



AETC WEAPON SYSTEMS OZONE DEPLETING SUBSTANCE MANAGEMENT GUIDE

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**HQ AETC/LG-EM
RANDOLPH AFB TX
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This guide is intended to complement AFI 32-7086 and its AETC Supplement; in the event of discrepancy, applicable AFIs take precedence.

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1. INTRODUCTION

1.1 Background

A class of commonly used organic halogenated compounds is the major contributor of the rapidly accelerating destruction of the Earth's protective stratospheric ozone layer. These compounds, called ozone-depleting substances (ODSs), are divided into two main groups, halons and chlorofluorocarbons, or CFCs. Halons are primarily used in fire suppression applications. CFCs have a wide range of applications as refrigerants, solvents, propellants, and blowing agents for plastic manufacture, just to name a few. Hydrochlorofluorocarbons (HCFCs) are similar to CFCs in structure and function, but contain a smaller percentage of halogen and are generally less destructive in the ozone-layer. ODSs are divided into two classes (I and II) based on their ozone-depleting potential. Class I ODSs, the class of compounds more destructive to the ozone layer, is the current focus of reduction efforts. While Class II ODSs are not currently regulated in any way, substitution of these chemicals is encouraged whenever possible.

1.2 Federal Government Activities Regarding Ozone Depleting Substances

Because of the destructive nature of ozone depleting substances, nations around the world agreed to cease all production of Class I ODSs by 31 December 1995 in the Montreal Protocol. To support the international effort, the federal government signed the protocol and is committed to reducing the country's dependence on ODSs. On Earth Day, 1993, President Clinton signed Executive Order (EO) 12843 - *Procurement Requirements for Federal Agencies for Ozone Depleting Substances*, directing the federal agencies (including the Air Force) to demonstrate leadership in the control and phase-out of ODS procurement and use. The EO requires federal agencies to support federal leadership by:

- minimizing, where economically practicable, the procurement of products containing or manufactured with Class I ODSs, and maximizing the use of safe alternatives, and similarly, procuring equipment that is not ODS dependent,
- amending existing contracts, to the extent permitted by law and where practicable, to be consistent with the phaseout schedule for Class I ODSs,
- implementing policies and practices that recognize the increasingly limited availability of Class I ODSs as production ceases. Such practices shall include, but not limited to:

- reducing emissions and recycling ODSs
- ceasing the purchase of non-essential products containing or manufactured with ODSs
- requiring new contracts to provide that any acquired products containing or manufactured with Class I ODSs be labeled in accordance with section 611 of the Clean Air Act Amendments

1.3 Air Force ODS Management Requirements

To support the federal initiatives, the Air Force has initiated an aggressive campaign to limit Class I ODSs in its operations by sharply reducing purchases and eliminating or reducing use wherever possible. Air Force guidance concerning Class I and Class II ODSs have been consolidated in Chapter 4 of AFI 32-7086. Some of the main installation-level AFI 32-7086 requirements pertaining to ODSs are summarized below:

- Work with MAJCOM (HQ AETC/LG-EM) to identify weapon system ODS elimination opportunities and fund, where economically and technically feasible, weapon system ODS elimination projects
- Manage the allocation of mission critical Air Force supplies of Class I ODS
- Implement the HAZMAT Pharmacy Program (HPP) to authorize, track and control requisitions, receipts, issues, transfers, uses, and dispositions of ODSs
- Reduce atmospheric discharges by modifying operating, training, and testing practices and implementing conservation measures such as recovery, recycling, and reuse
- Prohibit purchase of any Class I ODS unless authorized by a valid SAO approval
- Prohibit use of any Class I ODS not required by a formal technical document (e.g., Technical Order or commercial technical manual)
- Ensure all MAJCOM excess Class I ODS is turned-in to the DLA Class I ODS Defense Reserve according to approved Air Force turn-in procedures

- Ensure that no excess Class I ODS is transferred outside the Air Force, except to the DLA Class I ODS Defense Reserve
- Manage ODSs to meet mission needs, including mobilization and emergency requirements, while systems are being converted to non-ODS consumers.

