in the same vapor compression cycle as the ozone-depleting substances being replaced. They include hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs),

hydrocarbons, refrigerant blends, ammonia, perfluorocarbons (PFCs), and chlorine systems. The eighth category includes alternative technologies that generally do not rely on vapor compression cycles. Please refer to the final SNAP rule (59 FR 13044) for more discussion of these broad categories.

#### 4. Listing Decisions

a. Acceptable. CFC-11, CFC-12, CFC-113, CFC-114, CFC-115 Heat Transfer, Retrofit and Existing Equipment Designs.

##### (a) Perfluorocarbons.

*Perfluorocarbons are acceptable as substitutes for CFC-11, CFC-12, CFC-113, CFC-114, and CFC-115 in retrofitted heat transfer systems and in existing designs.* Although EPA normally discusses acceptable substitutes in its Notices, this decision is the result of comments received on the proposal. PFCs covered by this determination are C<sub>3</sub>F<sub>8</sub>, C<sub>4</sub>F<sub>10</sub>, C<sub>5</sub>F<sub>12</sub>, C<sub>5</sub>F<sub>11</sub>NO, C<sub>6</sub>F<sub>14</sub>, C<sub>6</sub>F<sub>13</sub>NO, C<sub>7</sub>F<sub>16</sub>, C<sub>7</sub>F<sub>15</sub>NO, C<sub>8</sub>F<sub>18</sub>, C<sub>8</sub>F<sub>16</sub>O, and C<sub>9</sub>F<sub>21</sub>N. PFCs offer high dielectric resistance, noncorrosivity, thermal stability, materials compatibility, chemical inertness, low toxicity, and nonflammability. In addition, they do not contribute to ground-level ozone formation or stratospheric ozone depletion. The principal characteristic of concern for PFCs is that they have long atmospheric lifetimes and have the potential to contribute to global climate change. For instance, C<sub>5</sub>F<sub>12</sub> has a lifetime of 4,100 years and a 100-year GWP of 5,600. PFCs are also included in the Climate Change Action Plan, which broadly instructs EPA to use section 612 of the CAA, as well as voluntary programs, to control emissions. Despite these concerns, EPA is listing PFCs as acceptable in heat transfer applications because they may be the only substitutes that can satisfy safety or performance requirements. For example, a transformer may require very high dielectric strength, or a heat transfer system for a chlorine manufacturing process could require compatibility with the process stream.

In cases where users must adopt PFCs, they should make every effort to:

- Recover and recycle these fluids during servicing;
- Adopt maintenance practices that reduce leakage as much as is technically feasible;
- Recover these fluids after the end of the equipment's useful life and either recycle them or destroy them; and
- Continue to search for other long-term alternatives.

Users of PFCs should note that if other alternatives become available,

EPA could be petitioned to list PFCs as unacceptable due to the availability of other suitable substitutes. If such a petition were granted, EPA may grandfather existing uses upon consideration of cost and timing of testing and implementation of new substitutes. EPA urges industry to develop new alternatives for this end-use that do not contain substances with such high GWPs and long lifetimes.

b. Acceptable Subject to Use Conditions. (1) CFC-12 Automobile and Non-automobile Motor Vehicle Air Conditioners, Retrofit and New.

EPA is concerned that the existence of several substitutes in this end-use may increase the likelihood of significant refrigerant cross-contamination and potential failure of both air conditioning systems and recovery/recycling equipment. In addition, a smooth transition to the use of substitutes strongly depends on the continued purity of the recycled CFC-12 supply. In order to prevent cross-contamination and preserve the purity of recycled refrigerants, EPA is imposing several conditions on the use of all motor vehicle air conditioning refrigerants. For the purposes of this rule, no distinction is made between "retrofit" and "drop-in" refrigerants; retrofitting a car to use a new refrigerant includes all procedures that result in the air conditioning system using a new refrigerant. It should be noted that EPA primarily reviews refrigerants based on environmental and health factors. Issues related to performance and durability fall outside the scope of SNAP review.

To meet the requirements under section 612, when retrofitting a CFC-12 system to use any substitute refrigerant, the following conditions must be met:

- Each refrigerant may only be used with a set of fittings that is unique to that refrigerant. These fittings (male or female, as appropriate) must be used with all containers of the refrigerant, on can taps, on recovery, recycling, and charging equipment, and on all air conditioning system service ports. These fittings must be designed to mechanically prevent cross-charging with another refrigerant. A refrigerant may only be used with the fittings and can taps specifically intended for that refrigerant. Using an adapter or deliberately modifying a fitting to use a different refrigerant will be a violation of this use condition. In addition, fittings shall meet the following criteria, derived from Society of Automotive Engineers (SAE) standards and recommended practices:

—When existing CFC-12 service ports are to be retrofitted, conversion

assemblies shall attach to the CFC-12 fitting with a thread lock adhesive and/or a separate mechanical latching mechanism in a manner that permanently prevents the assembly from being removed.

- All conversion assemblies and new service ports must satisfy the vibration testing requirements of sections 3.2.1 or 3.2.2 of SAE J1660, as applicable, excluding references to SAE J639 and SAE J2064, which are specific to HFC-134a.
- In order to prevent discharge of refrigerant to the atmosphere, systems shall have a device to limit compressor operation before the pressure relief device will vent refrigerant. This requirement is waived for systems that do not feature such a pressure relief device.
- All CFC-12 service ports shall be retrofitted with conversion assemblies or shall be rendered permanently incompatible for use with CFC-12 related service equipment by fitting with a device attached with a thread lock adhesive and/or a separate mechanical latching mechanism in a manner that prevents the device from being removed.
  - When a retrofit is performed, a label must be used as follows:
    - The person conducting the retrofit must apply a label to the air conditioning system in the engine compartment that contains the following information:
      - \* The name and address of the technician and the company performing the retrofit;
      - \* The date of the retrofit;
      - \* The trade name, charge amount, and, when applicable, the ASHRAE numerical designation of the refrigerant;
      - \* The type, manufacturer, and amount of lubricant used;
      - \* If the refrigerant is or contains an ozone-depleting substance, the phrase "ozone depleter"; and
      - \* If the refrigerant displays flammability limits as blended, measured according to ASTM E681, the statement "This refrigerant is FLAMMABLE. Take appropriate precautions."
    - This label must be large enough to be easily read and must be permanent.
    - The background color must be unique to the refrigerant.
    - The label must be affixed to the system over information related to the previous refrigerant, in a location not normally replaced during vehicle repair.
    - Information on the previous refrigerant that cannot be covered by the new label must be permanently rendered unreadable.

• No substitute refrigerant may be used to “top-off” a system that uses another refrigerant. The original refrigerant must be recovered in accordance with regulations issued under section 609 of the CAA prior to charging with a substitute.

Since these use conditions necessitate unique fittings and labels, it will be necessary for developers of automotive refrigerants to consult with EPA about the existence of other alternatives. Such discussions will lower the risk of duplicating fittings already in use.

No SNAP determination guarantees satisfactory performance from a refrigerant. Consult the original equipment manufacturer or service personnel for further information on using a refrigerant in a particular system.

