may include importers, formulators or end-users, when they are responsible for introducing a substitute into commerce.

Since the SNAP FRM, EPA has published a Notice listing acceptable alternatives on August 26, 1994 and a Notice of Proposed Rulemaking restricting the use of certain substitutes on September 26, 1994.

III. Listing of Acceptable Substitutes

This section presents EPA's most recent acceptable listing decisions for class I substitutes in the following industrial sectors: refrigerants and air conditioning, foam blowing, solvent cleaning, fire suppression and explosion protection; sterilants; aerosols; adhesives, coatings and inks. These decisions represent substitutes not previously reviewed in the final rulemaking for SNAP (59 FR 13044; March 18, 1994) and, consequently, add to the lists of acceptable substitutes under SNAP. For copies of the full list, contact the EPA Stratospheric Protection Hotline at the number listed in Section V of this Notice.

Parts A through D below present a detailed discussion of the substitute listing determinations by major use sector. Tables summarizing listing decisions in this Notice are in Appendix A. The comments contained in Appendix A provide additional information on a substitute, but like the listings themselves, are not regulatory in nature. Thus, adherence to recommendations in the comments are not mandatory for use of a substitute. In addition, the comments should not be considered comprehensive with respect to other legal obligations pertaining to the use of the substitute. However, EPA encourages users of acceptable substitutes to apply all comments to their use of these substitutes. 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

Please refer to the final SNAP rule for detailed information pertaining to the designation of end-uses, additional requirements imposed under sections 608 and 609, and other information related to the use of alternative refrigerants.

1. R-401A and R-401B

R-401A and *R*-401B, which consist of HCFC-22, HFC-152a, and HCFC-124, are acceptable as substitutes for CFC-

11, CFC–12, R–500, and R–502 in the following end-uses:

• New and Retrofitted Reciprocating Chillers.

New Industrial Process

Refrigeration.

- New Cold Storage Warehouses.
- New Refrigerated Transport.
- New Retail Food Refrigeration.
- New Commercial Ice Machines.
- New Vending Machines.
- New Water Coolers.
- New Household Refrigerators.
- New Household Freezers.
- New Residential Dehumidifiers.

Please note that different temperature regimes may affect the applicability of these substitutes within these end-uses.

Two of the constituents in these blends are HCFCs and thus contribute to ozone depletion; HCFC production will be phased out according to the accelerated schedule. While the GWP of HCFC-22 is somewhat high, refrigerant leak regulations should reduce its contribution to global warming. The GWPs of the other components are low. Although these blends do contain one flammable constituent, HFC-152a, the blends themselves are not flammable. In addition, each blend is a near azeotrope, and it does not fractionate in normal operation. Finally, leak testing of each blend demonstrated that while the vapor and liquid compositions changed. neither phase became flammable. Testing of these blends with centrifugal compressors is inadequate, and therefore such use is not recommended by the manufacturer. Further testing may resolve this uncertainty.

$2. CO_2$

CO₂ is acceptable as follows:
As a substitute for CFC-13, R-13B1, and R-503 in Very Low Temperature Refrigeration, Retrofit and New.

• As a substitute for CFC–13, R–13B1, and R–503 in Industrial Process Refrigeration, Retrofit and New.

• As a substitute for CFC-11, CFC-12, CFC-113, CFC-114, and CFC-115 in Non-mechanical Heat Transfer, Retrofit and New.

 CO_2 was historically used in refrigeration systems. It is a well-known, nontoxic, nonflammable gas. Its GWP is defined as 1, and all other GWPs are indexed to it. Since it is readily available as a waste gas, no additional chemical will need to be produced. Thus, the use of CO_2 as a refrigerant will not contribute to global warming. CO_2 's usefulness is limited to temperatures above $-70^{\circ}F$.

3. HCFC-22

HCFC-22 is acceptable as a substitute for R-400(60/40) and CFC-114 in New Industrial Process Air Conditioning. EPA recommends that HCFC–22 only be used where ambient temperatures are lower than 115°F because of very high system pressures.

HCFC-22 has been used in a variety of air conditioning and refrigeration applications for many years. HCFC-22 contributes to ozone depletion and is considered a transitional alternative. HCFC-22 production will be phased out according to the accelerated phaseout schedule. HCFC-22's GWP and atmospheric lifetime are higher than other HCFCs. HCFC-22 is not flammable and it is compatible with existing oils used in most refrigeration and air conditioning equipment.

4. HFC-134a

HFC-134a is acceptable as a substitute for R-400(60/40) and CFC-114 in New Industrial Process Air Conditioning.

EPA recommends that HFC-134a only be used where ambient temperatures are lower than 125°F because of very high system pressures. HFC-134a does not contribute to ozone depletion. HFC-134a's GWP and atmospheric lifetime are close to those of other alternatives which are acceptable in this end-use. While HFC-134a is compatible with most existing refrigeration and air conditioning equipment parts, it is not compatible with the mineral oils currently used in such systems. An appropriate ester-based, polyalkylene glycol-based, or other type of lubricant should be used.

5. R-401A

R-401A and *R*-401B, which consist of HCFC-22, HFC-152a, and HCFC-124, is acceptable as a substitute for *R*-400(60/40) and CFC-114 in Retrofitted Industrial Process Air Conditioning.

See the discussion on R–401A for more information about this blend.

6. R-404A

R-404A, which consists of HFC-125, HFC-143a, and HFC-134a, is acceptable as a substitute for CFC-12 in new household refrigerators.

None of this blend's constituents contains chlorine, and thus this blend poses no threat to stratospheric ozone. However, HFC–125 and HFC–143a have very high GWPs, and the GWP of HFC– 134a is somewhat high. EPA strongly encourages recycling and reclamation of this blend in order to reduce its direct global warming impact. Although HFC– 143a is flammable, the blend is not. Leak testing has demonstrated that its composition never becomes flammable.