To accomplish the mission, the AF allowed certain exceptions to the purchase cessation and is participating in an effort coordinated by the Defense Logistics Agency (DLA) to bank and manage certain stocks of mission-critical ODSs. As noted above, continued purchase and use of Class I ODSs are permitted for Technical Order (TO) applications where alternatives have not been identified by the Single Manager, and for contractors who are required to use ODSs by Air Force directives in the performance of their Statement of Work (SOW) objectives (through SAO Approval).

Because of the international emphasis to protect the ozone layer, large efforts are currently underway to develop substitutes for ODSs. Substitutes for certain applications have already been identified, particularly through the Environmental Protection Agency (EPA) Significant New Alternatives Program (SNAP). Additionally, because a significant portion of the military uses of these substances, a considerable level of effort is being directed to identify and evaluate substitute chemicals or non-ODS processes for use in military-critical maintenance and support operations. Once acceptable substitutes are identified, substitutions are then incorporated by Single Managers in system maintenance technical orders (TOs) or equivalent technical directives.

2. CURRENT ODS USES IN AETC WEAPON SYSTEMS

AETC weapon systems use ODSs, such as halons in hush house and aircraft fire suppression systems, refrigerants in older vehicle air conditioning, and solvents for other miscellaneous uses, mainly cleaning of gaseous and liquid oxygen systems.

2.1 Refrigerants

AETC Logistics is currently managing refrigerants for use in older transportation vehicle air conditioning units, and in air conditioning units found on C-21 and C-12 aircraft. Efforts are underway to replace refrigerants from R-12 to R-134a or other approved refrigerant as funds become available. CFC-114 refrigerant is also used in F-16/F-15 LANTIRN pods. No modification or substitute is currently available to replace CFC-114.

2.2 Halons

Halons are used as fire suppressants in hush houses, as a fuel-inerting agent in F-16s during war-time contingencies, and in aircraft fire suppression systems.

2.3 Solvents and Miscellaneous Uses

Solvents are used in a wide range of applications, however the vast majority of ODS solvents have been replaced with more environmentally-safe substitutes. The primary ODS still used in this area is CFC-113, which is required for the cleaning of equipment related to LOX and oxygen systems.

3. AETC WEAPON SYSTEMS ODS MANAGEMENT SYSTEMS

This section identifies and evaluates controls that AETC Logistics uses in meeting the AF goal of eliminating ODS usage wherever economically and technically feasible, and how it manages its existing resources.

3.1 Procurement Controls for Organic Air Force Activities

AETC Logistics has the ability of procuring ODSs through two main routes: through Base Supply and local purchases of goods and services (both through local purchase and formal solicitations). Issues associated with each of these routes are discussed below.

3.1.1 Controlling Class I ODS Procurements SAO Approval Process at MAJCOM Level

Each fiscal year, in accordance with AFI 32-7086, SAF/AQR allots purchase amounts of Class I ODSs to each MAJCOM. This amount is based upon MAJCOM datacalls identifying requirements for the continuing use of Class I ODSs. Purchase amounts allowed by SAF/AQR SAO Approval are broken into two categories. The first category includes those amounts the command is authorized to purchase from the Defense Logistics Agency (DLA) ODS Defense Reserve. The second category includes amounts the command is authorized to buy through other channels (ie, local). MAJCOMs take the SAF/AQR assigned allotments of Class I ODSs and redistribute them to their installations based upon mission requirements. Annually, at the beginning of each fiscal year, HQ AETC/LG-EM provides each installation HAZMO with a package indicating approved purchase quantities of Class I ODSs for the year. File this package carefully; this package is considered the installation's SAO Approval (formerly called "waiver") to procure Class I ODSs, and should include required Class I ODS amounts for organic Air Force support personnel and civilian contractors, as applicable. (**Note:** to secure SAO Approval for contracted Air Force operations, follow the steps outlined in section 3.2 below.) The bottom line is that HQ AETC/LG-EM formal approval is required before any Class I ODS can be purchased.