(a) HFC-134a. *HFC-134a is acceptable as a substitute for CFC-12 in retrofitted and new motor vehicle air conditioners, subject to the use conditions applicable to motor vehicle air conditioning described above.* 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 motor vehicle air conditioning systems (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. While HFC-134a is compatible with most existing refrigeration and air conditioning equipment parts, it is not compatible with the mineral oils currently used in such systems. An appropriate ester-based, polyalkylene glycol-based, or other type of lubricant should be used. Consult the original equipment manufacturer or the retrofit kit manufacturer for further information.

(b) R-401C.

*R-401C, which consists of HCFC-22, HFC-152a, and HCFC-124, is acceptable as a substitute for CFC-12 in retrofitted and new motor vehicle air conditioners, subject to the use conditions applicable to motor vehicle air conditioning described above.*

HCFC-22 and HCFC-124 contribute to ozone depletion, but to a much lesser degree than CFC-12. The production of HCFC-22 will be phased out according to the accelerated phaseout schedule (published 12/10/93, 58 FR 65018). The GWP of HCFC-22 is somewhat higher

than other alternatives for this end-use. Experimental data indicate that HCFC-22 may leak through flexible hosing in mobile air conditioners at a high rate. In order to preserve the blend's composition and to reduce its contribution to global warming, EPA strongly recommends using barrier hoses when hose assemblies need to be replaced during a retrofit procedure. The GWPs of the other components are low. Although this blend does contain one flammable constituent, the blend itself is not flammable. Leak testing demonstrated that the blend never becomes flammable.

(c) HCFC Blend Beta. *HCFC Blend Beta, which consists of HCFC-124, HFC-134a, and isobutane, is acceptable as a substitute for CFC-12 in retrofitted and new motor vehicle air conditioners, subject to the use conditions applicable to motor vehicle air conditioning described above.* The composition of this blend has been claimed confidential by the manufacturer. This blend contains at least one HCFC, and therefore contributes to ozone depletion, but to a much lesser degree than CFC-12. Regulations regarding recycling and reclamation issued under section 609 of the Clean Air Act apply to this blend. Its production will be phased out according to the accelerated schedule (published 12/10/93, 58 FR 65018). The GWPs of the components are moderate to low. This blend is nonflammable, and leak testing has demonstrated that the blend never becomes flammable.

c. Acceptable Subject to Narrowed Use Limits

(1) CFC-11, CFC-12, CFC-113, CFC-114, CFC-115 Heat Transfer, New. (a) *Perfluorocarbons. Perfluorocarbons are acceptable as substitutes for CFC-11, CFC-12, CFC-113, CFC-114, and CFC-115 in heat transfer systems only where no other alternatives are technically feasible due to safety or performance requirements.* PFCs covered by this determination are C<sub>3</sub>F<sub>8</sub>, C<sub>4</sub>F<sub>10</sub>, C<sub>5</sub>F<sub>12</sub>, C<sub>5</sub>F<sub>11</sub>NO, C<sub>6</sub>F<sub>14</sub>, C<sub>6</sub>F<sub>13</sub>NO, C<sub>7</sub>F<sub>16</sub>, C<sub>7</sub>F<sub>15</sub>NO, C<sub>8</sub>F<sub>18</sub>, C<sub>8</sub>F<sub>16</sub>O, and C<sub>9</sub>F<sub>21</sub>N. The principal characteristic of concern for PFCs is that they have very long atmospheric lifetimes and have the potential to contribute to global climate change. For instance, C<sub>5</sub>F<sub>12</sub> has a lifetime of 4,100 years and a 100-year GWP of 5,600.

Despite concerns about high global warming potential, EPA is listing PFCs as acceptable in certain limited applications because a PFC may be the only substitute that can satisfy safety or performance requirements. These requirements might include very high dielectric strength, noncorrosivity,

thermal stability, materials compatibility, and chemical inertness. In addition, PFCs do not contribute to stratospheric ozone depletion. Examples of applications where PFCs may represent the only alternative to ODS include uranium isotope separation, chemical processing, electrical inverters, ozone generation for water purification, space simulators, air purification, and integrated chip manufacturing.

Users should note, however, that use of a PFC should be an ODS substitute of last resort. As the determination states, PFCs should be used “only where no other alternatives are technically feasible due to safety or performance requirements.” Potential users are required to conduct a thorough review of other more environmentally acceptable substitutes. Although EPA does not require users to submit the results of their substitute evaluation, companies must keep the results on file for future reference.

In cases where users must adopt PFCs, they should make every effort to:

- Recover and recycle these fluids during servicing;
- Adopt maintenance practices that reduce leakage as much as is technically feasible;
- Recover these fluids after the end of the equipment's useful life and either recycle them or destroy them; and
- Continue to search for other long-term alternatives.

Users of PFCs should note that if other alternatives become available, EPA could be petitioned to list PFCs as unacceptable due to the availability of other suitable substitutes. If such a petition were granted, EPA would determine whether to grandfather existing uses based upon consideration of cost and timing of testing and implementation of new substitutes.

d. Unacceptable Substitutes. (1) R-403B. *R-403B, which consists of HCFC-22, R-218, and propane, is unacceptable as a substitute for R-502 in the following new and retrofitted end-uses:*

- Industrial process refrigeration;
- Cold storage warehouses;
- Refrigerated transport;
- Retail food refrigeration;
- Commercial ice machines; and
- Household freezers.

R-218, perfluoropropane, has an extremely high GWP and lifetime, which pose additional risk beyond that of other acceptable substitutes for these end-uses. In particular, the lifetime of R-218 is over 2000 years, which means that global warming effects would be essentially irreversible. While other substitutes may have high GWPs, they do not exhibit such long lifetimes.

In addition to direct global warming effects, EPA considers indirect impacts associated with changes in energy efficiency. Many manufacturers, including that of R-403B, claim energy efficiency gains associated with their products. Such gains are highly dependent on equipment type, ambient conditions, optimization of the system, and other factors. No data demonstrate, however, that R-403B would produce such large indirect benefits as to overcome the direct impact of its use as compared to the use of other already acceptable substitutes. Thus, EPA performed no detailed analysis of the indirect global warming impacts of R-403B.

As discussed in the SNAP FRM, the Agency is authorized to grandfather existing uses from a prohibition where appropriate under the four-part test established in *Sierra Club v. EPA*, 719 F.2d 436 (D.C. Cir. 1983). As requested by two commenters, the Agency has conducted the four analyses required under this test, and has concluded that the balance of equities favors the grandfathering of two current uses of R-403B. Within industrial process refrigeration, use of R-403B is permitted until supplies purchased prior to September 26, 1994, the date EPA proposed to list R-403B as unacceptable, are exhausted. Within refrigerated transport, R-403B may be used in systems converted to its use as of September 26, 1994 for the lifetime of that particular equipment. No use outside these two specific cases is allowed.

