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FINAL GOVERNING STANDARDS

for

Portugal

(FGS-P)

Prepared By

Headquarters United States Air Forces Europe

United States Department of Defense

Environmental Executive Agent for Portugal

February 2011

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FINAL GOVERNING STANDARDS for PORTUGAL

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OVERVIEW

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CHAPTER 1

OVERVIEW

C1.1. PURPOSE

C1.1.1. The primary purpose of these Final Governing Standards (FGS) is to provide specific standards for environmental compliance at United States (US) Department of Defense (DoD) installations in Portugal. This document implements DoD Instruction (DoDI) 4715.5, "Management of Environmental Compliance at Overseas Installations," and is based on DoD 4715.05-G, "Overseas Environmental Baseline Guidance Document" (OEBGD).

C1.1.2. These standards do not create any rights or obligations enforceable against the US, the DoD, or any of its Components, nor does it create any standard of care or practice for individuals. Although this document refers to other DoD Directives (DoDDs) and DODIs, it is intended only to coordinate the requirements of those directives as required to implement the policies found in DoD Instruction 4715.5. This document does not change other DoDDs or DODIs or alter DoD policies.

C1.2. APPLICABILITY

C1.2.1. These FGS provide environmental compliance standards for actions for DoD Components at installations in Portugal, which comprises the territory on the European mainland that is historically defined as Portuguese, and the Azores and Madeira archipelagos.

C1.3. EXEMPTIONS. These standards do not apply to:

C1.3.1. DoD installations that do not have more than *de minimis* potential to affect the natural environment (e.g., offices whose operations are primarily administrative, including defense attaché offices, security assistance offices, foreign buying offices or other similar organizations), or activities for which the DoD Components exercise control over only on a temporary or intermittent basis;

C1.3.2. Leased, joint-use and similar facilities to the extent that DoD does not control the instrumentality or operation that a criterion seeks to regulate;

C1.3.3. Operations of US military vessels or the operations of US military aircraft, or off-installation operational and training deployments. Off-installation operational deployments include cases of hostilities, contingency operations in hazardous areas, and when US forces are operating as part of a multi-national force not under full control of the US. Such excepted operations and deployments shall be conducted in accordance with applicable international agreements, other DoDDs and DoDIs, and environmental annexes incorporated into operation plans or operation orders. However, these FGS do apply to support functions for US military vessels and US military aircraft provided by the DoD Components, including management or disposal of off-loaded waste or material;

C1.3.4. Facilities and activities associated with the Naval Nuclear Propulsion Program, which are covered under Executive Order (EO) 12344, "Naval Nuclear Propulsion Program," and conducted pursuant to 42 United States Code (U.S.C.) 7158;

C1.3.5. The determination or conduct of remediation to correct environmental problems caused by DoD's past activities; and

C1.3.6. Environmental analyses conducted under EO 12114 "Environmental Effects Abroad of Major Federal Actions."

C1.4. DEFINITIONS. For purposes of this document, unless otherwise indicated, the following definitions apply:

C1.4.1. Appropriate DoD Medical Authority. The medical professional designated by the in-theater Component Commander to be responsible for resolving medical issues at the Component's installations.

C1.4.2. Existing Facility. Any facility/building, source or project in use or under construction before 1 October 1994, unless it is subsequently substantially modified.

C1.4.3. Installation. A base, camp, post, station, yard, center, or other activity (e.g., a geographically separated unit) under the jurisdiction of the Secretary of a Military Department that is located outside the US and outside any territory, commonwealth, or possession of the US.

C1.4.4. New Facility. Any facility/building, source or project with a construction start date on, or after, 1 October 1994, or a pre-existing facility that has been substantially modified since 1 October 1994.

C1.4.5. Portuguese Base Commander. The Portuguese Base Commander is the formal representative of the installation pursuant to bilateral agreement and serves as the liaison with national authorities and the contact with local authorities and local Portuguese military and civil entities.

C1.4.6. Substantial Modification. Any modification to a facility/building the cost of which exceeds $1 million, regardless of funding source.

C1.5. PERMITS AND REPORTING

C1.5.1. Formal interaction or interaction of common (Portuguese and US) interest with Portuguese authorities should be conducted with the cognizance of the Portuguese Base Commander.

C1.5.2. The DoD shall not directly obtain permits from Portugal. If a permit is required for DoD activities, the DoD Component shall request the Portuguese Base Commander to obtain such permit on their behalf. When the Portuguese Base Commander obtains a permit on behalf of a DoD Component and the permit requires a more protective standard than prescribed in the FGS, the standard in the permit shall be the compliance standard. However, if a permit allows a less protective standard, then the FGS will be the compliance standard unless a waiver is obtained. DoD Components will assist the Portuguese Base Commander with applying for permits and providing reports and records or otherwise helping him with his liaison duties. If the Portuguese Base Commander is unable to obtain the necessary permit, contact the EEA for guidance.

C1.5.3. If the installation at issue does not appear to fall under the responsibility of any Portuguese Base Commander, the DoD installation shall request clarification from the Environmental Executive Agent via the chain of command. The Environmental Executive Agent will pursue having higher Portuguese military headquarters resolve representational responsibility, when necessary.

C1.6. ADDITIONAL INFORMATION

C1.6.1. DoDI 4715.4, "Pollution Prevention," implements policy, assigns responsibility, and prescribes procedures for implementation of pollution prevention programs throughout DoD. DoDI 4715.4 should be consulted for particular requirements that apply, as a matter of DoD policy, to activities outside the US. Where economically advantageous and consistent with mission requirements, pollution prevention shall be the preferred means for attaining compliance with these FGS.

C1.6.2. Laboratory analyses necessary to implement these FGS shall normally be conducted in a laboratory that has been certified by a US or Portuguese regulatory authority for the applicable test method. In the absence of a laboratory that has been so certified, laboratory analyses may also be conducted at a laboratory that has established reliable compliance with quality assurance standards for the applicable test method that are generally recognized by appropriate industry or scientific organizations.

C1.6.3. DoD Components shall establish and implement an environmental audit program to ensure that overseas installations assess compliance with these FGS at least once every 3 years at all major installations.

C1.6.4. Unless otherwise specified, all record keeping requirements, including assessements, inspection records, logs, manifests, notices, forms, and formats, are described in accordance with paragraph C4.4.2 of DoD 8910.1-M, “DoD Procedures for Management of Information Requirements.”

C1.7. ENVIRONMENTAL EXECUTIVE AGENT

The Environmental Executive Agent for these FGS is the HQ USAFE/CV. These duties, other than the duty to approve waivers to these FGS, have been delegated to the HQ USAFE Civil Engineer.

Questions or comments pertaining to this FGS should be directed to the HQ USAFE Environmental Branch staff at:

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Chapter 2

AIR EMISSIONS

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CHAPTER 2

AIR EMISSIONS

C2.1. SCOPE

This Chapter contains standards for air emissions sources. Criteria addressing open burning of solid waste are contained in Chapter 7, "Solid Waste." Criteria addressing asbestos are contained in Chapter 15, "Asbestos."

C2.2. DEFINITIONS

C2.2.1. Air Emission Limit Value (ELV). Mass of concentration (expressed in units specific to each parameter) or emission level for a certain substance, group, family or category of substances which is calculated under normal conditions of pressure and temperature and shall not be exceeded by facilities discharging into ambient air.

C2.2.2. Coating. Any preparation, including organic solvents or preparations containing organic solvents necessary for its proper application.

C2.2.3. Cold Cleaning Machine. Any device or piece of equipment that contains and/or uses liquid solvent, into which parts are placed to remove soils and other contaminants from the surfaces of the parts or to dry the parts. Cleaning machines that contain and use heated, non-boiling solvent to clean the parts are classified as cold cleaning machines.

C2.2.4. Combustion Unit. Any mechanical unit where a fuel or fuels are subject to a combustion process.

C2.2.5. Commercial and Industrial Solid Waste Incinerator (CISWI) Units. Any combustion device that combusts commercial and industrial waste in an enclosed device using controlled flame combustion, without energy recovery, that is a distinct operating unit of any commercial or industrial facility (including field-erected, modular, and custom incineration units operating with starved or excess air). CISWI units do NOT include Municipal Waste Combustor Units, Sewage Sludge Incinerators, Medical Waste Incinerators, and Hazardous Waste Combustion Units.

C2.2.6. Consumption. Total input of organic solvents into a facility per calendar year, or any other 12 month period, less any volatile organic compounds (VOCs) recovered for reuse.

C2.2.7. Controlled Substances. Chlorofluorocarbons (CFCs), other fully halogenated CFCs, halons, carbon tetrachloride, 1,1,1-trichloroethane, methyl bromide, hydrobromofluorocarbons and hydrochlorofluorcarbons (HCFCs), whether alone, in a mixture, virgin, recovered, recycled or reclaimed.

C2.2.8. Dry Cleaning. Any industrial or commercial activity using VOCs in a facility to clean garments, furnishings, and similar consumer goods, with the exception of the manual removal of stains and spots in the textile and clothing industry.

C2.2.9. Existing Facility. Facilities using VOCs within the scope of criteria C2.3.3. that were in operation before 31 August 2001.

C2.2.10. Facility. A technical unit in which one or more activities are performed that produce substantial air emissions (e.g., a paint booth). Facilities do not include miscellaneous activities on the flightline or within a hangar.

C2.2.11. Fluorinated Greenhouse Gases. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6) as listed in Appendix C2.A2., and preparations containing these substances, but excluding controlled substances listed at C2.2.7.

C2.2.12. Fossil Fuel. Natural gas, petroleum, coal, and any form of solid, liquid or gaseous fuel derived from such material for the purpose of creating useful heat.

C2.2.13. Freeboard Ratio. The ratio of the solvent cleaning machine freeboard height to the smaller interior dimension (length, width, or diameter) of the solvent cleaning machine.

C2.2.14. Fugitive Emission Values. Limit values for air emissions not included in the primary waste flue gases of a process. Fugitive emissions include uncaptured emissions released to the atmosphere via windows, doors, vents, and similar openings.

C2.2.15. Gantry. Any structure at a terminal at which gasoline can be loaded onto a single road tanker at one time.

C2.2.16. Gasoline. Any petroleum derivative, with or without additives, having a Reid Vapor Pressure of 27.6 kilopascals (kPa) (4 pounds per square inch, or psi) or more, which is intended for use as a fuel for motor vehicles, except liquefied petroleum gas (LPG).

C2.2.17. Gasoline Station. Facility for the dispensing of gasoline, gas oil or liquid petroleum gas (LPG) to vehicles for private, public or cooperative use. The gasoline station is considered the dispensing pumps and their corresponding tanks, the gasoline station complex and the pavement necessary for the movement of vehicles around the station. This definition includes, by extension, similar installations for the filling of ships or planes, but not hydrant fueling systems.

C2.2.18. Hydrofluorocarbon (HFC). A compound consisting of hydrogen, fluorine, and carbon often used as a replacement for Ozone-Depleting Substances (ODS).

C2.2.19. Incinerator. Any furnace used in the process of burning solid or liquid waste for the purpose of reducing the volume of the waste by removing combustible matter, including equipment with heat recovery systems for either hot water or steam generation.

C2.2.20. Intermediate Storage of Vapors. The intermediate storage of vapors in a fixed roof tank at a terminal for later transfer to and recovery at another terminal. The transfer of vapors from one storage facility to another at a terminal shall not be considered as intermediate storage of vapor for the purposes of this Chapter.

C2.2.21. Loading Facility. Any facility at a terminal at which gasoline can be loaded onto mobile containers. Loading facilities for road tankers are comprised of one or more gantries.

C2.2.22. Mass Flow. Emission quantity of an air pollutant, measured in mass per unit of time.

C2.2.23. Maximum Mass Flow. Mass flow value of an air pollutant above which continuous monitoring of that pollutant is mandatory.

C2.2.24. Minimum Mass Flow. Mass flow value of an air pollutant below which complying with ELV is not mandatory.

C2.2.25. Mobile Container. Any tank, transported by road, rail or waterways used for the transfer of gasoline from one terminal to another or from a terminal to a gasoline station.

C2.2.26. Motor Vehicle. Any commercially available vehicle that is not adapted to military use which is self-propelled and designed for transporting persons or property on a street or highway, including but not limited to passenger cars, light duty vehicles, and heavy duty vehicles.

C2.2.27. Municipal Waste Combustion (MWC) Units. Any equipment that combusts solid, liquid, or gasified municipal solid waste (MSW) including, but not limited to, field-erected MWC units (with or without heat recovery), modular MWC units (starved-air or excess-air), boilers (for example, steam generating units), furnaces (whether suspension-fired, grate-fired, mass-fired, air curtain incinerators, or fluidized bed-fired), and pyrolysis/combustion units. Municipal waste combustion units do NOT include pyrolysis or MWC units located at a plastics or rubber recycling unit, cement kilns that combust MSW, internal combustion engines, gas turbines, or other combustion devices that combust landfill gases collected by landfill gas collection systems.

C2.2.28. Municipal Solid Waste (MSW). Any household, commercial/retail, or institutional waste. Household waste includes material discarded from residential dwellings, hotels, motels, and other similar permanent or temporary housing. Commercial/retail waste includes material discarded by stores, offices, restaurants, warehouses, nonmanufacturing activities at industrial facilities, and other similar establishments or facilities. Institutional waste includes materials discarded by schools, hospitals (nonmedical), nonmanufacturing activities at prisons and government facilities, and other similar establishments or facilities. Household, commercial/retail, and institutional waste does include yard waste and refuse-derived fuel. Household, commercial/retail, and institutional waste does not include used oil; sewage sludge; wood pallets; construction, renovation, and demolition wastes (which include railroad ties and telephone poles); clean wood; industrial process or manufacturing wastes; medical waste; or motor vehicles (including motor vehicle parts or vehicle fluff).

C2.2.29. New Facility. Any facility using VOCs within the scope of criteria C2.3.3., not included under the definition of "Existing Facility."

C2.2.30. Organic Solvents. Any VOC used alone or in combination with other agents, and without undergoing a chemical change, to dissolve raw materials, products or waste materials, used as a cleaning agent to dissolve contaminants; or used as a solvent, a dispersion medium, a viscosity adjuster, a surface tension adjuster, a plasticizer, or a preservative.

C2.2.31. Ozone-Depleting Substances (ODS). Those substances listed in Appendix C2.A1.

C2.2.32. Perfluorocarbon (PFC). An organic compound consisting solely of carbon and fluorine often used as a replacement for ODS.

C2.2.33. Process Heater. A device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst.

C2.2.34. Pyrolysis. The endothermic gasification of hospital waste and/or medical/infectious waste using external energy.

C2.2.35. Stack. Any point in a source covered by criteria contained in C2.3.1., C2.3.2. or C2.3.3. designed to emit pollutants.

C2.2.36. Storage Facility. Any stationary tank with a volume greater than 416 liters (110 US gallons) at a terminal used for the storage of gasoline.

C2.2.37. Substantially-Modified. Any modification to a facility/building, the cost of which exceeds $1 million, regardless of funding source.

C2.2.38. Surface Cleaning. Any activity, except dry cleaning, using organic solvents to remove contamination from the surfaces of materials, including degreasing. A cleaning activity consisting of more than one step before or after any other activity shall be considered as one surface cleaning activity.

C2.2.39. Terminal. Any facility which is used for the storage and loading of gasoline onto road tankers, rail tankers, or vessels, including all storage facilities on the site of the facility.

C2.2.40. Throughput. The highest annual quantity over a three year period of gasoline loaded from a storage facility at a terminal or from a gasoline station into mobile containers.

C2.2.41. Total Emission Limit Value (TELV). Sum of fugitive emissions and emissions in waste gases.

C2.2.42. Vapors. Any gaseous compound that evaporates from gasoline or a solvent.

C2.2.43. Vapor Cleaning Machine. A batch or in-line solvent cleaning machine that boils liquid solvent generating solvent vapor that is used as a part of the cleaning or drying cycle.

C2.2.44. Vapor Recovery Unit. Equipment for the recovery of vapors from gasoline including any buffer reservoir systems at a terminal.

C2.2.45. Vehicle Refinishing. Any industrial or commercial coating activity and associated degreasing activities performing the coating of road vehicles or parts of them as part of vehicle repair, conservation or decoration outside of manufacturing facilities and the coating of trailers (including semi-trailers).

C2.2.46. Volatile Organic Compounds (VOCs). Organic compounds having a vapor pressure greater than or equal to 0.01 kPa at a temperature of 293.15 K (68ºF), or having a corresponding volatility while in use. It includes the fraction of creosote that exceeds this value of vapor pressure at 293.15 K (68ºF).

C2.2.47. Waste Gases. The final gaseous discharge containing VOCs or other pollutants from a stack or abatement equipment into air. The volumetric flow rates are expressed in m^3/hr at standard conditions.

C2.2.48. Wood Residue. Bark, sawdust, slabs, chips, shavings, mill trim, and other wood products derived from wood processing and forest management operations.

C2.3. CRITERIA

C2.3.1. Combustion Units

C2.3.1.1. Air Emission Standards for Combustion Units. The following criteria apply to combustion units with a maximum design heat input capacity between 0.1 Mw and 50 Mw (0.34 and 175 million BTU/hr, respectively).

C2.3.1.1.1. Existing combustion units and associated emission controls, if applicable, must be designed to meet the emission standards shown in Table C2.T1. at all times, with the following exceptions:

C2.3.1.1.1.1. Particulate: Existing combustion units must meet the particulate limit of Table C2.T2 starting 1 June 2011.

C2.3.1.1.1.2. Benzene, Vinyl Chloride, Acrylonitrile: Existing combustion units must meet the particulate limit of Table C2.T2. starting immediately.

C2.3.1.1.1.3. Starting 1 June 2012, existing combustion units and associated emission controls, if applicable, must meet the remaining emission standards shown in Table C2.T2., at all times.

C2.3.1.1.2. New combustion units and associated emission controls, if applicable, must be designed to meet the emission standards shown in Table C2.T2. at all times.

C2.3.1.1.3. Air emission standards are considered met when the ELV provided under Table C2.T1. or under Table C2.T2. are as follows:

C2.3.1.1.3.1. Non-continuous monitoring: 100% of the results do not exceed the ELV, and

C2.3.1.1.3.2. Continuous monitoring: during the period of one year the monthly average values do not exceed the respective ELV values and daily average values do not exceed 130% of the respective ELV.

C2.3.1.2. Air Emissions Monitoring for Combustion Units. Combustion units with a maximum design heat input capacity between 0.1 Mw and 50 Mw (0.34 and 171 million BTU/hr, respectively) must monitor for emissions as follows:

C2.3.1.2.1. Units with a mass flow value for pollutants above the maximum mass flow values of Table C2.T3. must use a properly calibrated and maintained continuous emissions monitoring system (CEMS) to measure the flue gas.

C2.3.1.2.2. Units with associated mass flow values between the minimum and maximum mass flow values under Table C2.T3. must monitor for emissions at least twice a year with a minimum time length of two months between measurements.

C2.3.1.2.3. Units that operate seasonally will monitor once a year when the unit is in operation. If after a minimum of twelve months, the results are below the minimum mass flow values of Table C2.T3., monitoring can be done once every three years.

C2.3.1.2.4. Units that operate less than 25 days or 500 hours per year do not require monitoring.

C2.3.1.3. Opacity. The opacity of combustion units with a maximum design heat input capacity greater than 8.8 Mw (30 million BTU/h) and using either liquid or solid fossil fuels or other solid fuels shall be monitored continuously. The average opacity over a 6-minute period shall not exceed 20%. A 30% opacity value is allowed for one 6-minute period every hour.

C2.3.2. Incinerators. Installations must coordinate with the Portuguese Base Commander to determine permitting requirements for any proposed incinerators. Should a permit be required and the conditions of that permit be more protective of the environment than the conditions listed below, the permit shall be the compliance standard. Otherwise, the standards are as follows:

C2.3.2.1. Commercial and Industrial Solid Waste Incinerators (CISWI). All CISWI and MWC units must comply with the emission standards prescribed in Tables C2.T1., C2.T2. and C2.T6. and operating limits in Table C2.T7.

C2.3.2.2. Municipal Waste Combustion (MWC) Units. Each MWC unit must comply with the emission standards prescribed in Tables C2.T1., C2.T2., and C2.T6. and operating limits in Table C2.T7.

C2.3.2.3. Sewage Sludge Incinerators. Sewage Sludge Incinerators must meet the criteria presented in Tables C2.T1. and C2.T2. and the following:

C2.3.2.3.1. All sewage sludge incinerators that commenced construction on or after 1 October 1994 or that were substantially modified since 1 October 1994 and that burn more than 1 ton per day (tpd) of sewage sludge or more than 10% sewage sludge must also be designed to meet a particulate emission limit of 0.65 g/kg dry sludge (1.30 lb/ton dry sludge) and an opacity limit of 20% at all times, except during periods of startup, shutdown, malfunction, or when emergency conditions exist.

C2.3.2.4. Medical Waste Incinerators (MWI). Each MWI unit must meet the emissions standards presented in Tables C2.T1. and C2.T2. In addition, the following standards apply to all units. These requirements do not apply to portable units (field deployable), pyrolysis units, or units that burn only pathological, low-level radioactive waste, or chemotherapeutic waste. Refer to Chapter 8, "Medical Waste Management," for other requirements pertaining to medical waste management.

C2.3.2.4.1. All MWI must be designed and operated according to the following good combustion practices (GCP):

C2.3.2.4.1.1. Unit design: dual chamber.

C2.3.2.4.1.2. Minimum temperature in primary chamber: 760-871ºC (1400-1600ºF).

C2.3.2.4.1.3. Minimum temperature in secondary chamber: 982-1205ºC (1800-2200ºF).

C2.3.2.4.1.4. Minimum residence time in the secondary chamber: 2 seconds.

C2.3.2.4.1.5. Incinerator operators must be trained in accordance with applicable Service requirements.

C2.3.3. Activities Involving the Use of Organic Solvents. Surface cleaning, coating and vehicle refinishing facilities that exceed their respective consumption threshold under Table C2.T4. and all dry cleaning facilities must meet the emission limit requirements stated in Table C2.T4.

C2.3.3.1. Monitoring Requirements

C2.3.3.1.1. Surface cleaning, coating, vehicle refinishing and dry cleaning facilities that possess emission reduction equipment must install a CEMS when the mass flow of emitted Total Organic Carbon at the final point of discharge is greater than 10 kg/hr (22 lb/hour).

C2.3.3.1.2. All surface cleaning, coating, vehicle refinishing and dry cleaning facilities must monitor air emissions periodically when the mass flow of emitted Total Organic Carbon at the final point of discharge is less than 10 kg/hr (22 lb/hour).

C2.3.3.2. Specific Requirements for Dry Cleaning Machines. All perchloroethylene (PCE) dry cleaning systems must be of the dry-to-dry design with emissions controlled by a refrigerated condenser. The temperature of the refrigerated condenser must be maintained at 7.2ºC (45°F) or less. Dry cleaning machines and control devices must be operated according to manufacturer recommendations.

