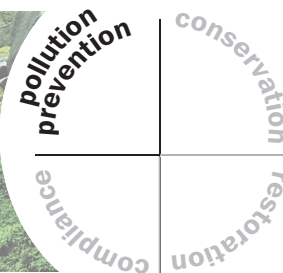


APPENDIX U

OZONE-DEPLETING SUBSTANCES



Natural cycles constantly create and destroy stratospheric ozone. However, various ozone-depleting substances (ODSs) may accelerate the destruction processes, resulting in lower than normal ozone levels. A diminished stratospheric ozone layer allows more radiation to reach the Earth's surface. For many people, overexposure to ultraviolet (UV) rays can lead to skin cancer, cataracts, and weakened immune systems. Increased UV radiation can also lead to reduced crop yield and disruptions in the marine food chain.

There are two types of ODSs. Class I ODSs have a higher ozone-depleting potential than Class II substances. Class I substances listed in the Clean Air Act include chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform. The United States Environmental Protection Agency later added hydrobromofluorocarbons and methyl bromide to the list. When CFCs reach the stratosphere, the ultraviolet radiation from the sun causes them to break apart and release chlorine atoms which react with ozone, starting chemical cycles of ozone destruction that deplete the ozone layer. One chlorine atom can break apart more than 100,000 ozone molecules. As methyl bromide and halons are broken apart, they release bromine atoms, which are 40 times more destructive to ozone molecules than chlorine atoms.

Section 505 of Executive Order (E.O.) 13148, "Greening the Government Through Leadership in Environmental Management," establishes actions that Federal agencies, including the Department of Defense (DoD), must take to reduce and manage the use of ODSs at Federal facilities. These requirements include developing a plan to phase out acquisition of Class I ODSs by December 31, 2010. The DoD Components work hard to reduce their reliance on ODSs and protect the environment through a variety of mechanisms including process changes, material substitutions, and technology initiatives.

Army

The Army remains committed to the elimination of Class I ODSs. Since 1992, the Army eliminated 99 percent of its use of such solvents, 98 percent of CFC refrigerant use, 92 percent of halon fire suppressant use on installations, and 80 percent of halon use in legacy weapon systems. The Army will not allow a continued dependency on Class I ODSs to degrade operational readiness.

Army installations eliminated their dependency on the commercial availability of Class I ODSs. Though installations may reuse CFC refrigerants recovered from retired or retrofit air conditioning and refrigeration (AC&R) systems, they are prohibited from supporting existing AC&R systems with new CFC refrigerant. Likewise, installations may still operate building fire suppression systems that use halon, but must retrofit them with a non-ODS system (preferably water) when discharged.

The Army Acquisition Executive issued a new, aggressive ODS elimination policy to the Army Program Executive Officers (PEOs) and Program Managers (PMs) on March 16, 2004. The Army Acquisition Executive directed the acquisition community to continue to actively pursue the elimination of ODSs from legacy weapon systems and industrial operations when economically feasible. One example of how

the Army complies with this directive is by continuing to retrofit the engine compartment fire suppression system in the Abrams main battle tank. PM Combat Systems, in cooperation with Anniston Army Depot, replaced the old Halon 1301 system with one based on dry powder using baking soda. The Army plans to convert half of the Abrams fleet by 2015. Another example is the conversion of the last tactical use of CFC refrigerants in the air conditioning systems of the Army's primary ambulance. This field retrofit, undertaken by PM Light Tactical Vehicles, will replace the Freon R-12 in the air conditioning system with hydrofluorocarbon (HFC) R-134a. The Army hopes to have this effort completed as early as next year.

Lake City Army Ammunition Plant (LCAAP) is responsible for supplying small caliber ammunition for all of DoD and several North American Treaty Organization allies. Even under incredible production pressures related to Operations Enduring Freedom and Iraqi Freedom, LCAAP successfully converted the 5.56mm high-speed production lines from methyl chloroform to propyl bromide, a non-ODS substance, in the casemouth waterproof sealant formulation.

The Army is a world leader in the elimination ODSs in the areas of helicopter engine nacelle fire suppression and natural refrigerant development. PEO Aviation, in conjunction with PM Apache, PM Utility Helicopter, and PM Cargo Helicopter, continues efforts to qualify a halon replacement for aircraft nacelles through the Halon Replacement Program. For new aircraft and life extension programs that extend legacy systems well beyond 2030, a qualified halon alternative is needed to ensure operational readiness is not compromised. The Army selected HFC-125 as the sole fire suppression agent. As part of continued contingency planning, the 46th Air Force Test Wing at Wright-Patterson Air Force Base is developing design criteria to optimize HFC-125 system performance in the Apache, Chinook, and Blackhawk aircraft.

