

## POLLUTION PREVENTION OPPORTUNITY DATA SHEET

**HALON REDISTRIBUTION/RECOVERY/RECYCLING/RECLAIMING**

**Revision:** 4/95  
**Product/Process:** Decommissioning of the fire extinguishing agents Halon 1211 and Halon 1301  
**Process Code:** N/A  
**Substitute for:** N/A  
**Waste Stream:** N/A  
**Applicable EPA Hazardous Waste Codes:** N/A  
**Applicable EPCRA Targeted Constituents:** Halon 1211 (Bromochlorodifluoromethane), Halon 1301 (Bromotrifluoromethane)

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**Introduction:** Halon 1211 and 1301 are widely-used fire-suppression and explosion-protection agents. However, both Halon 1211 and Halon 1301 have extremely high ozone-depletion potentials; therefore, production has been halted and use is being curtailed until existing supplies are exhausted.

Halon 1301 and Halon 1211 are still approved for use, but only in mission-critical applications such as flight-line fire fighting and ship- and shore-based crash and rescue operations. In addition, each mission-critical application requires a waiver for procurement of replacement Halon, and its procurement must come from the Defense Logistics Agency (DLA) Halon reserve, since purchase of new product is now impossible. Furthermore, any existing non-mission-critical applications must be decommissioned and allocated to the DLA Halon reserves' stockpile. Conservation of Halons is necessary to preserve existing supplies until replacement products and systems can be implemented. Actual use should be restricted to real incidents requiring fire suppression. Routine testing of systems for proper operation with the Halon product is discouraged.

The stockpile of reclaimed Halon is expected to last a number of years. Nevertheless, technical challenges have hindered product development of Halon substitutes. Although the EPA has approved a number of alternatives under its Significant New Alternatives Policy (SNAP) program, none of the alternatives are simple drop-in replacements.

**Description:** The current supply of Halon is limited for a number of reasons:

- 1) Production was stopped in 1994.
- 2) Companies stockpiled Halon in anticipation of price increases.
- 3) IRS-imposed excise tax.
- 4) True replacements have not been available as "approved and

## POLLUTION PREVENTION OPPORTUNITY DATA SHEET

listed.”

- 5) Large companies have bought up large quantities to ensure availability.

However, the price of reclaimed Halon should start to drop as “approved” alternatives become available and large companies satisfy their Halon needs. Surplus Halon is likely to be resold, since Halon cannot be destroyed economically. Thus, redistribution, recovery, recycling, and reclamation are all methods of meeting future Halon demand. Recycling is the process of removing contaminants (oils, nitrogen, particulates, moisture) by refrigeration and filtration so that the Halon can again be used in a fire suppression system. Reclaiming involves reprocessing the Halon to new product specifications through filtration, distillation, refrigeration, and vaporization.

Halon Redistribution: Both E/M Corporation, a subsidiary of Great Lakes Chemical Corporation, and Automatic Suppression Systems of South Holland, Illinois, provide a recycling service to restore contaminated Halon back to Mil-Spec quality, as well as a market for Halon 1301 and Halon 1211 resale to distributors. The steps required to recover Halon include the following:

- 1) Verify that cylinders contain Halon 1301, Halon 1211, or other Halons.
- 2) Transfer Halon to blow-down tank for storage.
- 3) Recycle Halon through a recycling system to remove contaminants or reclaim the Halon so that it meets all necessary specifications.
- 4) Verify that the reclaimed Halon meets the necessary specifications.
- 5) Return Halon to storage cylinders.

In order to recycle Halon, certain components are required. The pumping system must be able to quickly and efficiently (99 percent efficiency to prevent the escape of Halon into the atmosphere) move the Halon liquid and vapor from the storage tank to processing equipment. Operating pressures range from 360 to 600 psig for pressurized cylinders down to a vacuum of 10 to 20 inches of mercury for cylinders which will be opened to the atmosphere. The recycling system should include modules for 1) removing contaminants by filtration and 2) removing nitrogen by condensing the Halon and venting the nitrogen. Filters should be replaceable without the release of Halon. In general, the two modules can run automatically and are not labor intensive.

Typically, limited Halon supplies are restricted to the following critical use applications. These criteria are only suggested guidelines and do

## POLLUTION PREVENTION OPPORTUNITY DATA SHEET

not represent EPA legislation:

- Where a potential for fatalities or serious injuries exists.
- Where hazardous material processes could result in an environmental release with potential for fatalities, serious injuries, serious environmental incident, adverse public opinion, or fire/explosion.
- Where damage will exceed \$50 million.
- When severe economic impact will result due to interruption of sales.

For more detailed information on Halon 1211 and 1301 alternatives, see the Pollution Prevention Opportunity Data Sheets, "Halon 1211: Uses, Restrictions and Replacements," and, "Halon 1301: Uses, Restrictions and Replacements."

### **Materials**

#### **Compatibility:**

Halons are very inert and not deleterious to most elastomers, metals, or electronic systems. Halons do decompose to a small degree during a fire extinguishing event, releasing some hydrofluoric acid gases. However, the concentrations are so small (several hundred to several thousand ppm) and the gases so readily dispersed that material compatibility is not normally a concern, even if materials left in the enclosed space are sensitive to the acid gases/decomposition products of Halons. Damage is more often caused by the smoke, ash, and soot of the fire.

**Safety and Health:** Dry chemical has a low order toxicity. perfluorocarbons also have a low order toxicity, but care should be taken when handling any of these chemicals. Proper personal protective equipment is recommended.

Consult your local Industrial Health specialist, your local health and safety personnel, and the appropriate MSDS prior to implementing any of these technologies.