Under the first prong of the *Sierra Club* analysis, the prohibition set forth in this action clearly represents a departure from previously established practice, as use of this substitute was not previously restricted. However, through the proposed action on September 26, 1994 EPA provided notice that it was considering a change to this previous practice. Therefore, existing users of R-403B who, prior to September 26, 1994, switched from class I substances and invested in this substitute on the assumption that it would be a sufficient improvement over the class I used, relied on the fact that use of R-403B was unrestricted. Prohibiting their use of the substitute immediately would impose a severe economic burden on these users. Although there is a substantial interest in applying this requirement immediately, this interest is balanced by the fact that the restriction will apply immediately to new equipment using R-403B. Therefore, the requirement will apply immediately to a substantial number of systems and there will be no

incentive for future investment in R-403B equipment. These factors taken together outweigh any statutory interest in applying the new rule immediately to existing users who had invested in R-403 prior to September 26, 1994.

(2) R-405A. *R-405A, which is composed of HCFC-22, HFC-152a, HCFC-142b, and R-c318, is unacceptable as a substitute for CFC-12, R-500, and R-502 in the following new and retrofitted end-uses:*

- Commercial comfort air conditioning;
- Industrial process refrigeration;
- Ice skating rinks;
- Cold storage warehouses;
- Refrigerated transport;
- Retail food refrigeration;
- Vending machines;
- Water coolers;
- Commercial ice machines;
- Household refrigerators;
- Household freezers;
- Residential dehumidifiers; and
- Motor vehicle air conditioning.

R-405A was listed as HCFC/HFC/fluoroalkane Blend A in previous notices. R-405A contains a high proportion of R-c318, cycloperfluorobutane, which has an extremely high GWP and lifetime. In particular, the lifetime of R-c318 is over 3000 years, which means that global warming effects would be essentially irreversible. While other substitutes may have high GWPs, they do not exhibit such long lifetimes.

In addition to direct global warming effects, EPA considers indirect impacts associated with changes in energy efficiency. Many refrigerant manufacturers claim energy efficiency gains associated with their products. Such gains are highly dependent on equipment type, ambient conditions, optimization of the system, and other factors. No data demonstrate, however, that R-405A would produce such large indirect benefits as to overcome the direct impact of its use as compared to the use of other already acceptable substitutes. Thus, EPA performed no detailed analysis of the indirect global warming impacts of R-405A.

(3) Hydrocarbon Blend B.—*Hydrocarbon Blend B is unacceptable as a substitute for CFC-12 in the following new and retrofitted end-uses:*

- Commercial comfort air conditioning;
- Ice skating rinks;
- Cold storage warehouses;
- Refrigerated transport;
- Retail food refrigeration;
- Vending machines;
- Water coolers;
- Commercial ice machines;

- Household refrigerators;
- Household freezers;
- Residential dehumidifiers; and
- Motor vehicle air conditioning.

Flammability is the primary concern. Use of this substitute in very leaky end-uses like motor vehicle air conditioning may pose a high risk of fire. EPA requires that a risk assessment be conducted to demonstrate this blend may be safely used in any CFC-12 end-uses. The manufacturer of this blend has not submitted such a risk assessment, and EPA therefore finds it unacceptable.

(4) Flammable Substitutes.—*Flammable substitutes, defined as having flammability limits as measured according to ASTM E-681 with modifications included in Society of Automotive Engineers Recommended Practice J1657, including blends which become flammable during fractionation, are unacceptable as substitutes for CFC-12 in retrofitted motor vehicle air conditioning systems.*

Flammable refrigerants differ from traditional substances in several ways: Potential gains in energy efficiency, reductions in direct contribution to global warming, and additional risks from fire. Flammable refrigerants may be good substitutes in systems designed with fire risks in mind. In addition, in certain circumstances, they may serve well as substitutes in retrofit uses. EPA encourages research into the use of flammable refrigerants, but remains concerned about the dangers. Because of these concerns, EPA has established the requirement that manufacturers of flammable refrigerants conduct detailed risk assessments in all end-uses. The risks from flammability are extremely sensitive to the end-use and charge size.

In motor vehicle air conditioning systems (MVACS), flammable refrigerants pose risks not found in stationary equipment, including the potential for explosions in collisions, potential punctures of the condenser because of its placement directly behind the grille, potential punctures of flexible hoses, the hazard to technicians who are not expecting to handle flammable fluids, the danger to passengers from evaporator leaks, and the dangers to personnel involved in disposal of old automobiles. Due to the length of SNAP review, certain substitutes have been marketed which may pose risk to users. The intent of the 90-day review process was not to allow manufacturers to market risky substitutes, but rather to ensure a thorough review. Because of potential risks to users and service personnel, EPA finds it necessary to find all flammable substitutes unacceptable in retrofitted automotive air conditioning to prevent hazardous

substitutes from being sold without a thorough risk assessment.

EPA continues to encourage investigation of all substitute refrigerants, including flammable substances. This unacceptable determination only applies to retrofitted MVACS. If a manufacturer wishes an acceptable determination for a flammable substitute in MVACS, this risk assessment must be conducted in a scientifically valid manner. EPA will consider such a risk assessment in any determination on the substitute.

#### B. Solvents

##### 1. Acceptable Subject to Use Conditions

a. Electronics Cleaning. (1) HCFC-225 ca/cb. *HCFC-225 is an acceptable substitute for CFC-113 and MCF in electronics cleaning subject to a 25 ppm occupational exposure level for the ca-isomer.* The use condition is based on the toxicity of this chemical. The Agency's analysis of this substitute found that the exposure limit indicated is sufficient to protect worker health and that this limit can be met with exposure controls. The exposure limit of the HCFC-225 cb isomer is 250 ppm. The new limit for the ca-isomer should be readily achievable since HCFC-225 is only sold commercially as a (45%/55%) blend of ca- and cb-isomers. In addition, the cleaning equipment where HCFC-225 is used is characterized by low emissions, and the manufacturer of HCFC-225 is currently conducting personal monitoring to corroborate the projected emission levels.

These workplace standards are designed to protect worker safety until the Occupational Safety and Health Administration (OSHA) sets its own standards under P.L. 91-596. The existence of the EPA standards in no way bars OSHA from standard-setting under OSHA authorities as defined in P.L. 91-596.

b. Precision Cleaning. (1) HCFC-225 ca/cb. *HCFC-225 is an acceptable substitute for CFC-113 and MCF in precision cleaning subject to a 25 ppm occupational exposure level for the ca-isomer.* The reasons for this decision are described in the preceding section.

##### 2. Unacceptable Substitutes

a. Metals Cleaning. (1) Dibromomethane. *Dibromomethane (DBM) is an unacceptable substitute for CFC-113 and MCF in metals cleaning.* Dibromomethane has a comparatively high ODP (.17), and EPA's analysis of use of this chemical in cleaning processes revealed correspondingly high ozone depletion effects. In the case of DBM, the Agency's concern for high

ODP is compounded by the fact that DBM can in some cases be used as a drop-in replacement, which could result in greater probability of uncontrolled venting to the atmosphere. Since other alternatives with lower overall environmental impacts exist for the cleaning processes in question, EPA elected to ban use of DBM as a cleaning substitute.

b. Electronics Cleaning. (2) Dibromomethane. *Dibromomethane is an unacceptable substitute for CFC-113 and MCF in electronics cleaning.* Reasons for this decision are described in the preceding section.

c. Precision Cleaning. (3) Dibromomethane. *Dibromomethane is an unacceptable substitute for CFC-113 and MCF in precision cleaning.* Reasons for this decision are described in the preceding section.