C2.3.3.3. Specific Requirements for Solvent Cleaning Machines. These requirements apply to all solvent cleaning machines that use organic solvents. The use of carbon tetrachloride and 1,1,1-trichloroethane is prohibited. All other substances or preparations containing VOCs classified as carcinogens, mutagens, or toxic to reproduction and assigned risk phrases R45, R46, R49, R60 or R61 (e.g., trichloroethylene) shall be replaced, if possible, with less harmful substances or preparations.

C2.3.3.3.1. All cold cleaning machines (remote reservoir and immersion tanks) must be covered when not in use. Additionally immersion type cold cleaning machines must have either a 2.54-cm (1-inch) water layer or a freeboard ratio of at least 0.75. In any case, compliance with air emission limit values under C2.3.3. must be ensured.

C2.3.3.3.2. All vapor cleaning machines (vapor degreasers) must incorporate design and work practices which minimize the direct release of halogenated solvent to the atmosphere. In any case, compliance with air emission limit values under C2.3.3. must be ensured.

C2.3.3.4. Chromium Electroplating and Chromium Anodizing Tanks. Electroplating and anodizing tanks must comply with one of the three methods below for controlling chromium emissions. Implement one of the following methods that is most appropriate to suit local conditions.

C2.3.3.4.1. Option 1: Limit chromium emissions in the ventilation exhaust to 0.015 milligrams per dry standard cubic meter (mg/dscm). Control devices/methods must be operated according to manufacturer recommendations.

C2.3.3.4.2. Option 2: Use chemical tank additives to prevent the surface tension of the electroplating or anodizing bath from exceeding 45 dynes per centimeter (cm) as measured by a stalagmometer or 35 dynes/cm as measured by a tensiometer. Measure the surface tension prior to the first initiation of electric current on a given day and every 4 hours thereafter.

C2.3.3.4.3. Option 3: Limit chromium emissions to the maximum allowable mass emission rate (MAMER) calculated using the following equation: MAMER = ETSA x K x 0.015 mg/dscm, where: MAMER = the alternative emission rate for enclosed hard chromium electroplating tanks in mg/hr; ETSA = the hard chromium electroplating tank surface area in square feet (ft^2); K = a conversion factor, 425 dscm/(ft^2-hr). Option 3 is ONLY applicable to hard chrome electroplating tanks equipped with an enclosing hood and ventilated at half the rate or less than that of an open surface tank of the same surface area.

C2.3.4. Units Containing ODS Listed in Appendix C2.A1. The following criteria apply to direct atmospheric emissions of ODS:

C2.3.4.1. Use (i.e., utilization in maintenance or servicing of products and equipment) of the following ODSs is prohibited. Running an existing system without maintenance (e.g., using a refrigerator) would not be classified as use.

C2.3.4.1.1. Chlorofluorocarbons (CFCs);

C2.3.4.1.2. Other fully halogenated chlorofluorocarbons;

C2.3.4.1.3. Carbon tetrachloride;

C2.3.4.1.4. 1,1,1-trichloroethane; and

C2.3.4.1.5. Hydrobromofluorocarbons.

C2.3.4.2. Halons may still be used for critical uses as specified in Appendix C2.A3.

C2.3.4.3. Except as allowed in C2.3.4.4., the use (i.e., utilization in maintenance or servicing of products or equipment) of hydrochlorofluorocarbons (HCFCs) listed in Appendix C2.A1. is prohibited in the following applications. Running an existing system without maintenance (e.g., using a refrigerator) would not be classified as use.

C2.3.4.3.1. In aerosols.

C2.3.4.3.2. As solvents.

C2.3.4.3.3. As refrigerants:

C2.3.4.3.3.1. In equipment produced after 31 December 1995 for the following uses:

C2.3.4.3.3.1.1. In non-confined direct-evaporation systems;

C2.3.4.3.3.1.2. In household refrigerators and freezers;

C2.3.4.3.3.1.3. In motor vehicle, tractor, and off-road vehicle or trailer air-conditioning systems operating on any energy source;

C2.3.4.3.3.1.4. In road public-transport air-conditioning.

C2.3.4.3.3.2. In equipment produced after 31 December 1997 for use in rail transport air-conditioning.

C2.3.4.3.3.3. In equipment produced after 31 December 1999 for the following uses:

C2.3.4.3.3.3.1. In public and distribution cold stores and warehouses; and

C2.3.4.3.3.3.2. For equipment of 150 kW and over, shaft input.

C2.3.4.3.3.4. In all other refrigeration and air-conditioning equipment produced after 31 December 2000.

C2.3.4.3.3.5. The use of virgin HCFCs in the maintenance and servicing of refrigeration and air-conditioning equipment was prohibited starting on 1 January 2010. The use of all HCFCs in the maintenance and servicing of all refrigeration and air-conditioning equipment shall be prohibited after 1 January 2015.

C2.3.4.3.4. For the production of foams except integral skin foams for use in safety applications and rigid insulating foams.

C2.3.4.3.5. As carrier gas for sterilization substances in closed systems, in equipment produced after 31 December 1997; and

C2.3.4.3.6. In all other applications.

C2.3.4.4. The use of HCFCs shall be allowed:

C2.3.4.4.1. In laboratory uses, including research and development;

C2.3.4.4.2. As feedstock (i.e., undergoes chemical transformation in a process in which it is entirely converted from its original composition and whose emissions are insignificant);

C2.3.4.4.3. As a processing agent; and

C2.3.4.4.4. As total halon substitutes in existing fire protection systems.

C2.3.5. Control of ODS listed in Appendix C2.A1. and Fluorinated Greenhouse Gases listed in Appendix C2.A2. The following criteria apply to direct atmospheric emissions of ODS and fluorinated greenhouse gases from refrigeration equipment, air-conditioners, heat pump equipment, equipment containing solvents, and from fire protection systems and fire extinguishers.

C2.3.5.1. Refrigerant Recovery/Recycling. All repairs, including leak repairs or services to equipment, industrial process refrigeration units, air conditioning units, or motor vehicle air conditioners, must be performed using commercially available refrigerant recovery/recycling equipment operated by trained personnel. Operators shall be trained in proper recovery/recycling procedures, leak detection, safety, shipping, and disposal in accordance with recognized industry standards or Portuguese equivalent.

C2.3.5.2. Repaired equipment containing 3 kg (6.6 lbs) or more of refrigerating fluid charge shall be checked for leakages on an annual basis.

C2.3.5.3. Where methyl bromide is used in soil fumigation, the use of virtually impermeable films for a sufficient time, or other techniques ensuring the same level of environmental protection must be used. All practicable precautionary measures must be taken to prevent and minimize leakage of methyl bromide from fumigation installations and operations.

C2.3.5.4. Refrigerant Venting Prohibition. Any class I or class II ODS, HFC, PFC and fluorinated greenhouse gas refrigerant, identified in Appendix C2.A.1. and Appendix C2.A2. shall not be intentionally released in the course of maintaining, servicing, repairing, or disposing of appliances, industrial process refrigeration units, air conditioning units, or motor vehicle air conditioners. *De minimis* releases associated with good faith attempts to recycle or recover ODS, HFC, PFC, and fluorinated greenhouse gas refrigerant refrigerants are not subject to this prohibition.

C2.3.5.5. ODS Refrigerant (Appendix C2.A1.) Leak Monitoring and Repair. Monitor and repair refrigeration equipment for ODS leakage in accordance with the following criteria and repair, if found to be leaking.

C2.3.5.5.1. Commercial Refrigeration Equipment. Commercial refrigeration equipment normally containing more than 22.7 kg (50 lbs) of refrigerant must have leaks repaired if the appliance is leaking at a rate such that the loss of refrigerant will exceed 35% of the total charge during a 12-month period.

C2.3.5.5.2. Industrial Process Refrigeration Equipment. Industrial process refrigeration equipment normally containing more than 22.7 kg (50 lbs) of refrigerant must have leaks repaired if the appliance is leaking at a rate such that the loss of refrigerant will exceed 35% of the total charge during a 12-month period.

C2.3.5.5.3. Comfort Cooling Appliances. Comfort cooling appliances normally containing more than 22.7 kg (50 lbs) of refrigerant and not covered by subparagraphs C2.3.5.5.1. or C2.3.5.5.2. must have leaks repaired if the appliance is leaking at a rate such that the loss of refrigerant will exceed 15% of the total charge during a 12-month period.

C2.3.5.6. Fluorinated Greenhouse Gas (Appendix C2.A2.) Leak Monitoring and Repair. Monitor and repair equipment for fluorinated greenhouse gas leakage must be in accordance with the following criteria and repair.

C2.3.5.6.1. Equipment containing 3 kg (6.6 lbs) or more of fluorinated greenhouse gases shall be checked for leaks at least once every 12 months; this shall not apply to equipment with hermetically sealed systems, which are labeled as such and contain less than 6 kg (13.2 lbs) of fluorinated greenhouse gases.

C2.3.5.6.2. Equipment containing 30 kg (66 lbs) or more of fluorinated greenhouse gases shall be checked for leaks at least once every six months.

C2.3.5.6.3. Equipment containing 300 kg (660 lbs) or more of fluorinated greenhouse gases shall be checked for leaks at least once every three months.

C2.3.5.6.4. Installations operating equipment containing 300 kg (660 lbs) or more of fluorinated greenhouse gases, shall install leak detection systems. These leak detection systems shall be checked at least once every 12 months to ensure their proper functioning. In the case of such fire protection systems installed before 4 July 2007, leak detection systems shall be already fitted.

C2.3.5.6.5. Where a properly functioning appropriate leak detection system is in place, the frequency of the checks required under C2.3.5.6.2. and C2.3.5.6.3. shall be halved.

C2.3.5.6.6. The equipment shall be checked for leaks within one month after a leak has been repaired to ensure that the repair has been effective.

C2.3.5.7. Fluorinated Greenhouse Gas (Appendix C2.A2.) Recovery

C2.3.5.7.1. Technicians must ensure the proper recovery of fluorinated greenhouse gases from the following equipment prior to its disposal and, when appropriate, during its servicing and maintenance:

C2.3.5.7.1.1. The cooling circuits of refrigeration, air-conditioning and heat pump equipment;

C2.3.5.7.1.2. Equipment containing fluorinated greenhouse gas-based solvents;

C2.3.5.7.1.3. Fire protection systems and fire extinguishers; and

C2.3.5.7.1.4. High-voltage switchgear.

C2.3.5.7.2. When a refillable or non-refillable fluorinated greenhouse gas container reaches the end of its life, the person using the container for transport or storage purposes must ensure the proper recovery of any residual gases it may contain.

C2.3.5.7.3. Fluorinated greenhouse gases contained in other products and equipment, including mobile equipment shall, to the extent that it is technically feasible and does not entail disproportionate cost, be recovered to ensure their recycling, reclamation or destruction prior to its disposal and, when appropriate, during its servicing and maintenance.

C2.3.5.8. Fluorinated Greenhouse Gas (Appendix C2.A2) Record Keeping. Operators of stationary refrigeration, air conditioning and heat pump equipment including circuitry, and fire protection systems containing 3 kg (6.6 lbs) or more of fluorinated greenhouse gases shall maintain records on the quantity and type of fluorinated greenhouse gases installed, any quantities added and the quantity recovered during servicing, maintenance and final disposal.

C2.3.5.8.1. Additionally, installations shall maintain relevant information including identification of the company and/or technician performing the service or maintenance, dates and results of checks carried out to comply with C2.3.5.6., and relevant information identifying the equipment referred to in C2.3.5.6.2. and C2.3.5.6.3.

C2.3.5.8.2. The records shall include information on the fluorinated greenhouse gas charge for a fire protection system.

C2.3.5.8.3. The records shall include information on the fluorinated greenhouse gas charge for any refrigeration, air conditioning or heat pump equipment.

C2.3.5.8.4. These records shall be made available to the Portuguese Base Commander upon request.

C2.3.5.9. <u>ODS Fire Suppression Agent (Halon) Venting Prohibition</u>. Halons shall not be intentionally released into the environment while testing, maintaining, servicing, repairing, or disposing of halon-containing equipment or using such equipment for technician training. Halon uses authorized in criterion C2.3.4.2. are exempt from the venting prohibition in the following situations:

C2.3.5.9.1. *De minimis* releases associated with good faith attempts to recycle or recover halons (i.e., release of residual halon contained in fully discharged total flooding fire extinguishing systems);

C2.3.5.9.2. Emergency releases for the legitimate purpose of fire extinguishing, explosion inertion, or other emergency applications for which the equipment or systems were designed; and

C2.3.5.9.3. Releases during the testing of fire extinguishing systems if each of the following is true: systems or equipment employing suitable alternative fire extinguishing agents are not available; release of extinguishing agent is essential to demonstrate equipment functionality; failure of system or equipment would pose great risk to human safety or the environment; and, a simulant agent (i.e., substitute product that can perform the same function) cannot be used.

C2.3.5.10. <u>Fluorinated Greenhouse Gas (Appendix C2.A2.) Leak Monitoring and Repair of Fire Protection Systems</u>. Installations must monitor fire protection systems containing 3 kg (6.6 lbs) or more of fluorinated greenhouse gases and make repairs to any leaks according to the following criteria:

C2.3.5.10.1. Pressure gauges and weight-monitoring devices shall be checked once every 12 months to ensure proper functioning;

C2.3.5.10.2. The technician shall ensure a leak test is performed prior to recharging of equipment;

C2.3.5.10.3. Newly installed fire protection systems shall be checked for leaks immediately after they have been placed into service; and

C2.3.5.11. Leak Monitoring and Repair of working and temporarily out of operation stationary refrigeration, air conditioning and heat pump equipment containing 3 kg (6.6 lbs) or more of fluorinated greenhouse gases, shall meet the following:

C2.3.5.11.1. Prior to any repair, a pump-down or recovery shall be carried out, where necessary;

C2.3.5.11.2. A leakage test with Oxygen-Free Nitrogen (OFN) or another suitable pressure testing and drying gas shall be carried out where necessary, followed by evacuation, recharge and leakage-test;

C2.3.5.11.3. Before pressure testing, technicians shall recover fluorinated greenhouse gases from the appliance, where necessary;

C2.3.5.11.4. The cause of any leakage shall be identified to the extent possible, to avoid recurrence; and

C2.3.5.11.5. Newly installed refrigeration, air conditioning and heat pump equipment shall be checked for leaks immediately after they have been placed into service.

C2.3.5.12. ODS Leaks. All precautionary measures practicable shall be taken to prevent and minimize leaks of:

C2.3.5.12.1. CFCs, halons, carbon tetrachloride, 1,1,1-trichloroethane, hydrobromofluorocarbons and HCFCs from commercial and industrial air-condition and refrigeration equipment, fire protection systems, and equipment containing solvents during the manufacture, installation, operation, and servicing processes;

C2.3.5.12.2. Methyl bromide from fumigation facilities and operations in which methyl bromide is used;

C2.3.5.12.3. Controlled substances used as feedstock and as processing agents; and

C2.3.5.12.4. Controlled substances inadvertently produced in the course of the manufacture of other chemicals.

C2.3.6. Combustion of Used Oils

C2.3.6.1. The combustion of used oils in facilities shall comply with the following ELV:

C2.3.6.1.1. Plants with a thermal input of less than 3 Mw (10 million BTU/h) shall comply with the emission limits under Table C2.T1.

C2.3.6.1.2. Plants with a thermal input greater than or equal to 3 Mw (10 million BTU/h) shall comply with the emission limits of Table C2.T5.

C2.3.6.2. Installations combusting used oils, shall coordinate with the Portuguese Base Commander to obtain any necessary permits.

C2.3.7. Vapor Recovery at Gasoline Stations

C2.3.7.1. Vapors displaced by the delivery of gasoline into storage facilities at gasoline stations and in fixed-roof tanks used for the intermediate storage of vapors must be returned through a vapor-tight connection line to the mobile container delivering the gasoline. Loading operations may not take place unless the arrangements are in place and properly functioning. The total annual loss of gasoline resulting from loading into storage facilities at gasoline stations shall not exceed 0.01 weight by weight (w/w) % of the throughput.

C2.3.7.2. Vapor recovery pipes shall be equipped with a floating valve to avoid the entrance of liquid in the interconnected pipes during the transport of vapors. However this valve is not necessary if the aerial pipes where the interconnection takes place are above the height of the tank vehicle.

C2.3.8. Vapor Recovery for POL at Gasoline Terminals

C2.3.8.1. Vapor Recovery at Stationary Tanks. All stationary tanks located at terminals shall comply with the following criteria:

C2.3.8.1.1. The external wall and roof of tanks above ground must be painted in a color with a total radiant heat reflectance of 70% or more. These operations may be programmed so as to be conducted as part of the usual maintenance cycles of the tanks. This provision shall not apply to tanks linked to a vapor recovery unit which conforms to the requirements set out in C2.3.8.2.2.

C2.3.8.1.2. Tanks with external floating roofs must be equipped with a primary seal to cover the annular space between the tank wall and the outer periphery of the floating roof and with a secondary seal fitted above the primary seal. The seals should be designed to achieve an overall containment of vapors of 95% or more as compared to a comparable fixed-roof tank with no vapor-containment controls (that is a fixed-roof tank with only vacuum/pressure relief valve).

C2.3.8.1.3. All new storage facilities at terminals, where vapor recovery is required according to requirements of criterion C2.3.8.1.1., must be either:

C2.3.8.1.3.1. Fixed-roof tanks connected to the vapor recovery unit in conformity with the requirements of criterion C2.3.8.2.2.; or

C2.3.8.1.3.2. Designed with a floating roof, either external or internal, equipped with primary and secondary seals to meet the performance requirements set down in criterion C2.3.8.1.2.

C2.3.8.1.4. Existing fixed-roof tanks must either:

C2.3.8.1.4.1. Be connected to a vapor-recovery unit in conformity with the requirements of criterion C2.3.8.2.2.; or

C2.3.8.1.4.2. Have an internal floating roof with a primary seal which should be designed to achieve an overall containment of vapors of 90% or more in relation to a comparable fixed-roof tank with no vapor controls.

C2.3.8.1.5. The requirements for vapor-containment controls mentioned under criteria C2.3.8.1.3. and C2.3.8.1.4. do not apply to fixed-roof tanks at terminals, where intermediate storage of vapors is permitted according to criterion C2.3.8.2.1.2.

C2.3.8.1.6. The total annual loss of gasoline resulting from loading and storage at each storage facility shall not exceed 0.01 (w/w) % of the throughput.

C2.3.8.2. Loading and Unloading of Mobile Containers at Terminals. All loading and unloading of mobile containers at terminals with a throughput greater than 10,000 metric tonnes/year (11,023 US tons/year), shall be designed and operated in accordance with the following technical provisions:

C2.3.8.2.1. Displacement vapors from the mobile container being loaded must be returned through a vapor-tight connection line to a vapor recovery unit for regeneration at the terminal in accordance with the criteria below. This provision does not apply to top-loading tankers of less than 10,000 metric tonnes/year (11,023 US tons/year) constructed prior to 12 August 1997.

C2.3.8.2.1.1. At terminals that load gasoline onto vessels, a vapor incineration unit may be substituted for a vapor recovery unit if vapor recovery is unsafe or technically impossible because of the volume of return vapor. Requirements concerning atmospheric emissions from the vapor recovery unit shall also apply to the vapor incineration unit.

C2.3.8.2.1.2. At terminals with a throughput of less than 25,000 metric tonnes/year (27,558 US tons/year), intermediate storage of vapors may be substituted for immediate vapor recovery at the terminal.

C2.3.8.2.2. The mean concentration of vapors in the exhaust from the vapor recovery-unit corrected for dilution during treatment - must not exceed 35 g/normal cubic meter (Nm^3) in one hour.

C2.3.8.2.2.1. Monitoring and analysis methods and their frequency shall be performed according to Portuguese or US industry standards.

C2.3.8.2.2.2. Monitoring must be made over the course of one full working day (7 hours minimum) of normal throughput.

C2.3.8.2.2.3. Monitoring may be continuous or discontinuous. If discontinuous methods are employed, at least four monitoring events per hour must be conducted.

C2.3.8.2.3. The total annual loss of gasoline resulting from loading and unloading of mobile containers at terminals shall not exceed 0.005 w/w % of the throughput.

C2.3.9. Stack Heights. Hg is the good engineering practice stack height necessary to minimize downwash of stack emissions due to aerodynamic influences from nearby structures.

C2.3.9.1. Stacks shall be designed and constructed to heights at least equal to the largest Hg calculated from either of the following two criteria:

C2.3.9.1.1. Hg = H +_1.5 L, where H is the height of the nearby structure measured from the ground level elevation at the base of the stack, and L is the lesser of height or projected width of the nearby structure(s). A structure is determined to be nearby when the stack is located within 5 liters (1.3 US gallons) of the structure envelope but not greater than 0.8 km (0.5 mile).

This calculation shall be performed for each structure nearby the stack being studied to determine the greatest Hg.

C2.3.9.1.2. Hg is the height demonstrated by a fluid model or a field study, which ensures that the emissions from a stack do not result in maximum ground-level concentrations of any air pollutant as a result of atmospheric downwash, wakes, or eddy effects created by the source itself, nearby structures, or nearby terrain features at least 40% in excess of the maximum ground-level concentrations of any air pollutant experienced in the absence of such atmospheric downwash, wakes, or eddy effects. For purposes of this paragraph, “nearby” means not greater than 0.8 km (0.5 miles), except that the portion of a terrain feature may be considered to be nearby which falls within a distance of up to 10 times the maximum height (Ht) of the feature, not to exceed 3.2 km (2 miles) if such feature achieves a height (Ht) 0.8 km (0.5 miles) from the stack that is at least 40% of the good engineering practice stack height determined by the formula provided in C2.3.9.1.1. of this part or 26 m (85.3 ft), whichever is greater, as measured from the ground-level elevation at the base of the stack. The height of the structure or terrain feature is measured from the ground-level elevation at the base of the stack.