#### **Benefits:**

Production of both Halon 1301 and Halon 1211 has been stopped, and any material already existing will most likely be used for its originally intended purpose, since it cannot be converted or easily destroyed. However, conserving the material only for mission-critical applications will prolong its useful lifetime and extend the time period over which the material enters the environment, thus lessening the immediate impact on the ozone layer.

Because there is no universal drop-in replacement and several of the substitutes also have undesirable characteristics, like high global

## POLLUTION PREVENTION OPPORTUNITY DATA SHEET

warming potentials, careful consideration of the choices is necessary in order to select the optimal alternative.

**Economic Analysis:** Use of pollution prevention funds for replacement of Halon fire extinguishing systems with non-Halon based systems is not authorized if the reason for conversion is that the existing system has reached the end of its life expectancy.

Conversion of existing military systems is mandatory, but if an acceptable substitute does not yet exist or the Halon application is considered mission-critical, good maintenance and leak integrity can be used to prolong the useful life of the existing Halon system. Furthermore, as existing Halon systems are phased out of use, the Halon contained in those systems can be recovered and reused in other mission-critical systems still in service. By reclaiming and reusing the Halon from decommissioned systems, the replacements can be done more gradually, lessening the financial impact of the Halon phaseout.

**Major Assumptions:** N/A

**Points of Contact:** Captain Robert Tetla  
Halon Replacement Program  
Occupied Areas  
Wright Laboratories (WR/FIVCF)  
DSN 523-3746

Mr. Fred Walker  
Fire Protection Engineer  
HQ AFCESA/DFE  
DSN 523-6315

Corinna C. Gilfillan  
Program Associate  
Halon Recovery Campaign  
Ozone Protection Project  
Friends of the Earth  
(202) 783-7400 ext. 214

US EPA Stratospheric Ozone Information Hotline, (800) 296-1996  
US EPA Halon Program Manager (202) 233-9193  
Halon Recycling Corporation, (800) 258-1283, (202) 223-6166  
Navy CFC and Halon Clearinghouse, (703) 769-1883  
DLA Halon Bank, (804) 279-4525  
National Fire Protection Association (NFPA), (800) 344-3555

## POLLUTION PREVENTION OPPORTUNITY DATA SHEET

National Association of Fire Equipment Distributors, (312) 644-6610  
Fire Suppression Systems Association, (410) 931-8100  
Fire Equipment Manufacturers Association, (216) 241-7333  
Underwriters Laboratories, (708) 272-8800  
Factory Mutual Research Corporation, (617) 255-4773

## POLLUTION PREVENTION OPPORTUNITY DATA SHEET

Ms. Karen Metchis  
Halon Specialist  
SNAP Program  
Office of Stratospheric Ozone Protection  
US EPA  
(202) 233-9193

Ms. Reva Rubenstein  
Toxicity Specialist  
SNAP Program  
Office of Stratospheric Ozone Protection  
US EPA  
(202) 233-9155

### **Vendors:**

DuPont Fluorochemicals  
(302) 992-2177, Fax (302) 992-2836  
Barley Mill Plaza 13-2150  
P.O. Box 80013  
Wilmington, DE 19880-0013  
Former manufacturer of Halon 1301  
Mr. Daniel Moore  
Market Development Manager for Halon Replacements

The following vendors can provide complete fire suppression systems:

Ansul Fire Protection  
1240 Iroquois Drive, Suite 102  
Napierville, IL 60563-8537  
(708) 305-5700, Fax (708) 305-3360  
Also supplies IG-541  
Mr. David Pelton

Automatic Suppression Systems, Inc.  
130 Armory Drive  
South Holland, IL 60473-2817  
Recovery and reclamation of Halon  
Mr. George A. Krabbe  
President/CEO

Figgie Fire Suppression Systems  
1000 Governors Highway  
University Park, IL 60466  
(708) 534-1000, Fax (708) 534-1011  
Mr. Steve Dimetrovich

POLLUTION PREVENTION OPPORTUNITY DATA SHEET

Fike Fire Suppression Systems  
704 South 10th St.  
P.O. Box 610  
Blue Springs, MO 64013  
(816) 229-3405, Fax (816) 229-4615  
Mr. Jeff Moore

Kidde-Fenwal, Inc.  
400 Main St.  
Ashland, MA 01721  
(508) 881-2000 ext. 2273, Fax (508) 881-8920  
Mr. Stan Slanski

The following vendor can provide Halon reclamation service:  
E/M Corporation  
917 134th St. SW  
Everett, WA 98204  
(206) 787-1068, (206) 787-1070

Paul Huston & Associates  
220 Snake Hill Road  
Trusville, AL 35173  
Recovery and reclamation of Halon  
Mr. Paul Huston.

<b>Approving Authority:</b>	Approving authority is controlled locally and is not required by the major claimant.
<b>Note:</b>	This recommendation should be implemented only after engineering approval has been granted by cognizant authority.

Source(s): Solomon, J., "Halon Redistribution," 1994 International CFC and Halon Alternatives Conference, p. 426-427, October 1994.  
Krabbe, G., "Halon Recovery and Reclaim Technology from the Viewpoint of the Installers/Distributors," 1994 International CFC and Halon Alternatives Conference, p. 428-435, October 1994.  
Huston, P., "The Modular Concept of Halon 1301 Recovery/Recycling/Reclaiming," 1994 International CFC and Halon Alternatives Conference, p. 436-441, October 1994.  
Burton, J. "Halon Bank Management in the Industrial Sector," 1994 International CFC and Halon Alternatives Conference, p. 449-455, October 1994.

