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Wednesday  
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**Part VI**

**Environmental  
Protection Agency**

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**40 CFR Part 82**

**Protection of Stratospheric Ozone; Listing  
of Substitutes for Ozone-Depleting  
Substances; Final Rule**

## ENVIRONMENTAL PROTECTION AGENCY

### 40 CFR Part 82

[FRL-6332-3]

RIN 2060-AG12

### Protection of Stratospheric Ozone; Listing of Substitutes for Ozone-Depleting Substances

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

**SUMMARY:** This action imposes restrictions or prohibitions on substitutes for ozone-depleting substances (ODSs) under the U.S. Environmental Protection Agency's (EPA) Significant New Alternatives Policy (SNAP) program. SNAP implements section 612 of the Clean Air Act, as amended in 1990, which requires EPA to evaluate 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 substitutes posing other environmental problems.

On March 18, 1994, EPA promulgated a final rulemaking setting forth its plan for administering the SNAP program, and has since issued decisions on the acceptability and unacceptability of a number of substitutes. In this Final Rule (FRM), EPA is issuing its decisions on the acceptability of certain substitutes included in a May 21, 1997 notice of proposed rulemaking. Specifically, this action clarifies the criteria for unique fittings used in motor vehicle air-conditioning systems, and addresses the acceptability of certain substitutes in the fire suppression, solvent, and aerosol sectors, and the unacceptability of substitutes in the refrigeration and air conditioning, solvents, aerosols, fire suppression, and adhesives, coatings, & inks sectors.

**EFFECTIVE DATE:** May 28, 1999.

**ADDRESSES:** Written comments and data are available in Docket A-91-42, U.S. Environmental Protection Agency, OAR Docket and Information Center, 401 M Street, SW, Room M-1500, Mail Code 6102, Washington, DC 20460. The docket may be inspected between 8 a.m. and 5:30 p.m. on weekdays. Telephone (202) 260-7548; fax (202) 260-4400. As provided in 40 CFR part 2, a reasonable fee may be charged for photocopying.

**FOR FURTHER INFORMATION CONTACT:** The Stratospheric Protection Hotline at (800) 296-1996. Kelly Davis at (202) 564-2303 or fax (202) 565-2096, Analysis and Review Branch, Stratospheric Protection Division, Mail Code 6205J, Washington, DC 20460. Overnight or courier deliveries should be sent to 501 3rd Street, NW, Washington, DC, 20001. EPA's Ozone World Wide Web site at "http://www.epa.gov/ozone/title6/snap/".

**SUPPLEMENTARY INFORMATION:** This action is divided into four sections:

- I. Section 612 Program
  - A. Statutory Requirements
  - B. Regulatory History
- II. Listing of Substitutes
- III. Administrative Requirements
- IV. Additional Information

#### I. Section 612 Program

##### A. Statutory Requirements

Section 612 of the Clean Air Act (CAA) 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 six 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 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 (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 consumed 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.

## II. Listing of Substitutes

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

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. Fully acceptable substitutes, *i.e.*, those with no restrictions, can be used 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 represents 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 make a determination that a substitute is acceptable only if certain conditions of use are met to minimize risk to human health and the environment. Such substitutes are described as "acceptable subject to use conditions." Use of such substitutes without meeting associated use conditions renders these substitutes unacceptable and subjects the user to enforcement for violation of section 612 of the Clean Air Act.

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.

In this final rule, EPA is issuing its decision on the acceptability of certain substitutes not previously reviewed by the Agency. Today's rule incorporates decisions proposed on May 21, 1997, at 62 FR 27873 (referred to hereinafter as "the proposal"). 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.

Parts A–E below present a detailed discussion of the substitute listing determinations by major use sector. Tables summarizing listing decisions in this Final Rule are in Table 1 and Appendix H. Appendix H will appear in the Code of Federal Regulations (CFR) at 40 CFR part 82. Listings in Table 1 will not appear in the CFR and add to the list of alternatives acceptable with no limitations. Such listings do not impose any sanction, nor do they remove any prior license to use a substitute. The comments contained in Appendix H provide additional information on substitutes determined to be either unacceptable, acceptable subject to narrowed use limits, or acceptable subject to use conditions. 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 substitutes to apply all comments in their application of these substitutes, regardless of any regulatory requirements. In many instances, the comments simply allude to 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—Class I

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

###### a. CFC-12 Automobile and Non-automobile Motor Vehicle Air Conditioners, Retrofit and New

###### (1) Criteria for Uniqueness of Fittings

*Current SNAP regulations require that each refrigerant used in motor vehicle air conditioning may only be used with a set of fittings that is unique to that refrigerant. This final rule clarifies minimum criteria for uniqueness of fittings.*

In the course of retrofitting a motor vehicle air-conditioning (MVAC) system, servicers of these systems, whether professional technicians or do-it-yourselfers, must affix fittings that are designed to work only with that refrigerant. To meet that goal, servicers must install fittings that satisfy the requirements set forth below.

- High-side screw-on fittings for each refrigerant must differ from high-side screw-on fittings for all other refrigerants, including CFC-12, and from low-side screw-on fittings for CFC-12;

- Low-side screw-on fittings for each refrigerant must differ from low-side screw-on fittings for all other refrigerants, including CFC-12;

- High-side screw-on fittings for a given refrigerant must differ from low-side screw-on fittings for that refrigerant, to protect against connecting a low-pressure system to a high-pressure one;

- High-side quick-connect fittings for each refrigerant must differ from high-side quick-connect fittings for all other refrigerants, including CFC-12 (if they exist);

- Low-side quick-connect fittings for each refrigerant must differ from low-side quick-connect fittings for all other refrigerants, including CFC-12 (if they exist);

- High-side quick-connect fittings for a given refrigerant must differ from low-side quick-connect fittings for that refrigerant, to protect against connecting a low-pressure system to a high-pressure one;

- For each type of container, the fitting for each refrigerant must differ from the fitting for that type of container for all other refrigerants, including CFC-12.

For screw-on fittings, "differ" means that either the diameter must differ by at least 1/16 inch or the thread direction must be reversed (*i.e.* right-handed vs. left-handed). Simply changing the thread pitch is not sufficient. For quick-connect fittings, "differ" means that a person using normal force and normal tools (including wrenches) must not be able to cross-connect fittings. Following are some examples:

- a 3/8 (9/16) inch outside diameter screw-on fitting with a right-hand thread differs from a 5/16 inch outside diameter screw-on fitting with a right-hand thread;

- a 3/8 inch outside diameter screw-on fitting with a left-hand thread differs from a 3/8 inch outside diameter screw-on fitting with a right-hand thread;

- a 3/8 inch outside diameter screw-on fitting with a right-hand thread pitch of 18 threads/inch does not differ from a 3/8 inch outside diameter screw-on fitting with a right-hand thread pitch of 24 threads/inch;

- a quick-connect fitting differs from another quick-connect fitting if all combinations of the same type male and female parts (high, low, small can, 30-lb. cylinder) will not connect using normal tools.

The sole exception to the  $\frac{1}{16}$  inch difference requirement is the difference between the small can fittings for GHG-X4 and R-406A. The GHG-X4 small can fitting uses a metric measurement, and is slightly less than  $\frac{1}{16}$  inch larger than the small can fitting for R-406A. EPA has concluded that these fittings will not cross-connect, and therefore they may be used. No other exception exists, although EPA will consider any requests on a case-by-case basis.

## 2. Response to Comments

A commenter noted that the fittings for small cans of GHG-X4 are not  $\frac{1}{16}$  inch different from those of other refrigerants, and expressed concern that the fittings would be disallowed under the criteria for uniqueness in today's rule. The commenter further suggested that because the fittings were metric and EPA had confirmed they would not cross-thread with other fittings, that an exception be granted. EPA agrees and discusses this above.

### B. Refrigeration and Air Conditioning—Class II

#### 1. Unacceptable Substitutes

##### a. NARM-22

*NARM-22, which consists of HCFC-22, HFC-23, and HFC-152a, is unacceptable as a substitute for HCFC-22 in all new and retrofitted end-uses.*

NARM-22 contains HCFC-22, which is a class II ozone-depleting substance. EPA does not believe it is appropriate to replace a class II refrigerant with a blend containing a class II refrigerant. Listing this blend as acceptable would be a barrier to a smooth transition away from ozone-depleting refrigerants. Other alternatives to HCFC-22 are already acceptable that do not contain any ozone-depleting refrigerants.

In addition, HFC-23 has a lifetime of 250 years, and its 100-year global warming potential (GWP) is 11,700.<sup>1</sup> Both of these characteristics are considerably higher than other HFCs and HCFCs. Other acceptable HCFC-22 substitutes do not contain such high global warming components. The 1993 Climate Change Action Plan directs EPA to narrow the scope of uses allowed for

<sup>1</sup> GWPs and atmospheric lifetimes cited in this document are from the Intergovernmental Panel on Climate Change (IPCC) report entitled *Climate Change 1995—The Science of Climate Change*, IPCC Second Assessment Report. More recent values for GWPs and atmospheric lifetimes published in the *Scientific Assessment of Ozone Depletion: 1998*, World Meteorological Organization Global Ozone Research and Monitoring Project—Report No. 44, may be somewhat different than the values cited here but do not alter any of the technical or policy determinations by EPA in this rule.

HFCs with high global warming potentials where better alternatives exist. For this reason, and the fact that NARM-22 contains HCFC-22, the use of this blend as an HCFC-22 substitute is unacceptable.

#### C. Solvents Cleaning

##### 1. Acceptable Substitutes

###### a. Metals Cleaning

(1) HFC-4310mee  
*HFC-4310mee is an acceptable substitute for CFC-113 and methyl chloroform (MCF) in metals cleaning.* This chemical does not deplete the ozone layer since it does not contain chlorine or bromine. Review under the SNAP program and the Toxic Substances Control Act premanufacture notification program determined that a time-weighted average workplace exposure standard of 200 ppm and a workplace exposure ceiling of 400 ppm established by the submitting company would adequately protect human health and that the industry can meet these exposure limits using the types of equipment specified in the product safety information provided by the chemical manufacturer. The ceiling limit, established by the submitting company, was set based on a potential acute central nervous system effect above 1500 ppm.