#### c. Fire Suppression and Explosion Protection

##### 1. Response to Comments

One commenter believes that CF<sub>3</sub>I should not be acceptable for use in any fire protection applications until two-year chronic testing is done, and should be treated as a suspect carcinogen as defined by OSHA regulations, along with appropriate warnings for handlers.

The commenter bases his belief on two points. First, the commenter suggests that the cardiotoxicity test resulting in death of a test animal is not like the results from Halon 1211, CFC-11 or HCFC-123, which resulted in heart arrhythmias followed by recovery when the test animal was removed from exposure.

Second, the commenter states that the results of the genotoxicity tests give positive indications that CF<sub>3</sub>I is potentially a carcinogen. The commenter states that the structural relationship of CF<sub>3</sub>I to CH<sub>3</sub>I, which the commenter states is a known skin carcinogen, increases the likelihood that CF<sub>3</sub>I is a carcinogen.

The cardiotoxicity protocol incorporates simulation of a worse-case response by injecting the test animal with epinephrine prior to administering the test agent. The standard protocol interpretation requires observation of at least five life-threatening ventricular arrhythmias in order to conclude that the LOAEL has been attained. This response is a precursor to the imminent death of the animal.

In addition, the response of an animal to a cardiotoxicizing agent is somewhat random. Whereas one animal may experience heart arrhythmias, another animal might experience immediate death by the same dose. Thus, the

observations of ventricular arrhythmias are considered to be the same as observations of death and both are considered valid indicators of the LOAEL value.

Regarding the commenters' concern that CF<sub>3</sub>I is a carcinogen, EPA conducts a risk assessment of an agent by initially asking qualitative questions such as: "Is the structure of the compound likely to be carcinogenic, and does the agent test positive in a mutagenesis assay? If so, how potent is the reaction, in other words, what dosage level gives a positive reaction?"

CF<sub>3</sub>I is not a known carcinogen, although it tested positive in a mutagenicity screening assay to determine which are potential candidates for further testing. The Ames mutagenicity test used as a predictor of carcinogenicity is accurate as a predictor approximately 50 per cent of the time. The ability of this assay to predict for carcinogenicity, even given the positive finding, is questionable in the case of halogenated compounds.

Even should it be determined in a two-year carcinogenicity bioassay that the agent is a carcinogen, its use under the particular conditions representative of fire suppression applications in which could be expected only one or a few exposures in a life time, is likely not to constitute a cancer risk. A cancer risk usually requires long term exposure to the agent.

If the agent is a very good fire agent, on balance, the risk to protect lives overrides the remote concern of carcinogenicity from the agent. In such a case, for those situations where a manufacturing or service worker or fire fighter would be repeatedly exposed, appropriate precautions would be taken. A firefighter is not training in an environment where he is not already protected. And in industrial settings, the acceptable exposure limits are set using the subchronic and chronic data that is available and due precautions are taken, as in any other industrial chemical use.

One commenter requested that the use restrictions on SF<sub>6</sub> be altered to allow its use as a discharge test agent for all civilian as well as military aircraft fire suppression systems. The commenter reported that research efforts by private companies, the U.S. Navy, and the National Institute for Standards and Technology have identified SF<sub>6</sub> as the preferred test agent for simulating halon 1301 in aircraft fire suppression systems. The commenter indicated that the amount of SF<sub>6</sub> released in developing and certifying new commercial aircraft will be approximately 1,000 pounds per year or less.



EPA concurs with the commenter's request. EPA is aware that the airline industry is conducting a strategic research effort to identify new agents for use in new aircraft. Meanwhile, airlines and aircraft manufacturers are maintaining banks of recycled halon to service existing aircraft as well as new aircraft being built before the new systems and aircraft design can be developed and implemented. To preserve the stock of recycled halon for critical onboard use, and to minimize emission of halon during testing, EPA is broadening the language in this final rulemaking to allow the use of SF<sub>6</sub> as a discharge test agent in commercial as well as military aircraft fire suppression systems.

One commenter took issue with the use of the EPA's statement that PFCs are agents of "last resort" and that "in most total flooding applications, the Agency believes that alternatives to C<sub>3</sub>F<sub>8</sub> exist." The commenter cited cases where confusion resulted in no action being taken by the user to move into an alternative. The commenter took no issue with the use conditions or the narrowed use limits imposed on PFCs in previous SNAP rulemakings. The commenter requested that EPA issue guidance on the 'narrowed use limits' evaluation.

EPA's use of the term 'agent of last resort' is intended to further explain, in simple terms, EPA's intention to the end-user. Further, EPA cannot agree to eliminate the statement "in most total flooding applications, the Agency believes that alternatives to C<sub>3</sub>F<sub>8</sub> exist." This same language was used in the original SNAP rulemaking (59 FR 13109, 13110), and conveys to the user that most applications can be served by non-PFC technology and should be evaluated as such.

The narrowed use restriction imposed on PFCs was developed with the input of users and industry. EPA was requested to leave the technical evaluations to end-users and fire protection engineers, as each use scenario presented its own challenges and requirements. It was felt that specific guidance by EPA would limit the ability of the fire protection community to select and design the most appropriate system for each application. Thus, EPA requires that end-users conduct an evaluation of the alternatives, and maintain documentation in the event a PFC is selected. EPA regrets there is some confusion in the market concerning the determination that other alternatives are not technically feasible, but to be more specific may inadvertently limit a user's choices. EPA is expressly leaving

technical evaluations to the user community.

## 2. Listing Decisions

### a. Acceptable Subject to Use Conditions

(1) Total Flooding Agents. (a) C<sub>3</sub>F<sub>8</sub>. *C<sub>3</sub>F<sub>8</sub> is acceptable as a Halon 1301 substitute where other alternatives are not technically feasible due to performance or safety requirements: (a) Due to their physical or chemical properties or (b) where human exposure to the agents may approach cardiosensitization levels or result in other unacceptable health effects under normal operating conditions.* This agent is subject to the same use conditions stipulated for all total flooding agents, that is:

- Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its NOAEL.
- Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its LOAEL.
- Agent concentrations greater than the LOAEL are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.

Cup burner tests in heptane indicate that C<sub>3</sub>F<sub>8</sub> can extinguish fires in a total flood application at concentrations of 7.30 per cent and therefore has a design concentration of 8.8 per cent. The cardiotoxic NOAEL of 30 per cent for this agent is well above its extinguishment concentration and therefore this agent is safe for use in occupied areas. This agent can replace Halon 1301 by a ratio of 2 to 1 by weight.