Table C2.T1. General Air Emission Limit Values – Existing Combustion Units

Parameter	Emission Limit Value (mg/Nm^3) [1]
Particulates	300
SO_2	2,700
H_2S	50
NO_x (expressed as NO_2)	1,500
Organic compounds (expressed as Total Carbon)	50
Volatile Organic Compounds, VOCs (expressed as C)	200
Fluorine inorganic compounds (expressed as F^-)	50
Chlorinated inorganic compounds (expressed as Cl^-)	250
Heavy Metals (Total)	8
Sum of Cd and Hg	0.2
Sum of As and Ni	1
Sum of Pb, Cr and Cu	5
Carcinogenic Substances	
- Asbestos	Total Sum: 0.1 [2]
- Benzene	
- Vinyl Chloride	
- Zinc and Potassium Chromates	
- 2-naphtyl amine	
- Arsenic trioxide	
- Acrylonitrile	Total Sum: 1.0 [3]
- Benzo-a-pyrene	
- 1,3-Butadiene	
- 1-chloro-2,3-epoxipropane	
- Calcium Chromate	
- Chromium III Chromate	
- Strontium Chromate	
- Dibezoanthracene	
- 1,2-dibromoethane	
- 3,3-dichlorobenzidine	
- 1,2-epoxipropane	
- Epoxiethane Dimethyl sulfate	
- Lead Chromate	5.0 [4]

Notes:

1. Referred to as a volumetric percentage of 8% of O_2; milligrams per normal cubic meter = mg/Nm^3
2. For a total mass flow ≥ 0.5 grams per hour (g/hr)
3. For a total mass flow ≥ 5.0 g/hr
4. For a total mass flow ≥ 25.0 g/hr

Table C2.T2. General Air Emission Limit Values – New Combustion Units

Pollutant	Emission Limit Value (mg/Nm^3) [1]
General ELVs	
Sulfur Dioxide (SO_2)	500
Nitogen Oxide NO_x (expressed as NO_2)	500
Particulate (PTS)	150
Fluorine Inorganic Compounds (expressed as F^-)	5
Chlorinated inorganic compounds (expressed as Cl^-)	30
Hydrogen Sulfide (H_2S)	5
Volatile Organic Compounds, VOCs (expressed as C)	200
Non-Methane Volatile Organic Compounds, NMVOC (expressed as C)	110
Chlorine (Cl2)	5
Bromine and Bromine Inorganic Compounds (expressed as HBr)	5
Metals I (Cd, Hg, Tl)	0.2 [5]
Metals II (As, Ni, Se, Te)	1 [5]
Metals III (Pt, V, Pb, Cr, Cu, Sb, Sn, Mn, Pd, Zn)	5 [5]
Organic Substances[5]	
Acetaldehyde Acrylic acid Chloroacetic acid Formaldehyde Acrolein (acrylic aldehyde -2-propenal) Methyl acrylate Maleic anhydride Aniline Biphenyls Cloroacetaldeyde Chloroform (trichloromethane) Chloromethane (methyl chloride) Clorotolueno (benzyl chloride) Cresol 2,4-toluene diisocyanate Alkali derivatives of lead Dichloromethane (methylene chloride) 1,2-dichlorobenzene (o-dichlorobenzene) 1,1-dichloroethylene 2,4-dichlorophenol Diethylamine Dimethylamine 1,4-dioxane	20 mg/m^3 [5]

Pollutant	Emission Limit Value (mg/Nm^3) [1]
Ethylamine 2-furaldehyde (furfural) Methacrylates Mercaptans (thiols) Nitrobenzene Nitrocresol Nitrophenol Phenol Pyridine 1,1,2,2-tetrachloroethane Tetrachloroethylene (perchlorethylene) Tetrachloromethane (carbon tetrachloride) Thioethers Thiols O-toluidine 1,1,2-trichloroethane Trichloroethylene 2,4,5-trichlorophenol 2,4,6-trichlorophenol Triethylamine Xylenol (except 2,4-xylenol)	20 mg/m^3
Carcinogenic Substances	
Asbestos (chrysotile, crocidulite, amosite, anthophyllite, actionlite,tremolite) as fine particles Benzo (a) pyrene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (j) fluoranthene Benzo (k) fluoranthene Dibenzo (a, h) anthracene Beryllium and its compounds (expressed as Be) Chromium (VI), expressed as Cr 2-naphthylamine (+ salts) 2-nitropropane	0.1 mg/m^3 [2, 5]
Cobalt (dusts / aerosols of cobalt metal and salts with low solubility of cobalt in respirable form) expressed as Co Ethyleneimine (aziridine) Ethylene oxide (referred to epoxyethane 1.2) Diethyl sulfate Dimethyl sulphate	1.0 mg/m^3 [3, 5]

Pollutant	Emission Limit Value (mg/Nm^3) [1]
3,3 '-dimethylbenzidine (+ salt) (referred to 3,3'-dichloro - (1,1 '-biphenyl) 3,3 '-dichloro - (1,1'-biphenyl) 1.2 epoxyethane	$1.0\ mg/m^3$ [3, 5]
Acrylonitrile Benzene 1,3-butadiene, butadiene (referred to 1,3-butadiene) 1-chloro -2,3-epoxipropane, epichlorohydrin 1,2-dichloroethane, ethylene chloride 1,2-dibromomethane Propene oxide (refered to 1,2-epoxipropane) Propylene oxide, 1,2-epoxipropane, methiloxyrane) 1,2-epoxipropane Hydrazine (+ salts) Vinyl chloride, chloroethylene	$5.0\ mg/m^3$ [4, 5]

Notes:

1. Referred to as a volumetric percentage of 8% of O_2; milligrams per normal cubic meter = mg/Nm^3
2. For a minimum mass flow ≥ 0.5 grams per hour (g/hr)
3. For a minimum mass flow ≥ 5.0 g/hr
4. For a minimum mass flow ≥ 25.0 g/hr
5. The ELV applies to the sum of the pollutants if there are more than one.

Table C2.T3. Minimum and Maximum Flue Gas Flows for Combustion Units

Pollutant	**Minimum Mass Flow (kg/h)**	**Maximum Mass Flow (kg/h)**
Sulfur Dioxide (SO_2)	(*) 2	(*) 50
Nitogen Oxide NO_x (expressed as NO_2)	2	30
Particulate (PTS)	0.5	5
Fluorine Inorganic Compounds (expressed as F^-)	0.05	0.5
Chlorinated inorganic compounds (expressed as Cl^-)	0.3	3
Hydrogen Sulfide (H_2S)	0.05	1
Carbon Monoxide (CO)	5	100
Volatile Organic Compounds, VOCs (expressed as total C)	2	30
Non-Methane Volatile Organic Compounds, NMVOC (expressed as C)	1.5	25
Chlorine (Cl2)	0.05	Not established
Bromine and Bromine Inorganic Compounds (expressed as HBr)	0.05	Not established
Metals I (Cd, Hg, Tl) ([1]) (* *)	0.001	Not established
Metals II (As, Ni, Se, Te) ([2]) (* *)	0.005	Not established
Metals III (Pt, V, Pb, Cr, Cu, Sb, Sn, Mn, Pd, Zn) ([3]) (* *)	0.025	Not established
Organic Substances (*)		
Acetaldehyde Acrylic acid Chloroacetic acid Formaldehyde Acrolein (acrylic aldehyde -2-propenal) Methyl acrylate Maleic anhydride Aniline Biphenyls Cloroacetaldeyde Chloroform (trichloromethane) Chloromethane (methyl chloride) Clorotolueno (benzyl chloride) Cresol 2,4-toluene diisocyanate	2	Not established

Pollutant	Minimum Mass Flow (kg/h)	Maximum Mass Flow (kg/h)
Alkali derivatives of lead Dichloromethane (methylene chloride) 1,2-dichlorobenzene (o-dichlorobenzene) 1,1-dichloroethylene 2,4-dichlorophenol Diethylamine Dimethylamine 1,4-dioxane Ethylamine 2-furaldehyde (furfural) Methacrylates Mercaptans (thiols) Nitrobenzene Nitrocresol Nitrophenol Phenol Pyridine 1,1,2,2-tetrachloroethane Tetrachloroethylene (perchlorethylene) Tetrachloromethane (carbon tetrachloride) Thioethers Thiols O-toluidine 1,1,2-trichloroethane Trichloroethylene 2,4,5-trichlorophenol 2,4,6-trichlorophenol Triethylamine Xylenol (except 2,4-xylenol)	2	Not established
Carcinogenic Substances (*)	(g/h)	(g/h)
Asbestos (chrysotile, crocidulite, amosite, anthophyllite, actionlite,tremolite) as fine particles Benzo (a) pyrene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (j) fluoranthene Benzo (k) fluoranthene Dibenzo (a, h) anthracene Beryllium and its compounds (expressed as Be) Chromium (VI) compounds, expressed as Cr	0.5	Not established

Pollutant	Minimum Mass Flow (kg/h)	Maximum Mass Flow (kg/h)
2-naphthylamine (+ salts) 2-nitropropane	0.5	Not established
Cobalt (dusts / aerosols of cobalt metal and cobalt salts of low solubility, as respirable) expressed as Co Ethyleneimine (aziridine) 3,3 '-dichlorobenzidine (+ salts) [refered to 3,3'-dichloro - (1,1 '-biphenyl)] Diethyl sulfate Dimethyl sulphate Ethyleneimine (aziridine) Ethene oxide (referred to 1,2 epoxyethane) 3,3 '-dichloro - (1,1'-biphenyl) 1,2 epoxyethane	5	Not established
Acrylonitrile Benzene 1,3-butadiene, butadiene (referred to 1,3-butadiene). 1-chloro -2,3-epoxipropane, epichlorohydrin 1,2-dichloroethane, ethylene chloride 1,2-dibromomethane Propene oxide (refered to 1,2-epoxipropane) Propylene oxide, 1,2-epoxipropane, methiloxyrane) 1,2-epoxipropane Hydrazine (+ salts) Vinyl chloride, chloroethylene	25	Not established

Notes:

(*) and (**) for each category, if more than one listed component is present, the value applies to the sum of all components.

Table C2.T4. Air Emission Limits for Specific Operations Using VOCs

Activity	Solvent consumption threshold (tonnes/year)	Emission limit values in waste gases (mg C/Nm^3)	Fugitive emission values (% of solvent input)	Total Emission Limit Values (g/kg)[5]
Surface cleaning [1]	1-5	20 [2]	15 [3]	-
	> 5		10 [3]	-
Other surface cleaning	2-10	75 [2]	20 [3]	-
	> 10		15 [3]	-
Vehicle refinishing	> 0.5	50	25	-
Dry cleaning	-	-	-	20 [4]
Coating	5-15	100 [6]	25 [6]	-
	>15	50 (drying) [6] 75 (coating) [6]	20 [6]	-

Notes:

1. Using substances or preparations that are classified as:
   - Carcinogenic, mutagenic or toxic to reproduction (R45, R46, R49, R60, R61 – see criterion C2.3.3.3 of these FGS for a definition of each of the risk phrases listed) because of their VOC contents;
   - R40 for halogenated substances (R40 - Possible risks of irreversible effects.).
2. Limit refers to mass of compounds in milligrams per normal cubic meter (mg/Nm^3), and not total carbon.
3. Facilities that demonstrate their average organic solvent content of all cleaning material used does not exceed 30% by weight are exempt from these values.
4. Mass of solvent (in g) emitted per kilogram of product cleaned and dried.
5. grams per kilogram = g/kg
6. Coating activities which cannot be applied under contained conditions (e.g. shipbuilding, aircraft painting) may be exempted from these values.

Table C2.T5. Emission Limits Values for Facilities Burning Used Oils with a Thermal Input ≥ 3 Megawatts (Mw)

Pollutant	**Emission Limit Value (mg/Nm^3) [1]**
Cd	0.5
Ni	1
Cr, Cu, V	1.5
Pb	5
Cl [2]	100
F [3]	5
SO_2	2,000
Particulates	150

Notes:

1. ELV indicate the mass concentration of pollutants in waste gases, in terms of the volume of waste gas in the standard state [273.15 °K (32 ºF); 1.013 kPa (14.7 psi)], after deduction of the water vapor moisture content, and of a 3% oxygen content by volume in waste gas.
2. Inorganic gaseous compounds of chlorine expressed as hydrogen chlorine.
3. Inorganic gaseous compounds of fluorine expressed as hydrogen fluoride.

Table C2.T6. Additional Emission Standards for Incinerators

Pollutant	Emission Standards[1]				
Incinerator Type	**Existing MWC units[2]**		**MWC units that begin new construction or undergo substantial modification[2]**		**CISWI units**
Rated Capacity	**35-250 tpd**	**>250 tpd**	**35-250 tpd**	**>250 tpd**	**All units**
Particulate	70 mg/dscm	27 mg/dscm	24 mg/dscm		70 mg/dscm
Opacity	10%		10%		10%
NOx	266	See Note 3	266 ppmv	150 ppmv	266 ppmv
SO2	50% reduction or 77 ppmv	75% reduction or 29 ppmv	80% reduction or 30 ppmv		20 ppmv
Dioxins/furans	125 ng/dscm	See Note 4	13 ng/dscm		0.41 ng/dscm
HCl	50% reduction or 250 ppmv	955 reduction or 29 ppmv	80% reduction or 30 ppmv	95% reduction or 25 ppmv	62 ppmv
Fugitive ash	%5 of hourly observation period		%5 of hourly observation period		N/A

Notes:

1. Emission standard concentrations (mg/dscm, ppmv) are corrected to 7% oxygen, dry basis at standard conditions. mg/dscm = milligram per dry standard cubic meter, ng = nanogram, ppm = parts per million.

2. Construction or modifications that were undertaken pursuant to existing (or previous) FGS are not subject to these requirements. These criteria are not intended to require retrofitting of MEW units.

3. NOx limits for units rated >250 tons/day (tpd) capacity: mass burn refractory-266 ppm; mass burn waterwall-205 ppmv; mass burn rotary waterwall: 250 ppmv; refuse-derived fuel combustor-250 ppmv; fluidized bed combustor-180 ppmv.

4. Dioxins/furans limits for units rated >250 tpd capacity; MWC with electrostatic precipitator (ESP)-60 mg/dscm; MWC with non-ESP-30 ng/dscm

Table C2.T7. Carbon Monoxide Operating Limits for Incinerators [1]

Incinerator Type	Existing MWC units[2]		MWC units that begin new construction or undergo substantial modification[2]		CISWI units
Rated Capacity	**35-250 tpd**	**>250 tpd**	**35-250 tpd**	**Rated Capacity**	**35-250 tpd**
Fluidized bed	100 ppmv (4-hr avg)		100 ppmv (4-hr avg)		157 ppmv
Fluidized bed, mixed fuel (wood/refuse-derived fuel)	200 ppmv (24-hr avg)		200 ppmv (24-hr avg)	100 ppmv (4-hr avg)	
Mass burn rotary refractory	100 ppmv (4-hr avg)		100 ppmv (24-hr avg)		
Mass burn rotary waterfall	250 ppmv (24-hr avg)		100 ppmv (24-hr avg)		
Mass burn waterfall and refractory	100 ppmv (4-hr avg)		100 ppmv (4-hr avg)		
Mixed fuel-fired (pulverized coal/refuse-derived fuel)	150 ppmv (4-hr avg)		150 ppmv (4-hr avg)		
Modular starved-air and excess air	50 ppmv (4-hr avg)		50 ppmv (4-hr avg)		
Spreader stoker, mixed fuel-fired (coal/refuse-derived fuel)	200 ppmv (24-hr avg)		150 ppmv (24-hr avg)		
Stoker, refuse-derived	200 ppmv (24-hr avg)		150 ppmv (24-hr avg)		

Notes:

1. Compliance is determined by continuous emission monitoring systems.

2. Construction or modifications that were undertaken pursuant to existing (or previous) FGS are not subject to these requirements. These criteria are not intended to require retrofitting of MWC unit.

APPENDIX C2.A1. LIST OF OZONE DEPLETING SUBSTANCES (ODSs) – CLASS I AND II

Class I (Portuguese Groups I to VII and IX)

CFC - 11	CFC - 114	CFC - 215	Halon – 1011 (Chlorobromomethane)
CFC - 12	CFC - 115	CFC - 216	Halon - 1211
CFC - 13	CFC - 211	CFC - 217	Halon - 1301
CFC - 111	CFC - 212		Halon - 2402
CFC - 112	CFC - 213		Carbon Tetrachloride
CFC - 113	CFC - 214		Methyl Chloroform
CHFBr2	C2H2F3Br	C3HF6Br	Methyl Bromide
HBFC-2201 (CHF2Br)	C2H3FBr2	C3H2FBr5	C3H3F4Br
CH2FBr	C2H3F2Br	C3H2F2Br4	C3H4FBr3
C2HFBr4	C2H4FBr	C3H2F3Br3	C3H4F2Br2
C2HF2Br3	C3HFBr6	C3H2F4Br2	C3H4F3Br
C2HF3Br2	C3HF2Br5	C3H2F5Br	C3H5FBr2
C2HF4Br	C3HF3Br4	C3H3FBr4	C3H5F2Br
C2H2FBr3	C3HF4Br3	C3H3F2Br3	C3H6FBr
C2H2F2Br2	C3HF5Br2	C3H3F3Br2	

Class II (Portuguese Group VIII)

HCFC – 21	HCFC - 133a	HCFC - 225cb	HCFC - 243
	HCFC-141		
HCFC - 22	HCFC – 141b	HCFC - 226	HCFC - 244
	HCFC-142		
HCFC - 31	HCFC – 142b	HCFC - 231	HCFC - 251
HCFC - 121	HCFC - 151	HCFC - 232	HCFC - 252
HCFC - 122	HCFC - 221	HCFC - 233	HCFC - 253
HCFC - 123	HCFC - 222	HCFC - 234	HCFC - 261
HCFC - 124	HCFC - 223	HCFC - 235	HCFC - 262
HCFC - 131	HCFC - 224	HCFC - 241	HCFC - 271
	HCFC-225		
HCFC - 132b	HCFC - 225ca	HCFC - 242	

Note: All isomers of the above chemicals are considered as controlled substances, except isomers of 1,1,1-trichloroethane (also known as methyl chloroform) (such as 1,1,2-trichloroethane), and isomers of carbontetrachloride, methylbromide and bromochloromethane .

APPENDIX C2.A2. FLUORINATED GREENHOUSE GASES

Sulfur hexafluoride			
HFCs			
HFC-23	HFC-134	HFC-227ea	HFC-245fa
HFC-32	HFC-134a	HFC-236cb	HFC-365mcf
HFC-41	HFC-152a	HFC-236ea	
HFC-43-10-mee	HFC-143	HFC-236fa	
HFC-125	HFC-143a	HFC-245ca	
PFCs			
Perfluoromethane	Perfluoropropane	Perfluoropentane	Perfluorocyclobutane
Perfluoroethane	Perfluorobutane	Perfluorohexane	

APPENDIX C2.A3. CRITICAL USES OF HALON

Use of Halon 1301:

1. In aircraft for the protection of crew compartments, engine nacelles, cargo bays, and dry bays
2. In military land vehicles and naval vessels for the protection of spaces occupied by personnel and engine compartments
3. For the making inert of occupied spaces where flammable liquid and/or gas release could occur in the military and oil, gas and petrochemical sector, and in existing cargo ships
4. For the making inert of existing manned communication and command centers of the armed forces or others, essential for national security
5. For the making inert of spaces where there may be a risk of dispersion of radioactive matter
6. In the Channel Tunnel and associated installations and rolling stock

Use of Halon 1211:

1. In hand-held fire extinguishers and fixed extinguisher equipment for engines for use on board aircraft
2. In aircraft for the protection of crew compartments, engine nacelles, cargo bays and dry bays
3. In fire extinguishers essential to personal safety used for initial extinguishing by fire brigades
4. In military and police fire extinguishers for use on persons

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Chapter 3

DRINKING WATER

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CHAPTER 3

DRINKING WATER

C3.1. SCOPE

This Chapter contains criteria for providing potable water.

C3.2. DEFINITIONS

C3.2.1. Action Level. The concentration of a substance in water that establishes appropriate treatment for a water system.

C3.2.2. Appropriate DoD Medical Authority. The medical professional designated by the in-theater DoD Component commander to be responsible for resolving medical issues necessary to provide safe drinking water at the DoD Component's installations.

C3.2.3. Audit Monitoring. A series of monitoring procedures to establish whether drinking water meets all parameters.

C3.2.4. Check Monitoring. A series of actions for the evaluation of microbiological quality, touch, taste, or smell, and also on the organism as a whole, of water supplied for human consumption and the effectiveness of drinking water treatment (particularly disinfection) to determine whether or not water intended for human consumption complies with the relevant parameters.

C3.2.5. Concentration/Time (CT). The product of residual disinfectant concentration, C, in milligrams per liter (mg/L) determined before or at the first customer, and the corresponding disinfectant contact time, T, in minutes. CT values appear in Tables C3.T16. through C3.T29.

C3.2.6. Conventional Treatment. Water treatment, including chemical coagulation, flocculation, sedimentation, and filtration.

C3.2.7. Diatomaceous Earth Filtration. A water treatment process of passing water through a precoat of diatomaceous earth deposited onto a support membrane while additional diatomaceous earth is continuously added to the feed water to maintain the permeability of the precoat, resulting in substantial particulate removal from the water.

C3.2.8. Direct Filtration. Water treatment, including chemical coagulation, possibly flocculation, and filtration, but not sedimentation.

C3.2.9. Disinfectant. Any oxidant, including but not limited to, chlorine, chlorine dioxide, chloramines, and ozone, intended to kill or inactivate pathogenic microorganisms in water.

C3.2.10. DoD Water System. A public or non-public water system.

C3.2.11. Emergency Assessment. Evaluation of the susceptibility of the water source, treatment, storage and distribution system(s) to disruption of service caused by natural disasters, accidents, and sabotage.

C3.2.12. First Draw Sample. A one-liter sample of tap water that has been standing in plumbing at least six hours and is collected without flushing the tap.

C3.2.13. Groundwater Under the Direct Influence of Surface Water (GWUDISW). Any water below the surface of the ground with significant occurrence of insects or other microorganisms, algae, or large diameter pathogens such as *Giardia lamblia*; or significant and relatively rapid shifts in water characteristics, such as turbidity, temperature, conductivity, or pH, which closely correlate to climatological or surface water conditions.

C3.2.14. Haloacetic Acids (HAA5). The sum of the concentrations in milligrams per liter of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid).

C3.2.15. Indicator parameters. The parameters which values constitute a guide indicator used to demonstrate no negative change in water quality from the water treatment stage to the tap of consumers.

C3.2.16. Lead-free. A maximum lead content of 0.2% for solder and flux, and 8.0% for pipes and fittings.

C3.2.17. Lead Service Line. A service line made of lead that connects the water main to the building inlet, and any lead pigtail, gooseneck, or other fitting that is connected to such line.

C3.2.18. Managing Entity of Water Supply Systems. The entity responsible for operation and management of drinking water supply systems.

C3.2.19. Maximum Contaminant Level (MCL). The maximum permissible level of a contaminant in water that is delivered to the free-flowing outlet of the ultimate user of a public water system except for turbidity for which the maximum permissible level is measured after filtration. Contaminants added to the water under circumstances controlled by the user, except those resulting from the corrosion of piping and plumbing caused by water quality, are excluded.

C3.2.20. Maximum Residual Disinfectant Level (MRDL). The level of a disinfectant added for water treatment measured at the consumer's tap, which may not be exceeded without the unacceptable possibility of adverse health effects.

C3.2.21. Operational Control. The set of observations, analytical assessments and subsequent actions to be implemented in the supply system that help to ensure water quality for human consumption.

C3.2.22. Parameter. Specific value or maximum/minimum concentration for a certain property, element, organism or substance that shall not be exceeded after treatment.

C3.2.23. Point-of-Entry (POE) Treatment Device. A treatment device applied to the drinking water entering a facility to reduce contaminants in drinking water throughout the facility.