##### 2. Unacceptable Substitutes

###### a. Chlorobromomethane

*Chlorobromomethane (CBM) is unacceptable as a substitute for CFC-113, methyl chloroform (MCF), and HCFC-141b in metals cleaning, electronics cleaning and precision cleaning.* CBM, also called Halon 1011, has been used as a fire suppressant. EPA has received notification that it can also be used as a solvent and that it is a potential substitute for the ozone-depleting solvents CFC-113, methyl chloroform and HCFC-141b. EPA received a SNAP submission requesting consideration of CBM as an acceptable substitute for CFC-113 and MCF in solvents cleaning of metals, electronics, and in precision cleaning.

Recent model analyses establish a best estimate for the ozone depletion potential (ODP) for CBM in the range of 0.07 to 0.15. Numerous other alternatives exist with either zero or much lower ODP that do not pose a comparable risk.

##### 3. Response to Comments

Commenters identified six issues related to the proposed determination for chlorobromomethane:

- Ozone depletion potential of chlorobromomethane;

- Uncertainty in ODP calculation;
- CBM as a substitute for HCFC-141b;
- Comparison of CBM with CFC-113;
- CBM under the Montreal Protocol phaseout;
- Toxicological issues regarding CBM.

##### a. Ozone Depletion Potential of Chlorobromomethane

A number of the comments questioned the science employed in calculating the ODP of CBM. Other comments included studies to determine ODP conducted by separate groups. As these studies were completed, they were added to the docket during the comment period. The differences in estimates from the studies resulted in a conference among the modelers to compare results, and two of the modelers were found to have made miscalculations that affected their initial ODP estimates. Because the commenters were not privy to these collaborative conversations amongst the modelers, the Agency offers the following chronology to clarify the sequence of events leading to the agreement on ODP values.

The initial studies performed on CBM were the following: "Estimates of the Atmospheric Lifetime and ODP of CBM," (Ko and Chang, 1994); Calculation of the ODP of CBM (Pyle and Bekki, 1994); "Evaluation of ODP for CBM and 1-Bromo-Propane," (Wuebbles, Jain, and Patten, 1997). These studies produced ODP estimates for CBM ranging from 0.05 to 0.28. Because of inconsistencies between the models, Pyle, Bekki and Wuebbles met in the spring of 1997 to discuss the proper modeling procedures and appropriate variables to be used. The Pyle/Bekki model had not taken into account several key factors used in the standard assessments for determining ODP in international forums (e.g., WMO, 1995). The meeting resulted in a clarification of various model parameters (e.g., atmospheric lifetimes and atmospheric transport of different ozone-depleting compounds, relative reactivity of bromine, losses to the ocean sink), and recalculation of the original values. Based on their reanalyses, the group estimated the ODP for CBM, including the ocean sink, to be in the range of 0.07–0.15.

Based on additional sensitivity analyses on the potential effects of the ocean sink and the nearly negligible effects of the soil sink, Wuebbles et al. (1997) determined an ODP range of 0.11–0.13. Subsequently, extensive revisions were made to the underlying two-dimensional model to reflect recent data on various parameters including tropospheric chemistry and kinetic

rates, atmospheric transport rates, and ozone hole processes. Based on these changes, Wuebbles et al. (1998) derived an ODP for CBM in the range of 0.08–0.1, with the range reflecting uncertainty in the ocean sink for CBM. A semi-empirical model used by a researcher in the NOAA Aeronomy Laboratory generated an ODP range comparable to the range derived in the analyses described above (Solomon, 1997).

Considering all available model results, EPA concludes that the best estimate for the ODP of CBM lies in the range 0.07 to 0.15 when an estimate for the ocean sink is included. This range is similar to the ODP for HCFC–141b, a compound also unacceptable for use as a solvent or adhesive, and whose use as a solvent is allowed only for specific aerosol applications exempted from the nonessential products prohibition under section 610 of the Clean Air Act.

#### b. Uncertainty in ODP Calculation

One commenter suggested that EPA should not make decisions until all areas of uncertainty are resolved and areas of disagreement among researchers have been understood. In fact, the Agency has attempted to gather and assess all available information from the full range of experts on the ODP of chlorobromomethane. Under section 612 of the CAA, the Agency has the obligation to reduce the overall risk to human health and the environment associated with substitutes to ozone-depleting substances. If new data become available after final rulemaking that are contrary to the current scientific understanding, section 612 of the CAA allows the Agency to reconsider its SNAP decision in response to either a petition or additional information.

#### c. CBM as a substitute for HCFC–141b

A commenter stated that in the past, the Agency has approved HCFC–141b while expressing concern for its ODP of 0.11, but that such approval was warranted to assist in the goal of the Montreal Protocol and section 612 of the CAA to move usage away from other compounds with higher ODPs (e.g., CFCs). The commenter believed that the same analysis applies to CBM as a substitute for HCFC–141b. The Agency disagrees with this comparison. In the case of HCFC–141b, there were no other viable alternatives for specific end-uses, and consequently HCFC–141b was deemed acceptable despite its relatively high ODP. HCFC–141b is scheduled for a production phaseout in 2003, and has been listed as unacceptable in many specific end-uses, including solvent end-uses, because available alternatives

exist with a lower ODP. HCFC–141b use is banned under section 610 of the Clean Air Act (the nonessential products ban) for many uses, with exemptions limited to aerosol applications of wasp and hornet sprays, mold release agents, solvent cleaners for electronics applications, lubricants, aircraft maintenance products, and spinnerette cleaner lubricants. Considering that the ODP range for CBM is comparable to that of HCFC–141b and HCFC–141b is unacceptable as a substitute solvent in all end-uses, the Agency sees no environmental benefit to approving CBM.

#### d. Comparison of CBM with CFC–113

One commenter declared that the U.S. EPA must compare the ODP of CBM only to that of CFC–113, and not to the ODP of other substitutes. The Agency disagrees; under section 612(c) of the Clean Air Act (CAA), the Agency is required to compare substitutes to each other when they are available:

“\* \* \* it shall be unlawful to replace any class I or class II substance with any substitute substance which the Administrator determines may present adverse effects to human health or the environment, when the Administrator has identified an alternative that reduces the overall risk to human health and the environment and is currently or potentially available.”

Recent model analyses establish a best estimate for the ODP for CBM in the range of 0.07 to 0.15. Numerous other alternatives exist with either zero or a much lower ODP that do not pose a comparable risk. Therefore, while the Agency does compare the substitute to the substance being replaced, if there are alternatives that pose a lower overall risk, EPA cannot list the substitute as acceptable.

#### e. CBM under the Montreal Protocol Phaseout

A commenter stated that the Montreal Protocol does not require the phaseout of CBM. While Parties to the Protocol have agreed to phase out many ozone-depleting substances, many other chemicals that pose risks to the ozone layer, including CBM, have not yet been addressed. Nevertheless, the CAA gives EPA authority to take actions more stringent than the Montreal Protocol, and the Agency believes that section 612 of the Act requires EPA to list CBM as an unacceptable substitute because of the environmental and health effect risks that it poses.

#### f. Toxicological Issues regarding CBM

Many commenters submitted comments regarding toxicological issues related to CBM. EPA is not addressing

comments raised on toxicity issues at this time because the SNAP decision is based solely on the ODP of CBM.

#### D. Fire Suppression and Explosion Protection

##### 1. Acceptable Subject to Use Conditions a. Total Flooding Agents

###### (1) 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) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions.*

See the discussion under “Response to Comments” (section II.D.4) of the changes made to the use limits on this agent. See Appendix H for a complete statement of the use conditions (unchanged) which apply to this agent in this end-use.

###### (2) C<sub>4</sub>F<sub>10</sub>

*C<sub>4</sub>F<sub>10</sub> is acceptable as a Halon 1301 substitute where other alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions.*

See the discussion under “Response to Comments” (section II.D.4) of the changes made to the use limits on this agent. See Appendix H for a complete statement of the use conditions (unchanged) which apply to this agent in this end-use.

###### (3) HFC–236fa

*HFC–236fa is acceptable as a Halon 1301 substitute when manufactured using any process that does not convert perfluoroisobutylene directly to HFC–236fa in a single step. HFC–236fa may be used in explosion suppression and explosion inertion applications without use limits, and may be used in fire suppression applications where other non-PFC agents or alternatives are not technically feasible due to performance or safety requirements: (a) because their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions.*

As discussed in the initial SNAP rulemaking (59 FR 13044, March 18, 1994), total flooding agents are acceptable for use in occupied areas only under the following conditions:

1. Where egress from an area cannot be accomplished within one minute, the employer shall not use the agent in

concentrations exceeding its "no observed adverse effect level" (NOAEL);

2. Where egress takes greater than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its "lowest observed adverse effect level" (LOAEL);

3. 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.

4. The employer shall assure that no unprotected employees enter the area during agent discharge.

These conditions were derived from an OSHA safety and health standard governing fire protection systems used in all workplaces (29 CFR part 1910, subpart L). This OSHA standard is designed to limit employee exposures to toxic levels of gaseous agents used in fixed total flood systems. Because OSHA had not set specific workplace standards for halon substitutes, EPA adopted the relevant provisions of 29 CFR part 1910, subpart L to govern the general use of halon substitute gaseous agents. As stated in the original SNAP rulemaking, EPA specifically defers to OSHA and has no intention to assume responsibility for regulating workplace safety in regard to fire protection (59 FR 13099 and 13101; also see discussion directly below).

The cardiac sensitization NOAEL of HFC-236fa is 10.0% (by volume) and its LOAEL is 15%. Cup burner tests with heptane indicate that the extinguishment concentration for this agent is 5.3%, thus making its calculated design concentration 6.4%. Compared to the cardiac sensitization values, these concentrations provide a sufficient margin of safety for use in a normally occupied area. HFC-236fa can replace Halon 1301 at a ratio of 1.3 by weight and 1.5 by volume. Due to its relatively high boiling point of minus 1.6 degrees centigrade, this agent may not be suitable in a low temperature environment.