3.1.2 Controlling Class I ODS Procurements at Installation-level Base Supply

Procurement of Class I ODS-containing materials through the base supply system are controlled through the Logistics Hazardous Material Field Office (LG-HAZFO). Potentially hazardous materials are reviewed by the installation Hazardous Material Management Office (HAZMO) and are

assigned an Issue Exception Code (IEX) code of 8, 9 or M if the item is managed through the HPP. IEX "M" is used for pure ODS compounds. At the discretion of each installation, all HPP managed items can be assigned IEX code of "9". If this method is chosen, the actual IEX code is maintained in the Air Force Environmental Management Information System (AF-EMIS).

Each work area (shop) requiring the use of a hazardous material or ODS must request an authorization using AF Form 3952, Chemical/Hazardous Material Request/Authorization. Authorization requests for pure Class I ODSs and Class I ODS-containing refrigerants require a TO reference for approval. Authorizations are reviewed by the HAZMO for environmental, safety and occupation health concerns. If the item is approved for use, the authorization is input into the AF-EMIS database creating an Authorized User List (AUL), and a copy of the TO page or technical directive will be kept on file for future reference. All hazardous materials and ODS items must be listed on the AUL prior to order and issue action through base supply. As each base is allotted a set amount of Class I ODSs in their SAO Approval package, the HAZMOs must ensure their issue of these products do not exceed their allotment. (See section 2.3) Products such as cleaners and solvents containing Class I ODSs are still being supplied to bases through various sources; the bases should act independently to minimize the impact of this loophole as much as possible by selectively procuring non-ODS containing products whenever possible. The Air Force is selectively procuring non-ODS materials and will continue to send ODS-containing products to installations until stocks of those items are depleted.

Situations may arise where a Class I ODS usage is "rediscovered" or an increase in operations tempo will create a shortfall in the base's annual allocation. Occasionally, an end-user will require a Class I ODS to complete mission objectives, but have no technical directive authorizing its use. In cases like these, the HAZMO should contact HQ AETC/LG-EM (see appendix) as soon as possible. To help speed your request, please have ready the NSN, type ODS, TO page/technical directive reference, and estimated annual quantity needed. Each request will be promptly reviewed on a case-by-case basis.

3.1.3 Controlling Procurement of ODSs Obtained Through Local Purchases

The International Merchant Purchase Authorization Card (IMPAC) system is used for local purchases of goods and services of up to \$25,000, depending upon the limit on authorized cards. Before purchasing, the purchaser is required to determine if the item contains an ODS. The request is then reviewed by the approving official and entered into the IMPAC log, or

alternatively in accordance with local policies. The IMPAC Office at the base Contracting Office will review the log periodically. Procedures for use of IMPAC are the same as those for ODS items obtained through base supply. Authorizations must be approved through the HAZMO and each purchase tracked through the LG-HAZFO or requesting organization's supporting HAZFO prior to procurement action. The purchaser should annotate on the IMPAC log the HAZMO authorization to prevent any misunderstandings.

The system components are responsible for identifying, reviewing, and controlling locally-purchased goods and services. Review by the HAZMO is not automatic. Also, local purchases are sometimes reviewed by personnel relatively inexperienced in identifying hazardous materials, and some ODS purchases may get through the current system. Therefore, a review by experienced, trained personnel should be extended to all local purchases.

3.2 Procurement Controls for Contracted Air Force Activities

For procurements of goods or services over the limit of your IMPAC card, a formal contract and solicitation is normally required. For these purchases, requesting organization commanders are directed under the Under Secretary of the Air Force for Acquisition (SAF/AQ) contracting policy to sign a statement certifying that the requirements of the request do not require the use of a Class I ODS, nor does it require the contractor to use a Class I ODS. In solicitations, installations comply with SAF/AQ guidance by including Air Force Federal Acquisition Regulation Supplement (AFFARS) clause 5310. The AFFARS requires the following:

- a. The AF cannot require the use of, nor specify a requirement that can only be met by a Class I ODS without obtaining Senior Acquisition Official (SAO) Approval (formerly called "ODS Waiver").
- b. The purchase of refrigeration or support equipment (facility air conditioning systems, aerospace ground equipment, commercial vehicles, and other) that use ODS as a coolant/refrigerant is prohibited.