C3.2.24. Point-of-Use (POU) Treatment Device. A treatment device applied to a tap to reduce contaminants in drinking water at that tap.

C3.2.25. Potable Water. Water that has been examined and treated to meet the standards in this Chapter, and has been approved as potable by the appropriate DoD medical authority.

C3.2.26. Public Water System (PWS). A system for providing piped water to the public for human consumption, if such system has at least 15 service connections or regularly serves a daily average of at least 25 individuals at least 60 days of the year. This also includes any collection, treatment, storage, and distribution facilities under control of the operator of such systems, and any collection or pretreatment storage facilities not under such control that are used primarily in connection with such systems. A PWS is either a "community water system" or a "non-community system":

C3.2.26.1. Community Water System (CWS). A PWS that has at least 15 service connections used by year-round residents, or which regularly serves at least 25 year-round residents.

C3.2.26.2. Non-Community Water System (NCWS). A PWS that serves the public, but does not serve the same people year-round.

C3.2.26.2.1. Non-transient, Non-community Water System (NTNCWS). A PWS that supplies water to at least 25 of the same people at least six months per year, but not year round. Examples include schools, factories, office buildings, and hospitals that have their own water systems.

C3.2.26.2.2. Transient, Non-Community Water System (TNCWS). A PWS that provides water to at least 25 persons (but not the same 25 persons) at least six months per year. Examples include but are not limited to gas stations, motels, and campgrounds that have their own water sources.

C3.2.27. Quality of Water Intended for Human Consumption. The characterization of water according to both the set of microbiological and physio-chemical parameters of this chapter.

C3.2.28. Sanitary Survey. An on-site review of the water source, facilities, equipment, operation, and maintenance of a public water system to evaluate the adequacy of such elements for producing and distributing potable water.

C3.2.29. Service Population. The number of people served by a DoD water system.

C3.2.30. Slow Sand Filtration. Water treatment process where raw water passes through a bed of sand at a low velocity (1.2 ft/hr), resulting in particulate removal by physical and biological mechanisms.

C3.2.31. Total Trihalomethanes. The sum of the concentration in milligrams per liter of chloroform, bromoform, dibromochloromethane, and bromodichloromethane.

C3.2.32. Underground Injection. A subsurface emplacement through a bored, drilled, driven or dug well where the depth is greater than the largest surface dimension, whenever the principal function of the well is emplacement of any fluid.

C3.2.33. Vulnerability Assessment. The process the commander uses to determine the susceptibility to attack from the full range of threats to the security of personnel, family members, and facilities, which provide a basis for determining antiterrorism measures that can protect personnel and assets from terrorist attacks.

C3.3. CRITERIA

C3.3.1. DoD water systems, regardless of whether they produce or purchase water, will:

C3.3.1.1. Maintain a map/drawing of the complete potable water system.

C3.3.1.2. Update the potable water system master plan at least every 5 years. The master plan shall include at a minimum:

C3.3.1.2.1. Map/drawing of the complete potable water system indicating the locations and boundaries of the water supply areas,

C3.3.1.2.2. Name of the water supply areas,

C3.3.1.2.3. Name of the water treatment plants that serve the area,

C3.3.1.2.4. Service population,

C3.3.1.2.5. Sampling points and daily average values,

C3.3.1.2.6. Information on approved deviations from criteria of this Chapter for the water supplied in the area,

C3.3.1.2.7. Information on the corrective measures adopted to comply with this Chapter, and

C3.3.1.2.8. Information regarding restrictions on the use of water.

C3.3.1.2.9. The water use restriction information referred to in the master plan and the water quality sampling results shall be made accessible to customers and to the Portuguese Base Commander, when requested.

C3.3.1.3. Protect all water supply aquifers (groundwater) and surface water sources from contamination by suitable placement and construction of wells, by suitable placing of the new intake (heading) to all water treatment facilities, by siting and maintaining septic systems and onsite treatment units, and by appropriate land use management on DoD installations. At a minimum, the following criteria shall be complied with:

C3.3.1.3.1. The top of well casings from groundwater wells or boreholes must be higher than the surrounding ground and sealed to prevent infiltration. Impermeable surface shall surround well casings to promote positive drainage away from the well head. All other abstractions of groundwater must be adequately protected against the introduction of pollutants and acts of vandalism.

C3.3.1.4. Conduct sanitary surveys of the water system at least every 3 years for systems using surface water, and every 5 years for systems using groundwater, or as warranted, including review of required water quality analyses. Off-installation surveys will be coordinated with the Portuguese Base Commander.

C3.3.1.5. Provide proper treatment for all water sources. Surface water supplies, including GWUDISW, must conform to the surface water treatment requirements set forth in Table C3.T1. Groundwater supplies, at a minimum, must be disinfected.

C3.3.1.6. Maintain a continuous positive pressure of at least 20 pounds per square inch (psi) in the water distribution system.

C3.3.1.7. Perform water distribution system operation and maintenance practices consisting of:

C3.3.1.7.1. Maintenance of a disinfectant residual throughout the water distribution system (except where determined unnecessary by the appropriate DoD medical authority);

C3.3.1.7.2. Proper procedures for repair and replacement of mains (including disinfection and bacteriological testing);

C3.3.1.7.3. An effective annual water main flushing program;

C3.3.1.7.4. Proper operation and maintenance of storage tanks and reservoirs;

C3.3.1.7.5. Maintenance of distribution system appurtenances (including hydrants and valves); and

C3.3.1.7.6. Maintenance of records of actions and activities associated with operation and maintenance controls implemented.

C3.3.1.8. Establish an effective cross connection control and backflow prevention program.

C3.3.1.9. Manage underground injection on DoD installations to protect underground water supply sources. The underground injection of wastewater is prohibited. In addition, direct discharges of List I and List II substances into groundwater that is suitable for human consumption is prohibited (see Appendix C3.A1 for List I and List II substances). At a minimum, conduct monitoring to determine the effects of any underground injection wells on nearby groundwater supplies.

C3.3.1.10. Develop and update as necessary an emergency contingency plan to ensure the provision of potable water despite interruptions from natural disasters and service interruptions. At a minimum, the plan will include:

C3.3.1.10.1. Plans, procedures, and identification of equipment that can be implemented or utilized in the event of an intentional or un-intentional disruption;

C3.3.1.10.2. Identification of key personnel;

C3.3.1.10.3. Procedures to restore service;

C3.3.1.10.4. Procedures to isolate damaged lines;

C3.3.1.10.5. Identification of alternative water supplies; and

C3.3.1.10.6. Installation public notification procedures.

C3.3.1.11. Use only lead-free pipe, solder, flux, and fittings in the installation or repair of water systems and plumbing systems for drinking water. Provide installation public notification concerning the lead content of materials used in distribution or plumbing systems, or the corrosivity of water that has caused leaching, which indicates a potential health threat if exposed to leaded water, and remedial actions which may be taken.

C3.3.1.11.1. The materials used in water supply systems in contact with water for human consumption shall not cause adverse changes in its quality.

C3.3.1.12. Maintain records showing monthly operating reports for at least 3 years, and records of bacteriological results for not less than 5 years, records of water quality parameters for at least 5 years, and chemical results for not less than 10 years.

C3.3.1.13. Document corrective actions taken to correct breaches of criteria and maintain such records for at least 3 years. Cross connection and backflow prevention testing and repair records should be kept for at least 10 years.

C3.3.1.14. Conduct vulnerability assessments, which include, but are not limited to, a review of:

C3.3.1.14.1. Pipes and constructed conveyances, physical barriers, water collection, pretreatment, treatment, storage, and distribution facilities, electronic, computer, or other automated systems utilized by the PWS;

C3.3.1.14.2. Use, storage, or handling of various chemicals; and

C3.3.1.14.3. Operation and maintenance of the water storage, treatment, and distribution systems.

C3.3.2. Regardless of whether a DoD water system produces or purchases water, it will, by independent testing or validated supplier testing, ensure conformance with the following:

C3.3.2.1. <u>Bacteriological Requirements</u>

C3.3.2.1.1. An installation responsible for a PWS will conduct a bacteriological monitoring program to ensure the safety of water provided for human consumption and allow evaluation with the total coliform-related and bacteriological parameters (see Table C3.T3., "Bacteriological Parameters"). Total coliform parameters are only based on the presence or absence of total coliforms. Compliance is determined based on individual sample results, not averages of results. The MCL is exceeded whenever a confirmed sample is positive for any of the bacteriological parameters (except total coliforms) or if any repeat sample is positive for total coliforms.

C3.3.2.1.2. Each system must develop a written, site-specific monitoring plan and collect routine samples according to Table C3.T2., "Total Coliform Monitoring Frequency."

C3.3.2.1.3. Each system must also monitor for additional bacteriological parameters according to Table C3.T6a., "Minimum Frequency of Sampling and Analyses for Check Monitoring" and Table C3.T6b., "Minimum Frequency of Sampling and Analyses for Audit Monitoring."

C3.3.2.1.4. Systems with initial samples testing positive for *E. coli*, Enterecocci and total coliform will collect repeat samples as soon as possible, preferably the same day. Repeat sample locations are required at the same tap as the original sample plus an upstream and downstream sample, each within five service connections of the original tap. Any additional repeat sampling which may be required will be performed according to the appropriate DoD medical authority. Monitoring will continue as directed by the appropriate DoD medical authority until all bacteriological parameters are no longer detected.

C3.3.2.1.5. When any routine or repeat sample tests positive for total coliforms, it will be tested for fecal coliform or *E. coli*. Fecal-type testing can be foregone on a total coliform positive sample if fecal coliform or *E. coli* is assumed to be present.

C3.3.2.1.6. If a system has exceeded the MCL for total coliform or other bacteriological parameters, the installation will complete the notification in subsection C3.3.3. to:

C3.3.2.1.6.1. The appropriate DoD medical authority, as soon as possible, but in no case later than the end of the same day the command responsible for operating the PWS is notified of the result.

C3.3.2.1.6.2. The installation public as soon as possible, but not later than 72 hours after the system is notified of the test result that an acute risk to public health may exist.

C3.3.2.2. Inorganic Chemical Requirements & Other Parameters

C3.3.2.2.1. An installation responsible for a PWS will ensure that the water distributed for human consumption does not exceed applicable limitations set out in Table C3.T4., "Inorganic Chemical MCLs" and Table C3.T5., "Indicator Parameters."

C3.3.2.2.2. System compliance for inorganic chemicals is determined by a single representative sample, including nitrate and nitrite. If a sample exceeds the MCL, the system is in non-compliance. Systems will be monitored for inorganic chemicals and other parameters at the frequency set in Tables C3.T6a., "Minimum Frequency of Sampling and Analyses for Check Monitoring" C3.T6b., "Minimum Frequency of Sampling and Analyses for Audit Monitoring" and C3.T6c., "Additional Inorganics Monitoring Requirements."

C3.3.2.2.3. If a system is out of compliance, the installation will complete the notification in paragraph C3.3.3. as soon as possible. If the nitrate, nitrite, or total nitrate and nitrite parameters are exceeded, then this is considered an acute health risk and the installation will complete the notification to:

C3.3.2.2.3.1. The appropriate DoD medical authority as soon as possible, but in no case later than the end of the same day the command responsible for operating the PWS is notified of the result.

C3.3.2.2.3.2. The installation public as soon as possible, but not later than 72 hours after the system is notified of the test result. If the installation is only monitoring annually on the basis of direction from the appropriate DoD medical authority, it will immediately increase monitoring in accordance with Table C3.T6c., "Additional Inorganic Monitoring Requirements," until remedial actions are completed and authorities determine the system is reliable and consistent.

C3.3.2.3. Fluoride Requirements

C3.3.2.3.1. An installation commander responsible for a PWS will ensure that the fluoride content of drinking water does not exceed the MCL of 1.5 mg/L.

C3.3.2.3.2. Systems will be monitored for fluoride by collecting one treated water sample annually at the entry point to the distribution system for surface water systems, and once every three years for groundwater systems. In addition, fluoride monitoring will be conducted at the point of consumption in accordance with specifications of Table C3.T6b., "Minimum Frequency of Sampling and Analyses for Audit Monitoring" and Table C3.T6c., "Additional Inorganic Monitoring Requirements." Daily monitoring is recommended for systems practicing fluoridation using the criteria in Table C3.T7., "Recommended Fluoride Concentration at Different Temperatures."

C3.3.2.3.3. If any sample exceeds the MCL, the installation will complete the notification in paragraph C3.3.3. as soon as possible, but in no case later than 14 days after the violation.

C3.3.2.4. Lead and Copper Requirements

C3.3.2.4.1. DoD CWS and NTNCWS will comply with action levels (distinguished from the MCL) of 0.015 mg/L for lead and 1.3 mg/L for copper to determine if corrosion control treatment, public education, and removal of lead service lines, if appropriate, are required. Actions are triggered if the respective lead or copper levels are exceeded in more than 10% of all sampled taps.

C3.3.2.4.2. Affected DoD systems will conduct monitoring in accordance with Table C3.T8., “Monitoring Requirements for Lead and Copper Water Quality Parameters.” High risk sampling sites will be targeted by conducting a materials evaluation of the distribution system. Sampling sites will be selected as stated in Table C3.T8.

C3.3.2.4.3. If an action level is exceeded, the installation will collect additional water quality samples specified in Table C3.T8., “Monitoring Requirements for Lead and Copper Water Quality Parameters.” Optimal corrosion control treatment will be pursued. If action levels are exceeded after implementation of applicable corrosion control and source water treatment, lead service lines will be replaced if the lead service lines cause the lead action level to be exceeded. The base commander will implement an education program for installation personnel (including US and Portuguese) within 60 days and will complete the notification in paragraph C3.3.3. as soon as possible, but in no case later than 14 days after the violation.

C3.3.2.5. Synthetic Organics Requirements

C3.3.2.5.1. An installation responsible for CWS and NTNCWS will ensure that synthetic organic chemicals in water distributed to people do not exceed the limitations delineated in Table C3.T9., “Synthetic Organic Chemical MCLs.” For systems monitored quarterly or more frequently, a system is out of compliance if the annual running average concentration of an organic chemical exceeds the MCL. For systems monitored annually or less frequently, a system is out of compliance if a single sample exceeds the MCL. For the parameters listed in Table C3.T9. Note 10, a system is in non-compliance if the MCL is exceeded.

C3.3.2.5.2. Systems will be monitored for synthetic organic chemicals according to the schedule stated in Table C3.T6b., “Minimum Frequency of Sampling and Analyses for Audit Monitoring” and Table C3.T10., “Additional Synthetic Organic Chemical Monitoring Requirements.”

C3.3.2.5.3. If a system is out of compliance, the notification set out in paragraph C3.3.3. shall be completed as soon as possible, but in no case later than 14 days after the violation. The installation will immediately begin quarterly monitoring and will increase quarterly monitoring if the level of any contaminant is at its detection limit but less than its MCL, as noted in Table C3.T10., “Additional Synthetic Organic Chemical Monitoring Requirements,” and will continue until the installation commander determines the system is back in compliance, and all necessary remedial measures have been implemented.

C3.3.2.6. Disinfectant/Disinfection Byproducts (DDBP) Requirements

C3.3.2.6.1. An installation responsible for a CWS and NTNCWS that adds a disinfectant (oxidant, such as chlorine, chlorine dioxide, chloramines, or ozone) to any part of its treatment process (to include the addition of disinfectant by a local water supplier) will:

C3.3.2.6.1.1. Ensure that the MCL of 0.08 mg/L for total trihalomethanes (TTHM), the MCL of 0.06 mg/L for haloacetic acids (HAA5), the MCL of 1.0 mg/L for chlorite, and the MCL of 0.01 mg/L for bromate are met in drinking water.

C3.3.2.6.1.2. Ensure that the maximum residual disinfectant level (MRDL) of 4.0 mg/L for chlorine, the MRDL of 4.0 mg/L (measured as combined total chlorine) for chloramines when ammonia is added during chlorination, and the MRDL of 0.8 mg/L for chlorine dioxide are met in drinking water. Operators may increase residual disinfectant levels of chlorine or chloramines (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as distribution line breaks, storm runoff events, source water contamination, or cross-connections.

C3.3.2.6.2. Such systems that add a disinfectant will monitor TTHM and HAA5 in accordance with Table C3.T11., "Disinfectant/Disinfection Byproducts Monitoring Requirements." Additional disinfectant and disinfection byproduct monitoring for systems that utilize chlorine dioxide, chloramines, or ozone are also included in Table C3.T11.

C3.3.2.6.3. For TTHM and HAA5 a system is noncompliant when the running annual average of quarterly averages of all samples taken in the distribution system, computed quarterly, exceed the MCL for TTHM, 0.080 mg/L, or the MCL for HAA5, 0.060 mg/L. Refer to Table C3.T11., "Disinfectant/Disinfection Byproducts Monitoring Requirements" for chlorine, chloramine, and chlorine dioxide compliance requirements. If a system is out of compliance as described in Table C3.T11., the installation will accomplish the notification requirements outlined in paragraph C3.3.3. as soon as possible, but in no case later than 14 days after the violation, and undertake remedial measures.

C3.3.2.7. Radionuclide Requirements

C3.3.2.7.1. An installation responsible for a CWS will test the system for conformance with the applicable radionuclide limits contained in Table C3.T12., "Radionuclide MCLs and Monitoring Requirements."

C3.3.2.7.2. Systems will perform radionuclide monitoring as stated in Table C3.T6b., "Minimum Frequency of Sampling and Analyses for Audit Monitoring."

C3.3.2.7.3. If the average annual MCL for gross alpha activity for radium is exceeded, the installation will complete the notification according to the procedures in paragraph C3.3.3. within 14 days. Monitoring will continue until remedial actions are completed and the average annual concentration no longer exceeds the respective MCL. Continued monitoring for gross alpha-related contamination will occur quarterly, while gross beta-related monitoring will be monthly. If any gross beta MCL is exceeded, the major radioactive components will be identified.

C3.3.2.8. Surface Water Treatment Requirements. DoD water systems that use surface water sources or GWUDISW will meet the surface water treatment requirements delineated in Table C3.T1. If the turbidity readings in Table C3.T1. are exceeded, the installation will complete the notification in paragraph C3.3.3. as soon as possible, but in no case later than 14 days after the violation and undertake remedial action. Surface water and GWUDISW systems that make changes to their disinfection practices (e.g., change in disinfectant or application point) in order to meet DDBP requirements (C3.3.2.6.), will ensure that protection from microbial pathogens is not compromised.

C3.3.2.9. Non-Public Water Systems. DoD NPWSs will be monitored for total coliforms, at a minimum, and disinfectant residuals periodically.

C3.3.2.10. Alternative Water Supplies. DoD installations will, if necessary, only utilize alternative water sources, including POE/POU treatment devices and bottled water supplies, which are approved by the installation commander.

C3.3.2.11. Filter Backwash Requirements. To prevent microbes and other contaminants from passing through and into finished drinking water, DoD PWSs will ensure that recycled streams (i.e., recycled filter backwash water, sludge thickener supernatant, and liquids from dewatering processes) are treated by direct and conventional filtration processes. This requirement only applies to DoD PWSs that:

C3.3.2.11.1. Use surface water or GWUDISW;

C3.3.2.11.2. Use direct or conventional filtration processes; and

C3.3.2.11.3. Recycle spent filter backwash water, sludge thickener supernatant, or liquids from dewatering processes.

C3.3.3. Notification Requirements. When a DoD water system is out of compliance as set forth in the preceding criteria, the appropriate DoD medical authority, installation personnel (US and Portuguese), the Environmental Executive Agent, and the responsible Headquarters Water Quality Manager will be notified. The notice will provide a clear and readily understandable explanation of the violation, any potential adverse health effects, the population at risk, the steps being taken to correct the violation, the necessity for seeking an alternative water supply, if any, and any preventive measures the consumer should take until the violation is corrected. The appropriate DoD medical authority, in consultation with the Portuguese Base Commander, will coordinate notification of Portuguese authorities in cases where off-installation populations are at risk.

C3.3.3.1. Water monitoring results shall be made available to consumers quarterly. The Portuguese Base Commander shall, upon request, be notified of the water monitoring results along with any planned/implemented corrective measures derived from non-compliances.

C3.3.3.1.1. Quarterly water monitoring results shall, at a minimum include, by parameter:

C3.3.3.1.1.1. The number of tests in the monitoring program;

C3.3.3.1.1.2. The percentage of tests performed;

C3.3.3.1.1.3. The established limit value;

C3.3.3.1.1.4. The maximum and minimum values obtained;

C3.3.3.1.1.5. The percentage of tests that comply with the criteria of this Chapter;

C3.3.3.1.1.6. The supplementary information on the causes of non-compliance and the corrective measures implemented.

C3.3.4. System Operator Requirements. DoD installations will ensure that personnel are appropriately trained to operate DoD water systems.

Table C3.T1. Additional Surface Water Treatment Requirements

1. Filtered Systems

a. Filtered water systems will provide a combination of disinfection and filtration that achieves a total of 99.9% (3-log) removal of *Giardia lamblia* cysts and 99.99% (4-log) removal of viruses.

b. The turbidity of filtered water will be monitored at least once every four hours. The turbidity of filtered water for direct and conventional filtration systems will not exceed 0.5 NTU (1 NTU for slow sand and diatomaceous earth filters) in 95% of the analyses in a month, with a maximum of 5 NTU.

c. Disinfection must provide the remaining log-removal of *Giardia lamblia* cysts and viruses not obtained by the filtration technology applied.*

d. Disinfection residual maintenance and monitoring requirements:

1. Disinfection systems must have redundant components to ensure uninterrupted disinfection during operational periods.

2. Disinfectant residual monitoring immediately after disinfection is required once every four hours that the system is in operation. Disinfectant residual measurements in the distribution system will be made at the same times as total coliforms are sampled.

3. Disinfectant residual of water entering the distribution system cannot be less than 0.2 mg/L for greater than four hours.

4. Water in a distribution system with a heterotrophic bacteria concentration less than or equal to 500/mL measured as heterotrophic plate count is considered to have a detectable disinfectant residual for the purpose of determining compliance with the Surface Water Treatment Requirements.

*Proper conventional treatment typically removes 2.5-log *Giardia*/ 2.0-log viruses. Proper direct filtration and diatomaceous earth filtration remove 2.0-log *Giardia*/ 1.0-log viruses. Slow sand filtration removes typically removes 2.0-log *Giardia*/ 2.0-log viruses. Less log-removal may be assumed if treatment is not properly applied.

2. SW or GWUDISW systems will provide at least 99% (2-log) removal of *Cryptosporidium*. A system is considered to be compliant with the *Cryptosporidium* removal requirements if:

a. For conventional and direct filtration systems, the turbidity level of the system's combined filter effluent water does not exceed 0.3 NTU in at least 95% of the measurements taken each month and at no time exceeds 1 NTU.

b. For slow sand and diatomaceous earth filtration plants, the turbidity level of the system's combined filter effluent water does not exceed 1 NTU in at least 95% of measurements taken each month and at no time exceeds 5 NTUs.

c. For alternative systems, the system demonstrates to the appropriate medical authority that the alternative filtration technology, in combination with disinfection treatment, consistently achieves 3-log removal and/or inactivation of *Giardia lamblia* cysts, 4-log removal and/or inactivation of viruses, and 2-log removal of *Cryptosporidium* oocysts.