Using agents in high concentrations poses a risk of asphyxiation by displacing oxygen. With an ambient oxygen level of 21 per cent, a design concentration of 22.6 per cent may reduce oxygen levels to approximately 16 per cent, the minimum level considered to be required to prevent impaired judgement or other physiological effects. Thus, the oxygen level resulting from discharge of this agent must be at least 16 per cent.

C<sub>3</sub>F<sub>8</sub> has no ozone depletion potential, and is nonflammable, essentially non-toxic, and is not a VOC. However, this agent has an atmospheric lifetime of 3,200 years and a 100-year GWP of 6100. Due to the long atmospheric lifetime of C<sub>3</sub>F<sub>8</sub>, the Agency is finding this chemical acceptable only in those limited instances where no other

alternative is technically feasible due to performance or safety requirements. In most total flooding applications, the Agency believes that alternatives to C<sub>3</sub>F<sub>8</sub> exist. EPA intends that users select C<sub>3</sub>F<sub>8</sub> out of need and that this agent be used as the agent of last resort. Thus, a user must determine that the requirements of the specific end-use preclude use of other available alternatives.

Users must observe the limitations on C<sub>3</sub>F<sub>8</sub> acceptability by undertaking the following measures: (i) Conduct an evaluation of foreseeable conditions of end use; (ii) determine that human exposure to the other alternative extinguishing agents may approach or result in cardiosensitization or other unacceptable toxicity effects under normal operating conditions; and (iii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use.

EPA recommends that users minimize unnecessary emissions of this agent by limiting testing of C<sub>3</sub>F<sub>8</sub> to that which is essential to meet safety or performance requirements; recovering C<sub>3</sub>F<sub>8</sub> from the fire protection system in conjunction with testing or servicing; and destroying or recycling C<sub>3</sub>F<sub>8</sub> for later use. EPA encourages manufacturers to develop aggressive product stewardship programs to help users avoid such unnecessary emissions.

(b) CF<sub>3</sub>I *CF<sub>3</sub>I is acceptable as a Halon 1301 substitute in normally unoccupied areas.* Any employee that could possibly be in the area must be able to escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.

CF<sub>3</sub>I (Halon 13001) is a fluoriodocarbon with an atmospheric lifetime of only 1.15 days due to its rapid photolysis in the presence of light. The resulting GWP of this agent is less than one, and its ODP when released at ground level is likely to be extremely low, with current conservative estimates ranging from .008 to .01. Complete analysis of the ozone depleting potential of this agent will be available in the near future.

Anticipating EPA's concern about releases of CF<sub>3</sub>I from aircraft, and the associated likelihood of increased ozone-depleting effectiveness when released at higher altitudes, the military has conducted an analysis of historical releases of Halon 1301 from both military and commercial aircraft. Initial assessment indicates that emissions from U.S. military aircraft appear to have averaged about 56 pounds annually, of which 2 pounds were emitted above 30,000 feet. Commercial

aircraft worldwide released an estimated average of 933 pounds of Halon 1301 annually, of which 158 pounds was released above 30,000 feet. While EPA is awaiting the results of the ODP calculations of  $\text{CF}_3\text{I}$ , it is unlikely that such low emissions at high altitude will pose a significant threat to the ozone layer.

Interest in this agent is very high because it may constitute a drop-in replacement to Halon 1301 on a weight and volume basis. Initial tests have shown its weight equivalence for fire extinguishment to be 1.36, and its volume equivalence to be 1.0, while for explosion inertness it is 1.42 and 1.04 respectively. The research community is continuing to qualify the properties of this agent, including its materials compatibility, its storage stability and its effectiveness. While the manufacturer's SNAP submission only requests listing in normally unoccupied areas, preliminary cardiotoxicity data received by the Agency indicate that  $\text{CF}_3\text{I}$  has a NOAEL of 0.2 per cent and a LOAEL of 0.4 per cent, and thus this agent would not be suited for use in normally occupied areas.

(c) Gelled Halocarbon/Dry Chemical Suspension. *Gelled Halocarbon/Dry Chemical Suspension is acceptable as a Halon 1301 substitute in normally unoccupied areas.* Any employee who could possibly be in the area must be able to escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.

The manufacturer is proposing to blend either of two halocarbons (HFC-125 or HFC-134a) with either ammonium polyphosphate (which is not corrosive) or monoammonium phosphate (which is corrosive on hard surfaces). An initial assessment of inhalation toxicology of fine particulates indicates that some risk exists of inhalation exposure when the particles are below a certain size compared to the mass per cubic meter in air. Particle sizes less than 10 to 15 microns and a mass above the ACGIH nuisance dust levels raise concerns which need to be further studied. In a total flooding application, the exposure levels may be of concern. In addition, because the discharge of powders obscures vision, evacuation could be impeded. EPA is asking manufacturers of total flooding systems using powdered aerosols to submit to the Agency a review of the medical implications of inhaling atmospheres flooded with fine powder particulates. While the manufacturer requested a SNAP listing for unoccupied areas only, EPA would not consider its use in occupied areas until

the requested peer review is complete. Meanwhile, EPA is finding this technology acceptable for use in normally unoccupied areas.

For further discussion of this agent, including a review of particle size distributions, see the listing under "Streaming Agents—Acceptable."

(d) Inert Gas/Powdered Aerosol Blend. *Inert Gas/Powdered Aerosol Blend is acceptable as a Halon 1301 substitute in normally unoccupied areas.* In areas where personnel could possibly be present, as in a cargo area, the employer shall provide a pre-discharge employee alarm capable of being perceived above ambient light or noise levels for alerting employees before system discharge. The pre-discharge alarm shall provide employees time to safely exit the discharge area prior to system discharge.

This alternative agent is formulated from a mixture of dry powders pressed together into pill form. Upon exposure to heat from a fire, a pyrotechnic charge initiates a series of exothermic, gas-producing reactions composed mainly of a mixture of nitrogen, carbon dioxide and water vapor, with small amounts of carbon monoxide, nitrous oxide, nitrogen dioxide, and solid residues. The oxygen level in the room is largely depleted, thus extinguishing the fire.

The manufacturer has proposed this technology for use in normally unoccupied areas only, such as engine nacelles and engine compartments, aircraft dry bay areas and unoccupied cargo areas. Comparing agents alone, deployment of 2.0 pounds of this agent at 400°F has an equivalent fire suppression effectiveness to 1.0 pound of Halon 1301 at 70°F.

This agent has no ODP. The carbon dioxide generated in the combustion of this agent has a GWP of 1.

#### b. Acceptable Subject to Narrowed Use Limits

(1) Total Flooding Agents. (a)  $\text{C}_3\text{F}_8$ .  *$\text{C}_3\text{F}_8$  is acceptable as a Halon 1301 substitute where other alternatives are not technically feasible due to performance or safety requirements: a) due to their physical or chemical properties or b) where human exposure to the agents may approach cardiotoxicity levels or result in other unacceptable health effects under normal operating conditions.* This agent is subject to the use conditions stipulated for all total flooding agents, that is:

- Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its NOAEL.

- Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its LOAEL.

- Agent concentrations greater than the LOAEL are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.