Except materials covered by (a), above, ODS-containing materials are allowed for purchase without SAO Approvals or statements concerning the government requirements if the government does not direct or specify the manufacture or formulation of the product. A potential loophole exists in contractors using Class I ODSs, where the use is not required by the AF. This potential loophole requires continued diligence on the part of the Contracting Office and the base populace to ensure that Class I ODSs are not, even indirectly, procured through goods and services contracts.

Contracts requiring the use of a Class I ODS by the Air Force to meet their statement of work objectives must be coordinated and worked through MAJCOM *prior* to their award. Current contracts which are found to require Class I ODS usage must also procure SAO Approval through MAJCOM. To apply for SAO Approval, forward the following information to HQ AETC/LG-EM *as early in the contracting process as possible*:

- Weapons System Mission Design Series (MDS)
- Technical Directive reference (TO number, page and paragraph; or other applicable commercial technical directive)
- Type ODS required and estimated annual quantity required
- Contract action type (ie, aircraft maintenance, transportation)
- Contractor Company and Contract number (if assigned)
- Contract award date and performance completion date
- Point of Contact

3.3 Recordkeeping and Reporting

Each year, MAJCOMs are allotted limited amounts of Class I ODSs for use in their processes. These amounts reflect those quantities of Class I ODSs in DLA set aside for critical mission uses, along with those amounts procurable through local channels. To meet mission objectives, these amounts are allocated by MAJCOMs to their installations. To avert possible shortfalls, the MAJCOM tracks installation Class I ODS procurement through monthly reports submitted by the HAZMOs. It is incumbent upon each installation to manage and track how much of these ODSs are used in their processes. Any purchase of Class I ODSs must be reported by the 10th of each month, or the first working day thereafter, to HQ AETC/LG-EM in the format shown on the following page (fig. 1). Please note that only purchases are required to be reported, as existing stocks do not count towards the installation's Class I ODS allotment from MAJCOMs. Also, only "pure" purchases should be reported, ie, those items containing at least 85% of a *single* ODS. Those procured products containing less than 85% of any single Class I ODS are not required to be reported.

CLASS I ODS PURCHASE REPORT

NSN/ Locally Assigned Number	Unit of Issue	Type of ODS	Total lbs Purchased		Using Organization	TO Justification	Page and Paragraph	Estimated Annual Requirement
			DLA	Local				

Fig. 1

4. WEAPON SYSTEMS REFRIGERANT MANAGEMENT PLAN

4.1 Weapon Systems Refrigerant Use in AETC

AETC has equipment which use CFC-12 and CFC 114 as refrigerant media.

4.1.1 CFC-12 Use

AETC Logistics manages a wide assortment of CFC-12 AC/Refrigeration equipment, including automotive and aircraft air conditioning systems. The Non-Airborne Vehicles Material Group Manager (WR-ALC/LV) has authorized three SNAP-approved refrigerants to replace R-12 in existing R-12 motor vehicle air conditioning (MVAC) systems. Their use is mandated whenever possible. Contact WR-ALC/LV for further guidance. For those systems where no SNAP-approved alternative is available, continued use of R-12 refrigerant requires a management plan as indicated in section 4.2 below.

4.1.2 CFC-114 Use

CFC-114 is only used on LANTIRN pods for use on F-16s and F-15s.

