substitutes from being sold without a thorough risk assessment.

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

B. Solvents

1. Acceptable Subject to Use Conditions

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

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

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

2. Unacceptable Substitutes

a. Metals Cleaning. (1) Dibromomethane. *Dibromomethane (DBM) is an unacceptable substitute for CFC–113 and MCF in metals cleaning.* Dibromomethane has a comparatively high ODP (.17), and EPA's analysis of use of this chemical in cleaning processes revealed correspondingly high ozone depletion effects. In the case of DBM, the Agency's concern for high ODP is compounded by the fact that DBM can in some cases be used as a drop-in replacement, which could result in greater probability of uncontrolled venting to the atmosphere. Since other alternatives with lower overall environmental impacts exist for the cleaning processes in question, EPA elected to ban use of DBM as a cleaning substitute.

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

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

c. Fire Suppression and Explosion Protection

1. Response to Comments

One commenter believes that CF_3I should not be acceptable for use in any fire protection applications until two-year chronic testing is done, and should be treated as a suspect carcinogen as defined by OSHA regulations, along with appropriate warnings for handlers.

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

Second, the commenter states that the results of the genotoxicity tests give positive indications that CF_3I is potentially a carcinogen. The commenter states that the structural relationship of CF_3I to CH_3I, which the commenter states is a known skin carcinogen, increases the likelihood that CF_3I is a carcinogen.

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

In addition, the response of an animal to a cardiosensitizing agent is somewhat random. Whereas one animal may experience heart arrhythmias, another animal might experience immediate death by the same dose. Thus, the observations of ventricular arrhythmias are considered to be the same as observations of death and both are considered valid indicators of the LOAEL value.

Regarding the commenters' concern that CF_3I is a carcinogen, EPA conducts a risk assessment of an agent by initially asking qualitative questions such as: ''Is the structure of the compound likely to be carcinogenic, and does the agent test positive in a mutagenesis assay? If so, how potent is the reaction, in other words, what dosage level gives a positive reaction?''

CF_3I is not a known carcinogen, although it tested positive in a mutagenicity screening assay to determine which are potential candidates for further testing. The Ames mutagenicity test used as a predictor of carcinogenicity is accurate as a predictor approximately 50 per cent of the time. The ability of this assay to predict for carcinogenicity, even given the positive finding, is questionable in the case of halogenated compounds.

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

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

One commenter requested that the use restrictions on SF_6 be altered to allow its use as a discharge test agent for all civilian as well as military aircraft fire suppression systems. The commenter reported that research efforts by private companies, the U.S. Navy, and the National Institute for Standards and Technology have identified SF_6 as the preferred test agent for simulating halon 1301 in aircraft fire suppression systems. The commenter indicated that the amount of SF_6 released in developing and certifying new commercial aircraft will be approximately 1,000 pounds per year or less.