The exposure concentration limits referred to here, set as conditions of acceptability under SNAP, are intended to protect worker safety in the absence of OSHA or other workplace limits established under voluntary consensus bodies. As suggested by the court in *Southern Pacific Transp. Co. v. Usery*, 539 F.2d 386 (5th Cir. 1976), "the scope of the exemption created by [OSHA] § 4(b)(1) is determined by the [Agency's] intent." EPA wishes to clarify that it has no intention of duplicating or displacing OSHA coverage related to the use of personal protective equipment (e.g., respiratory protection), fire protection, hazard communication, worker training

or any other occupational safety and health standard with respect to EPA's regulation of halon substitutes. In accordance with the National Technology Transfer and Advancement Act of 1995 (NTTAA), section 12(d), EPA will work in consultation with OSHA to encourage development of technical standards to be adopted by voluntary consensus standards bodies. Once applicable consensus standards are established, EPA will rescind the workplace standards established under this rulemaking.

In the original March 18, 1994 SNAP rulemaking (59 FR 13099), the Agency made clear that in cases like this (where EPA finds acceptable the use of an agent only under certain conditions), we have sought to avoid overlap with other existing regulatory authorities. In setting conditions for the safe use of halon substitutes in the workplace under SNAP, EPA has specifically deferred to OSHA's other regulations that govern workplace safety. As stated in the preamble to the original SNAP rule at 59 FR 13099, "EPA has no intention to assume responsibility for regulating workplace safety especially with respect to fire protection, nor does the Agency intend SNAP regulations to bar OSHA from regulating under its Public Law 91-596 authority."

In the March 18, 1994 final SNAP rule (59 FR 13044), EPA required manufacturers to submit information on manufacturing processes to allow an assessment of the risks posed to the general public and workers. EPA clarified in that action that acceptability determinations made on the basis of one company's submission would apply to the same chemical produced by other manufacturers, obviating the need for duplicative reporting requirements and review. However, manufacturers who believe a given manufacturing process may pose additional risks beyond those posed by other processes involving the same chemical were required to alert EPA to that increased hazard. The February 8, 1996 (61 FR 4736) Notice of Acceptability specifically discussed the manufacturing process used in making HFC-236fa, and that discussion is repeated below.

EPA is aware of several methods for manufacturing HFC-236fa, including one that produces HFC-236fa directly from perfluoroisobutylene (PFIB). PFIB is an extremely toxic substance that could pose risks in very small concentrations. Thus, EPA believes it is appropriate to distinguish among the different methods for producing HFC-236fa. This acceptability determination does not prohibit the manufacture of HFC-236fa directly from PFIB. Rather, it

finds acceptable the production of HFC-236fa in processes that do not convert PFIB directly to HFC-236fa in a single step. If a manufacturer wishes to produce HFC-236fa directly from PFIB, it must submit that process to EPA for review under SNAP.

HFC-236fa does not deplete stratospheric ozone. However, it has an atmospheric lifetime of 209 years and a 100-year GWP of 6300. Concerns have been raised about this agent's potential atmospheric effects. Please see discussion in the "Response to Comments" section II.D.4 on this issue. This agent should be handled so as to minimize unnecessary emissions, including: avoiding discharge testing and training; providing a high level of maintenance to avoid leaks and accidental discharges; recovering HFC-236fa from fire protection equipment in conjunction with testing or servicing; and destroying HFC-236fa or recycling it for later use. In addition, EPA encourages manufacturers to develop aggressive product stewardship programs to help users avoid such unnecessary emissions.

While HFC-236fa may be used without "last resort" use restrictions in explosion protection applications, this is not so for other total flooding applications, see section II.D.2 below. Before users adopt it for general fire suppression applications in the total flooding end-use, they must first ascertain that other non-PFC substitutes or alternatives are not technically feasible due to performance or safety requirements. In contrast, if a PFC is the only other substitute that is technically feasible due to performance or safety requirements, then this agent may be used in a general fire suppression application. Potential users are expected to evaluate the technical feasibility of other non-PFC substitutes or alternatives to determine their adequacy to control the particular fire risk. Such assessment may include an evaluation of the performance or functional effectiveness of the non-PFC agents for the intended applications as well as the risk to personnel potentially exposed to the agent. Similarly, use of HFC-236fa would be appropriate where use of other non-PFC substitutes or alternatives would violate the workplace safety use conditions set forth in the SNAP rulemakings and thus pose risks of adverse health effects.

To assist users in their evaluation for general fire suppression applications, EPA has prepared a list of vendors manufacturing halon substitutes and alternatives. Although users are not required to report the results of their investigation to EPA, companies must

retain these results for five years for future reference.

## 2. Acceptable Subject to Narrowed Use Limits

### a. Total Flooding Agents

#### (1) 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) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions.*

See the discussion under "Response to Comments" (section II.D.4) of the changes made to the use limits on this agent. See Appendix H for a complete statement of the use conditions (unchanged) which apply to this agent in this end-use.

#### (2) C<sub>4</sub>F<sub>10</sub>

*C<sub>4</sub>F<sub>10</sub> is acceptable as a Halon 1301 substitute where other alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions.*

See the discussion under "Response to Comments" (section II.D.4) of the changes made to the use limits on this agent. See Appendix H for a complete statement of the use conditions (unchanged) which apply to this agent in this end-use.

#### (3) HFC-236fa

*HFC-236fa is acceptable as a Halon 1301 substitute when manufactured using any process that does not convert perfluoroisobutylene (PFIB) directly to HFC-236fa in a single step. HFC-236fa may be used in explosion suppression and explosion inertion applications, and may be used in fire suppression applications where other non-PFC agents or alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions. Please see the section on "Acceptable Subject to Use Conditions" (II.D.1) for a complete discussion of this agent. This agent is subject to the use conditions stated in that section.*

### b. Streaming Agents

#### (1) C<sub>6</sub>F<sub>14</sub>

*C<sub>6</sub>F<sub>14</sub> is acceptable as a Halon 1211 substitute in nonresidential applications where other alternatives are not*

*technically feasible due to performance or safety requirements: (a) because of their physical or chemical, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions.*

See the discussion under "Response to Comments" (section II.D.4) of the changes made to the use limits on this agent. No applicable use conditions exist for this agent in the streaming agent end-use.

#### (2) HFC-236fa

*HFC-236fa is acceptable as a Halon 1211 substitute in nonresidential applications when manufactured using any process that does not convert perfluoroisobutylene (PFIB) directly to HFC-236fa in a single step. The cardiac sensitization NOAEL of HFC-236fa is 10.0% and its LOAEL is 15%. (See preceding discussion regarding OSHA, HFC-236fa, and voluntary consensus workplace standards in section II.D.1) Cup burner tests with heptane indicate that the extinguishment concentration for this agent is 5.3%. Compared to Halon 1211, HFC-236fa has a weight equivalence of 1.08 to 2.15.*

As discussed above, HFC-236fa does not deplete stratospheric ozone. However, it has an atmospheric lifetime of 209 years and a 100-year GWP of 6300. Concerns have been raised about this agent's potential atmospheric effects. Please see discussion in "Response to Comments" section II.D.4 regarding this issue. This agent should be handled so as to minimize unnecessary emissions, including: avoiding discharge testing and training; providing a high level of maintenance to avoid leaks and accidental discharges; recovering HFC-236fa from the fire protection equipment in conjunction with testing or servicing; and destroying HFC-236fa or recycling it for later use. In addition, EPA encourages manufacturers to develop aggressive product stewardship programs to help users avoid such unnecessary emissions.

Further, this agent may not be used in residential applications, e.g., by a private individual in applications in or around a permanent or temporary household, during recreation, or for any personal use or enjoyment. Use in watercraft or aircraft is excluded from the definition of residential use. As discussed in the "Response to Comments" section II.D.4, the use of this agent in local application extinguishing systems in textile process machinery is considered to be a streaming agent application.

#### (3) HFC-227ea

*HFC-227ea is acceptable as a Halon 1211 substitute in nonresidential*

*applications. The weight equivalence of this agent is 1.66 pounds per pound of Halon 1211. It has a cardiac sensitization NOAEL of 9.0%, and a LOAEL of 10.5%. (See preceding discussion regarding OSHA and voluntary consensus workplace standards in section II. D.1) Its cup burner extinguishment value is 5.8%.*

This agent has no ozone depletion potential, a 100-year GWP of 2,900 relative to carbon dioxide, and an atmospheric lifetime of 36.5 years. It is already listed as acceptable subject to use conditions for use in total flooding applications as an alternative to Halon 1301 (See 59 FR 13107, March 18, 1994).

## 3. Unacceptable Substitutes

### a. Total Flooding Agents

#### (1) Chlorobromomethane

*Chlorobromomethane (CBM) is unacceptable as a substitute for Halon 1301 in total flooding applications. Recent analyses establish an ODP range for CBM of 0.07 to 0.15. Other alternatives exist for total flooding applications with lower or no ODP and do not pose a comparable risk. For example, HFC-227ea, as well as several inert gases, have no ODP. Additionally, current OSHA regulations prohibit the use of CBM as an extinguishing agent in fixed fire extinguishing systems where employees may be exposed. See 29 CFR 1910.160(b)(11).*

## 4. Response to Comments

EPA received 197 letters with comments related to proposed halon substitute listings in the NPRM. Many of the letters were identical. This section summarizes the major comments and provides EPA's response to those comments. A supplemental response to comments document that addresses the remaining comments is available in the public docket for this rulemaking. The comments addressed in this document are grouped into the following four major categories:

- Limits on PFCs and other long-lived gases;
- HFC-236fa;
- Unrelated issues;
- Chlorobromomethane.

### a. Limits on PFCs and Other Long-lived Gases

#### (1) Description of Use Limits

In the May 21, 1997 proposal, EPA proposed a change in the description of the use limits (often referred to as "last resort" use limits, first described in the June 13, 1995 final rule, 60 FR 31100) applicable to PFCs and other long-lived gases. Two commenters supported EPA's stated purpose in clarifying the

language but disagreed with the proposed change in language. One of the commenters opposed the proposed change because it eliminates the existing reference to cardiac sensitization. The commenter suggests that, despite EPA's statement that it is not changing but only clarifying policy, this change could be viewed by fire protection professionals, who might not read the preamble discussion, as a reduced concern by EPA for cardiac sensitization and therefore a change in policy. This commenter proposed alternative language, as follows:

"[X] is proposed acceptable as a Halon [1211/1301] substitute where other alternatives are not technically feasible due to performance or safety requirements: (a) due to their chemical or physical properties or (b) where human exposure may result in exposure to agent concentrations at or above established cardiac sensitization levels or below safe oxygen levels, in a failure to meet other applicable use conditions or in other unacceptable health effects under normal operating conditions."