4.2 Weapon Systems Refrigerant Management Requirements

The AF directs the following requirements in managing its refrigerant assets:

- Adopt policies and procedures that prohibit the purchase of Class I ODS refrigerant or equipment that uses Class I ODS refrigerants without SAO Approval
- Prohibit use of any Class I ODS refrigerant not required by a formal technical document (e.g., TO or commercial technical manual)
- Use Class II ODSs only as a last resort, when all other alternatives have been shown to be infeasible
- Manage existing inventories so that existing equipment can be operated with sufficient charge until equipment economic life is reached
- Recover refrigerant from retired equipment
- Prohibit the release of refrigerant to the environment
- Ensure all excess Class I refrigerant is turned in to the DLA Class I ODS Defense Reserve according to approved Air Force turn-in procedures

(see chapter 7). Contact HQ AETC/LG-EM prior to turn in of non-essential halon reserves to the DLA ODS Bank (DoD Reserve)

- Use only trained, certified technicians to handle or work on Class I ODS equipment
- Each unit that utilizes Class I ODS refrigerant equipment will develop a Refrigerant Management Plan. This plan will at a minimum indicate servicing intervals, quantities, and retirement/replacement timeline for each piece of equipment to a non-Class I ODS refrigerant to show a decreasing reliance on Class I ODSs

5. HALON MANAGEMENT PLAN

5.1 Weapon Systems Halon Uses in AETC

The Air Force operations in AETC currently use halon in fire suppression applications. These include facility fire suppression systems (hush houses), flightline fire suppression systems, and fire extinguisher systems and portable bottles on aircraft, mainly the C-5, C-141, C-17, C-130, C-9, C-21 airplanes, and UH-1 helicopters.

5.1.1 Halon 1211 Use

Halon 1211 is used in 150 pound flightline extinguishers. Halon 1211 is also used in portable fire extinguisher bottles on various aircraft. Because no suitable replacement has been identified, these have not been programmed for replacement.

5.1.2 Halon 1301 Use

Halon 1301 is contained in T-10 and T-12 hush houses with fixed facility fire extinguishing systems. Efforts are underway to identify a Halon 1301 replacement in AF Hush Houses, and in the meantime, HQ USAF/ILM (per letter dated 31 Dec 97, Air Force Hush House (HH) Interim Strategy) has allowed the use of Halon 1301 from the Defense Reserve on a case-by-case basis provided the quantity does not exceed the maximum allowable by the SAF/AQ Class I ODS SAO Approval (contact HQ AETC/LG-EM for more information). Halon 1301 is also widely used in on-board aircraft fire suppression systems and in F-16s as a fuel-inerting agent. Currently, aircraft fire suppression systems are eligible to obtain halon 1301 per TO directive. The use of Halon 1301 on F-16s as a fuel-inerting agent is not allowed under peacetime conditions.

5.2 Weapon Systems Halon Management Requirements

As was discussed in Chapter 1, Air Force halon management requirements are contained in AFI 32-7086 and the Air Force Environmental Strategy. These requirements pertinent to halon include:

- Prohibition on the purchase of all halons (unless authorized by SAO Approval).
- Prohibition on the use of any halon not required by a formal technical document (e.g., TO or commercial technical manual).

- Prohibition on the purchase of all halon fire extinguishing equipment for ground applications. This does not include aircraft related applications.
- Convert halon systems to non-ODS alternatives whenever technically and economically feasible. Efforts are currently underway to identify a halon 1301 replacement for all Air Force hush houses. Similar needs are under research for aircraft-installed systems. Utilize the Tech Needs Survey (TNS) process and the Hazardous Material Reduction Prioritization Process (HMRPP) to identify new requirements and potential solutions.
- Properly manage halon to meet mission critical needs, including mobilization and emergency requirements, during conversion to non-halon systems.
- Ensure all excess Class I refrigerant is turned in to the DLA Class I ODS Defense Reserve according to approved Air Force turn-in procedures. Contact HQ AETC/LG-EM prior to turn in of non-essential halon reserves to the DLA ODS Bank (DoD Reserve).

