with other existing regulatory authorities. EPA believes that section 612 clearly authorizes imposition of use conditions to ensure safe use of replacement agents. EPA's mandate is to list agents that "reduce the overall risk to human health and the environment" for "specific uses." In light of this authorization, EPA is only intending to set conditions for the safe use of halon substitutes in the workplace until OSHA incorporates specific language addressing gaseous agents into OSHA regulation. Under OSHA Public Law 91–596, section 4(b)(1), OSHA is precluded from regulating an area currently being regulated by another federal agency. EPA is specifically deferring to OSHA, and has no intention to assume responsibility for regulating workplace safety especially with respect to fire protection. EPA's workplace use conditions will not bar OSHA from regulating under its Pub. L. 91–596 authority.

1. Proposed Acceptable Subject to Use Conditions

a. Total Flooding Agents

(1) IG-55 (Formerly [Inert Gas Blend] B)

IG–55 is proposed acceptable as a Halon 1301 substitute for total flooding applications. IG–55, which is comprised of 50% nitrogen and 50% argon, is designed to lower the oxygen level in a protected area to a level that does not support combustion, and, unlike pure carbon dioxide systems, sufficient oxygen remains to maintain life support.

The toxicological issues of concern with inert gas systems differ from those of halocarbon agents, in that the endpoint for hypoxic (low oxygen) atmospheres is asphyxiation while the end-point for halocarbons is cardiosensitization leading to cardiac arrhythmias. Thus, EPA requested the manufacturers of the newly proposed inert gas systems to conduct a peer review by a panel of medical specialists to consider specific questions concerning exposing the typical working population to this agent. A similar review was conducted at EPA's request by the manufacturer of IG-541, which simultaneously lowers oxygen and raises CO₂ levels.

The results of the peer review and discussions with other medical specialists further convinces us that the SNAP conditions previously listed for IG–541 are appropriate for IG–55 and IG–01 as well. Specifically, while the terms No Observed Adverse Effect Level (NOAEL) and Lowest Observed Adverse Effect Level (LOAEL) refer to cardiotoxic effect levels which are not appropriate when discussing hypoxic atmospheres, EPA intends to propose a 'no effect level' for inert gas systems at 12% oxygen, and a 'lowest effect level' at 10% oxygen.

Thus, consistent with the Occupational Safety and Health Administration (OSHA) conditions used by EPA for all total flooding agents, EPA proposes that an IG-55 system could be designed to an oxygen level of 10% if employees can egress the area within one minute, but may be designed only to the 12% level if it takes longer than one minute to egress the area. If the possibility exists for the oxygen to drop below 10%, employees must be evacuated prior to such oxygen depletion. A design concentration of less than 10% oxygen may only be used in normally unoccupied areas, as long as any employee who could possibly be exposed can egress within 30 seconds.

EPA stresses that, even though the medical specialists concur that it is probably safe to expose the typical worker to 10% or 12% oxygen for up to five minutes, EPA does not encourage any employee to intentionally remain in the area, even in the event of accidental discharge. In addition, the system must include alarms and warning mechanisms as specified by OSHA.

The question has been raised concerning the benefits or dangers of added carbon dioxide in other inert gas systems. The added CO₂ induces increased respiration after an exposure of approximately 3 to 5 minutes, which ensures adequate oxygen uptake by the brain. EPA's review of IG-541 (59 FR 13044, March 18, 1994) considered this parameter, and the Agency believed that the CO₂ offered an added margin of safety. However, questions remain as to the relative 'risk balanced' distinction between an inert gas system with, and one without, added CO₂. Fire scenarios are unpredictable, and therefore the amount of combustion products are also unpredictable. It is difficult to evaluate whether deeper breathing due to added CO₂ under different fire circumstances may also be bringing in more combustion products and thus constitute an increased risk. EPA believes on the basis of the peer review that in the event of an accidental discharge where there is no fire, the added O_2 in the mixture will serve as a margin of safety for protected populations. EPA also recognizes the known physiological benefits of added CO₂ to prevent brain hypoxia in other applications. Therefore, EPA will be working with other regulatory agencies and the technical community to further delineate appropriate use conditions for the use of the varying inert gas systems in the fire protection sector.

EPA intends that all personnel be evacuated from an area prior to, or quickly after, discharge. An inert gas system may not be designed with the intention of personnel remaining in the area unless appropriate protection is provided, such as self-contained breathing apparatus.

(2) IG-01 (Formerly [Inert Gas Blend] C)

IG-01 is proposed acceptable as a Halon 1301 substitute for total flooding applications. IG-01 is comprised 100% of argon, and as with IG-55, is designed to lower the oxygen level in a protected area to a level that does not support combustion, while maintaining sufficient oxygen for life support.

As with IG–55, EPA proposes that an IG–01 system may be designed to an oxygen level of 10% if employees can egress the area within one minute, but may be designed only to the 12% level if it takes longer than one minute to egress the area. If the possibility exists for the oxygen to drop below 10%, employees must be evacuated prior to such oxygen depletion. A design concentration of less than 10% may only be used in normally unoccupied areas, as long as any employee who could possibly be exposed can egress within 30 seconds.

EPA stresses that, even though the medical specialists concur that it is probably safe to expose the typical worker to 10% or 12% oxygen for up to five minutes, EPA does not encourage any employee to intentionally remain in the area, even in the event of accidental discharge. In addition, the system must include alarms and warning mechanisms as specified by OSHA.

Please refer to the discussion of IG– 55 for a fuller description of inert gas systems.

2. Proposed Acceptable Subject to Narrowed Use Limits

a. Streaming Agents

(1) CF_3I is proposed acceptable as a Halon 1211 substitute in nonresidential applications. CF₃I (Halon 13001) is a fluoroiodocarbon with an atmospheric lifetime of only 1.15 days due to its rapid photolysis in the presence of light. Due to the short atmospheric lifetime of this chemical and the photolytic decomposition mechanism, the resulting GWP is essentially equivalent to that of CO_2 , which is 1. The ODP when released at ground level is extremely low, with current conservative estimates ranging from .008 to .01. Detailed kinetic data and three dimensional modeling efforts are currently in progress, and are expected to reduce these values significantly.