In response, EPA reiterates that the proposed change in language is indeed a clarification of, not a change in, policy and that reference to "failure to meet applicable use conditions" is the most precise way to refer to the existing use conditions for any halon substitute. Existing SNAP use conditions for "clean agent" halon substitutes (meaning they dissipate rapidly, leaving no residue thereby avoiding secondary damage to the property they are protecting) are generally based on two measurements of exposure to health risks: the concentration and the length of time a person is exposed to the agent. To describe the applicable use conditions as "exposure to agent concentrations at or above established cardiac sensitization levels or below safe oxygen levels" is imprecise (as is the original language, "may approach cardiac sensitization levels") because it refers only to the exposure concentration, i.e., a "NOAEL," "LOAEL," "no effect level," or "lowest effect level," and not to the length of exposure.

The applicable use conditions for each SNAP-listed acceptable halon substitute are listed in the Code of Federal Regulations chart in a column immediately adjacent to the decision column containing the narrowed use limit language, if applicable. See 40 CFR part 82, subpart G, appendices A through G. It is easy for any fire protection professional to check the applicable use conditions to see the cardiac sensitization NOAEL or LOAEL, or the oxygen deprivation "no effect level" or "lowest effect level" by simply reading the next column of the chart for

a particular halon substitute. Thus, EPA believes the commenter's concerns are addressed by EPA's proposed revised language and therefore rejects the proposed alternative language suggested by this commenter.

A second commenter supported EPA's proposed change in language, with one exception. The exception is EPA's proposed decision not to change the phrase "or result in other unacceptable health effects under normal operating conditions." The commenter suggests that this language may still allow for too much latitude regarding ability to select PFCs as an acceptable alternative. The commenter recommends deleting the phrase or, if that is not possible, changing the phrase to specify the type of unacceptable health effects, i.e., hypoxia for inert gases or cardiac sensitization for halocarbons. This would prevent system designers or specifiers from using theoretical or potentially insignificant health effects to justify the use of PFCs.

EPA acknowledges that the phrase "or result in other unacceptable health effects under normal operating conditions" is vague, and leaves open the possibility of citing unnamed health effects as reasons for using otherwise unacceptable halon substitutes. EPA's use of this phrase in the original language was intended to refer to hypoxia for inert gases. Other than halocarbon clean agents for which cardiac sensitization is the health effect of concern, inert gases were the only type of clean agents for which use conditions were imposed. In making the proposed change to "failure to meet applicable use conditions," EPA no longer needs the phrase "or result in other unacceptable health effects under normal operating conditions" because both specified health effects, i.e., cardiac sensitization and hypoxia, are incorporated by reference to the "applicable use conditions" of halon substitutes. EPA's proposal should have made a corresponding change to delete the phrase "or result in other unacceptable health effects under normal operating conditions," or it should have specifically identified other health effects that would be the basis of proposed use conditions for particular agents. The phrase adds no information without identifying specific health concerns, and contributes to the imprecision of the original language. Thus, EPA accepts the commenter's suggestion to delete this phrase, which EPA neglected to do in the proposal. The final language reads as follows:

"[X] is proposed acceptable as a Halon [1211/1301] substitute where other

alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions."

(2) Changes to "Comments" Column in CFR

Each substitute reviewed under SNAP and found unacceptable, acceptable subject to narrowed use limits, or acceptable subject to use conditions is listed in charts in the Code of Federal Regulations by end-use. For each substitute, "comments" may be listed in a separate column, and they provide additional information on a substitute intended to help users apply sound operating practices (e.g., existing industry standards) for listed substitutes. EPA proposed a change to the "comments" which apply to halon substitutes for which the "last resort" use limits apply. One comment was received that opposed changing the language from "making reasonable effort to undertake the following measures" to "taking the following measures." The commenter cites SNAP regulations at § 82.180(b)(2), where the users intending to adopt a restricted substitute are directed as follows:

—82.180(b)(2) Acceptable subject to use conditions. . . . Where users intending to adopt a substitute acceptable to use conditions must make reasonable efforts to ascertain that other alternatives are not feasible due to safety, performance or technical reasons, documentation of this assessment must be retained on file for the purpose of demonstrating compliance.

The commenter objects that EPA has not provided any basis for making the change, and that any changes to an existing regulation must be justified and explained. The commenter states this change unfairly singles out PFCs, and could confuse the user community in light of the regulatory language cited above.

EPA may have caused some confusion by incorrectly indicating in the preamble of the proposed rule that the "last resort" use limits at issue here are "use conditions," when in fact they are not; instead, they are "narrowed use limits." The instructions to users are worded differently in the regulatory text for these two different types of listing decisions.

"Narrowed use limits" are described in § 82.180(b)(3) of the SNAP regulations, which provides that:

—82.180(b)(3) Acceptable subject to narrowed use limits. . . . Users intending to adopt a substitute acceptable with narrowed use limits must ascertain that other 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."

The "comments" language, as proposed, that users must observe the limits by "taking" certain steps, conforms to the regulatory language that users "must ascertain" that other alternatives are not technically feasible. Thus, EPA is not changing the regulatory language but rather providing "comment" language that is consistent with the existing regulations. Although these instructions are contained in the "comments" column of the appendix to the final rule, the source of the instructions is the SNAP regulation itself. The only change is in the summary of this regulatory language which appears in the "comments" column as a convenience to users of substitutes.

This change in wording does not "unfairly single out" PFCs. EPA notes that the same "last resort" use restrictions apply to a non-PFC substitute, HFC-236fa, which is listed in this final rule as acceptable as a total flooding agent subject to these narrowed use limits.

### (3) Procedural Aspects of EPA's review

The May 21, 1997 proposal discussed a petition that EPA received asking for reconsideration of the wording of use conditions for PFCs and other long-lived gases. EPA received one comment expressing concern that the procedure for EPA's review of this petition might be used in the future as a way to urge changes in proposed use conditions without providing sufficient technical justification for those changes. Specifically, the commenter raises a concern that it did not receive notice from EPA of the petition, as § 82.184(d)(1) of the SNAP regulations requires. Although, it is the original submitter of the substitutes which were the subject of the petition. Additionally, the commenter notes that the SNAP rule allows EPA to submit the petition for review by appropriate experts inside and outside EPA prior to proceeding to a proposed rule. The commenter recommends that EPA should rely on this provision in the future to engage in technical dialogue with affected companies and other stakeholders to ensure that any proposed rule resulting from the petition reflects such technical input.

In response, EPA regrets any concerns that may have been raised by the Agency's process in reviewing this petition, and assures the public that the Agency does not view the petition process as a way for interested parties to urge changes in SNAP regulatory

conditions without providing sufficient technical justification for those changes. EPA acknowledges that the Agency failed to formally notify the commenter upon receipt of the petition, and EPA apologizes for this failure. EPA notes, however, that the commenter did contact the Agency to discuss the petition. This initial contact was followed by several discussions between representatives of EPA and representatives of the commenter over several months, as well as a letter from the commenter to EPA discussing the merits of the petition.

Although EPA failed to meet the required notice provision of § 82.184(d)(1) of the SNAP regulations, the purpose of the notice requirement—to provide the opportunity to communicate on the merits of the petition—was in fact fulfilled. EPA did not deny any opportunity to the commenter to participate in discussing the merits of the petition. EPA has placed in the docket for this rulemaking a description of the contacts between EPA staff and the commenter's staff on this subject; it is EPA's belief that the commenter fully participated in the process of commenting on the merits of the petition.

EPA agrees that in certain cases it may be appropriate to engage in technical dialogue with affected companies and other stakeholders to ensure that any proposed rule resulting from a petition reflects such technical input. However, the Agency notes that the SNAP regulations do not require such dialogue; rather, the regulations provide EPA with the discretion to allow internal or external experts an opportunity to review the petition. The Agency will determine on a case-by-case basis if and when to seek review by outside experts and whether additional dialogue with others is appropriate. In addition, § 82.184(d)(5) of the SNAP regulations requires EPA to follow standard rulemaking procedures whenever the Agency grants a petition to change an acceptable listing by imposing or deleting use conditions or limits, among other actions. Such rulemaking procedures require public notice and comment, which afford interested parties the opportunity to comment on the merits of EPA's decision on a petition, or to recommend that EPA consult with outside experts or others in a particular case. EPA has followed that process in this case.

In any event, EPA notes that it did engage in dialogue with stakeholders, including the commenter, on the merits of this petition prior to publishing the proposed rule, and the description in the docket explains EPA's contacts with

the commenter in this regard. Further, as described above in discussing its response to the comments on the substance of the proposed changes, EPA believes there is sufficient technical justification for these changes, and that the justification was discussed with affected parties and adequately explained in the preamble to the proposed rule. Both commenters who provided written comments on EPA's proposed language, including this commenter, stated they supported EPA's purpose in clarifying the language.

### b. HFC-236fa

#### (1) Use Conditions and Limits

EPA proposed various use conditions and use limits for HFC-236fa as a streaming agent and as a total flooding agent. Many comments objected to the lack of proposed "last resort" use limits to the streaming agent end-use of HFC-236fa. One commenter also specifically objected to the lack of proposed "last resort" use limits to explosion protection applications within the total flooding end-use of HFC-236fa. These comments were based on concerns that since this substitute's global warming potential (GWP) is high and its atmospheric lifetime is long, it should be subject to the same "last resort" use restrictions in all end-use categories and applications.

One commenter stated that the GWP of HFC-236fa is between 6,300 and 8,000 and that its atmospheric lifetime is 250 years; others stated that the GWP of HFC-236fa is more than three times that of HFC-227ea. For HFC-236fa, the 1995 IPCC Second Assessment Report lists a GWP of 6,300 (on a 100-year basis) not a range from 6,300 to 8,000, and an atmospheric lifetime of 209 years not 250 years. (Based on information available at the time, EPA listed the atmospheric lifetime of HFC-236fa as 250 years in the preamble to the May 21, 1997 proposed rule.) By comparison, the GWP (on a 100-year basis) for HFC-227ea is listed in the 1995 IPCC Report as 2,900, which is roughly one-half the listed value for HFC-236fa.