6. ODS SOLVENT AND OTHER MISCELLANEOUS USES

6.1 Weapon Systems Solvent Use in AETC

The majority of Class I ODS solvent use in this category consists of general parts cleaners, lubricants and corrosion preventative compounds. These are frequently used by a variety of operations in AETC, usually on at least a weekly basis, in small amounts, typically one to two ounces per application. Some solvent uses for Class I ODS compounds are still required by AF Technical Order (TO), but most are not. It is expected that Class I ODS-containing solvent use will continue to decline rapidly, as the cost of related ODSs become more expensive, as manufacturers reformulate their products, and general requirements are eliminated from technical orders. As ODS-containing compounds are phased out, the Air Force restocks in favor of equivalent products without ODSs; AETC Weapon systems activities are switching to other non-ODS formulations with the help of the HPP. The HAZMO will continue to assist in identifying alternatives for ODS-containing formulations wherever possible. For TO requirements, the shops should identify the requirements to the item manager responsible for the TO via an AFTO Form 22 and the Technical Needs Survey Process. Contact your unit Environmental Coordinator for help. These measures will continue to reduce ODS solvent use, approaching zero in time.

Two uses of a pure ODS were identified, pure trichlorotrifluoroethane (CFC-113) cleaning solvent is used in PMEL and Oxygen Equipment Cleaning applications. Alternatives for CFC-113 are under review for incorporation into Air Force TOs.

6.2 Future Activities

Through efforts made to identify suitable substitutes and eliminate all non-essential uses, AETC weapon systems can easily realize a zero dependence on this class of compounds. The HAZMO will continue to assist in identifying and eliminate non-essential uses by requiring justification for use, identifying potential substitutes where possible, restricting the amount of material used. Likewise, the unit Environmental Coordinator should be working with the shops to evaluate potential substitutes and take the appropriate steps to incorporate their use in technical directives.

7. AIR FORCE ODS TURN-IN FOR THE DEFENSE RESERVE

7.1 ODS Turn-in

The Defense Reserve was established to bridge the gap between the end to Class I ODS manufacturing and their use in mission-critical weapons systems. Any excess unopened/unused refrigerants, halons, or solvents listed below are required to be returned to DLA. ***Do not send these unopened items to DRMO for disposition.*** If you are unsure about the disposition of a Class I ODS, please contact HQ AETC/LG-EM for help.

- Halons: 1202, 1211, and 1301
- Refrigerants (R) / Chlorofluorocarbon (CFC): -11, -12, -114, -500, -502
- Solvents: CFC-113; 1,1,1 Trichloroethane (TCA); a.k.a. Methyl Chloroform (MCF)

7.2 ODS Turn-in Procedures

- Contact your base HAZMO or supporting HAZFO for possible redistribution on base
- If no requirement exists on base, call HQ AETC/LG-EM for possible redistribution within AETC or the Air Force. If no requirement exists at this level, then the ODSs should be shipped directly to the Defense Reserve. Funding to ship ODSs may be available through DLA.
- Only pure ODSs are accepted by the Defense Reserve. Solvents should be returned in their original unopened containers. Opened containers should be turned in through DRMO for disposal IAW installation procedures.
- Empty recovery and standard cylinders can be turned in to the Defense Reserve, with the following exceptions: empty fire extinguishers, empty commercial containers, burnt out or mixed chemicals, aerosol cans with residual chemicals, and dry chemicals.

8. CLASS II OZONE DEPLETING SUBSTANCES: THE NEXT PHASE

8.1 Class II ODS Timeline

As was the case with Class I ODSs, Class II ODSs are subject to an international agreement ceasing all production. On 1 Jan 2030, all Class II ODS production will completely cease. However, by 2020, US production will have effectively ended.

The Air Force is already looking ahead to this next round of ODS reductions/eliminations. Any new weapon system scheduled to remain in the Air Force inventory beyond 1 Jan 2020 is required to be Class II ODS-free. Likewise, the Air Force will not modify existing weapon systems to accept Class II ODSs if the system lifespan exceeds 1 Jan 2020.