Cup burner tests in heptane indicate that  $\text{C}_3\text{F}_8$  can extinguish fires in a total flood application at concentrations of 7.30 per cent and therefore has a design concentration of 8.8 per cent. The cardiotoxic NOAEL of 30 per cent for this agent is well above its extinguishment concentration; therefore, it is safe for use in occupied areas. This agent has a weight equivalence of two-to-one by weight compared to Halon 1301.

Using agents in high concentrations poses a risk of asphyxiation by displacing oxygen. With an ambient oxygen level of 21 per cent, a design concentration of 22.6 per cent may reduce oxygen levels to approximately 16 per cent, the minimum level considered to be required to prevent impaired judgment or other physiological effects. Thus, the oxygen level resulting from discharge of this agent must be at least 16 per cent.

This agent has an atmospheric lifetime of 3,200 years and a 100-year GWP of 6,100. Due to the long atmospheric lifetime of  $\text{C}_3\text{F}_8$ , the Agency is finding this chemical acceptable only in those limited instances where no other alternative is technically feasible due to performance or safety requirements. In most total flooding applications, the Agency believes that alternatives to  $\text{C}_3\text{F}_8$  exist. EPA intends that users select  $\text{C}_3\text{F}_8$  out of need and that this agent be used as the agent of last resort. Thus, a user must determine that the requirements of the specific end-use preclude use of other available alternatives.

Users must observe the limitations on  $\text{C}_3\text{F}_8$  acceptability by undertaking the following measures: (i) Conduct an evaluation of foreseeable conditions of end use; (ii) determine that human exposure to the other alternative extinguishing agents may approach or result in cardiotoxicity or other unacceptable toxicity effects under normal operating conditions; and (iii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use.

EPA recommends that users minimize unnecessary emissions of this agent by

limiting testing of C<sub>3</sub>F<sub>8</sub> to that which is essential to meet safety or performance requirements; recovering C<sub>3</sub>F<sub>8</sub> from the fire protection system in conjunction with testing or servicing; and destroying or recycling C<sub>3</sub>F<sub>8</sub> for later use. EPA encourages manufacturers to develop aggressive product stewardship programs to help users avoid such unnecessary emissions.

(b) Sulfur Hexafluoride (SF<sub>6</sub>). SF<sub>6</sub> is acceptable for use as a discharge test agent in military uses and civilian aircraft uses only. Sulfur Hexafluoride is a nonflammable, nontoxic gas which is colorless and odorless. With a density of approximately five times that of air, it is one of the heaviest known gases. SF<sub>6</sub> is relatively inert, and has an atmospheric lifetime of 3,200 years, with a 100-year, 500-year, and 1,000-year GWP of 16,500, 24,900 and 36,500 respectively.

This agent has been developed by the U.S. Navy as a test gas simulant in place of halon in new halon total flooding systems on ships which have been under construction prior to identification and qualification of substitute agents. Halon systems are no longer included in designs for new ships. The Navy estimates its annual usage to be less than 10,000 pounds annually, decreasing over time. Similarly, the airline industry has an interest in using SF<sub>6</sub> as a discharge test agent simulating Halon 1301 in aircraft system certification testing to ensure aircraft inflight fire safety. During the period of development, FAA certification, and implementation of suitable substitutes for aircraft, the airlines will continue to build new aircraft with halon systems. The amount of SF<sub>6</sub> released in developing and certifying these critical systems for commercial aircraft will be approximately 1,000 pounds per year or less. EPA believes that the quantities involved in these two use sectors are moderate, and avoiding the discharge of halon to test new halon systems is an immediate priority.

While SF<sub>6</sub> is not currently used in other commercial sector testing regimes, EPA is imposing a narrowed use limit to ensure that emissions of this agent remain minimal. The NFPA 12a and NFPA 2001 standards recommend that halon or other total flooding gases not be used in discharge testing, but that alternative methods of ensuring enclosure and piping integrity and system functioning be used. Alternative methods can often be used, such as the "door fan" test for enclosure integrity, UL 1058 testing to ensure system functioning, pneumatic test of installed piping, and a "puff" test to ensure

against internal blockages in the piping network. These stringent design and testing requirements have largely obviated the need to perform a discharge test for total flood systems containing either Halon 1301 or a substitute agent.

#### c. Unacceptable

(1) Total Flooding. (a) HFC-32. HFC-32 is unacceptable as a total flooding agent. HFC-32 has been determined to be flammable, with a large flammability range, and is therefore inappropriate as a halon substitute when used as a pure agent. This agent was proposed acceptable in the first SNAP proposed rulemaking (58 FR 28093, May 12, 1993) but public comment received indicated agreement about the flammability characteristics of this agent. EPA is not aware of any interest in commercializing this agent as a fire suppression agent.

### IV. Administrative Requirements

#### A. Executive Order 12866

Under Executive Order 12866, (58 FR 51735; October 4, 1993) the Agency must determine whether the regulatory action is "significant" and therefore subject to OMB review and the requirements of the Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may: (1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the "Executive Order."

Pursuant to the terms of Executive Order 12866, OMB notified EPA that it considers this a "significant regulatory action" within the meaning of the Executive Order and EPA submitted this action to OMB for review. Changes made in response to OMB suggestions or recommendations have been documented in the public record.

#### B. Unfunded Mandates Act

Section 202 of the Unfunded Mandates Reform Act of 1995 requires EPA to prepare a budgetary impact

statement before promulgating a rule that includes a Federal mandate that may result in expenditure by state, local, and tribal governments, in aggregate, or by the private sector, of \$100 million or more in any one year. Section 203 requires the Agency to establish a plan for obtaining input from and informing any small governments that may be significantly or uniquely affected by the rule. Section 205 requires that regulatory alternatives be considered before promulgating a rule for which a budgetary impact statement is prepared. The Agency must select the least costly, most cost-effective, or least burdensome alternative that achieves the rule's objectives, unless there is an explanation why this alternative is not selected or this alternative is inconsistent with law.

Because this final rule is estimated to result in the expenditure by State, local, and tribal governments or the private sector of less than \$100 million in any one year, the Agency has not prepared a budgetary impact statement or specifically addressed the selection of the least costly, most cost-effective, or least burdensome alternative. Because small governments will not be significantly or uniquely affected by this rule, the Agency is not required to develop a plan with regard to small governments. However, the rule has the net effect of reducing burden from part 82, Stratospheric Protection regulations, on regulated entities.

#### C. Regulatory Flexibility Act

The Regulatory Flexibility Act, 5 U.S.C. 604(a), applies to any rulemaking that is subject to public notice and comment requirements. The Act requires that a regulatory flexibility analysis be performed or the head of the Agency certifies that a rule will not have a significant economic effect on a substantial number of small entities, pursuant to 5 U.S.C. 605(b).

The Agency believes that this final rule will not have a significant effect on a substantial number of small entities and has therefore concluded that a formal RFA is unnecessary. Because costs of the SNAP requirements as a whole are expected to be minor, the rule is unlikely to adversely affect businesses, particularly as the rule exempts small sectors and end-uses from reporting requirements and formal agency review. In fact, to the extent that information gathering is more expensive and time-consuming for small companies, this rule may well provide benefits for small businesses anxious to examine potential substitutes to any ozone-depleting class I and class II substances they may be using, by

requiring manufacturers to make information on such substitutes available.