Several commenters stated that the GWP of HFC-236fa is higher than those of the PFCs. In fact, the GWP of HFC-236fa for the 100-year time horizon is comparable to the GWP of many PFCs. This is not the case, however, when comparisons are made in terms of GWPs integrated over a longer time horizon that reflects the significantly longer atmospheric lifetimes of PFCs. Because PFCs have atmospheric lifetimes at least an order of magnitude longer than HFC-236fa (2,600 to 50,000 years for PFCs versus 209 years for HFC-236fa), a more relevant comparison is in terms of

GWPs integrated over 500 years. As such, the GWP of HFC-236fa for the 500-year time horizon (4700 according to the 1995 IPCC report) is significantly lower than the 500-year GWP for any of the listed PFCs (which range between 10,000 and 14,000).

These commenters supported their concerns with both general statements regarding the need to limit use of greenhouse gases, and specific statements designed to show that the streaming agent end-use would be highly emissive, and/or that the streaming agent end-use would be at least as, if not more, emissive than the total flooding end-use. The general statements include the following: (a) HFC-236fa is 6,300 times more effective than carbon dioxide in its global warming potential; (b) HFC-236fa is not a byproduct or feedstock of another chemical's production, which was the justification for SNAP listing of HFC-23, another potent greenhouse gas, as a total flooding agent; (c) the unrestricted use of HFC-236fa as a streaming agent is tantamount to a decision to do nothing about global warming; and (d) the unrestricted use of HFC-236fa contradicts President Clinton's 1993 Climate Change Action Plan (CCAP), which directs EPA (in Action 40) to reduce the use of greenhouse gases as substitutes for ozone-depleting substances.

EPA appreciates the concerns for both global warming potential and atmospheric lifetime. EPA does not disagree with the first two general statements regarding the potency of HFC-236fa as a greenhouse gas and this agent's lack of status as a byproduct or feedstock in another chemical process.

With respect to the final two general statements, EPA disagrees that the lack of "last resort" restrictions on HFC-236fa in its use as a streaming agent is tantamount to a decision to do nothing about global warming, and that it contradicts Action 40 of the CCAP. In discussing HFCs generally as a halon substitute in the preamble to the original SNAP rule (59 FR 13100), EPA noted that, because HFCs can contribute to global warming, they are included in the CCAP, and EPA is directed to limit uses of gases with high global warming potentials as substitutes for ozone-depleting substances where better substitutes exist. EPA noted further that, because EPA is simultaneously also interested in promoting the broader shift away from ozone-depleting substances, any limits on use will be imposed in ways that preserve as much flexibility as possible for those trying to move to alternatives.

EPA evaluates substitutes within a comparative risk framework in order to fulfill both the mandate under Clean Air Act section 612 to identify alternatives to ozone-depleting substances which reduce overall risk to human health and the environment, and the President's direction under the CCAP. In evaluating a potential substitute by comparing risks, EPA compares the substitute to the original ODS it would replace and to other substitutes *by use*. Although it may be desirable to compare restrictions between end-uses such as streaming agents and total flooding agents, EPA's SNAP determinations require a relative comparison among all substitutes available for a particular end-use, as well as to the original ODS, at the time the comparison is made. See discussion in the preamble to the original SNAP rule, 59 FR 13044 (March 18, 1994), at pages 13046 and 13067-13069.

Thus, in evaluating the use of HFC-236fa as a streaming agent, EPA compared its use to that of other SNAP-listed and proposed streaming agent substitutes currently available. Of clean agent substitutes for Halon 1211, there are no commercially available alternatives for general fire protection use with both zero ozone depletion potential and low toxicity. HFC-236fa meets these criteria and thus can serve a unique role as a streaming agent, aiding in the transition from halons. Although some of the commercially available streaming agent substitutes which are not clean agents have no ozone depletion potential and are low in toxicity, they are not as widely applicable as halocarbon clean agent alternatives and thus are not suitable for general fire protection use.

EPA made a similar comparison of SNAP-listed and proposed halon substitutes which are commercially available in the total flooding agent end-use. By contrast to the streaming agent end-use, there are commercially available clean agent alternatives in the flooding agent end-use for general fire suppression which have both zero ozone depletion potential and low toxicity, such as HFC-227ea and the inert gases. In the explosion protection application, however, which is a type of total flooding use, the required design concentration is much higher than for general fire suppression. As a practical matter, this eliminates most of the SNAP-listed total flooding clean agent substitutes for use in explosion protection except for HFC-23 and the PFCs, some of which have even higher GWPs, and all of which have longer atmospheric lifetimes, than that of HFC-236fa. By comparison to the commercially available clean agent

substitutes, HFC-236fa can serve a unique role in the explosion protection application of the total flooding agent end-use, but not in the general fire suppression applications of this end-use.

Responses are given below to each of the specific comments that emissions from streaming end-uses are high and are at least as great, if not greater, compared to total flooding end-uses. EPA notes that most of these statements were made without any specific supporting data.

(a) Expected discharge in a streaming application would be greater than if used in a flooding system.

As noted previously, EPA's SNAP determinations require a relative comparison among all substitutes available for a particular end-use, as well as to the original ODS, at the time the comparison is made. Nevertheless, streaming agent uses in fire extinguishers, whether handheld, wheeled, or vehicular, typically use many fewer pounds of agent than total flooding systems, which are piped into an enclosed space to flood the enclosure upon discharge. One would expect, therefore, that discharges from streaming applications would be less per discharge than those from a flooding system. It is not clear whether the commenters who claimed that "expected discharge in a streaming application would be greater than if used in a flooding system" (without any supporting data) meant discharges per unit or total discharges, which would require data on the total number of units in each end-use and/or the rates of discharge for each end-use.

(b) Both streaming and flooding systems are intended to be discharged, and are not closed systems.

EPA notes that all fire extinguishing uses are emissive by their nature, even though the cylinder or container which holds the agent is a "closed system" in the sense that the chemical is contained in equipment that precludes full emission unless emission is triggered. In order to extinguish a fire, however, the agent must be emitted from its container.

The emission of fire extinguishing agents is usually only done in case of fire, a life-threatening emergency. Other possible sources of emissions are leakage, accidental discharge, maintenance losses during servicing, and discharge during testing and training. EPA estimates the total amount of losses for leakage and discharges other than for fire protection is less than 5% per year. Of this amount, virtually none is due to testing and training. In response to the phaseout of halon and

concerns over atmospheric impacts of both halon and halocarbon substitutes, the fire protection community has greatly decreased the use of fire extinguishing agents in testing and training (formerly the single largest use of halon fire extinguishers). There is also a financial incentive to conserve halocarbon fire extinguishing agents which serve as clean agent substitutes for halon because they are more expensive than traditional fire extinguishing agents such as dry chemical and foam.

(c) Portable fire extinguishers are more numerous than flooding systems, and are discharged more often.

EPA has no data on the number of portable fire extinguishers versus flooding systems, nor on relative discharge rates of portables versus flooding systems. No data were offered by the commenters who claimed portables are more numerous, and are discharged more often. EPA believes that this type of comparison is not relevant to the risk comparison of particular substitutes within a particular end-use, but EPA refers to its earlier estimate of 5% total losses (not related to fire suppression) from all fire extinguishers as support for the statement that non-emergency emissions of halocarbon fire extinguishing agents in both streaming agent and total flooding agent end-uses is relatively small.

(d) This agent should be restricted to the "original design concept" of a closed system such as refrigeration substitutes for CFC-114 in heat pumps, which are subject to venting prohibitions.

This comment reflects concern about possible emissions from any fire extinguishing system, whether streaming or flooding. As noted above, fire extinguishing systems are by nature emissive but serve a valuable purpose in preventing or mitigating danger to human health and property. Fire extinguisher emission rates are relatively low and, when balanced against the risks of fire emergencies, are extremely valuable. Comparing refrigeration uses to fire suppression uses is not relevant to the risk comparison of particular fire suppression substitutes within a particular end-use. Previous decisions in another SNAP industrial sector are not relevant to decisions in a different SNAP industrial sector, just as decisions for a particular end-use within a single sector are not relevant to a different end-use in the same sector.

(e) This agent has a lower weight equivalence to Halon 1301 than to Halon 1211, is more effective as a Halon

1301 substitute than as a Halon 1211 substitute, and is probably more efficient as a flooding agent than as a streaming agent.

Weight equivalence relates the number of pounds of substitute required to replace each pound of halon to achieve the same fire extinguishing capability. A substitute's weight equivalence to halon is not the only measure of a substitute's efficiency or effectiveness in extinguishing fires. A substitute's extinguishing (or design) concentration is important as well as its storage volume equivalence to halon. Additional factors, which would be tested in full-scale performance fire testing by independent testing laboratories in order to rate particular products, include the extinguisher configurations, pressurization, nozzle and valve assembly as well as other characteristics. EPA notes that several portable fire extinguishing products using this agent have received performance ratings from an independent testing laboratory which could not have happened without satisfactory performance test results. These commenters provided no further information to support their statements that this agent may be more efficient and more effective as a replacement for halon 1301 in flooding systems than as a replacement for halon 1211 as a streaming agent. EPA is not aware of any evidence to support these statements.

Nevertheless, EPA notes that the reported weight equivalencies in the preamble to the proposed rule were based on information in the SNAP submission, which has become outdated due to further commercial development of portable fire extinguishing equipment using this agent as a replacement for halon 1211. EPA requested and obtained current information from the system designer regarding this agent's weight equivalence to halon 1211, and has placed in the public docket for this rulemaking the memo from the system designer providing this information, as well as information from Underwriters Laboratories, Inc., showing its current listing information for portable fire extinguishing products containing this agent.