3. Individual Filter Effluent Monitoring. Conventional or direct filtration systems must continuously monitor (every 15 minutes) the individual filter turbidity for each filter used at the system. Systems with two or fewer filters may monitor combined filter effluent turbidity continuously, in lieu of individual filter turbidity monitoring. If a system exceeds 1.0 NTU in two consecutive measurements for three months in a row (for the same filter), the installation must conduct a self assessment of the filter within 14 days. The self-assessment must include at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a self-assessment report. If a system exceeds 2.0 NTU (in two consecutive measurements 15 minutes apart) for two months in a row, a Comprehensive Performance Evaluation (CPE) must be conducted within 90 days by a third party.

4. Covers for Finished Water Storage Facilities. Installations must physically cover all finished water reservoirs, holding tanks, or storage water facilities.

Table C3.T2. Total Coliform Monitoring Frequency

Population Served	Number of Samples [1]	Population Served	Number of Samples [1]
25 to 1,000	1	59,001 to 70,000	70
1,001 to 2,500	2	70,001 to 83,000	80
2,501 to 3,300	3	83,001 to 96,000	90
3,301 to 4,100	4	96,001 to 130,000	100
4,101 to 4,900	5	130,001 to 220,000	120
4,901 to 5,800	6	220,001 to 320,000	150
5,801 to 6,700	7	320,000 to 450,000	180
6,701 to 7,600	8	450,001 to 600,000	210
7,601 to 8,500	9	600,001 to780,000	240
8,501 to 12,900	10	780,001 to 970,000	270
12,901 to 17,200	15	970,001 to 1,230,000	300
17,201 to 21,500	20	1,230,001 to 1,520,000	330
21,501 to 25,000	25	1,520,001 to 1,850,000	360
25,001 to 33,000	30	1,850,001 to 2,270,000	390
33,001 to 41,000	40	2,270,001 to 3,020,000	420
41,001 to 50,000	50	3,020,000 to 3,960,000	450
50,001 to 59,000	60	3,960,001 or more	480

Notes:

1. Minimum Number of Routine Samples Per Month
2. A non-community water system using groundwater and serving 1,000 or less people may monitor once in each calendar quarter during which the system provides water provided a sanitary survey conducted within the last 5 years shows the system is supplied solely by a protected groundwater source and free of sanitary defects.

Systems that use groundwater, serve less than 4,900 people, and collect samples from different sites, may collect all samples on a single day. All other systems must collect samples at regular intervals throughout the month.

- Samples shall be taken to ensure compliance with the parameters at the following locations:
- In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
- In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
- In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.

Table C3.T3. Bacteriological Parameters

Parameter	Parameters	
	Bacteriological Parameters	Indicator Parameters[2,3]
Fecal coliform or E. coli	0 positives in 100 mL[2] 0 positives in 250 mL[5]	-
Enterococci	0 positives in 100 mL[2] 0 positives in 250 mL[5]	-
Clostridium perfringens[4]	-	0 positives in 100 mL
Colony count at 22 ºC	100 positives per mL[5]	No abnormal change
Colony count at 37 ºC	20 positives per mL[5]	No abnormal change
Pseudomona aeruginosa	0 positives per mL[5]	-

Notes:

1. Samples shall be taken to ensure compliance with the parameters at the following locations:
   - In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
   - In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
   - In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.
2. For water supplied through water distribution systems, distribution networks, tanker trucks or ships or used in a food-production processes.
3. Exceedances shall be reported to the Appropriate DOD Medical Authority in order to determine corrective actions.
4. This parameter does not need to be measured unless the water originates from surface water or is GWUDISW. In the event of non-compliance with this indicator parameter, the distribution system shall be investigated to ensure that there is no potential danger to human health arising from the presence of pathogenic micro-organisms, e.g. cryptosporidium
5. For water for purchase in bottles or other containers

Table C3.T4. Inorganic Chemical MCLs

Contaminant	MCL	Units
Arsenic	0.01	mg As/L
Antimony	0.005	mg Sb/L
Asbestos	7 million	fibers/L (longer than 10 um)
Barium	2.0	mg Ba/L
Beryllium [2]	0.004	mg Be/L
Boron	1.0	mg B/L
Bromate [3]	0.01 (on & after 25 Dec 2013)	mg BrO_3/L
Cadmium	0.005	mg Cd/L
Chromium [4]	0.05	mg Cr/L
Copper [4, 5]	2.0	mg Cu/L
Cyanide	0.05	mg CN/L
Fluoride [3, 6]	1.5	mg F/L
Lead [4, 5, 7]	0.025 (until immediately before 25 Dec 2013)	mg Pb/L
	0.01 (on & after 25 Dec 2013)	mg Pb/L
Mercury	0.001	mg Hg/L
Nickel [2, 4]	0.02	mg Ni/L
Nitrate [8]	10	mg/L (as N)
Nitrite [8]	0.15	mg/L (as N)
	0.5	mg/L (as NO_2)
Total Nitrite & Nitrate [9]	10	mg/L (as N)
Selenium	0.01	mg Se/L
Sodium	200	mg Na/L
Thallium	0.002	mg/L

Notes:

1 Samples shall be taken to ensure compliance with the parameters at the following locations:

- In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
- In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
- In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.

2 MCLs apply to CWS and NTNCWS systems. All other MCLs in the table above not marked by this superscript apply to all PWS.

3 The value must be as low as possible without compromising the effectiveness of disinfection.

4 The value applies to a sample of water for human consumption obtained at the tap of consumers, by an appropriate sampling method, and collected to be representative of the weekly average ingested by consumers.

5 See criteria C3.3.2.4 for lead and copper requirements.

6 See criteria C3.3.2.3 for additional fluoride requirements.

7 The value for lead of 0.010 mg/L Pb must be respected no later than December 25, 2013. From the implementation of this document until December 25, 2013 the value for lead of 0.025 mg/L Pb must be respected and the installation must take all necessary measures to reduce, to the maximum extent practicable, the concentration of lead in water intended for human consumption.

8 The value applies to samples taken at the outlet of the water treatment plant, [nitrate]/50 + [nitrite]/3 <= 1, where the brackets represent the concentration in mg/L for nitrates and for nitrites, and the limit value of 0.10 mg/L for nitrites

9 MCLs apply to CWS, NTNCWS, and TNCWS systems. All other MCLs in the table above not marked by this superscript apply to all PWS.

Table C3.T5. Indicator Parameters[2]

Parameters	**Maximum Concentration Limit (MCL)**	**Units**
Aluminum	0.2	mg/L Al
Ammonium	0.5	mg/L NH4
Calcium[3, 4, 5]	-	mg/L Ca
Chloride[3]	250	mg Cl/L
Clostridium perfringens[8] (including spores)	0	Number/100 mL
Colony Counts[16,17]	No abnormal change	Number/1mL at 22ºC
Colony Counts[16,17]	No abnormal change	Number/1mL at 37ºC
Color	20	mg/L PtCo
Conductivity[3]	2500	µS/cm at 20° C
Hydrogen Ion[3, 9]	≥6.5 and ≤9.0	pH value
Iron	0.2	mg/L Fe
Magnesium[3, 5, 7]	-	mg/L Mg
Manganese	0.05	mg/L Mn
Microcystins – Total LR[15]	0.001	mg/L
Odor, @ 25° C	3	Dilution Factor
Oxidizability[10]	5	mg/L O2
Residual disinfectant[18]	-	mg/L
Sodium	200	mg Na/L
Sulfate[3]	250	mg SO_4/L
Taste, @ 25° C	3	Dilution Factor
Total Coliform[11]	0	Number/100mL
Total Hardness[3, 6, 7]	-	mg/L CaCO3
Total Organic Carbon (TOC)[12, 17]	No abnormal change	mg C/L
α-total	0.5	Bq/L
β-total	1.0	Bq/L
Total Indicative Dose[14] (for radioactivity)	0.10	mSv/year
Tritium (for radioactivity)	100	Bq/L
Turbidity[13]	4	NTU

<u>Notes</u>

1 Samples shall be taken to ensure compliance with the parameters at the following locations:

- In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
- In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
- In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.

2 Indicator parameters. If a system is in non-compliance with these parameters, the appropriate Installation Medical Authority in consultation with the installation's organization responsible for water distribution (e.g. civil engineers or public works) will determine the requirement for increased monitoring, corrective action and notification, if necessary.

3 The water should not be a factor in the deterioration of materials with which it comes into contact, i.e. it shall be desirably balanced. To check this property, various methods can be used, including the index of Langelier (IL), which, should be between +/- 0.5 IL.

4 It is not desirable that the concentration of calcium is greater than 100 mg/l ca.

5 It is not desirable that the concentration of magnesium is greater than 50 mg/L Mg.

6 It is desirable that the total hardness in calcium carbonate is between 150 mg and 500 mg/l $CaCO_3$.

7 When a supply system is managed by only one entity, these parameters must also be determined upstream of the distribution, under the program of operational control.

8 Failure to comply with this parameter, requires the entire supply system to be investigated to identify risk to human health due to the presence of other pathogenic microorganisms, for example, *Cryptosporidium*. The results of all the investigations shall be reported to the Portuguese Base Commander upon request.

9 For non-carbonated water contained in bottles or other containers, the minimum value of pH can be reduced to 4.5 units. For water in bottles or other containers, naturally or artificially enriched in carbon dioxide, the minimum amount may be lower.

10 During control inspections, the analysis of oxidizability is not mandatory provided that the content of TOC is determined in the sample. This does not apply to supply zones with daily average volumes below 10,000 m3 where oxidizability should always be monitored in compliance with Table C3.T6a, "Minimum Frequency of Sampling and Analyses for Check Monitoring".

11 The unit is N/250 ml for the water contained in bottles or other containers.

12 An analysis of the parameter TOC is required for all supply zones with average daily volumes in excess of 10,000 m3.

13 For surface water, the parameter of turbidity at the exit of treatment should be 1 NTU.

14 The total indicative dose is determined only when failures of the parameters (alpha)-total and/or (beta)-total occur. In these cases proceed to the determination of concentrations of specific emitting radionuclides (alpha) and or (beta).

15 This parameter must be determined at the exit of the water treatment plant, when there is suspicion of eutrophication of the surface water body. If confirmed a number of cyanobacterias potentially producing microcystins exceeding 2000 cells/ml the frequency of sampling must be increased, in the framework of the program of operational control.

16 It is not desirable that the number of colonies at 22° C and 37° C are greater than 100 and 20, respectively.

17 No abnormal change means, on the basis of historical analysis, results within the criteria established by managing entities. When an abnormal change occurs, the managing entity should investigate the causes.

18 It is recommended that concentrations of this parameter are between 0.2 and 0.6 mg/l of free residual chlorine.

Table C3.T6a. Minimum Frequency of Sampling and Analyses for Check Monitoring

Check Monitoring Parameters [2]	Volume of water distributed or produced each day within a supply zone (m^3/day) [2]	Number of samples per year[2, 3, 4]
E.coli Residual disinfectant	< 100 ≥ 100	6 12/5,000 people [5]
Aluminum [6, 8] Ammonium [8] Clostridium perfringens (including spores) [8] Colony count at 22 ºC [8] Colony count at 37 ºC [8] Color [8] Conductivity8 [8] Iron [6] Manganese [8] Nitrate [7] Nitrite [7] Odor Oxidizability [8] pH [8] Taste [8] Turbidity [8]	<100 >100 - ≤1,000 >1,000	2 4 4 + 3 for each 1,000 m^3/day and part thereof of the total volume

Notes:

1 Samples shall be taken to ensure compliance with the parameters at the following locations:

- In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
- In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
- In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.

2 In the case of intermittent short-term supply, the appropriate DoD medical authority in conjunction with the Portuguese Base Commander, will determine the frequency and parameters to be determined.

3 If the appropriate DoD medical authority is of the opinion that the quality of supplied water is unlikely to deteriorate, that the water is intended exclusively for purposes that have no influence, either direct or indirect, on the health of consumers, and in each of two successive years the results of samples taken show no significant variation, and values for parameters are significantly lower than their MCLs, the reduced number of samples may be used.

The minimum frequency will not be less than 50% of the number of samples specified, expect in the case of supplies less than 100 m3/day where the reduction of frequency does not apply.

4 As far as possible, the number of samples should be distributed equally in time and location.

5 Where the population is not an exact multiple of 5,000, round up.

6 Use check monitoring when parameter is used as flocculant, or where the water originates from, or is influenced by, surface waters, otherwise use audit monitoring.

7 Use check monitoring only when chloramination is practiced, otherwise use audit monitoring.

8 Indicator Parameter. If a system is in non-compliance with these parameters, the appropriate Installation Medical Authority in consultation with the installation's organization responsible for water distribution (e.g. civil engineers or public works) will determine the requirement for increased monitoring, corrective action and notification, if necessary.

Table C3.T6b. Minimum Frequency of Sampling and Analyses for Audit Monitoring.

Audit Monitoring Parameters	Volume of water distributed or produced each day within a supply zone (m^3/day) [2]	Number of samples per year
Enteroccoci Total Organic Carbon [5] Oxidizability [5] Antimony Arsenic Boron Bromate Cadmium Calcium Chloride [5] Chromium Copper Cyanide Fluoride Hardness Lead Nickel Nitrate Magnesium Manganese Mercury Selenium Sodium [5] Sulfate [5] Synthetic Organic Compounds [3, 4] Tritium [5] Total alpha [5] Total beta [5] Total indicative dose [5]	$\leq$ 1000	1
	1,001 - 10,000	1 + 1 for each 3,300 m^3/day and part thereof of the total volume
	10,001 - 100,000	3 + 1 for each 10,000 m^3/day and part thereof of the total volume
	> 100,000	10 + 1 for each 25,000 m^3/day and part thereof of the total volume

Notes:

1. Samples shall be taken to ensure compliance with the parameters at the following locations:
   - In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
   - In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
   - In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.

2. The volumes are calculated as averages taken over a calendar year.
3. Includes benzo(a)pyrene, polycyclic aromatic hydrocarbons, and the following volatile organic compounds (VOCs) listed in Table C3.T8: benzene, 1,2-dichloroethane, tetrachloroethylene, trichloroethylene, and vinyl chloride. All other VOCs shall be monitored according to Table C3.T10. If the parameter is exceeded, corrective actions must be adopted immediately to restore water quality (e.g., monitoring results remain below the parameter).
4. Pesticides/Polychlorinated Biphenyls (PCBs)/Other shall be monitored following the frequency specified in this table, except for ethylene dibromide and 2,3,7,8-TCDD (dioxin) that are to be monitored according to Table C3.T10. If the parameter is exceeded, corrective actions must be adopted immediately to restore water quality (e.g., monitoring results remain below the parameter).
5. Indicator parameter. If a system is in non-compliance with these parameters, the appropriate Installation Medical Authority in consultation with the installation's organization responsible for water distribution (e.g. civil engineers or public works) will determine the requirement for increased monitoring, corrective action and notification, if necessary.
6. The managing entity that distributes water acquired exclusively from another managing entity is responsible for the control of parameters for water quality.

Table C3.T6c. Additional Inorganics Monitoring Requirements

Contaminant	Groundwater Baseline Requirement [2]	Surface Water Baseline Requirement	Trigger That Increases Monitoring [3]	Reduced Monitoring
Arsenic	See table C3.T6b	See table C3.T6b	>MCL	---
Antimony	See table C3.T6b	See table C3.T6b	>MCL	---
Barium	1 sample / 3 yr	Annual sample	>MCL	---
Beryllium	1 sample / 3 yr	Annual sample	>MCL	---
Cadmium	See table C3.T6b	See table C3.T6b	>MCL	---
Chromium	See table C3.T6b	See table C3.T6b	>MCL	---
Cyanide	See table C3.T6b	See table C3.T6b	>MCL	---
Fluoride	See table C3.T6b	See table C3.T6b	>MCL	
Mercury	See table C3.T6b	See table C3.T6b	>MCL	---
Nickel	See table C3.T6b	See table C3.T6b	>MCL	---
Selenium	See table C3.T6b	See table C3.T6b	>MCL	---
Thallium	1 sample / 3 yr	Annual sample	>MCL	---
Sodium	See table C3.T6b	See table C3.T6b	---	---
Asbestos [4]	1 sample every 9 years	1 sample every 9 years	>MCL	Yes
Total Nitrate/Nitrite	Annual sample	Quarterly	>50% Nitrite MCL	---
Nitrate	See table C3.T6b	See table C3.T6b [5]	>50% MCL [6]	Yes [7]
Nitrite	See table C3.T6b	See table C3.T6b [5]	>50% MCL [6]	Yes [8]
Corrosivity [9]	Once	Once	---	---

Notes:

1. Samples shall be taken to ensure compliance with the parameters at the following locations:
   - In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
   - In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
   - In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.

2. Samples shall be taken as follows: groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment; surface water systems shall take at least one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after the treatment.

3. Increased quarterly monitoring requires a minimum of 2 samples per quarter for groundwater systems and at least 4 samples per quarter for surface water systems.

4. Necessity for analysis is predicated upon a sanitary survey conducted by the PWS.

5. Any sampling point with an analytical value greater than or equal to 0.5 mg/L as N, (50% of the Nitrite MCL) must begin sampling for nitrate and nitrite separately. Since nitrite readily converts to nitrate, a system can conclude that if the total nitrate/nitrite value of a sample is less than half of the nitrite MCL, then the value of nitrite in the sample would also be below half of its MCL.

6. Increased quarterly monitoring shall be undertaken for nitrate and nitrate if a sample is >50% of the MCL.

7. The appropriate DoD medical authority may reduce repeat sampling frequency for surface water systems to annually if after 1 year results are <50% of MCL.

8. The appropriate DoD medical authority may reduce repeat sampling frequency to 1 annual sample if results are 50% of MCL.

9. PWSs shall be analyzed within 1 year of the effective date of country-specific FGS to determine the corrosivity entering the distribution system. Two samples (one mid-winter and one mid-summer) will be collected at the entry point of the distribution system for systems using surface water and GWUDISW. One sample will be collected for systems using only groundwater. Corrosivity characteristics of the water shall include measurements of pH, calcium, hardness, alkalinity, temperature, total dissolved solids, and calculation of the Langelier Saturation Index.

As an exclusion, pH shall follow the monitoring frequency specified in Table C3.T6a

Table C3.T7. Recommended Fluoride Concentrations at Different Temperatures

Annual Average of Maximum	Control Limits (mg/L)		
Daily Air Temperatures (°F)	**Lower**	**Optimum**	**Upper**
50.0 - 53.7	0.9	1.2	1.5
53.8 - 58.3	0.8	1.1	1.5
58.4 - 63.8	0.8	1.0	1.3
63.9 - 70.6	0.7	0.9	1.2
70.7 - 79.2	0.7	0.8	1.0
79.3 - 90.5	0.6	0.7	0.8

Table C3.T8. Monitoring Requirements for Lead and Copper Water Quality Parameters

Population Served	No. of Sites for Standard Monitoring [2, 3]	No. of Sites for Reduced Monitoring [4]	No. of Sites for Water Quality Parameters [5]
>100,000	100	50	25
10,001 – 100,000	60	30	10
3,301 – 10,000	40	20	3
501 – 3,300	20	10	2
101 – 500	10	5	1
<100	5	5	1

Notes:

1. Samples shall be taken to ensure compliance with the parameters at the following locations:
    - In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
    - In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
    - In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.
2. Every 6 months for lead and copper.
3. Sampling sites shall be based on a hierarchical approach. Priority will be given to single family residences which contain copper pipe with lead solder installed after 1982, contain lead pipes, or are served by lead service lines; then, structures, including multifamily residences, with the foregoing characteristics; and finally, residences and structures with copper pipe with lead solder installed before 1983. First draw samples will be collected from a cold water kitchen or bathroom tap; non-residential samples will be taken at an interior tap from which water is typically drawn for consumption.
4. Annually for lead and copper if action levels are met during each of 2 consecutive 6 month monitoring periods. Any small or medium-sized system (<50,000) that meets the lead and copper action levels during 3 consecutive years may reduce the monitoring for lead and copper from annually to once every 3 years. Annual or triennial sampling will be conducted during the 4 warmest months of the year.
5. This monitoring must be conducted by all large systems (>50,000). Small and medium sized systems must monitor water quality parameters when action levels are exceeded. Samples will be representative of water quality throughout the distribution system and include a sample from the entry to the distribution system. Samples will be taken in duplicate for pH, alkalinity, calcium, conductivity or total dissolved solids, and water temperatures to allow a corrosivity determination (via a Langelier saturation index or other appropriate saturation index); additional parameters are orthophosphate when a phosphate inhibitor is used and silica when a silicate inhibitor is used.

Table C3.T9. Synthetic Organic Chemical MCLs

Synthetic Organic Chemical	MCL, mg/L	Detection limit, mg/L
Pesticides/PCBs		
Pesticide substances considered separately [10]	0.0001 [2, 3, 4]	
Total Pesticides [10]	0.0005 [2, 3, 5]	
Aldrin [10]	0.00003	
Benzo[a]pyrene [10]	0.00001	
Di (2-ethylhexyl) adipate	0.4	
Dieldrin [10]	0.00003	
Ethylene dibromide (EDB)	0.00005	0.00001
Heptachlor	0.00003	
Heptachlor epoxide	0.00003	0.00002
2,3,7,8-TCDD (Dioxin)	0.00000003	
PCBs (as decachlorobiphenyls)	0.0005	0.00004
Volatile Organic Chemicals		
Benzene [10]	0.005	0.0005
Carbon tetrachloride	0.005	0.0005
o-Dichlorobenzene	0.6	0.0005
cis-1,2-Dichloroethylene	0.07	0.0005
trans-1,2-Dichloroethylene	0.1	0.0005
1,1-Dichloroethylene	0.003	0.0005
1,1,1-Trichloroethane	0.20	0.0005
1,2-Dichloroethane [10]	0.005	0.0005
Dichloromethane	0.005	
1,1,2-Trichloroethane	0.005	
1,2,4-Trichloro-benzene	0.07	
1,2-Dichloropropane	0.005	0.0005
Ethylbenzene	0.7	0.0005
Monochlorobenzene	0.1	0.0005
para-Dichlorobenzene	0.075	0.0005
Styrene	0.1	0.0005
Tetrachloroethylene [10]	0.005 [7]	0.0005
Trichloroethylene [10]	0.005 [7]	0.0005
Toluene	1.0	0.0005
Total Trihalomethanes [10]	0.08 [8]	
Vinyl chloride [3, 10]	0.0005	0.0005
Xylene (total)	10	0.0005
Other Organic Chemicals		
Acrylamide [10]	0.0001 [9]	
Epihydrochlorin [10]	0.0001 [9]	
Polycyclic Aromatic Hydrocarbons [10]	0.0001 [6]	
Di (2-ethylhexyl) phthalate	0.006	

Notes:

1. Samples shall be taken to ensure compliance with the parameters at the following locations:

- In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
- In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
- In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.