**D. Paperwork Reduction Act**

The EPA has determined that this final rule contains no information requirements subject to the Paperwork Reduction Act 44 S.S.C. 3501 et seq.

**V. Additional Information**

For copies of the comprehensive SNAP lists or additional information on SNAP contact the Stratospheric Protection Hotline at 1-800-296-1996, Monday-Friday, between the hours of 10:00 a.m. and 4:00 p.m. (EST).

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 in the **Federal Register** on March 18, 1994 (59 FR 13044). **Federal Register** notices can be ordered from the Government Printing Office Order Desk (202) 783-3238; the citation is the date of publication.

Notices and rulemaking under the SNAP program can also be retrieved electronically from EPA's Protection of Stratospheric Ozone Technology Transfer Network (TTN), Clean Air Act Amendment Bulletin Board. The access number for users with a 1200 or 2400

bps modem is (919) 541-5742. For users with a 9600 bps modem the access number is (919) 541-1447. For assistance in accessing this service, call (919) 541-5384 during normal business hours (EST).

**List of Subjects in 40 CFR Part 82**

Environmental protection, administrative practice and procedure, Air pollution control, Reporting and recordkeeping requirements.

Dated: June 2, 1995.

**Carol M. Browner,**  
*Administrator.*

For the reasons set out in the preamble, 40 CFR part 82 is amended 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.

2. Section 82.180 is amended by revising paragraph (a)(8)(ii) to read as follows:

**§ 82.180 Agency review of SNAP submissions.**

(a) \* \* \*

(8) \* \* \*

(ii) *Communication of Decision to the Public.* The Agency will publish in the **Federal Register** on a quarterly basis a complete list of the acceptable and unacceptable alternatives that have been reviewed to date. In the case of substitutes proposed as acceptable with use restrictions, proposed as unacceptable or proposed for removal from either list, a rulemaking process will ensue. Upon completion of such rulemaking, EPA will publish revised lists of substitutes acceptable subject to use conditions or narrowed use limits and unacceptable substitutes to be incorporated into the Code of Federal Regulations. (See Appendices to this subpart.)

\* \* \* \* \*

4. Subpart G is amended by adding appendix B to read as follows:

**Subpart G—Significant New Alternatives Policy Program**

\* \* \* \* \*

**Appendix B to Subpart G—Substitutes Subject to Use Restrictions and Unacceptable Substitutes**

Listed in the June 13, 1995 final rule, effective July 13, 1995.

**REFRIGERANTS—ACCEPTABLE SUBJECT TO USE CONDITIONS**

Application	Substitute	Decision	Conditions	Comments
CFC-12 Automobile Motor Vehicle Air Conditioning (Retrofit and New Equipment/NIKS).	HFC-134a, R-401C, HCFC Blend Beta.	Acceptable .....	—must be used with unique fittings. —must be used with detailed labels. —all CFC-12 must be removed from the system prior to retrofitting. Refer to the text for a full description.	EPA is concerned that the existence of several substitutes in this end-use may increase the likelihood of significant refrigerant cross-contamination and potential failure of both air conditioning systems and recovery/recycling equipment. For the purposes of this rule, no distinction is made between "retrofit" and "drop-in" refrigerants; retrofitting a car to use a new refrigerant includes all procedures that result in the air conditioning system using a new refrigerant.

**REFRIGERANTS—ACCEPTABLE SUBJECT TO NARROWED USE LIMITS**

End-use	Substitute	Decision	Comments
CFC-11, CFC-12, CFC-113, CFC-114, CFC-115 Non-Mechanical Heat Transfer, New.	C <sub>3</sub> F <sub>8</sub> , C <sub>4</sub> F <sub>10</sub> , C <sub>5</sub> F <sub>12</sub> , C <sub>5</sub> F <sub>11</sub> NO, C <sub>6</sub> F <sub>14</sub> , C <sub>6</sub> F <sub>13</sub> NO, C <sub>7</sub> F <sub>16</sub> , C <sub>7</sub> F <sub>15</sub> NO, C <sub>8</sub> F <sub>18</sub> , C <sub>8</sub> F <sub>16</sub> O, and C <sub>9</sub> F <sub>21</sub> N.	Acceptable only where no other alternatives are technically feasible due to safety or performance requirements.	Users must observe the limitations on PFC acceptability by determining that the physical or chemical properties or other technical constraints of the other available agents preclude their use. Documentation of such measures must be available for review upon request. The principal environmental characteristic of concern for PFCs is that they have high GWPs and long atmospheric lifetimes. EPA strongly recommends recovery and recycling of these substitutes.

REFRIGERANTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
CFC-11, CFC-12, CFC-113, CFC-114, R-500 Centrifugal Chillers (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Reciprocating Chillers (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-11, CFC-12, R-502 Industrial Process Refrigeration (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
CFC-12, R-502 Ice Skating Rinks (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Cold Storage Warehouses (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500, R-502 Refrigerated Transport (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Retail Food Refrigeration (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Commercial Ice Machines (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Vending Machines (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Water Coolers (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.

REFRIGERANTS—UNACCEPTABLE SUBSTITUTES—Continued

End-use	Substitute	Decision	Comments
CFC-12 Household Refrigerators (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Household Freezers (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500 Residential Dehumidifiers (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Motor Vehicle Air Conditioners (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B ....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	Flammable Substitutes ..	Unacceptable .....	The risks associated with using flammable substitutes in this end-use have not been addressed by a risk assessment.

SOLVENT CLEANING SECTOR—ACCEPTABLE SUBJECT TO USE CONDITIONS SUBSTITUTES

Application	Substitute	Decision	Conditions	Comments
Electronics Cleaning w/CFC-113, MCF.	HCFC-225 ca/cb ....	Acceptable .....	Subject to the company set exposure limit of 25 ppm of the -ca isomer.	HCFC-225 ca/cb blend is offered as a 45%-ca/55%-cb blend. The company set exposure limit of the -ca isomer is 25 ppm. The company set exposure limit of the -cb isomer is 250 ppm. It is the Agency's opinion that with the low emission cold cleaning and vapor degreasing equipment designed for this use, the 25 ppm limit of the HCFC-225 ca isomer can be met. The company is submitting further exposure monitoring data.
Precision Cleaning w/CFC-113, MCF.	HCFC-225 ca/cb ....	Acceptable .....	Subject to the company set exposure limit of 25 ppm of the -ca isomer.	HCFC-225 ca/cb blend is offered as a 45%-ca/55%-cb blend. The company set exposure limit of the -ca isomer is 25 ppm. The company set exposure limit of the -cb isomer is 250 ppm. It is the Agency's opinion that with the low emission cold cleaning and vapor degreasing equipment designed for this use, the 25 ppm limit of the HCFC-225 ca isomer can be met. The company is submitting further exposure monitoring data.