The commenters are correct in identifying the weight equivalence of this agent to halon 1211 as 2.4 in the portable fire extinguishing product containing 6.0 pounds of this agent, since it apparently replaced a product with equivalent fire extinguishment ratings containing 2.5 pounds of halon 1211. However, there are three other sizes of portable extinguishers containing this agent which have weight

equivalencies to halon 1211 ranging from 1.08 to 2.15. The product with 6.0 pounds of this agent, although it is still listed by UL, has been replaced by the system designer with a product containing 4.75 pounds of this agent, with the same UL rating, resulting in a weight equivalence to halon 1211 of 2.15. Thus, this agent's weight equivalence to halon 1211 currently ranges from 1.08 to 2.15, rather than a range of 1.1 to 1.5 as indicated in the preamble to the proposed rule.

Even if this agent's efficiency and effectiveness as a halon replacement were in doubt, these characteristics are not the only factors involved in making a SNAP determination on the substitute's acceptability. As stated in the preamble to the original SNAP rule, at 59 FR 13101 (March 18, 1994), EPA believes that efficacy of a substitute is a consideration in decision making in the fire suppression sector in order to help assess the risks of using a substitute, its health effects, and its potential to fill various niche markets. However, this is only one of many characteristics of a substitute that are evaluated in making a SNAP determination which fulfills the section 612 mandate to "reduce overall risk to human health and the environment." See discussion in preamble to the original SNAP rule, 59 FR 13044 (March 18, 1994) at pages 13054-13056, and at pages 13068-13069, for more information on the characteristics to be evaluated.

(f) Since there are fewer limits on testing and training for streaming agents, and more testing and training is done with portable fire extinguishers than with flooding systems, the discussion in the preamble regarding the need to minimize emissions during such activities should be equally as strict for streaming agent uses as for total flooding agent uses.

EPA agrees that the discussion in the preamble regarding the need to minimize emissions during testing and training should be equally as strict for streaming agents as for total flooding agents; these two discussions in the preamble to the final rule are now the same. EPA notes that it has no information to support or oppose the statements made by these commenters that there are fewer limits on testing and training for streaming agents, and that more testing and training is done with portable fire extinguishers than with flooding systems.

(2) Use in Local Application Systems Under the SNAP program, halon substitutes have been categorized as either those used in streaming applications (manually dispensed from

a hand-held or portable fire extinguisher), or in total flooding and explosion protection applications (a predetermined quantity of the gas is dispensed into an enclosed space and maintained at a certain concentration for a period of time throughout the entire protected space). Another well-recognized type of fire protection product, referred to as "local application" or "pre-engineered" local application extinguishing systems, is not clearly considered either a streaming agent system or a total flooding agent system. Local application extinguishers are designed to release a set amount of an extinguishing agent from a fixed nozzle or nozzles directly onto burning material. They have been used to provide fire protection for specialized industrial uses such as textile processing machinery.

The Agency received several comments, discussed below, that HFC-236fa be listed acceptable for use in a newly created category of local application or pre-engineered systems. Elsewhere in today's action, HFC-236fa is being listed as acceptable for use as a substitute for halon 1211 and halon 1301 in fire suppression and explosion protection; the Agency does not believe it is necessary or appropriate at this time, however, to designate under SNAP a new category of fire protection specifically for local application systems.

Although the vast majority of fire protection systems using halon and halon substitutes can be classified as streaming agents or total flooding agent systems, the local application systems defy easy classification in either category. Unlike total flooding systems, they are not designed to distribute the extinguishing agent evenly at a specific design concentration maintained throughout the entire volume of the protected space and, unlike streaming agents, they are not designed to allow a person to manipulate the discharge direction or quantity of the extinguishing agent. Local application or pre-engineered systems are mentioned in and may be subject to parts of National Fire Protection Association (NFPA) standards which apply to total flooding systems (NFPA 12, 12A, and 2001, for example). However, as mentioned by two commenters referred to below, local application systems primarily use halon 1211 (which is more commonly associated with streaming agents), rather than halon 1301 (which is more commonly associated with total flooding agents), as the fire extinguishant.

Five commenters urged EPA to list HFC-236fa acceptable for use in a third, distinct category—"local application" systems. Three of the five commenters specifically urged acceptability of this agent as a replacement for halon 1211 in local application systems; two of these three commenters specifically urged acceptability of this agent as a replacement for halon 1211 in textile process machinery, and indicated that this type of use could be considered a streaming agent application.

The remaining two commenters urged EPA to list HFC-236fa acceptable for use in local application systems as a replacement for either halon 1211 or halon 1301. One of these commenters urged EPA to create an additional category for "pre-engineered systems" or "local application systems" or "pre-engineered local application systems," which would be distinct from engineered total flooding systems.

The other commenter urged that EPA list HFC-236fa acceptable for use in local application systems as a type of streaming agent application, presumably as a replacement for halon 1211, and acceptable for use in local application systems as a type of total flooding agent application, presumably as a replacement for halon 1301. This commenter specifically urged EPA to consider such local application uses in the total flooding agent category as "without prejudice" (similar to the proposal for use in explosion suppression and explosion inertion applications in the total flooding agent category) and therefore not subject to the "last resort" restrictions which EPA proposed for general fire suppression applications in the total flooding agent category.

Based on the description from the commenters of local application systems generally, and local application systems for textile process machinery specifically, neither of EPA's existing risk assessment methodologies for halon substitutes are relevant to local application systems. The existing methodology for evaluating end-use exposure to streaming agent substitutes assumes the discharged extinguishing agent will be completely released into the protected space immediately following its discharge, resulting in a high concentration of extinguishing agent which eventually disperses throughout the space at lower concentrations. Local application systems for textile process machinery, by contrast, discharge the extinguishing agent at a very high concentration into the localized protected space, inside the machinery. The extinguishing agent is eventually released outside the

machinery by dissipating into the rest of the space where the machinery is located. In neither case is there an alarm before discharge or is the extinguishing concentration maintained at a constant level in an enclosed space as for total flooding systems.

EPA's evaluation of the characteristics of local application systems, particularly in the case of textile process machinery (which is the only case presented to EPA with actual design specifications for use of this agent in a local application system) shows that exposure patterns for this type of use are more similar to streaming agents than total flooding agent systems. Evaluating the exposure risk of persons who are near the textile process machinery when a local application system is discharged requires modifying the streaming agent methodology to account for the different rate of release of the extinguishing agent. Based on relevant system and exposure specifications provided by one of the commenters, EPA has made these modifications. The Agency's analyses project that local application extinguishing systems using HFC-236fa located inside textile process machinery would maintain worker exposures below the cardiotoxicity NOAEL and LOAEL concentrations.

In summary, EPA agrees with the suggestion of some of the commenters that the use of HFC-236fa in local application systems inside textile process machinery as a replacement for halon 1211 is covered by the acceptability listing of this agent in the streaming agent end-use. Local application systems other than those used inside textile process machinery are not included in the streaming agent end-use since EPA's review is based solely on the specifications for such systems in textile process machinery. Thus, EPA rejects suggestions by some of the commenters that this agent be listed acceptable as a replacement for halon 1211 in local application systems generally.

Since EPA has no specific information on the potential use of this agent in local application systems as a replacement for halon 1301, and since the methodology for evaluating exposure to total flooding agents is not appropriate for the textile processing machinery system, EPA does not agree that local application systems using this agent as a replacement for halon 1301 are covered by the total flooding agent end-use. Thus, EPA is rejecting suggestions by some of the commenters that this agent be listed acceptable as a replacement for halon 1301 in local application systems, either as a separate end-use or as part of the total flooding

end-use. EPA welcomes information about potential uses of this agent and other halon substitutes in local application systems as a replacement for either halon 1211 or halon 1301, and may consider creating a separate end-use for local application extinguishing systems in the future. EPA notes the potential for environmental benefit if more use is made of these systems since they may require relatively small amounts of extinguishing agent and pose less risk of occupational exposure than other types of fire extinguishing systems, such as total flooding systems.

### (3) "Grandfathering" Existing Uses of HFC-236fa

One commenter took issue with the following paragraph, which appeared in Section III.D.3 of the preamble to the proposed rule and was incorporated by reference in the proposed listing of HFC-236fa acceptable subject to use conditions in the total flooding agent end-use:

"In the event of the development of acceptable alternatives which EPA finds should not only replace halon 1301 and HFC-236fa in new systems, EPA may grandfather existing uses but only to the extent warranted by cost and timing as outlined in the original SNAP rule discussion of grandfathering of unacceptable substitutes (59 FR 13057)."

The commenter requested that this paragraph be modified and relocated. The commenter believes that such discussion is inappropriate when specifically isolated to comments about one particular substitute; to the extent this may be consistent with EPA's mandate under the Act, the commenter states it should be clear to potential end-users that the comments apply to all alternatives or to all members of a defined class of alternatives.

EPA has included similar language in the preamble discussion of specific listings of substitutes in previous rulemakings. (See discussion of PFCs as acceptable subject to narrowed use limits in the Solvents sector in the original SNAP rule (March 18, 1994) at 59 FR 13095-13096). This commenter suggests this statement by EPA is consistent with the scope of EPA's authority to permit the continuation of activities otherwise restricted where the balance of equities supports such grandfathering. See discussion in the preamble of the original SNAP rule (59 FR 13057).

EPA believes, since this language is merely a statement of the Agency's authority and not a stated intention to take such action, it is appropriate to include this statement in discussion of listings of any substitute, even if this statement is not included in its

discussion of listings of all substitutes in a particular rulemaking. EPA can use its grandfathering authority, within the limits described above, any time it changes a listing of a substitute. EPA did not intend, however, to create confusion by including this language in the listing of this particular substitute alone; thus, EPA is deleting any reference in this final rule to potential grandfathering in this sector and refers end-users to the discussion of grandfathering in the original SNAP rule as described above.

### c. Unrelated Issues

EPA received one letter with comments purportedly relating to this proposal but which actually are unrelated. This commenter asked that EPA modify the use conditions and/or change to unacceptable several halon substitutes currently listed as acceptable by SNAP. Since none of these listings was proposed to be changed in this rulemaking, the comments are not relevant to this final rule. In any event, the commenter did not provide adequate information to justify re-opening the listings which were made through notice-and-comment rulemakings in the past. A more complete discussion of this comment and EPA's response is contained in the Supplemental Response to Comments which is available in the public docket for this rulemaking.