2. The performance characteristics apply to each individual pesticide and will depend on the pesticides concerned. The limit of detection may not achievable for all pesticides present, but analyses should strive to achieve this standard.
3. Pesticide may include but is not limited to:
   Organic insecticides
   Organic herbicides
   Organic fungicides
   Organic nematocides
   Organic acaricides
   Organic algicides
   Organic rodenticides
   Organic slimicides
   Related products (in particular growth regulators), its metabolites, degradation products.
4. The parameter applies to each individual pesticide and includes at a minimum the following

   Alachlor
   Endothall
   Aldicarb
   Glyphosphate
   Aldicarb Sulfone
   Hexachlorobenzene
   Aldicarb Sulfoxide
   Hexachlorocyclopentadiene
   Atrazine
   Lindane
   Carbofuran
   Methoxychlor
   Chlordane
   Oxamyl (Vydate)
   Dalapon
   Pentachlorophenol
   2,4-D
   Picloram
   Dinoseb
   Simazine
   Diquat
   2,4,5-TP (Silvex)
   Endrin

   In addition to the pesticides listed above, only those pesticides that are likely to be present in a given water supply need to be monitored. In the case of aldrin, dieldrin, heptachlor, and heptachlor epoxide the parameter is 0.030 µg/L.

5. Total pesticides means the sum of all individual pesticides detected and quantified in the monitoring procedure.
6. The specified compounds are:
   - Benzo(b) fluoranthene
   - Benzo(k)fluoranthene
   - Benzo(ghi)perylene
   - Indeno(1,2,3-cd)pyrene

   The parameter applies to the sum of the concentrations of the individual compounds detected and quantified in the monitoring process.
7. The parameter applies to the sum of the concentration of Tetrachloroethylene (PCE) and Trichloroethylene.
8. Where possible, without compromising disinfectrion, the concentration of chlorinated hydrocarbon compounds in water shall be reduced. The specific compounds are chloroform, bromoform, dibromochloromethane and bromodichloromethane. The parameter applies to the sum of the concentrations of the individual compounds.
9. The parameter refers to the residual monomer concentration in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with water.
10. A system is in non-compliance if any one of these parameters is exceeded. For all other parameters listed above not marked by this table note, system compliance is determined as indicated in section C3.3.2.5.1.

Table C3.T10. Additional Synthetic Organic Chemical Monitoring Requirements

Contaminant	Base Requirements[1]		Triggers for more monitoring[2]	Reduced Monitoring
	Groundwater	Surface water		
VOCs [8]	Quarterly	Quarterly	>0.0005 mg/L	Yes[3, 4]
Pesticides/PCBs [9]	4 Quarterly samples/3 years during most likely period for their presence		>Detection limit[5]	Yes[4, 6]

Notes:

1. Groundwater systems shall take a minimum of one sample at every entry point which is representative of each well after treatment; surface water systems will take a minimum of one sample at every entry point to the distribution system at a point which is representative of each source after treatment. For CWS, monitoring compliance is to be met within 1 year of the publishing of the FGS; for NTNCW, compliance is to be met within 2 years of the publishing of the FGS.
2. Increased monitoring requires a minimum of 2 quarterly samples for groundwater systems, and at least 4 quarterly samples for surface water systems.
3. Repeat sampling frequency may be reduced to annually after 1 year of no detection, and every 3 years after three rounds of no detection.
4. Monitoring frequency may be reduced if warranted based on a sanitary survey of the PWS.
5. Detection limits noted in Table C3.T8., or as determined by the best available testing methods.
6. Repeat sampling frequency may be reduced to the following if after one round of no detection: systems >3,300 reduce to a minimum of 2 quarterly samples in one year during each repeat compliance period, or systems <3,300 reduce to a minimum of 1 sample every 3 years.
7. Compliance is based on an annual running average for each sample point for systems monitoring quarterly or more frequently; for systems monitoring annually or less frequently, compliance is based on a single sample, unless the appropriate DoD medical authority requests a confirmation sample. A system is out of compliance if any contaminant exceeds the MCL.
8. Includes benzo(a)pyrene, polycyclic aromatic hydrocarbons and all VOCs listed in C3.T8 with the exception of benzene, 1,2-dichloroethane, tetrachloroethylene, trichloroethylene, and vinyl chloride. These chemicals shall follow the requirements specified in Table C3.T6b.
9. Includes ethylene dibromide and 2,3,7,8-TCDD (dioxin). All other pesticides listed in Table C3.T8 shall follow the monitoring listed in Table C3.T6b.

Table C3.T11. Disinfectant/Disinfection Byproducts Monitoring Requirements

Source Water Type	Population Served by System	Analyte & Frequency of Samples	Number of Samples
Surface Water (SW) or Groundwater Under the Direct Influence of Surface Water (GWUDISW)	10,000 or more	TTHM & HAA5 – Quarterly [1,2]	4 [1,2,3]
SW or GWUDISW	Serving 500 to 9,999	TTHM & HAA5 - Quarterly4	1 [5,6]
SW or GWUDISW	499 or less	TTHM & HAA5 - Yearly	1[7,8]
Ground Water (GW)	10,000 or more	TTHM & HAA5 – Quarterly [9]	1[10,11]
GW	9,999 or less	TTHM & HAA5 - Yearly [12]	1[13,14]
		Chlorite - Daily & Monthly [15,16,17,18]	
		Bromate – Monthly [19,20]	
		Chlorine [21,22]	
		Chloramines [23,24]	
		Chlorine Dioxide [25,26,27]	
		TOC [28]	

Notes:

1. For TTHM and HAA5, a DoD system using surface water or GWUDISW that treats its water with a chemical disinfectant must collect the number of samples listed above. One of the samples must be taken at a location in the distribution system reflecting the maximum residence time of water in the system. The remaining samples shall be taken at representative points in the distribution system.
2. To be eligible for reduced monitoring, a system must meet all of the following conditions: a) the annual average for TTHM is no more than 0.040 mg/L; b) the annual average for HAA5 is no more than 0.030 mg/L; c) at least one year of routine monitoring has been completed; and d) the annual average source water total organic carbon level is no more than 4.0 mg/L prior to treatment. Systems may then reduce monitoring of TTHM and HAA5 to one sample per treatment plant per quarter. Systems remain on the reduced schedule as long as the average of all samples taken in the year is no more than 0.060 mg/L for TTHM and 0.045 mg/L for HAA5. Systems that do not meet these levels must revert to routine monitoring the following quarter.
3. A system is noncompliant if the running annual average for any quarter exceeds the TTHM MCL, 0.080 mg/L or the HAA5 MCL, 0.060 mg/L.

4. One sample must be collected per treatment plant in the system at the point of maximum residence time in the distribution system.
5. Systems meeting the eligibility requirements in Note 2 may reduce monitoring frequency to one sample per treatment plant per year. Sample must be taken at the point of maximum residence time in the distribution system and during the month of warmest water temperature. Systems remain on the reduced schedule as long as the average of all samples taken in the year is no more than 0.060 mg/L for TTHM and 0.045 mg/L for HAA5. Systems that do not meet these levels must revert to routine (quarterly) monitoring the following quarter.
6. A system is noncompliant if the annual average of all samples taken that year exceeds the TTHM MCL, 0.080 mg/L or the HAA5 MCL, 0.060 mg/L.
7. Sample must be taken at the point of maximum residence time in the distribution system and during the month of warmest water temperature. If annual sample exceeds MCL (TTHM or HAA5) the system must increase monitoring to one sample per treatment plant per quarter at the point of maximum residence time. The system may return to routine monitoring if the annual average of quarterly samples is no more than 0.060 mg/L for TTHM and 0.045 mg/L for HAA5.
8. No reduced monitoring schedule is available. Noncompliance exists when the annual sample (or average of annual samples is conducted) exceeds the TTHM MCL, 0.080 mg/L or if the HHA5 concentration exceeds the MCL, 0.060 mg/L.
9. For TTHM and HAA5, a DoD system using only ground water NOT under the influence of surface water that treats its water with a chemical disinfectant must collect the number of samples listed above. Samples must be taken at a location in the distribution system reflecting the maximum residence time of water in the system.
10. System may reduce monitoring to one sample per treatment plant per year if the system meets all of the following conditions: a) the annual average for TTHM is no more than 0.040 mg/L; b) the annual average for HAA5 is no more than 0.030 mg/L; and c) at least one year of routine monitoring has been completed. Sample must be taken at the point of maximum residence time in the distribution system and during the month of warmest water temperature. Systems remain on the reduced schedule as long as the average of all samples taken in the year is no more than 0.060 mg/L for TTHM and 0.045 mg/L for HAA5. Systems that do not meet these levels must revert to routine monitoring the following quarter.
11. Noncompliance exists when the annual average of quarterly averages of all samples, compounded quarterly, exceeds the TTHM MCL, 0.080 mg/L or the HHA5 the MCL, 0.060 mg/L.
12. For TTHM and HAA5, a DoD system using only ground water NOT under the influence of surface water that treats its water with a chemical disinfectant must collect the number of samples listed above. One sample per treatment plant must be taken at a location in the distribution system reflecting the maximum residence time of water in the system and during the month of warmest water temperature. If the sample exceeds the MCL, the system must increase monitoring to quarterly.
13. System may reduce monitoring to one sample per three-year monitoring cycle if the system meets all the following conditions: a) the annual average for TTHM is no more than 0.040 mg/L; b) the annual average for HAA5 is no more than 0.030 mg/L; and c) at least one year of routine monitoring has been completed. Sample must be taken at the point of maximum residence time in the distribution system and during the month of warmest water temperature. Systems remain on the reduced schedule as long as the average of all samples taken in the year is no more than 0.060 mg/L for TTHM, and 0.045 mg/L for HAA5. Systems that do not meet these levels must revert to routine monitoring. Systems on increased monitoring may return to routine monitoring if the

annual average of quarterly samples does not exceed 0.060 mg/L for TTHM and 0.045 mg/L for HAA5.

14. Noncompliance exists when the annual sample (or average of annual samples) exceeds the TTHM MCL, 0.080 mg/L or the HHA5 the MCL, 0.060 mg/L.
15. For systems using chlorine dioxide for disinfection or oxidation, daily samples are taken for chlorite at the entrance to the distribution system for chlorite. The monthly chlorite samples are collected within the distribution system, as follows: one as close as possible to the first customer, one in a location representative of average residence time, and one as close as possible to the end of the distribution system (reflects maximum residence time within the distribution system).
16. Additional monitoring is required when a daily sample exceeds the chlorite MCL, 1.0 mg/L. A three-sample set (following the monthly sample set protocol) is required to be collected the following day. Further distribution system monitoring will not be required in that month unless the chlorite concentration at the entrance to the distribution system again exceeds the MCL, 1.0 mg/L.
17. For chlorite, systems may reduce routine distribution system monitoring from monthly to quarterly if the chlorite concentration in all samples taken in the distribution system is below the MCL, 1.0 mg/L, for a period of one year and the system has not been required to conduct any additional monitoring. Daily samples must still be collected. Monthly sample set monitoring resumes when if any one daily sample exceeds the MCL, 1.0 mg/L.
18. Noncompliance for chlorite exists if the average concentration of any three-sample set (i.e., one monthly sample set from within the distribution system) exceeds the MCL, 1.0 mg/L.
19. Systems using ozone for disinfection or oxidation are required to take at least one sample per month from the entrance to the distribution system for each treatment plant in the system using ozone under normal operating conditions. Systems may reduce monitoring from monthly to once per quarter if the system demonstrates that the yearly average raw water bromide concentration is less than 0.05 mg/L based upon monthly measurements for one year.
20. Noncompliance is based on a running yearly average of samples, computed quarterly, that exceeds the MCL, 0.01 mg/L.
21. Chlorine samples must be measured at the same points in the distribution system and at the same time as total coliforms. Not withstanding the MRDL, operators may increase residual chlorine levels in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems.
22. Noncompliance is based on a running yearly average of monthly averages of all samples, computed quarterly, exceeds the MRDL, 4.0 mg/L.
23. Chloramine samples (as either total chlorine or combined chlorine) must be measured at the same points in the distribution system and at the same time as total coliforms. Not withstanding the MRDL, operators may increase residual chlorine levels in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems.
24. Noncompliance is based on a running yearly average of monthly averages of all samples, computed quarterly, exceeds the MRDL, 4.0 mg/L.
25. For systems using chlorine dioxide for disinfection or oxidation, samples must be taken daily at the entrance to the distribution system. If the MRDL, 0.8 mg/L, is exceeded, three additional samples must be taken the following day as follows: one as close as possible to the first customer, one in a location representative of average residence time, and one as close as possible to the end

of the distribution system (reflects maximum residence time within the distribution system). Systems not using booster chlorination systems after the first customer must take three samples in the distribution system as close as possible to the first customer at intervals of not less than 6 hours.

26. If any daily sample from the distribution system exceeds the MRDL and if one or more of the three samples taken the following day from within the distribution system exceeds the MRDL, the system is in violation of the MRDL and must issue public notification in accordance with paragraph C3.3.3. If any two consecutive daily samples exceed the MRDL but none of the distribution samples exceed the MRDL, the system is in violation of the MRDL. Failure to monitor at the entrance to the distribution system on the day following an exceedance of the chlorine dioxide MRDL is also an MRDL violation.
27. The MRDL for chlorine dioxide may NOT be exceeded for short periods to address specific microbiological contamination problems.
28. Systems that use conventional filtration treatment must monitor each treatment plant water source for TOC on a monthly basis. Samples must be taken from the source water prior to treatment and the treated water not later than the point of combined filter effluent turbidity monitoring. Source water alkalinity must also be monitored at the same time. Surface water and GWUDISW systems with average treated water TOC of less than 2.0 mg/L for two consecutive years, or less than 1.0 mg/L for one year, may reduce TOC and alkalinity to one paired sample per plant per quarter.

Table C3.T12. Radionuclide Substances and Associated Parameters

Parameter	Parameters	
	Radioactive Parameters	**Indicator Parameters[2]**
Total Alpha	15 pCi/L [4]	0.5 Bq/L (13.5 pCi)
Total Beta	50 pCi/L	1.0 Bq/L (27 pCi)
Tritium		100 Bq/L (2,700 pCi)
Total indicative dose [3]		0.10 milli-Sievers (mSv)/year
Combined Radium–226 and -228	5	
Uranium	30 μg/L	

Notes

1. Samples shall be taken to ensure compliance with the parameters at the following locations:
    - In the case of water supplied from a distribution network, at the point within the premises or facility at which it emerges from taps that are normally used for human consumption;
    - In the case of water supplied from a tanker, at the point at which it emerges from the tanker; and/or
    - In the case of water put into bottles or containers intended for sale, at the point at which water is put into the bottles or containers.
2. Indicator Parameters. If a system is in non-compliance with requirements, the Appropriate Installation Medical Authority in consultation with the installation's organization responsible for water distribution (e.g., civil engineers or public works) representative will determine the requirement for increased monitoring, corrective action and notification, if necessary.
3. Excluding tritium, potassium–40, radon and radon decay products. This parameter is only necessary to be monitored when total alpha and total beta are in non-compliance. In non-compliance cases for total alpha and total beta, the concentrations of specific emitting radionuclides (alpha) and/or (beta) must be determined.
4. Total alpha activity includes radium–226, but excludes radon and uranium.
5. All PWSs using groundwater, surface water, or systems using both ground and surface water must sample at every point (i.e., sampling points) to the distribution system that is representative of all sources being used under normal operating conditions.

Table C3.T13. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 0.5 °C or Lower*

Chlorine Concentration (mg/L)	pH< = 6 Log Inactivations						pH = 6.5 Log Inactivations						pH = 7.0 Log Inactivations						pH = 7.5 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	23	46	69	91	114	137	27	54	82	109	136	163	33	65	98	130	163	195	40	79	119	158	198	237
0.6	24	47	71	94	118	141	28	56	84	112	140	168	33	67	100	133	167	200	40	80	120	159	199	239
0.8	24	48	73	97	121	145	29	57	86	115	143	172	34	68	103	137	171	205	41	82	123	164	205	246
1	25	49	74	99	123	148	29	59	88	117	147	176	35	70	105	140	175	210	42	84	127	169	211	253
1.2	25	51	76	101	127	152	30	60	90	120	150	180	36	72	108	143	179	215	43	86	130	173	216	259
1.4	26	52	78	103	129	155	31	61	92	123	153	184	37	74	111	147	184	221	44	89	133	177	222	266
1.6	26	52	79	105	131	157	32	63	95	126	158	189	38	75	113	151	188	226	46	91	137	182	228	273
1.8	27	54	81	108	135	162	32	64	97	129	161	193	39	77	116	154	193	231	47	93	140	186	233	279
2	28	55	83	110	138	165	33	66	99	131	164	197	39	79	118	157	197	236	48	95	143	191	238	286
2.2	28	56	85	113	141	169	34	67	101	134	168	201	40	81	121	161	202	242	50	99	149	198	248	297
2.4	29	57	86	115	143	172	34	68	103	137	171	205	41	82	124	165	206	247	50	99	149	199	248	298
2.6	29	58	88	117	146	175	35	70	105	139	174	209	42	84	126	168	210	252	51	101	152	203	253	304
2.8	30	59	89	119	148	178	36	71	107	142	178	213	43	86	129	171	214	257	52	103	155	207	258	310
3	30	60	91	121	151	181	36	72	109	145	181	217	44	87	131	174	218	261	53	105	158	211	263	316

Chlorine Concentration (mg/L)	pH< = 8 Log Inactivations						pH = 8.5 Log Inactivations						pH = 9.0 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	46	92	139	185	231	277	55	110	165	219	274	329	65	130	195	260	325	390
0.6	48	95	143	191	238	286	57	114	171	228	285	342	68	136	204	271	339	407
0.8	49	98	148	197	246	295	59	118	177	236	295	354	70	141	211	281	352	422
1	51	101	152	203	253	304	61	122	183	243	304	365	73	146	219	291	364	437
1.2	52	104	157	209	261	313	63	125	188	251	313	376	75	150	226	301	376	451
1.4	54	107	161	214	268	321	65	129	194	258	323	387	77	155	232	309	387	464
1.6	55	110	165	219	274	329	66	132	199	265	331	397	80	159	239	318	398	477
1.8	56	113	169	225	282	338	68	136	204	271	339	407	82	163	245	326	408	489
2	58	115	173	231	288	346	70	139	209	278	348	417	83	167	250	333	417	500
2.2	59	118	177	235	294	353	71	142	213	284	355	426	85	170	256	341	426	511
2.4	60	120	181	241	301	361	73	145	218	290	363	435	87	174	261	348	435	522
2.6	61	123	184	245	307	368	74	148	222	296	370	444	89	178	267	355	444	533
2.8	63	125	188	250	313	375	75	151	226	301	377	452	91	181	272	362	453	543
3	64	127	191	255	318	382	77	153	230	307	383	460	92	184	276	368	460	552

*$CT_{99.9}$ =CT for 3 log inactivation.

Table C3.T14. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 5.0 °C*

Chlorine Concentration (mg/L)	pH< = 6 Log Inactivations						pH = 6.5 Log Inactivations						pH = 7.0 Log Inactivations						pH = 7.5 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	16	32	49	65	81	97	20	39	59	78	98	117	23	46	70	93	116	139	28	55	83	111	138	166
0.6	17	33	50	67	83	100	20	40	60	80	100	120	24	48	72	95	119	143	29	57	86	114	143	171
0.8	17	34	52	69	86	103	20	41	61	81	102	122	24	49	73	97	122	146	29	58	88	117	146	175
1	18	35	53	70	88	105	21	42	63	83	104	125	25	50	75	99	124	149	30	60	90	119	149	179
1.2	18	36	54	71	89	107	21	42	64	85	106	127	25	51	76	101	127	152	31	61	92	122	153	183
1.4	18	36	55	73	91	109	22	43	65	87	108	130	26	52	78	103	129	155	31	62	94	125	156	187
1.6	19	37	56	74	93	111	22	44	66	88	110	132	26	53	79	105	132	158	32	64	96	128	160	192
1.8	19	38	57	76	95	114	23	45	68	90	113	135	27	54	81	108	135	162	33	65	98	131	163	196
2	19	39	58	77	97	116	23	46	69	92	115	138	28	55	83	110	138	165	33	67	100	133	167	200
2.2	20	39	59	79	98	118	23	47	70	93	117	140	28	56	85	113	141	169	34	68	102	136	170	204
2.4	20	40	60	80	100	120	24	48	72	95	119	143	29	57	86	115	143	172	35	70	105	139	174	209
2.6	20	41	61	81	102	122	24	49	73	97	122	146	29	58	88	117	146	175	36	71	107	142	178	213
2.8	21	41	62	83	103	124	25	49	74	99	123	148	30	59	89	119	148	178	36	72	109	145	181	217
3	21	42	63	84	105	126	25	50	76	101	126	151	30	61	91	121	152	182	37	74	111	147	184	221

Chlorine Concentration (mg/L)	pH< = 8 Log Inactivations						pH = 8.5 Log Inactivations						pH = 9.0 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	33	66	99	132	165	198	39	79	118	157	197	236	47	93	140	186	233	279
0.6	34	68	102	136	170	204	41	81	122	163	203	244	49	97	146	194	243	291
0.8	35	70	105	140	175	210	42	84	126	168	210	252	50	100	151	201	251	301
1	36	72	108	144	180	216	43	87	130	173	217	260	52	104	156	208	260	312
1.2	37	74	111	147	184	221	45	89	134	178	223	267	53	107	160	213	267	320
1.4	38	76	114	151	189	227	46	91	137	183	228	274	55	110	165	219	274	329
1.6	39	77	116	155	193	232	47	94	141	187	234	281	56	112	169	225	281	337
1.8	40	79	119	159	198	238	48	96	144	191	239	287	58	115	173	230	288	345
2	41	81	122	162	203	243	49	98	147	196	245	294	59	118	177	235	294	353
2.2	41	83	124	165	207	248	50	100	150	200	250	300	60	120	181	241	301	361
2.4	42	84	127	169	211	253	51	102	153	204	255	306	61	123	184	245	307	368
2.6	43	86	129	172	215	258	52	104	156	208	260	312	63	125	188	250	313	375
2.8	44	88	132	175	219	263	53	106	159	212	265	318	64	127	191	255	318	382
3	45	89	134	179	223	268	54	108	162	216	270	324	65	130	195	259	324	389

*$CT_{99.9}$ =CT for 3 log inactivation.