SOLVENT CLEANING SECTOR—UNACCEPTABLE SUBSTITUTES

End use	Substitute	Decision	Comments
Metals cleaning w/CFC-113 .....	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.
Metals cleaning w/MCF .....	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.
Electronics cleaning w/CFC-113 .....	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.
Electronics cleaning w/MCF .....	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.

SOLVENT CLEANING SECTOR—UNACCEPTABLE SUBSTITUTES—Continued

End use	Substitute	Decision	Comments
Precision cleaning w/CFC-113 .....	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.
Precision cleaning w/MCF .....	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—ACCEPTABLE SUBJECT TO USE CONDITIONS: TOTAL FLOODING AGENTS

Application	Substitute	Decision	Conditions	Comments
Halon 1301 Total Flooding Agents.	C <sub>3</sub> F <sub>8</sub> .....	Acceptable where other alternatives are not technically feasible due to performance or safety requirements: a. due to their physical or chemical properties, or b. where human exposure to the extinguishing agents may approach cardiosensitization levels or result in other unacceptable health effects under normal operating conditions.	Until OSHA establishes applicable workplace requirements: For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOEL of 30%. Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e. for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before concentration of C <sub>3</sub> F <sub>8</sub> exceeds 30%. Design concentration must result in oxygen levels of at least 16%.	The comparative design concentration based on cup burner values is approximately 8.8%. Users must observe the limitations on PFC acceptability by making reasonable efforts to undertake the following measures: (i) conduct an evaluation of foreseeable conditions of end use; (ii) determine that human exposure to the other alternative extinguishing agents may approach or result in cardiosensitization or other unacceptable toxicity effects under normal operating conditions; and (iii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; Documentation of such measures must be available for review upon request. The principal environmental characteristic of concern for PFCs is that they have high GWPs and long atmospheric lifetimes. Actual contributions to global warming depend upon the quantities of PFCs emitted. For additional guidance regarding applications in which PFCs may be appropriate, users should consult the description of potential uses which is included in the March 18, 1994 Rulemaking (59 FR 13043). See additional comments 1, 2, 3, 4.
	CF <sub>3</sub> I .....	Acceptable in normally unoccupied areas.	EPA requires that any employee who could possibly be in the area must be able to escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.	Manufacturer has not applied for listing for use in normally occupied areas. Preliminary cardiosensitization data indicates that this agent would not be suitable for use in normally occupied areas. EPA is awaiting results of ODP calculations. See additional comments 1, 2, 3, 4.
	Gelled Halocarbon/Dry Chemical Suspension.	Acceptable in normally unoccupied areas.	EPA requires that any employee who could possibly be in the area must be able to escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.	The manufacturer's SNAP application requested listing for use in unoccupied areas only. See additional comment 2.
	Inert Gas/Powdered Aerosol Blend.	Acceptable as a Halon 1301 substitute in normally unoccupied areas.	In areas where personnel could possibly be present, as in a cargo area, EPA requires that the employer shall provide a pre-discharge employee alarm capable of being perceived above ambient light or noise levels for alerting employees before system discharge. The pre-discharge alarm shall provide employees time to safely exit the discharge area prior to system discharge.	The manufacturer's SNAP application requested listing for use in unoccupied areas only. See additional comment 2.

Additional Comments

- 1—Must conform with OSHA 29 CFR 1910 Subpart L Section 1910.160 of the U.S. Code.
- 2—Per OSHA requirements, protective gear (SCBA) must be available in the event personnel must enter/reenter the area.
- 3—Discharge testing should be strictly limited only to that which is essential to meet safety or performance requirements.

4—The agent should be recovered from the fire protection system in conjunction with testing or servicing, and recycled for later use or destroyed.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—ACCEPTABLE SUBJECT TO NARROWED USE LIMITS: TOTAL FLOODING AGENTS

Application	Substitute	Decision	Conditions	Comments
Halon 1301, Total Flooding Agents.	C <sub>3</sub> F <sub>8</sub> .....	Acceptable where other alternatives are not technically feasible due to performance or safety requirements: a. due to their physical or chemical properties, or b. where human exposure to the extinguishing agents may approach cardiotoxicity levels or result in other unacceptable health effects under normal operating conditions.	Until OSHA establishes applicable workplace requirements: For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 30%. Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e. for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before concentration of C <sub>3</sub> F <sub>8</sub> exceeds 30%. Design concentration must result in oxygen levels of at least 16%.	The comparative design concentration based on cup burner values is approximately 8.8%. Users must observe the limitations on PFC acceptability by making reasonable efforts to undertake the following measures: (i) conduct an evaluation of foreseeable conditions of end use; (ii) determine that human exposure to the other alternative extinguishing agents may approach or result in cardiotoxicity or other unacceptable toxicity effects under normal operating conditions; and (iii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; Documentation of such measures must be available for review upon request. The principal environmental characteristic of concern for PFCs is that they have high GWPs and long atmospheric lifetimes. Actual contributions to global warming depend upon the quantities of PFCs emitted. For additional guidance regarding applications in which PFCs may be appropriate, users should consult the description of potential uses which is included in the March 18, 1994 Final Rulemaking (58 FR 13043).
	Sulfurhexa-fluoride (SF <sub>6</sub> ).	Acceptable as a discharge test agent in military uses and in civilian aircraft uses only.	.....	This agent has an atmospheric lifetime greater than 1,000 years, with an estimated 100-year, 500-year, and 1,000-year GWP of 16,100, 26,110 and 32,803 respectively. Users should limit testing only to that which is essential to meet safety or performance requirements. This agent is only used to test new Halon 1301 systems.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—UNACCEPTABLE SUBSTITUTES

Application	Substitute	Decision	Comments
Halon 1301 Total Flooding Agents.	HFC-32 .....	Unacceptable .....	Data indicate that HFC-32 is flammable and therefore is not suitable as a halon substitute.

[FR Doc. 95-14337 Filed 6-12-95; 8:45 am]  
BILLING CODE 6560-50-P

40 CFR Part 261

[SW-FRL-5219-5]

**Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Final Exclusion**

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

**SUMMARY:** The Environmental Protection Agency (EPA or Agency) today is granting a petition submitted by Conversion Systems, Inc. ("CSI") to exclude from hazardous waste control (or "delist") certain solid wastes. The wastes being delisted consist of electric arc furnace dust ("EAFD") that has been treated by a specific chemical stabilization process. This action responds to CSI's petition to delist these treated wastes on a "generator-specific" basis from the hazardous waste lists. After careful analysis, the Agency has concluded that the petitioned waste is not hazardous waste when disposed of

in Subtitle D landfills. This exclusion applies to chemically stabilized EAFD generated at CSI's Sterling, Illinois facility as well as to similar wastes that CSI may generate at future facilities. Accordingly, this final rule excludes the petitioned waste from the requirements of hazardous waste regulations under the Resource Conservation and Recovery Act (RCRA) when disposed of in Subtitle D landfills, but imposes testing conditions to ensure that the future-generated waste remains qualified for delisting.

**EFFECTIVE DATE:** June 13, 1995.