Key Class II ODS production dates, as provided in AFI 32-7086, are as follows: (Baseline date in 1996)

- 1 Jan 2004- 35 percent reduction in production
- 1 Jan 2010- 65 percent reduction in production
- 1 Jan 2015- 90 percent reduction in production
- 1 Jan 2020- 99.5 percent reduction in production
- 1 Jan 2030- all production ceases

8.2 Class II ODS Management

With the reduction timeline established by international agreement, we can expect to meet or accelerate the Air Force timeline to reduce our reliance on Class II ODSs. A number of weapon systems have substituted a Class II ODS for a Class I. While Class II ODSs are currently easily and perfectly legally obtainable from multiple supply sources, it is important that we begin now to minimize their uses. Actions we take today to minimize their use places the Air Force in the advantageous posture of leading by example and reducing overall compliance cost.

8.3 Class II ODS Reporting Procedures

Effective 1 Oct 98, AETC will begin tracking Class II ODSs for its Weapon Systems. Reporting procedures are the same as for reporting Class I purchases. A technical order requirement is not mandatory to purchase a Class II ODS, but it will be required for the

AF Form 3952, Chemical Authorization Request for initial purchases of a Class II ODS. This information will be entered into the EMIS data base and a purchasing report will be generated and sent to HQ AETC/LG-EM no later than the 10th day of each month. This procedure will only apply to AETC Logistic's/Operation's requests relating to weapon systems. All other organizations are not required to have technical order references or justifications to purchase a Class II ODS. These procedures will allow us to project future costs associated with eliminating Class II ODSs from our technical orders, and initiate required actions with the applicable Single Managers.

9. APPENDIX

9.1 Abbreviations and Acronyms

AETC	Air Education and Training Command
AF	Air Force
AF-EMIS	Air Force Environmental Management Information System
CFC	Chlorofluorocarbons
DLA	Defense Logistics Agency
EO	Executive Order
EPA	Environmental Protection Agency
HAZFO	Hazardous Material Field Office
HAZMO	Hazardous Material Management Office
HCFC	Hydrochlorofluorocarbons
HMRPP	Hazardous Material Reduction Prioritization Process
HPP	HAZMAT Pharmacy Program
IMPAC	International Merchant Purchase Authorization Card
MDS	Mission Design Series
NSN	National Stock Number
ODS	Ozone Depleting Substance
SAO	Senior Acquisition Official
SNAP	Significant New Alternatives Program
SOW	Statement of Work
TNS	Technical Needs Survey

9.2 Program Point of Contact

HQ AETC/LG-EM
555 E Street East
Randolph AFB TX 78150-4440

DSN 487-6850, fax 487-6054
Com (210) 652-6850, fax (210) 652-6054

9.3 Other Sources of Information

The following sources of information may help answer any questions:

HQ AETC/LG-EM Web Homepage:

<http://www-logistics.aetc.af.mil/maint/enviro/homepage.htm>

PRO-ACT Web Homepage:

<http://www.afcee.brooks.af.mil/PRO-ACT>

AETC Shop-Level Pollution Prevention Manual

Available for download at the HQ AETC/LG-EM Web Homepage

9.4 Class I and Class II ODS Listing

Class I Ozone Depleting Substances

Halocarbon Number	Molecular Formula	Name
CFC-11	CCl ₃ F	Trichlorofluoromethane
CFC-12	CCl ₂ F ₂	Dichlorodifluoromethane
CFC-113	C ₂ Cl ₃ F ₃	Trichlorotrifluoroethane
CFC-114	C ₂ Cl ₂ F ₄	Dichlorotetrafluoroethane
CFC-115	C ₂ ClF ₅	Chloropentafluoroethane
Halon 1011	CH ₂ BrCl	Bromochloromethane
Halon 1202	CBr ₂ F ₂	Dibromodifluoromethane
Halon 1211	CF ₂ ClBr	Bromochlorodifluoromethane
Halon 1301	CF ₃ Br	Bromotrifluoromethane
Halon 2402	C ₂ F ₄ Br ₂	Dibromotetrafluoroethane
CFC-13	CClF ₃	Chlorotrifluoromethane
CFC-111	C ₂ Cl ₅ F	Pentachlorofluoroethane
CFC-112	C ₂ Cl ₄ F ₂	Tetrachlorodifluoroethane
CFC-211	C ₃ Cl ₇ F ₃	Heptachlorofluoropropane
CFC-212	C ₃ Cl ₆ F ₂	Hexachlorodifluoropropane
CFC-213	C ₃ Cl ₅ F ₃	Pentachlorotrifluoropropane
CFC-214	C ₃ Cl ₄ F ₄	Tetrachlorotetrafluoropropane
CFC-215	C ₃ Cl ₃ F ₅	Trichloropentafluoropropane
CFC-216	C ₃ Cl ₂ F ₆	Dichlorohexafluoropropane
CFC-217	C ₃ ClF ₇	Chloroheptafluoropropane
Carbon Tetrachloride	CCl ₄	Tetrachloroethane
Methyl Chloroform	CHCl ₃	Trichloroethane (all isomers)
Methyl Bromide	CH ₃ Br	Bromomethane

Source: AFI 32-7086, Hazardous Materials Management

Class II Ozone Depleting Substances

HCFC Number	Molecular Formula
HCFC-21	CHFCI ₂
HCFC-22	CHF ₂ Cl
HCFC-31	CH ₂ FCI
HCFC-121	C ₂ HFCl ₄
HCFC-122	C ₂ HF ₂ Cl ₃
HCFC-123	C ₂ HF ₃ Cl ₂
HCFC-123b	CHCl ₂ CF ₃
HCFC-124	C ₂ HF ₄ Cl
HCFC-124b	CHFClCF ₃
HCFC-131	C ₂ H ₂ FCI ₃

HCFC Number	Molecular Formula
HCFC-132	C ₂ H ₂ F ₂ Cl ₂
HCFC-133	C ₂ H ₂ F ₃ Cl
HCFC-141	C ₂ H ₃ FCI ₂
HCFC-141b	CH ₃ CFCl ₂
HCFC-142	C ₂ H ₃ F ₂ Cl
HCFC-142b	CH ₃ CF ₂ Cl
HCFC-151	C ₂ H ₄ FCI
HCFC-221	C ₃ HFCl ₆
HCFC-222	C ₃ HF ₂ Cl ₅
HCFC-223	C ₃ HF ₃ Cl ₄

Class II Ozone Depleting Substances (continued)

HCFC Number	Molecular Formula
HCFC-224	C ₃ HF ₄ Cl ₃
HCFC-225	C ₃ HF ₅ Cl ₂
HCFC-225ca	CF ₃ CF ₂ CHCl ₂
HCFC-225cb	CF ₂ ClCF ₂ CHClF
HCFC-226	C ₃ HF ₆ Cl
HCFC-231	C ₃ H ₂ Cl ₅
HCFC-232	C ₃ H ₂ F ₂ Cl ₄
HCFC-233	C ₃ H ₂ F ₃ Cl ₃
HCFC-234	C ₃ H ₂ F ₄ Cl ₂
HCFC-235	C ₃ H ₂ F ₅ Cl

HCFC Number	Molecular Formula
HCFC-241	C ₃ H ₃ Cl ₄
HCFC-242	C ₃ H ₃ F ₂ Cl ₃
HCFC-243	C ₃ H ₃ F ₃ Cl ₂
HCFC-244	C ₃ H ₃ F ₄ Cl
HCFC-251	C ₃ H ₄ Cl ₃
HCFC-252	C ₃ H ₄ F ₂ Cl ₂
HCFC-253	C ₃ H ₄ F ₃ Cl
HCFC-261	C ₃ H ₅ Cl ₂
HCFC-262	C ₃ H ₅ F ₂ Cl
HCFC-271	C ₃ H ₆ Cl

Source: AFI 32-7086, Hazardous Materials Management