Table C3.T15. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 10 °C*

Chlorine Concentration (mg/L)	pH< = 6 Log Inactivations						pH = 6.5 Log Inactivations						pH = 7.0 Log Inactivations						pH = 7.5 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	12	24	37	49	61	73	15	29	44	59	73	88	17	35	52	69	87	104	21	42	63	83	104	125
0.6	13	25	38	50	63	75	15	30	45	60	75	90	18	36	54	71	89	107	21	43	64	85	107	128
0.8	13	26	39	52	65	78	15	31	46	61	77	92	18	37	55	73	92	110	22	44	66	87	109	131
1	13	26	40	53	66	79	16	31	47	63	78	94	19	37	56	75	93	112	22	45	67	89	112	134
1.2	13	27	40	53	67	80	16	32	48	63	79	95	19	38	57	76	95	114	23	46	69	91	114	137
1.4	14	27	41	55	68	82	16	33	49	65	82	98	19	39	58	77	97	116	23	47	70	93	117	140
1.6	14	28	42	55	69	83	17	33	50	66	83	99	20	40	60	79	99	119	24	48	72	96	120	144
1.8	14	29	43	57	72	86	17	34	51	67	84	101	20	41	61	81	102	122	25	49	74	98	123	147
2	15	29	44	58	73	87	17	35	52	69	87	104	21	41	62	83	103	124	25	50	75	100	125	150
2.2	15	30	45	59	74	89	18	35	53	70	88	105	21	42	64	85	106	127	26	51	77	102	128	153
2.4	15	30	45	60	75	90	18	36	54	71	89	107	22	43	65	86	108	129	26	52	79	105	131	157
2.6	15	31	46	61	77	92	18	37	55	73	92	110	22	44	66	87	109	131	27	53	80	107	133	160
2.8	16	31	47	62	78	93	19	37	56	74	93	111	22	45	67	89	112	134	27	54	82	109	136	163
3	16	32	48	63	79	95	19	38	57	75	94	113	23	46	69	91	114	137	28	55	83	111	138	166

Chlorine Concentration (mg/L)	pH< = 8 Log Inactivations						pH = 8.5 Log Inactivations						pH = 9.0 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	25	50	75	99	124	149	30	59	89	118	148	177	35	70	105	139	174	209
0.6	26	51	77	102	128	153	31	61	92	122	153	183	36	73	109	145	182	218
0.8	26	53	79	105	132	158	32	63	95	126	158	189	38	75	113	151	188	226
1	27	54	81	108	135	162	33	65	98	130	163	195	39	78	117	156	195	234
1.2	28	55	83	111	138	166	33	67	100	133	167	200	40	80	120	160	200	240
1.4	28	57	85	113	142	170	34	69	103	137	172	206	41	82	124	165	206	247
1.6	29	58	87	116	145	174	35	70	106	141	176	211	42	84	127	169	211	253
1.8	30	60	90	119	149	179	36	72	108	143	179	215	43	86	130	173	216	259
2	30	61	91	121	152	182	37	74	111	147	184	221	44	88	133	177	221	265
2.2	31	62	93	124	155	186	38	75	113	150	188	225	45	90	136	181	226	271
2.4	32	63	95	127	158	190	38	77	115	153	192	230	46	92	138	184	230	276
2.6	32	65	97	129	162	194	39	78	117	156	195	234	47	94	141	187	234	281
2.8	33	66	99	131	164	197	40	80	120	159	199	239	48	96	144	191	239	287
3	34	67	101	134	168	201	41	81	122	162	203	243	49	97	146	195	243	292

*$CT_{99.9}$ =CT for 3 log inactivation.

Table C3.T16. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 15 °C*

Chlorine Concentration (mg/L)	pH< = 6 Log Inactivations						pH = 6.5 Log Inactivations						pH = 7.0 Log Inactivations						pH = 7.5 Log Inactivations					
	0.5	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
<=0.4	8	16	25	33	41	49	10	20	30	39	49	59	12	23	35	47	58	70	14	28	42	55	69	83
0.6	8	17	25	33	42	50	10	20	30	40	50	60	12	24	36	48	60	72	14	29	43	57	72	86
0.8	9	17	26	35	43	52	10	20	31	41	51	61	12	24	37	49	61	73	15	29	44	59	73	88
1	9	18	27	35	44	53	11	21	32	42	53	63	13	25	38	50	63	75	15	30	45	60	75	90
1.2	9	18	27	36	45	54	11	21	32	43	53	64	13	25	38	51	63	76	15	31	46	61	77	92
1.4	9	18	28	37	46	55	11	22	33	43	54	65	13	26	39	52	65	78	16	31	47	63	78	94
1.6	9	19	28	37	47	56	11	22	33	44	55	66	13	26	40	53	66	79	16	32	48	64	80	96
1.8	10	19	29	38	48	57	11	23	34	45	57	68	14	27	41	54	68	81	16	33	49	65	82	98
2	10	19	29	39	48	58	12	23	35	46	58	69	14	28	42	55	69	83	17	33	50	67	83	100
2.2	10	20	30	39	49	59	12	23	35	47	58	70	14	28	43	57	71	85	17	34	51	68	85	102
2.4	10	20	30	40	50	60	12	24	36	48	60	72	14	29	43	57	72	86	18	35	53	70	88	105
2.6	10	20	31	41	51	61	12	24	37	49	61	73	15	29	44	59	73	88	18	36	54	71	89	107
2.8	10	21	31	41	52	62	12	25	37	49	62	74	15	30	45	59	74	89	18	36	55	73	91	109
3	11	21	32	42	53	63	13	25	38	51	63	76	15	30	46	61	76	91	19	37	56	74	93	111

Chlorine Concentration (mg/L)	pH< = 8 Log Inactivations						pH = 8.5 Log Inactivations						pH = 9.0 Log Inactivations					
	0.5	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
<=0.4	17	33	50	66	83	99	20	39	59	79	98	118	23	47	70	93	117	140
0.6	17	34	51	68	85	102	20	41	61	81	102	122	24	49	73	97	122	146
0.8	18	35	53	70	88	105	21	42	63	84	105	126	25	50	76	101	126	151
1	18	36	54	72	90	108	22	43	65	87	108	130	26	52	78	104	130	156
1.2	19	37	56	74	93	111	22	45	67	89	112	134	27	53	80	107	133	160
1.4	19	38	57	76	95	114	23	46	69	91	114	137	28	55	83	110	138	165
1.6	19	39	58	77	97	116	24	47	71	94	118	141	28	56	85	113	141	169
1.8	20	40	60	79	99	119	24	48	72	96	120	144	29	58	87	115	144	173
2	20	41	61	81	102	122	25	49	74	98	123	147	30	59	89	118	148	177
2.2	21	41	62	83	103	124	25	50	75	100	125	150	30	60	91	121	151	181
2.4	21	42	64	85	106	127	26	51	77	102	128	153	31	61	92	123	153	184
2.6	22	43	65	86	108	129	26	52	78	104	130	156	31	63	94	125	157	188
2.8	22	44	66	88	110	132	27	53	80	106	133	159	32	64	96	127	159	191
3	22	45	67	89	112	134	27	54	81	108	135	162	33	65	98	130	163	195

*$CT_{99.9}$ =CT for 3 log inactivation.

Table C3.T17. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 20 °C*

Chlorine Concentration (mg/L)	pH< = 6 Log Inactivations						pH = 6.5 Log Inactivations						pH = 7.0 Log Inactivations						pH = 7.5 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	6	12	18	24	30	36	7	15	22	29	37	44	9	17	26	35	43	52	10	21	31	41	52	62
0.6	6	13	19	25	32	38	8	15	23	30	38	45	9	18	27	36	45	54	11	21	32	43	53	64
0.8	7	13	20	26	33	39	8	15	23	31	38	46	9	18	28	37	46	55	11	22	33	44	55	66
1	7	13	20	26	33	39	8	16	24	31	39	47	9	19	28	37	47	56	11	22	34	45	56	67
1.2	7	13	20	27	33	40	8	16	24	32	40	48	10	19	29	38	48	57	12	23	35	46	58	69
1.4	7	14	21	27	34	41	8	16	25	33	41	49	10	19	29	39	48	58	12	23	35	47	58	70
1.6	7	14	21	28	35	42	8	17	25	33	42	50	10	20	30	39	49	59	12	24	36	48	60	72
1.8	7	14	22	29	36	43	9	17	26	34	43	51	10	20	31	41	51	61	12	25	37	49	62	74
2	7	15	22	29	37	44	9	17	26	35	43	52	10	21	31	41	52	62	13	25	38	50	63	75
2.2	7	15	22	29	37	44	9	18	27	35	44	53	11	21	32	42	53	63	13	26	39	51	64	77
2.4	8	15	23	30	38	45	9	18	27	36	45	54	11	22	33	43	54	65	13	26	39	52	65	78
2.6	8	15	23	31	38	46	9	18	28	37	46	55	11	22	33	44	55	66	13	27	40	53	67	80
2.8	8	16	24	31	39	47	9	19	28	37	47	56	11	22	34	45	56	67	14	27	41	54	68	81
3	8	16	24	31	39	47	10	19	29	38	48	57	11	23	34	45	57	68	14	28	42	55	69	83

Chlorine Concentration (mg/L)	pH< = 8 Log Inactivations						pH = 8.5 Log Inactivations						pH = 9.0 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	12	25	37	49	62	74	15	30	45	59	74	89	18	35	53	70	88	105
0.6	13	26	39	51	64	77	15	31	46	61	77	92	18	36	55	73	91	109
0.8	13	26	40	53	66	79	16	32	48	63	79	95	19	38	57	75	94	113
1	14	27	41	54	68	81	16	33	49	65	82	98	20	39	59	78	98	117
1.2	14	28	42	55	69	83	17	33	50	67	83	100	20	40	60	80	100	120
1.4	14	28	43	57	71	85	17	34	52	69	86	103	21	41	62	82	103	123
1.6	15	29	44	58	73	87	18	35	53	70	88	105	21	42	63	84	105	126
1.8	15	30	45	59	74	89	18	36	54	72	90	108	22	43	65	86	108	129
2	15	30	46	61	76	91	18	37	55	73	92	110	22	44	66	88	110	132
2.2	16	31	47	62	78	93	19	38	57	75	94	113	23	45	68	90	113	135
2.4	16	32	48	63	79	95	19	38	58	77	96	115	23	46	69	92	115	138
2.6	16	32	49	65	81	97	20	39	59	78	98	117	24	47	71	94	118	141
2.8	17	33	50	66	83	99	20	40	60	79	99	119	24	48	72	95	119	143
3	17	34	51	67	84	101	20	41	61	81	102	122	24	49	73	97	122	146

*$CT_{99.9}$ =CT for 3 log inactivation.

Table C3.T18. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 25 °C*

Chlorine Concentration (mg/L)	pH< = 6 Log Inactivations						pH = 6.5 Log Inactivations						pH = 7.0 Log Inactivations						pH = 7.5 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	4	8	12	16	20	24	5	10	15	19	24	29	6	12	18	23	29	35	7	14	21	28	35	42
0.6	4	8	13	17	21	25	5	10	15	20	25	30	6	12	18	24	30	36	7	14	22	29	36	43
0.8	4	9	13	17	22	26	5	10	16	21	26	31	6	12	19	25	31	37	7	15	22	29	37	44
1	4	9	13	17	22	26	5	10	16	21	26	31	6	12	19	25	31	37	8	15	23	30	38	45
1.2	5	9	14	18	23	27	5	11	16	21	27	32	6	13	19	25	32	38	8	15	23	31	38	46
1.4	5	9	14	18	23	27	6	11	17	22	28	33	7	13	20	26	33	39	8	16	24	31	39	47
1.6	5	9	14	19	23	28	6	11	17	22	28	33	7	13	20	27	33	40	8	16	24	32	40	48
1.8	5	10	15	19	24	29	6	11	17	23	28	34	7	14	21	27	34	41	8	16	25	33	41	49
2	5	10	15	19	24	29	6	12	18	23	29	35	7	14	21	27	34	41	8	17	25	33	42	50
2.2	5	10	15	20	25	30	6	12	18	23	29	35	7	14	21	28	35	42	9	17	26	34	43	51
2.4	5	10	15	20	25	30	6	12	18	24	30	36	7	14	22	29	36	43	9	17	26	35	43	52
2.6	5	10	16	21	26	31	6	12	19	25	31	37	7	15	22	29	37	44	9	18	27	35	44	53
2.8	5	10	16	21	26	31	6	12	19	25	31	37	8	15	23	30	38	45	9	18	27	36	45	54
3	5	11	16	21	27	32	6	13	19	25	32	38	8	15	23	31	38	46	9	18	28	37	46	55

Chlorine Concentration (mg/L)	pH< = 8 Log Inactivations						pH = 8.5 Log Inactivations						pH = 9.0 Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	8	17	25	33	42	50	10	20	30	39	49	59	12	23	35	47	58	70
0.6	9	17	26	34	43	51	10	20	31	41	51	61	12	24	37	49	61	73
0.8	9	18	27	35	44	53	11	21	32	42	53	63	13	25	38	50	63	75
1	9	18	27	36	45	54	11	22	33	43	54	65	13	26	39	52	65	78
1.2	9	18	28	37	46	55	11	22	34	45	56	67	13	27	40	53	67	80
1.4	10	19	29	38	48	57	12	23	35	46	58	69	14	27	41	55	68	82
1.6	10	19	29	39	48	58	12	23	35	47	58	70	14	28	42	56	70	84
1.8	10	20	30	40	50	60	12	24	36	48	60	72	14	29	43	57	72	86
2	10	20	31	41	51	61	12	25	37	49	62	74	15	29	44	59	73	88
2.2	10	21	31	41	52	62	13	25	38	50	63	75	15	30	45	60	75	90
2.4	11	21	32	42	53	63	13	26	39	51	64	77	15	31	46	61	77	92
2.6	11	22	33	43	54	65	13	26	39	52	65	78	16	31	47	63	78	94
2.8	11	22	33	44	55	66	13	27	40	53	67	80	16	32	48	64	80	96
3	11	22	34	45	56	67	14	27	41	54	68	81	16	32	49	65	81	97

*$CT_{99.9}$ =CT for 3 log inactivation.

Table C3.T19. CT Values for Inactivation of Viruses by Free Chlorine

	Log Inactivation		Log Inactivation		Log Inactivation	
	2.0 pH		3.0 pH		4.0 pH	
Temperature (°C)	**6-9**	**10**	**6-9**	**10**	**6-9**	**10**
0.5	6	45	9	66	12	90
5	4	30	6	44	8	60
10	3	22	4	33	6	45
15	2	15	3	22	4	30
20	1	11	2	16	3	22
25	1	7	1	11	2	15

Table C3.T20. CT Values for Inactivation of Giardia Cysts by Chlorine Dioxide

	Temperature (°C)					
Inactivation	**<=1**	**5**	**10**	**15**	**20**	**25**
0.5-log	10	4.3	4	3.2	2.5	2
1-log	21	8.7	7.7	6.3	5	3.7
1.5-log	32	13	12	10	7.5	5.5
2-log	42	17	15	13	10	7.3
2.5-log	52	22	19	16	13	9
3-log	63	26	23	19	15	11

Table C3.T21. CT Values for Inactivation of Viruses by Free Chlorine Dioxide pH 6-9

	Temperature (°C)					
Removal	**<=1**	**5**	**10**	**15**	**20**	**25**
2-log	8.4	5.6	4.2	2.8	2.1	1.4
3-log	25.6	17.1	12.8	8.6	6.4	4.3
4-log	50.1	33.4	25.1	16.7	12.5	8.4

Table C3.T22. CT Values for Inactivation of Giardia Cysts by Ozone

	Temperature (°C)					
Inactivation	**<=1**	**5**	**10**	**15**	**20**	**25**
0.5-log	0.48	0.32	0.23	0.16	0.12	0.08
1-log	0.97	0.63	0.48	0.32	0.24	0.16
1.5-log	1.5	0.95	0.72	0.48	0.36	0.24
2-log	1.9	1.3	0.95	0.63	0.48	0.32
2.5-log	2.4	1.6	1.2	0.79	0.60	0.40
3-log	2.9	1.9	1.43	0.95	0.72	0.48

Table C3.T23. CT Values for Inactivation of Viruses by Free Ozone

	Temperature (°C)					
Inactivation	**<=1**	**5**	**10**	**15**	**20**	**25**
2-log	0.9	0.6	0.5	0.3	0.25	0.15
3-log	1.4	0.9	0.8	0.5	0.4	0.25
4-log	1.8	1.2	1.0	0.6	0.5	0.3

Table C3.T24. CT Values for Inactivation of Giardia Cysts by Chloramine pH 6-9

	Temperature (°C)					
Inactivation	**<=1**	**5**	**10**	**15**	**20**	**25**
0.5-log	635	365	310	250	185	125
1-log	1,270	735	615	500	370	250
1.5-log	1,900	1,100	930	750	550	375
2-log	2,535	1,470	1,230	1,000	735	500
2.5-log	3,170	1,830	1,540	1,250	915	625
3-log	3,800	2,200	1,850	1,500	1,100	750

Table C3.T25. CT Values for Inactivation of Viruses by Chloramine

	Temperature (°C)					
Inactivation	**<=1**	**5**	**10**	**15**	**20**	**25**
2-log	1,243	857	643	428	321	214
3-log	2,063	1,423	1,067	712	534	356
4-log	2,883	1,988	1,491	994	746	497

Table C3.T26. CT Values for Inactivation of Viruses by UV

Log Inactivation	
2.0	**3.0**
21	36

Appendix C3.A1. List I and List II Substances

1. List I of Families and Groups of Substances

List I contains the individual substances that belong to the families and groups of substances enumerated below, with the exception of those that are considered inappropriate to List I on the basis of a low risk of toxicity, persistence and bioaccumulation.

1. Organohalogen compounds and substances which may form such compounds in the aquatic environment

2. Organophosphorus compounds

3. Organotin compounds

4. Substances which possess carcinogenic, mutagenic or teratogenic properties in or via the aquatic environment (1)

5. Mercury and its compounds

6. Cadmium and its compounds

7. Mineral oils and hydrocarbons

8. Cyanides.

(1) Where certain substances in List II are carcinogenic, mutagenic or teratogenic, they are included under 4 of this list.

2. List II of Families and Groups of Substances

List II contains:

- Substances belonging to the families and groups of substances in List I for which limit values have not been determined,

- certain individual substances and categories of substances belonging to the families and groups of substances listed below, and that have a deleterious effect on the aquatic environment, which can, however, be confined to a given area and which depend on the characteristics and location of the water into which they are discharged.

2.1 The following metalloids and metals and their compounds:

1. Zinc
2. Copper
3. Nickel
4. Chromium
5. Lead
6. Selenium
7. Arsenic
8. Antimony
9. Molybdenum
10. Titanium
11. Tin

12. Barium
13. Beryllium
14. Boron
15. Uranium
16. Vanadium
17. Cobalt
18. Thallium
19. Tellurium
20. Silver

2.2 Biocides and their derivatives not appearing in List I.

2.3 Substances which have a deleterious effect on the taste and/or odor of groundwater, and compounds liable to cause the formation of such substances in groundwater and to render it unfit for human consumption.

2.4 Toxic or persistent organic compounds of silicon, and substances that may cause the formation of such compounds in water, excluding those that are biologically harmless or are rapidly converted in water into harmless substances.

2.5 Inorganic compounds of phosphorus and elemental phosphorus.

2.6 Non persistent mineral oils and hydrocarbons of petroleum origin.

2.7 Cyanides, fluorides.

2.8 Substances which have an adverse effect on the oxygen balance, particularly ammonia and nitrites.

Chapter 4

WASTEWATER

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CHAPTER 4

WASTEWATER

C4.1. SCOPE

This Chapter contains criteria to control and regulate discharges of wastewaters into soil, surface waters, groundwater, or drainage systems. This includes, but is not limited to, storm water runoff associated with industrial activities, domestic and industrial wastewater discharges, and pollutants from indirect dischargers.

C4.2. DEFINITIONS

C4.2.1. 7-day Average. The arithmetic mean of pollutant parameter values for samples collected in a period of seven consecutive days.

C4.2.2. 30-day Average. The arithmetic mean of pollutant parameter values for samples collected in a period of 30 consecutive days.

C4.2.3. Agglomerate. An area where the population and/or economic activities are sufficiently concentrated for urban wastewater to be collected and conducted to an urban wastewater treatment plant or to a final discharge point.

C4.2.4. Average Monthly Discharge Limitations. The highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

C4.2.5. Average Weekly Discharge Limitation. The highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week.

C4.2.6. Best Management Practices (BMPs). Practical practices and procedures that will minimize or eliminate the possibility of pollution being introduced into Portuguese waters.

C4.2.7. Biochemical Oxygen Demand (BOD_5). The five-day measure of the dissolved oxygen used by microorganisms in the biochemical oxidation of organic matter. The pollutant parameter is biochemical oxygen demand (i.e., biodegradable organics in terms of oxygen demand).

C4.2.8. Carbonaceous Oxygen Demand (COD). An indirect measure of the amount of oxygen used by inorganic and organic matter in water. The measure is a laboratory test based on a chemical oxidant and therefore does not necessarily correlate with biochemical oxygen demand (BOD).

C4.2.9. Conventional Pollutants. BOD_5, total suspended solids (TSS), oil and grease, fecal coliforms and pH.

C4.2.10. Daily Discharge. The "discharge of a pollutant" measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement (e.g., concentration) "daily discharge" is calculated as the average measurement of the pollutant over the day.

C4.2.11. Direct Discharge. Any "discharge of pollutants" directly into Portuguese waters or soil.

C4.2.12. Direct Discharge into Groundwater. Any discharge of wastewater into groundwater where percolation through soil and subsoil does not occur.

C4.2.13. Discharge of Pollutants. Any addition of any pollutant or combination of pollutants to Portuguese waters and soil from any "point source."

C4.2.14. Domestic Wastewater. Wastewater, usually from residential areas and services, that consists predominantly of human metabolic waste and household wastes.

C4.2.15. Domestic Wastewater Treatment System (DWTS). Any DoD or Portuguese facility designed to treat domestic wastewater before it is discharged into Portuguese waters.

C4.2.16. Effluent Limitation. Any restriction imposed on quantities, discharge rates, and concentrations of pollutants that are ultimately discharged from point sources into Portuguese waters or soil.

C4.2.17. Eutrophication. The enrichment of water with nutrients, especially compounds of nitrogen and or phosphorus, causing an accelerated growth of algae and higher forms of aquatic plants, disrupting the biological balance and quality of water in question.

C4.2.18. Existing Source. A source in operation, or under construction, prior to 1 October 1994, unless it is subsequently substantially modified, that discharges pollutants.

C4.2.19. Indirect Discharge. An introduction of pollutants in process wastewater to a DWTS.

C4.2.20. Industrial Activities Associated with Storm Water. Activities that may contribute pollutants to storm water runoff or drainage during wet weather events (see Table C4.T3., “Best Management Practices.”).

C4.2.21. Indirect Discharge into Groundwater. Any discharge of wastewater that percolates through soil and subsoil into groundwater.

C4.2.22. Industrial Wastewater. Any wastewater that originates from premises conducting trade or industrial activities, other than domestic wastewater and storm water.

