SNAP Update and Risk Assessment on Aerosol Fire Extinguishing Technologies

Halon Options Technical Working Conference
May, 2003

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Overview

- Introduction
- New SNAP listings and submissions under review
- New information / reports on fire sector
- Aerosol Extinguishing Technologies
- Aerosol Standard Development
- SNAP Review of Aerosols

Significant New Alternatives Policy

- Broad authority to support the transition away from ODS
- List ODS alternatives that"reduce ***overall risk*** to human health and the environment"
- SNAP considers
  - Ozone Depletion Potential (ODP)
  - Global Warming Potential (GWP)
  - Occupational and population exposure
  - Other environmental, health, and safety concerns
- SNAP does not consider efficacy

New SNAP Listings

- C6-fluoroketone (FK-5-1-12 / Novec 1230)
  - Total flooding and streaming applications
- HFC-227ea + sodium bicarbonate (HFC 227-BC)
  - Total flooding
- Hydrofluoropolyethers (H-Galden HFPEs)
  - Streaming applications

SNAP Submissions Under Review

- Goodrich 244 *
- Sodium bicarbonate + HFC blends * (Envirogel)
- Inert gas generator *
- Aero - K *
- HFC-125 + *d*-limonene

New Information

- UNEP Halon Technical Options Committee (HTOC) 2002 Assessment Report (March 2003)
  - www.teap.org/REPORTS/downloads/HTOC2002.pdf
- “Status of Industry Efforts to Replace Halon Fire Extinguishing Agents” (March 2002)
  - www.epa.gov/ozone/snap/fire/status.pdf
- New EPA report reviewing use of carbon dioxide total flooding systems (in draft)

HTOC Report Highlights

- Halon fire extinquishants no longer necessary in virtually any new installations
- Research efforts continue for truly cost-effective, in-kind replacements to eliminate halon
- Halon decommissioning and destruction regulations require preparation now
- Consider concept of destruction credits

Next Generation Total Flooding Systems

- Halocarbon agents
- Inert gases
- Water mist
- **Aerosol technologies**
- Inert gas generators
- Foam

Aerosol Extinguishing Technology

- **Condensed aerosols** : Pyrotechnic generators create the particulate aerosol through a combustion process
- **Dispersed aerosols:** Particulate portion is stored in containers with a carrier gas (inert gases or halocarbons)
- Particulate generated have a mean mass aerodynamic diameter (MMAD) of less than 10 microns
  - effective at putting out hidden fires
  - can be inhaled deep into the lungs

Standards Development Ongoing

- **International Standards Organization***
  - Condensed and dispersed aerosols
  - Unoccupied and occupied areas
- **National Fire Protection Association* (Standard 2010)**
  - Condensed and dispersed aerosols
  - Unoccupied and occupied areas
- **CEN (European Union)**
  - Condensed aerosols only
  - Unoccupied areas

EPA participation

Risk Assessment Assumptions for Halon Alternatives

- Development of the risk scenario
  - Assessing accidental discharge
  - In case of fire, other factors have health impacts besides agent (e.g., smoke, fire decomposition products)
  - exposures to fire suppressants are assumed to be shorter than 5 minutes and rare
- Standards require predischarge alarms and personnel evacuation, no unnecessary exposure to any concentration of agent
- ***Identify health endpoints that would impair escape or cause irreversible harm to those exposed***

Risk Assessment Considerations for Aerosols

- Toxicity and inhaled dose of particulates
- By-products of the pyro reaction (condensed)
  - CO, Nox etc...
- Carrier gases (dispersed)
  - halocarbons or inert gases

Other considerations: Visibility

- Aerosols like other dispersed media present visibility issues
  - Will this impair egress?
  - May be mitigated with engineering controls
    - safety lights
    - reducing light scattering of particulate

SNAP Approved Aerosols

- Acceptable in normally occupied spaces
  - FM 227 BC: 227ea/Sodium Bicarbonate
  - Envirogel: Gelled Halocarbon /ammonium polyphosphate
- Acceptable in normally unoccupied spaces
  - SFE: Powdered Aerosol A
  - Pyrogen/Soyuz: Aerosol C
  - FS 0140: Inert Gas/Powdered Aerosol Blend
- **40 CFR Part 82 Subpart G**

Potential Advantages of Aerosols

- Low or no ODP
- Negligible GWP
- Reduce levels of HF in fire situation
- Attractive space /weight profiles

Conclusion

- Safe, cost effective alternatives to Halon still needed
- Alternatives to challenging applications (shipping and aircraft) are critical
- Aerosols offer advantages
- Aerosol standards development ongoing

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