Navy

Navy policy required shore facilities to retrofit or replace air conditioning and refrigeration equipment that contain CFC refrigerants no later than December 2000 unless a waiver was in place. Between 1996 and 2003, the Navy reduced the total number of CFC-containing pieces from approximately 3,000 units to fewer than 500 units. The remaining units operate under temporary waivers and are scheduled for replacement well ahead of the acquisition phase out goal. Navy policy also prohibits the refill of existing shore facility halon fire suppression systems in the event of discharge, thus already meeting the E.O. phase out goal in this area. On mission-critical weapons platforms, Navy uses a combination of retrofit and end-of-life phase out for Class I ODSs, thus balancing operational and environmental risks while still meeting the directives of E.O. 13148. Between 1993 and 2004, the Navy retrofitted more than 1,000 shipboard CFC air-conditioning and refrigeration systems to non-CFC refrigerants and used CFC refrigerant recovered from these retrofits to support other mission-critical systems until the end of their useful life.

Marine Corps

The Marine Corps completed implementation of ODS elimination initiatives at the installation level. With the exception of Marine Corps Base (MCB) Camp Butler, Japan, and MCB Hawaii, all Marine Corps installations transitioned to non-ODS substitutes or non-ODS technology. The waiver for MCB

Camp Butler does not extend beyond December 31, 2010. The waiver for MCB Hawaii does not extend beyond December 31, 2006. Although Marine Corps Air Station Cherry Point, North Carolina, was also granted a waiver until December 31, 2006, it is no longer required because all of the equipment listed on the waiver has been retrofitted and all of the Class I ODSs in the equipment have been recovered. The Defense Reserve of ODSs maintained by the Defense Logistics Agency (DLA) continues to support mission-critical applications for specified Marine Corps weapon systems such as the Amphibious Assault Vehicle, the Light Armored Vehicle, and the M1A1 Main Battle Tank.

Air Force

In 1993, the Air Force adopted a centralized management policy for ODSs to provide an effective, responsible program for ODS use that would ensure both mission capability and environmental protection. Since 1993, the Air Force invested approximately \$500 million to reduce its annual consumption of Class I ODSs by more than 96 percent. Most of the remaining uses of Class I ODSs are in existing weapon and facility systems that included Class I ODSs in the original equipment designs. The Air Force has not retrofitted these systems with non-ODS alternatives because it has been unable to find alternatives that are technically and economically feasible replacements. The Air Force includes the requirement that alternatives must not increase environmental, safety, and occupational health risks in its technical feasibility criteria.

For the remaining Air Force Class I ODS applications, the primary method of reduction will be through attrition—the retirement of these facility and weapon systems at the end of their useful lives and replacement by new design systems that do not use ODSs. For example, in the next two decades, the Air Force will replace over 2,000 F-15 and F-16 fighter aircraft, which use ODSs in integrated fire and explosion suppression systems, with the F-22 and F-35 aircraft, which have no ODS requirements. This approach is in accordance with the E.O. 13148 direction to “target cost-effective reduction of environmental risk by phasing out Class I ODS applications as the equipment using those substances reaches its expected service life.”

The Air Force continues to monitor commercial technology development efforts and implement Class I ODS alternatives as they become available. In Fiscal Year (FY) 2004, the Air Force qualified a new solvent, AK225G, as the replacement for the Class I ODS CFC-113 used in sensitive aircraft oxygen system cleaning processes. In addition, the Hush House Program Office was able to formally certify high-expansion foam as a suitable replacement for Halon 1301 used in the fire suppression systems in Air Force engine test facilities. This enabled the Air Force to comply with the European Union’s ODS regulations by replacing those fire suppression systems at installations in Europe during FY2004.

Since October 1999, the Air Force has not approved any purchases of ODSs. Instead, the Air Force relies entirely on its existing stocks of Class I ODSs to support its remaining needs. The Air Force ensures that all personnel are aware of the need to avoid unnecessary loss of Class I ODS and to recover, reclaim, and reuse the Class I ODSs in stock. The Air Force maintains these strict controls in both peacetime and in combat situations, where Class I ODS consumption can increase.

Defense Logistics Agency

The Defense Logistics Agency manages the Department of Defense ODS Reserve, providing the DoD Components with mission-critical ODSs. The Ozone Depleting Substances Reserve only supports mission-critical weapons platforms. There are no acceptable ODS alternatives for many of the major weapon systems currently deployed. DoD established the Reserve as an essential part of the Department's plan for phasing out the use of ODSs. DLA provides central management of ODSs and provides DoD with the capability to receive, reclaim, and issue Class I CFCs and halons. Storing and handling the ODSs properly protects the environment and makes it possible for DoD to conserve and recycle ODSs, reducing the overall quantities required. The ODS Reserve has agreements with other Federal agencies for the recovery and reclamation of excess ODS stocks. Transfers of ODSs from other Federal agencies have saved millions of dollars designated for purchase requirements and prevented poor handling and storage practices. The Reserve is a model for both foreign governments and commercial activities interested in ODS recovery and recycling.