### d. Chlorobromomethane

As described in the response to comments received under the Solvents; Aerosols; and Adhesives, Coatings, and Inks sectors, EPA received several comments on its proposed listing of chlorobromomethane as unacceptable in those sectors. The same comments apply to the proposed listing of CBM as unacceptable in the total flooding end-use in the Fire Suppression and Explosion Protection sector with respect to its ozone depletion potential. See the discussion of the ODP of CBM under the solvents section, II.C.3. Specific information related to flooding systems is discussed under the unacceptable determination for CBM, II.D.3.

### E. Aerosols

#### 1. Acceptable Substitutes

##### a. Solvents

(1) HFC-4310mee  
*HFC-4310mee is an acceptable substitute for CFC-113 and methyl chloroform (MCF) in aerosols.* For further information, see the discussion of HFC-4310mee in section II.C.1 above in the metals cleaning end-use within the solvents cleaning sector.

(2) HCFC-225 ca/cb  
*HCFC-225 ca/cb is an acceptable substitute for CFC-113 and methyl chloroform (MCF) in aerosols.* HCFC-225 ca/cb blend is offered as a 45%-ca/55%-cb blend. The company-set exposure limit for the -ca isomer is 25 ppm. The company-set exposure limit for the -cb isomer is 250 ppm. Based on the results of exposure assessment studies, it is EPA's opinion that companies can meet the 25 ppm limit of the HCFC-225 ca isomer in defluxing and cleaning providing that the standard operating procedures and employee work habits are conducted in accordance with the procedures specified in the product safety information provided by the chemical manufacturer.

#### 2. Unacceptable

##### a. Chlorobromomethane

*Chlorobromomethane is unacceptable as a substitute for CFC-113, methyl chloroform, and HCFC-141b in aerosols.* See the discussion of CBM in section II.C.2 above in the metals cleaning end-use within the solvents cleaning sector.

#### 3. Response to Comments

EPA incorporates by reference the response to comments on chlorobromomethane in the solvents cleaning sector, II.C.3.

### F. Adhesives, coatings, and inks

#### 1. Unacceptable

##### a. Chlorobromomethane

*Chlorobromomethane is unacceptable as a substitute for CFC-113, methyl chloroform, and HCFC-141b in adhesives, coatings and inks.* See the discussion of CBM in section II.C.2 above in the metals cleaning end-use within the solvents cleaning sector.

#### 2. Response to Comments

EPA incorporates by reference the response to comments on chlorobromomethane in the solvents cleaning sector, II.C.3.

## III. 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 ("Unfunded Mandates Act") (signed into law on March 22, 1995) requires that the Agency 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, educating, and advising any small governments that may be significantly or uniquely affected by the rule. Section 204 requires the Agency to develop a process to allow elected state, local, and tribal government officials to provide input in the development of any action containing a significant Federal intergovernmental mandate. Under section 205 of the Unfunded Mandates Act, the Agency must identify and consider a reasonable number of regulatory alternatives before promulgating a rule for which a budgetary impact statement is prepared. The Agency must select from those alternatives the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule, unless the Agency explains why this alternative is not selected or the selection of 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. Finally, because this FRM does not contain a significant intergovernmental mandate, the Agency is not required to develop a process to obtain input from elected state, local, and tribal officials.

#### C. Regulatory Flexibility

The Regulatory Flexibility Act (RFA) generally requires an agency to conduct a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small not-for-profit enterprises, and small governmental jurisdictions. This rule would not have a significant impact on a substantial number of small entities because costs of the SNAP requirements as a whole are expected to be minor. In fact, this rule offers regulatory relief to small businesses by providing alternatives to phased-out ozone-depleting substances. EPA has determined that it is not necessary to prepare a regulatory flexibility analysis in connection with this final rule. The actions herein 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. Therefore, I certify that this action will not have a significant economic impact on a substantial number of small entities.

#### D. Paperwork Reduction Act

EPA has determined that this final rule contains no information requirements subject to the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*, that are not already approved by the Office of Management and Budget (OMB). OMB has reviewed and approved two Information Collection Requests (ICRs) by EPA which are described in the March 18, 1994 rulemaking (59 FR 13044, at 13121, 13146-13147) and in the October 16, 1996 rulemaking (61 FR 54030, at 54038-54039). These ICRs included five types of respondent reporting and record-keeping activities pursuant to SNAP regulations: submission of a SNAP petition, filing a SNAP/TSCA Addendum, notification for test marketing activity, record-keeping for

substitutes acceptable subject to narrowed use limits, and record-keeping for small volume uses. The OMB Control Numbers are 2060-0226 and 2060-0350.

#### E. Submission to Congress and the Comptroller General

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. This rule is not a "major rule" as defined by 5 U.S.C. 804(2).

#### F. Executive Order 13045: "Protection of Children From Environmental Health Risks and Safety Risks"

Executive Order 13045: "Protection of Children from Environmental Health Risks and Safety Risks" (62 FR 19885, April 23, 1997) applies to any rule that: (1) is determined to be "economically significant" as defined under E.O. 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This final rule is not subject to the Executive Order because it is not economically significant as defined in E.O. 12866, and because the Agency does not have reason to believe the environmental health or safety risks addressed by this action present a disproportionate risk to children, as the exposure limits and acceptability listings in this final rule primarily apply to the workplace.

#### G. Executive Order 12875: Enhancing Intergovernmental Partnerships

Under Executive Order 12875, EPA may not issue a regulation that is not required by statute and that creates a mandate upon a State, local or tribal government, unless the Federal government provides the funds necessary to pay the direct compliance

costs incurred by those governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 12875 requires EPA to provide to the Office of Management and Budget a description of the extent of EPA's prior consultation with representatives of affected State, local and tribal governments, the nature of their concerns, copies of any written communications from the governments, and a statement supporting the need to issue the regulation. In addition, Executive Order 12875 requires EPA to develop an effective process permitting elected officials and other representatives of State, local and tribal governments "to provide meaningful and timely input in the development of regulatory proposals containing significant unfunded mandates."

Today's rule does not create a mandate on State, local or tribal governments. The rule does not impose any enforceable duties on these entities. Accordingly, the requirements of section 1(a) of Executive Order 12875 do not apply to this rule.

**H. Executive Order 13084: Consultation and Coordination with Indian Tribal Governments**

Under Executive Order 13084, EPA may not issue a regulation that is not required by statute, that significantly or uniquely affects the communities of Indian tribal governments, and that imposes substantial direct compliance costs on those communities, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 13084 requires EPA to provide to the Office of

Management and Budget, in a separately identified section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 requires EPA to develop an effective process permitting elected officials and other representatives of Indian tribal governments "to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities."

Today's rule does not significantly or uniquely affect the communities of Indian tribal governments, because this regulation applies directly to facilities that use these substances and not to governmental entities. Accordingly, the requirements of section 3(b) of Executive Order 13084 do not apply to this rule.

**I. National Technology Transfer and Advancement Act**

The National Technology Transfer and Advancement Act of 1995 (NTTAA), section 12(d), Public Law 104-113, requires federal agencies and departments to use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments. If use of such technical standards is inconsistent with applicable law or otherwise impractical, a federal agency or department may elect to use technical standards that are not developed or adopted by voluntary consensus standards bodies if the head

of the agency or department transmits to the Office of Management and Budget an explanation of the reasons for using such standards. This rule does not mandate the use of any technical standards; accordingly, the NTTAA does not apply to this rule.

**IV. 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). Notices and rulemakings under the SNAP program, as well as EPA publications on protection of stratospheric ozone, are available from EPA's Ozone Depletion World Wide Web site at "http://www.epa.gov/ozone/title6/snap/" and from the Stratospheric Protection Hotline number as listed above.

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

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

Dated: April 21, 1999.

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

**Note:** The following Table 1 will not appear in the Code of Federal Regulations.

**Table 1: Summary of Acceptable Decisions**

**SOLVENTS CLEANING—ACCEPTABLE SUBSTITUTES**

End-use	Substitute	Decision	Comments
Metals cleaning w/CFC-113 .....	HFC-4310mee ..	Acceptable .....	Company-set time-weighted average workplace exposure standard of 200 ppm, and a workplace exposure ceiling of 400 ppm.
Metals cleaning w/MCF .....	HFC-4310mee ..	Acceptable .....	Company-set time-weighted average workplace exposure standard of 200 ppm and a workplace exposure ceiling of 400 ppm.

**AEROSOLS—ACCEPTABLE SUBSTITUTES**

End-use	Substitute	Decision	Comments
Solvent in aerosols w/CFC-113 .....	HFC-4310mee ..	Acceptable .....	Company-set time-weighted average workplace exposure standard of 200 ppm, and a workplace exposure ceiling of 400 ppm.
Solvent in aerosols w/MCF .....	HFC-4310mee ..	Acceptable .....	Company-set time-weighted average workplace exposure standard of 200 ppm, and a workplace exposure ceiling of 400 ppm.
Solvent in aerosols w/CFC-113 .....	HCFC-225ca/cb	Acceptable .....	Company-set time weighted average exposure limit of 25 ppm for the HCFC-225 ca isomer.
Solvent in aerosols w/MCF .....	HCFC-225ca/cb	Acceptable .....	Company-set time weighted average exposure limit of 25 ppm for the HCFC-225 ca isomer.

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. Sec. 7414, 7601, 7671–7671q.

2. Subpart G is amended by adding the following Appendix H to read as follows:

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

\* \* \* \* \*

**Appendix H to Subpart G—Substitutes Subject to Use Restrictions and Unacceptable Substitutes, Effective May 28, 1999.**

*CFC-12 Automobile and Non-automobile Motor Vehicle Air Conditioners, Retrofit and New*

**Criteria for Uniqueness of Fittings**

(a) All fittings for alternative motor vehicle refrigerants must meet the following requirements:

(1) high-side screw-on fittings for each refrigerant must differ from high-side screw-on fittings for all other refrigerants, including CFC-12, and from low-side screw-on fittings for CFC-12;

(2) low-side screw-on fittings for each refrigerant must differ from low-side screw-on fittings for all other refrigerants, including CFC-12;

(3) high-side screw-on fittings for a given refrigerant must differ from low-side screw-on fittings for that refrigerant, to protect against connecting a low-pressure system to a high-pressure one;

(4) high-side quick-connect fittings for each refrigerant must differ from high-side quick-connect fittings for all other refrigerants, including CFC-12 (if they exist);

(5) low-side quick-connect fittings for each refrigerant must differ from low-side quick-connect fittings for all other refrigerants, including CFC-12 (if they exist);

(6) high-side quick-connect fittings for a given refrigerant must differ from low-side quick-connect fittings for that refrigerant, to protect against connecting

a low-pressure system to a high-pressure one;

(7) for each type of container, the fitting for each refrigerant must differ from the fitting for that type of container for all other refrigerants, including CFC-12.

