



Ozone Depleting Substances (ODS) Replacement

Environmental Quality Technology Pollution Prevention Program

Purpose: Respond to the phase out of global ODS production in accordance with the Montreal Protocol by demonstrating and qualifying ODS alternatives for critical Army applications.

Requirement: The Army requires the capability to utilize refrigerants and fire suppressants in military equipment. The Montreal Protocol and Clean Air Act phased out production of chlorofluorocarbons and hydrochlorofluorocarbons, which were traditionally used in solvents, refrigerants and fire suppression systems in Army weapon systems. For each use of ODS, the Army either eliminated the requirement or replaced the ODS with a low ozone depleting alternative. To the maximum extent possible, the Army relied on industry for alternatives and technical solutions for ODS applications. All newly introduced chemicals received a toxicity clearance before implementation. Existing quantities of ODSs are being conserved and reused.



The Fox NBCRS Vehicle was one of many systems converted from R-12 air conditioners to R-134a

Technical Approach:

- Evaluate alternatives to Halon 1301 for weapons system fire and explosion suppression applications
- Convert air conditioners in weapons systems from R-12 to R-134a
- Identify maintenance processes requiring ODS solvents and evaluate alternative cleaning and coating technologies
- Eliminate ODS in Army facility applications by retrofitting or replacing systems to allow for effective operations with alternative chemicals

Benefit to the Warfighter:

- Avoided catastrophic shortages of on-board explosion suppressants, fire extinguishers and refrigerants required to protect the Warfighter
- Transitioned all Army cleaning and coating applications to qualified alternatives in order to prevent production delays, interruptions and reduced throughput at depots, arsenals and plants as ODS ingredients became obsolete
- Replaced R-12 refrigerant, Halon 1301 fire suppressant and other ODS to greatest extent practical
- Provided technical justification needed to continue using, and to establish strategic reserve for, select ODS in critical force protection applications where alternatives could not be qualified

Next Steps: Many of the ODS replaced in Army weapon systems were substituted with hydrofluorocarbons, which have high global warming potential (GWP). As a result, these first generation ODS alternatives are now under scrutiny to be regulated globally. There is a need for second generation ODS alternatives with low GWP that also meet military specific performance, flammability and toxicity requirements.

Successfully Transitioned Products:

- Halon 1301 alternatives for fire suppression in ground combat vehicle crew and engine compartments
- Halon 1301 replacement on U.S. Army watercraft
- R-134A conversion of M885 air conditioners
- Alternatives to ODS solvents for all Army industrial operations
- Class I ODS recovery equipment and certification training programs
- ODS reserve for weapons systems that could not be replaced or retrofitted