(b) For screw-on fittings, “differ” means that either the diameter must differ by at least 1/16 inch or the thread direction must be reversed (i.e. right-handed vs. left-handed). Simply changing the thread pitch is not sufficient. For quick-connect fittings, “differ” means that a person using normal force and normal tools (including wrenches) must not be able to cross-connect fittings.

(c) The sole exception to the 1/16 inch difference requirement is the difference between the small can fittings for GHG-X4 and R-406A. The GHG-X4 small can fitting uses a metric measurement, and is slightly less than 1/16 inch larger than the small can fitting for R-406A. EPA has concluded that these fittings will not cross-connect, and therefore they may be used.

**REFRIGERATION AND AIR CONDITIONING—UNACCEPTABLE SUBSTITUTES**

End-use	Substitute	Decision	Comments
All HCFC-22 end-uses, retrofit and new.	NARM-22 .....	Unacceptable ....	This blend contains HCFC-22, and it is inappropriate to use such a blend as a substitute for HCFC-22. In addition, this blend contains HFC-23, which has an extremely high GWP and lifetime. Other substitutes for HCFC-22 exist that do not contain either HCFC-22 or HFC-23.

**SOLVENTS CLEANING—UNACCEPTABLE SUBSTITUTES**

End-use	Substitute	Decision	Comments
Metals, Electronic, and Precision cleaning with CFC-113, methyl chloroform, and HCFC-141b.	Chlorobromo-methane.	Unacceptable ....	Other alternatives exist with zero or much lower ODP.



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

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 replacement.	C3F8	<p>Acceptable for nonresidential uses where other alternatives are not technically feasible due to performance or safety requirements:</p> <p>(a) because of their physical or chemical properties, or</p> <p>(b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions</p>	<p>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.</p> <p>All personnel must be evacuated before concentration of C3F8 exceeds 30%.</p> <p>Design concentration must result in oxygen levels of at least 16%.</p> <p>See additional comment 5</p>	<p>The comparative design concentration based on cup burner values is approximately 8.8%. Users should observe the limitations on PFC acceptability by taking the following measures:</p> <p>(i) conduct an evaluation of foreseeable conditions of end-use;</p> <p>(ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and</p> <p>(iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions.</p> <p>Documentation of such measures should be available for review upon request.</p> <p>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.</p> <p>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 rule (59 FR 13044.)</p> <p>See additional comments 1, 2, 3, 4.</p>

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

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 replacement.	C4F10	<p>Acceptable for nonresidential uses where other alternatives are not technically feasible due to performance or safety requirements:</p> <ul style="list-style-type: none"> <li>(a) because of their physical or chemical properties, or</li> <li>(b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions</li> </ul>	<p>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 40%;</p> <p>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.</p> <p>All personnel must be evacuated before concentration of C4F10 exceeds 40%.</p> <p>Design concentration must result in oxygen levels of at least 16%.</p> <p>See additional comment 5</p>	<p>The comparative design concentration based on cup burner values is approximately 6.6%. Users should observe the limitations on PFC acceptability by taking the following measures:</p> <ul style="list-style-type: none"> <li>(i) conduct an evaluation of foreseeable conditions of end-use;</li> <li>(ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and</li> <li>(iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions.</li> </ul> <p>Documentation of such measures should be available for review upon request.</p> <p>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.</p> <p>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 rule (59 FR 13044.)</p> <p>See additional comments 1, 2, 3, 4.</p>
Halon 1301 replacement.	HFC-236fa	<p>Acceptable when manufactured using any process that does not convert perfluoroiso-butylene (PFIB) directly to HFC-236fa in a single step:</p> <ul style="list-style-type: none"> <li>—for use in explosion suppression and explosion inertion applications, and</li> <li>—for use in fire suppression applications where other non-PFC agents or alternatives are not technically feasible due to performance or safety requirements:</li> </ul> <ul style="list-style-type: none"> <li>(a) because of their physical or chemical properties, or</li> <li>(b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions</li> </ul>	<p>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 10%;</p> <p>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 of 15%;</p> <p>All personnel must be evacuated before concentration of HFC-236fa exceeds 15%.</p> <p>Design concentration must result in oxygen levels of at least 16%.</p> <p>See additional comment 5</p>	<p>The comparative design concentration based on cup burner values is approximately 6.4%. Users should observe the limitations on HFC-236fa acceptability by taking the following measures:</p> <ul style="list-style-type: none"> <li>(i) conduct an evaluation of foreseeable conditions of end-use;</li> <li>(ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and</li> <li>(iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions.</li> </ul> <p>Documentation of such measures should be available for review upon request.</p> <p>Feasible for use in a normally occupied area.</p> <p>See additional comments 1, 2, 3, 4.</p>
Additional comments				

1—Should conform with OSHA requirements, 29 CFR 1910, Subpart L, Section 1910.160.

2—Per OSHA requirements, protective gear (SCBA) should be available in the event personnel should reenter the area.

3—Discharge testing should be strictly limited 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—TOTAL FLOODING AGENTS—ACCEPTABLE SUBJECT TO USE CONDITIONS—Continued

End-use	Substitute	Decision	Conditions	Comments
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5—EPA has no intention of duplicating or displacing OSHA coverage related to the use of personal protective equipment (e.g., respiratory protection), fire protection, hazard communication, worker training or any other occupational safety and health standard with respect to EPA's regulation of halon substitutes.

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

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 replacement.	C3F8	Acceptable for non-residential uses where other alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions	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 C3F8 exceeds 30%. Design concentration must result in oxygen levels of at least 16%. See additional comment 5	The comparative design concentration based on cup burner values is approximately 8.8%. Users should observe the limitations on PFC acceptability by taking the following measures: (i) conduct an evaluation of foreseeable conditions of end-use; (ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and (iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions. Documentation of such measures should 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 rule (59 FR 13044.) See additional comments 1, 2, 3, 4.
Halon 1301 replacement.	C4F10	Acceptable for non-residential uses where other alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions	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 40%; 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 C4F10 exceeds 40%. Design concentration must result in oxygen levels of at least 16%. See additional comment 5	The comparative design concentration based on cup burner values is approximately 6.6%. Users should observe the limitations on PFC acceptability by taking the following measures: (i) conduct an evaluation of foreseeable conditions of end-use; (ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and (iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions. Documentation of such measures should 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 Rule (59 FR 13044.) See additional comments 1, 2, 3, 4.

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

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 replacement.	HFC-236fa	Acceptable when manufactured using any process that does not convert perfluoroisobutylene (PFIB) directly to HFC-236fa in a single step: -for use in explosion suppression and explosion inertion applications, and -for use in fire suppression applications where other non-PFC agents or alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions	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 10%; 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 of 15%; All personnel must be evacuated before concentration of HFC-236fa exceeds 15%. Design concentration must result in oxygen levels of at least 16%. See additional comment 5	The comparative design concentration based on cup burner values is approximately 6.4%. Users should observe the limitations on HFC-236fa acceptability by taking the following measures: (i) conduct an evaluation of foreseeable conditions of end-use; (ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and (iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions. Documentation of such measures should be available for review upon request. Feasible for use in a normally occupied area. See additional comments 1, 2, 3, 4.

Additional comments:

<sup>1</sup> Should conform with OSHA requirements, 29 CFR 1910, Subpart L, Section 1910.160.

<sup>2</sup> Per OSHA requirements, protective gear (SCBA) should be available in the event personnel should reenter the area.

<sup>3</sup> Discharge testing should be strictly limited to that which is essential to meet safety or performance requirements.

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

<sup>5</sup> EPA has no intention of duplicating or displacing OSHA coverage related to the use of personal protective equipment (e.g., respiratory protection), fire protection, hazard communication, worker training or any other occupational safety and health standard with respect to EPA's regulation of halon substitutes.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—STREAMING AGENTS—ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

End-use	Substitute	Decision	Conditions	Comments
Halon 1211 ..... replacement .....	C6F14	Acceptable for nonresidential uses where other alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions.		Users should observe the limitations on PFC acceptability by taking the following measures: (i) conduct an evaluation of foreseeable conditions of end-use; (ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and (iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions. Documentation of such measures should 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 Rule (59 FR 13044.) See comments 1, 2.
Halon 1211 replacement.	HFC-236fa	Acceptable in nonresidential uses when manufactured using any process that does not convert perfluoroisobutylene (PFIB) directly to HFC-236fa in a single step		See comments 1, 2, 3.
Halon 1211 replacement. Additional comments:	HFC-227ea	Acceptable in nonresidential uses only		See comments 1, 2.

1—Discharge testing and training should be strictly limited only to that which is essential to meet safety or performance requirements.

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

3—Acceptable for local application systems inside textile process machinery.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—TOTAL FLOODING AGENTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
Halon 1301 replacement .....	Chlorobromomethane.	Unacceptable ....	Other alternatives exist with zero or lower ODP; OSHA regulations prohibit its use as extinguishing agent in fixed extinguishing systems where employees may be exposed. See 29 CFR 1910.160(b)(11).

AEROSOLS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
Solvent in aerosols with CFC-113, MCF, or HCFC-141b.	Chlorobromomethane.	Unacceptable ....	Other alternatives exist with zero or much lower ODP.

ADHESIVES, COATINGS, AND INKS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
Solvent in adhesives, coatings, and inks with CFC-113.	Chlorobromomethane.	Unacceptable ....	Other alternatives exist with zero or much lower ODP.
Solvent in adhesives, coatings, and inks with MCF.	Chlorobromomethane.	Unacceptable ....	Other alternatives exist with zero or much lower ODP.
Solvent in adhesives, coatings and inks with HCFC-141b.	Chlorobromomethane.	Unacceptable ....	Other alternatives exist with zero or much lower ODP.

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