C4.2.23. Industrial Wastewater Treatment System (IWTS). Any DoD facility designed to treat process wastewater, other than a DWTS, before it is discharged to Portuguese waters.

C4.2.24. Interference. Any addition of any pollutant or combination of pollutant discharges that inhibits or disrupts the DWTS, its treatment processes or operations, or its sludge handling processes, use or disposal.

C4.2.25. Maximum Concentration. Mass concentration for a certain substance that shall not be exceeded by facilities discharging urban wastewater into Portuguese waters. Samples shall be collected as flow-proportional or time-based 24-hr samples.

C4.2.26. New Source. A source built or substantially modified on or after 1 October 1994 that directly or indirectly discharges pollutants to the wastewater system.

C4.2.27. Point Source. Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock; but not including vessels, aircraft or any conveyance that merely collects natural surface flows of precipitation.

C4.2.28. Pollutant. Includes, but is not limited to, the following: dredged spoil; solid waste; incinerator residue; filter backwash; sewage; garbage; sewage sludge; munitions; chemical wastes; biological materials; radioactive materials; heat; wrecked or discarded equipment; rock; sand; cellar dirt; and industrial, municipal, and agricultural waste discharged into water, soil or drainage systems.

C4.2.29. Population Equivalent or P.E. One population equivalent is equal to the organic biodegradable load having a BOD_5 of 60 grams of oxygen per day. The load expressed in P.E. shall be calculated on the basis of the maximum average weekly load entering the treatment plant during the year, excluding unusual situations, such as those due to heavy rain.

C4.2.30. Portuguese Waters. Groundwater and surface waters including the territorial seas recognized under customary international law, including:

C4.2.30.1. All waters, which are currently used, were used in the past, or may be susceptible to use in commerce.

C4.2.30.2. Waters which are or could be used for recreation or other purposes.

C4.2.30.3. Waters from which fish or shellfish are or could be taken and sold.

C4.2.30.4. Waters which are used or could be used for industrial purposes by industries.

C4.2.30.5. Waters including lakes, rivers, streams (including intermittent streams), sloughs, prairie potholes, or natural ponds.

C4.2.30.6. Tributaries of waters identified in this definition.

C4.2.30.7. Exclusions to waters of Portugal. Domestic or industrial waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of this Chapter, are not waters of the host nation. This exclusion applies only to manmade bodies of water that were neither originally waters of the host nation or resulted from impoundment of waters of the host nation.

C4.2.31. Process Wastewater. Any water which during manufacturing or processing, comes into direct contact with, or results from the production or use of, any raw material, intermediate product, finished product, by-product, or waste product.

C4.2.32. Regulated Discharge Points. Those locations for which criteria are established under this Chapter, such as DWTS, IWTS, or industrial discharges.

C4.2.33. Sensitive Area Waterbody. A water body is identified as a sensitive area if it belongs to one of the following categories:

C4.2.33.1. Natural freshwater lakes, other stretches of fresh water, estuaries and coastal waters which are eutrophic or may become eutrophic in the near future if no protection measures are taken.

C4.2.33.2. Surface freshwaters intended for the production of drinking water whose content of nitrate may exceed established concentration limits of 50 mg/L, if no measures are taken for protection.

C4.2.33.3. Areas where further treatment is necessary as directed by the competent Portuguese authorities.

C4.2.34. Sludge. The accumulated semi-liquid suspension of settled solids deposited from wastewater or other fluids in tanks or basins. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluent, dissolved materials in irrigation return flows, or other common water pollutants.

C4.2.35. Storm Water. Run-off and drainage from wet weather events such as rain, snow, ice, sleet or hail.

C4.2.36. Substantial Modification. Any modification to a facility, the cost of which exceeds $1,000,000, regardless of funding source.

C4.2.37. Total Suspended Solids (TSS). The pollutant parameter total filterable suspended solids.

C4.2.38. Total Toxic Organics (TTO). The summation of all quantifiable values greater than 0.01 mg/L for the toxic organics in Table C4.T1., "Components of Total Toxic Organics."

C4.2.39. Urban Wastewater. Domestic wastewater or the mixture of domestic wastewater with industrial wastewater and/or storm water.

C4.2.40. Wastewater Emission Limit Value (ELV). Mass of concentration (expressed in units specific to each parameter) or emission level for a certain substance, group, family or category of substances that shall not be exceeded by facilities discharging into Portuguese waters or soil.

C4.3. CRITERIA

C4.3.1. Installations discharging effluent to Portuguese waters and/or installations discharging List I and/or List II substances onto soil shall coordinate with the Portuguese Base Commander to obtain the necessary permits, unless already completed. The information required includes the facilities served, properties of wastewater, and quantities of wastewater generated.

C4.3.1.1. Direct discharges of List I and List II substances into groundwater are prohibited (see Appendix C3.A1. of Chapter 3, "Drinking Water," for List I and List II substances). The discharge of List I and List II substances onto soil will only be allowed if it is proved that the necessary technical precautions have been taken to prevent the percolation of these substances through soil and subsoil into nearby aquifers.

C4.3.2. Effluent Limitations for Direct Dischargers of Conventional Pollutants

C4.3.2.1. All sources of pollutants directly discharged to Portuguese soil or waters will comply with the discharge conditions deemed necessary to meet water quality requirements, established by the permits held by the Portuguese Base Commander. If permit conditions are less protective than the following effluent limitations, these limitations shall be observed. If no permits exist, sources shall comply with the following effluent limitations.

C4.3.2.1.1. BOD_5. The maximum concentration will not exceed 25 mg/L.

C4.3.2.1.2. TSS

C4.3.2.1.2.1. The maximum concentration will not exceed 35 mg/L for agglomerates greater than 10,000 P.E. Additionally, the 30-day average will not exceed 30 mg/L.

C4.3.2.1.2.2. The maximum concentration will not exceed 60 mg/L for agglomerates between 2,000 and 10,000 P.E. Additionally, the 30–day average will not exceed 30 mg/L and the 7-day average will not exceed 45 mg/L.

C4.3.2.1.2.3. For agglomerates less than 2,000 P.E., the following criteria apply for TSS:

C4.3.2.1.2.3.1. The 30-day average will not exceed 30 mg/L.

C4.3.2.1.2.3.2. The 7-day average will not exceed 45 mg/L.

C4.3.2.1.2.4. pH. The effluent pH values will be maintained between 6.0 and 9.0.

C4.3.2.1.3. COD. The maximum concentration will not exceed 125 mg/L.

C4.3.2.1.4. Oils and Fats. The ELV will not exceed 15 mg/L.

C4.3.2.1.5. The discharge of effluents at temperatures greater than 30ºC (86°F) is forbidden. A rise in temperature in the receiving environment after discharge, measured at 30 meters downstream from the point of discharge, shall not exceed 3ºC (37.4°F), and the average value of temperature of the receiving water at the point of measurement shall not exceed the average monthly value by more than 2ºC (35.6°F). The temperature of the receiving environment shall not exceed 30ºC (86°F), the variation in temperature being smaller than 3ºC (37.4°F).

C4.3.2.1.6. Discharge to Sensitive Areas. Domestic waste water from agglomerations of more than 10,000 P.E. which is discharged in sensitive areas subject to eutrophication must have a minimum of 80% reduction of total phosphorous and a minimum of 70-80% reduction of total nitrogen.

C4.3.2.2. Monitoring. Monitoring requirements apply to all regulated discharge points and will be completed in accordance with the appropriate permit conditions, if available, or with these FGS, whichever is most protective. The monitoring frequency (including both sampling and analysis) given in Table C4.T3., "Monitoring Requirements," includes all parameters which are regulated (BOD_5, TSS, pH, COD, oils and fats, temperature). Samples shall be collected at the point of discharge.

C4.3.2.3. Monitoring results shall be reported through the Portuguese Base Commander upon request and at the frequency specified in the permit conditions.

C4.3.2.4. Recordkeeping Requirements. The following monitoring and recordkeeping requirements apply to all facilities. Retain records for 3 years.

C4.3.2.4.1. The influent/effluent flow quantity, concentration, or other measurement specified for each regulated parameter.

C4.3.2.4.2. A measure of the daily volume of effluent discharge from each point source.

C4.3.2.4.3. Test procedures for the analysis of pollutants.

C4.3.2.4.4. The date, exact place and time of sampling and/or measurements.

C4.3.2.4.5. The name of the person who performed the sampling and/or measurements.

C4.3.2.4.6. The date of analysis.

C4.3.2.5. Complaint System. A system for investigating water pollution complaints from individuals or Portuguese water pollution control authorities will be established, involving the Environmental Executive Agent, as appropriate.

C4.3.3. Effluent Limitations For Non-Categorical Industrial Indirect Dischargers

C4.3.3.1. Effluent Limits. The following effluent limits will apply to all discharges of pollutants to DWTSs and associated collection systems from process wastewater for which categorical standards have not been established (see following section for a list of categorical standards).

C4.3.3.1.1. Solid or Viscous Pollutants. The discharge of solid or viscous pollutants that would result in an obstruction to the domestic wastewater treatment plant flow is prohibited.

C4.3.3.1.2. Ignitability and Explosivity

C4.3.3.1.2.1. The discharge of wastewater with a closed cup flashpoint of less than 60°C (140°F) is prohibited.

C4.3.3.1.2.2. The discharge of wastes with any of the following characteristics is prohibited:

C4.3.3.1.2.2.1. A liquid solution which contains more than 24% alcohol by volume and has a flash point less than 60°C (140°F).

C4.3.3.1.2.2.2. A non-liquid which under standard temperature and pressure can cause a fire through friction.

C4.3.3.1.2.2.3. An ignitable compressed gas.

C4.3.3.1.2.2.4. An oxidizer, such as peroxide.

C4.3.3.1.3. Reactivity and Fume Toxicity. The discharge of any of the following wastes is prohibited:

C4.3.3.1.3.1. Wastes that are normally unstable and readily undergo violent changes without detonating;

C4.3.3.1.3.2. Wastes that react violently with water;

C4.3.3.1.3.3. Wastes that form explosive mixtures with water or form toxic gases or fumes when mixed with water;

C4.3.3.1.3.4. Cyanide or sulfide waste that can generate potentially harmful toxic fumes, gases, or vapors;

C4.3.3.1.3.5. Waste capable of detonation or explosive decomposition or reaction at standard temperature and pressure;

C4.3.3.1.3.6. Wastes that contain explosives regulated by Chapter 5, “Hazardous Material”; and

C4.3.3.1.3.7. Wastes that produce any toxic fumes, vapors, or gases with the potential to cause safety problems or harm to workers.

C4.3.3.1.4. Corrosivity. It is prohibited to discharge pollutants that have the potential to be structurally corrosive to the DWTS. In addition, no discharge of wastewater below a pH of 5.0 is allowed, unless the DWTS is specifically designed to handle this type of wastewater.

C4.3.3.1.5. Oil and Grease. The discharge of the following oils that can pass through or cause interference to the DWTS is prohibited: petroleum oil, non-biodegradable cutting oil, and products of mineral oil origin.

C4.3.3.1.6. Spills and Batch Discharges (slugs). Activities or installations that have a significant potential for spills or batch discharges will develop a slug prevention plan. Each plan must contain the following minimum requirements:

C4.3.3.1.6.1. Description of discharge practices, including non-routine batch discharges;

C4.3.3.1.6.2. Description of stored chemicals;

C4.3.3.1.6.3. Plan for immediately notifying the DWTS of slug discharges and discharges that would violate prohibitions under this section, including procedures for subsequent written notification within 5 days;

C4.3.3.1.6.4. Necessary practices to prevent accidental spills. This would include proper inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, and worker training;

C4.3.3.1.6.5. Proper procedures for building containment structures or equipment;

C4.3.3.1.6.6. Necessary measures to control toxic organic pollutants and solvents; and

C4.3.3.1.6.7. Proper procedures and equipment for emergency response, and any subsequent plans necessary to limit damage suffered by the treatment plant or the environment.

C4.3.3.1.7. Trucked and Hauled Waste. The discharge of trucked and hauled waste into the DWTS, except at locations specified by the DWTS operator, is prohibited.

C4.3.3.1.8. Heat in amounts which inhibit biological activity in the DWTS resulting in interference, but in no case in such quantities that the temperature of the process water at the DWTS exceeds 40°C (104°F).

C4.3.3.1.9. Radioactive Materials. It is prohibited to discharge radioactive pollutants.

C4.3.3.1.10. Other non-categorical industrial discharges containing any of the following are prohibited:

C4.3.3.1.10.1. Hydroxilated cyclic compounds and their halogenated derivates (e.g., phenols, cresols, chlorophenols, benzenediol);

C4.3.3.1.10.2. Substances that encourage the destruction of the biological treatment process (e.g., strong oxidizing, toxic, acid or basic substances);

C4.3.3.1.10.3. Substances that can destroy aquatic or terrestrial ecosystems of the receiving environment (e.g., strong oxidizing, toxic, acid or basic substances); and

C4.3.3.1.10.4. Any substances that stimulate the development of pathogenic agents (e.g., excessive biodegradable organic matter and nutrients).

C4.3.3.2. Complaint System. A system for investigating water pollution complaints from individuals or Portuguese water pollution control authorities will be established, involving the Environmental Executive Agent, as appropriate.

C4.3.4. Effluent Limitations for Categorical Industrial Dischargers (Direct or Indirect). There are no categorical industrial effluent discharges (e.g., electro or electroless metal plating, anodizing, chemical milling or etching, metal coatings, or printed circuit board manufacturing) at US DoD installations in Portugal known to the Environmental Executive Agent. If an installation undertakes categorical industrial discharges, contact the Environmental Executive Agent for guidance.

C4.3.5. Storm Water Management

C4.3.5.1. Develop and implement storm water pollution prevention (P2) plans (SWPPP) for activities listed in Table C4.T2., "Best Management Practices." Update the SWPPP annually using in-house resources.

C4.3.5.2. Employee Training. Personnel who handle hazardous substances or perform activities that could contribute pollution to wet weather events should be trained in appropriate BMPs. Such training should stress P2 principles and awareness of possible pollution sources including non-traditional sources such as sediment, nitrates, pesticides, and fertilizers.

C4.3.6. Septic Systems. Discharge to a septic system of wastewater containing industrial pollutants in levels that will inhibit biological activity is prohibited. Known discharges of industrial pollutants to existing septic systems shall be eliminated and appropriate actions should be taken to eliminate contamination. Siting of such systems is addressed in Chapter 3, "Drinking Water."

C4.3.7. Sludge Disposal. All sludges produced during the treatment of wastewater will be disposed in accordance with Chapter 6, "Hazardous Waste," or Chapter 7, "Solid Waste," as appropriate. The discharge of sludge to surface waters is prohibited.

C4.3.8. Dental Care Facilities. Effluent from dental care facilities may be discharged into drainage systems provided the effluent is passed through amalgam separators prior to being discharged. In addition, if the DoD installation operates a direct discharge from dental care facilities into surface waters, coastal waters, groundwater, or soils, shall contact the Portuguese

Base Commander to determine if a permit is required. Amalgam separators shall comply with the following:

C4.3.8.1. Separators shall be installed as close as possible to the point of origin before mixture with other effluents generated at the dental care facility that do not contain amalgam.

C4.3.8.2. Prior to the installation of the amalgam separator, drainage systems with low inclination shall be cleaned and amalgam waste shall be collected or the pipes are to be replaced.

C4.3.8.3. At a minimum, the amalgam separator shall have an efficiency of 95% (expressed as load of amalgam present in the effluent). In order to achieve this, separators shall be periodically cleaned and maintained.

C4.3.8.4. Amalgam waste shall be managed in accordance with Chapter 8, “Medical Waste.”

Table C4.T1. Components of Total Toxic Organics

Volatile Organics	
Acrolein (Propenyl)	Bromodichloromethane
Acrylonitrile	1,1,2,2-Tetrachloroethane
Methyl chloride (chloromethane)	1,2-Dichloropropane
Methyl bromide (bromomethane)	1,3-Dichloropropylene (1,3-Dichloropropene)
Vinyl Chloride (chloroethylene)	Trichloroethene
Chloroethane	Dibromochloromethane
Methylene Chloride (9 dichloromethane)	1,1,2-Trichloroethane
1,1-Dichloroethene	Benzene
1,1-Dichloroethane	2-Chloroethyl vinyl ether (mixed)
1,2-Dichloroethane	Bromoform (tribromomethane)
1,2-trans-Dichloroethene	Tetrachloroethene
Chloroform (trichloromethane)	Toluene
1,1,1-Trichloroethane	Chlorobenzene
Carbon Tetrachloride (tetrachloromethane)	Ethylbenzene
Base/Neutral Extractable Organics	
N-nitrosodimethylamine	Diethyl phthalate
bis (2-chloroethyl) ether	1,2-Diphenylhydrazine
1,3-Dichlorobenzene	N-nitrosodiphenylamine
1,4-Dichlorobenzene	4-Bromophenyl phenyl ether
1,2-Dichlorobenzene	Hexachlorobenzene
bis(2-chloroisopropyl)-ether	Phenanthrene
Hexachloroethane	Anthracene
N-nitrosodi-n-propylamine	Di-n-butyl phthalate
Nitrobenzene	Fluoranthene
Isophorone	Pyrene
bis (2-chloroethoxy) methane	Benzidine
1,2,4-trichlorobenzene	Butyl benzyl phthalate
Naphthalene	1,2-benzoanthracene (benzo (a) anthracene)
Hexachlorobutadiene	Chrysene
Hexachlorocyclopentadiene	3,3-Dichlorobenzidine
2-Chloronaphthalene	bis (2-ethylhexyl) phthalate
Acenaphthylene	Di-n-octyl phthalate
Dimethyl Phthalate	3,4-Benzofluoranthene (benzo (b) fluoranthene)
2,6-Dinitrotoluene	11,12-Benzofluoranthene (benzo (k) fluoranthene)
Acenaphthene	Benzo (a) pyrene (3,4-benzopyrene)
2,4-Dinitrotoluene	Indeno (1,2,3-cd) pyrene (2,3-o-phenylene pyrene)
Fluorene	1,2,5,6-Dibenzanthracene (dibenezo (a,h) anthracene)
4-Chlorophenyl phenyl ether	1,12-Benzoperylene (benzo (g,h,i) perylene)

Table C4.T1. Components of Total Toxic Organics, Continued

Acid Extractables Organics	
2-Chlorophenol	2,4,6-Trichlorphenol
Phenol	2,4-Dinitrophenol
2-Nitrophenol	4-Nitrophenol
2,4-Dimethylphenol	p-Chloro-m-cresol
2,4-Dichlorophenol	Pentachlorophenol
4,6-Dinitro-o-cresol	
Pesticides/PCBs	
Alpha-Endosulfan	Endrin
Beta-Endosulfan	Endrin aldehyde
Endosulfan sulfate	Heptachlor
Alpha-BHC	Heptachlor Epoxide (BHC-hexachlorocyclohexane)
Beta-BHC	Toxaphene
Delta-BHC	PCB-1242 (Arochlor 1242)
Gamma-BHC	PCB-1254 (Arochlor 1254)
4,4-DDT	PCB-1221 (Arochlor 1221)
4,4-DDE (p,p-DDX)	PCB-1232 (Arochlor 1232)
(p,p-TDE)	PCB-1248 (Arochlor 1248)
Aldrin	PCB-1260 (Arochlor 1260)
Chlordane (technical mixture and metabolites)	PCB-1016 (Arochlor 1016)
Dieldrin	

Table C4.T2. Best Management Practices

Activity	Best Management Practice
Aircraft Ground Support Equipment Maintenance	Perform maintenance/repair activities inside Use drip pans to capture drained fluids Cap hoses to prevent drips and spills
Aircraft/runway deicing	Perform anti-icing before the storm Put critical aircraft in hangars/shelters
Aircraft/vehicle fueling operations	Protect fueling areas from the rain Provide spill response equipment at fueling station
Aircraft/vehicle maintenance & repair	Perform maintenance/repair activities inside Use drip pans to capture drained fluids
Aircraft/vehicle washing	Capture wash water and send to wastewater treatment plant Treat wash water with oil water separator before discharge
Bulk fuel storage areas	Use dry camlock connectors to reduce fuel loss Capture spills with drip pans when breaking connections Curb fuel transfer areas, treat with oil water separator
Construction activities	Construct sediment dams/silt fences around construction sites
Corrosion control activities	Capture solvent/soaps used to prepare aircraft for painting Perform corrosion control activities inside
Hazardous material storage	Store hazardous materials inside or under cover Reduce use of hazardous materials
Outdoor material storage areas	Cover and curb salt, coal, urea piles Store product drums inside or under cover Reduce quantity of material stored outside
Outdoor painting/depainting operations	Capture sandblasting media for proper disposal Capture paint clean up materials (thinners, rinsates)
Pesticide operations	Capture rinse water when mixing chemicals Store spray equipment inside
Power production	Capture leaks and spills from power production equipment using drip pans, etc.
Vehicle storage yards	Check vehicles in storage for leaks and spills Use drip pans to capture leaking fluids

22Table C4.T3. Monitoring Requirements

Plant Capacity (MGD)*	Monitoring Frequency
0.001 - 0.99	Monthly
1.0 - 4.99	Weekly
> 5.0	Daily

Note:

*MGD = million gallons per day

Chapter 5

HAZARDOUS MATERIAL

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CHAPTER 5

HAZARDOUS MATERIAL

C5.1. SCOPE

This Chapter contains criteria for the storage, handling, and disposition of hazardous materials. It does not cover solid or hazardous waste, underground storage tanks, petroleum storage, and related spill contingency and emergency response requirements, which are covered under other Chapters. This document does not cover munitions.

C5.2. DEFINITIONS

C5.2.1. USEUCOM Chemicals List. Official list of hazardous materials registered for use within USEUCOM's Area of Responsibility. Access to this list is available from the EEA (contact information is located in Chapter 1).

C5.2.2. Hazardous Chemical Warning Label. A label, tag, or marking on a container that provides the following information:

C5.2.2.1. Identification/name of hazardous chemicals;

C5.2.2.2. Appropriate hazard warnings; and

C5.2.2.3. The name and address of the manufacturer, importer or other responsible party; and which is prepared in accordance with DoD Instruction 6050.05, "DoD Hazard Communication (HAZCOM) Program," August 15, 2006. Locally purchased materials will display the manufacturer-generated hazardous chemical label.

C5.2.3. Hazardous Materials. Any material that is capable of posing an unreasonable risk to health, safety, or the environment if improperly handled, stored, issued, transported, labeled, or disposed. Munitions are excluded. Hazardous materials include the following:

C5.2.3.1. Hazardous Substance. A chemical element or chemical compound that is listed in the USEUCOM Chemicals List, is designated as hazardous in the Hazardous Material Information Resource System, or presents one or more of the hazards listed in Table C5.T1., "Classification of Dangerous Substances and Dangerous Preparations."

C5.2.3.2. Hazardous Preparation. Mixtures, blends, or solutions composed of two or more substances that present one or more hazards listed in Table C5.T1., "Classification of Dangerous Substances and Dangerous Preparations" and above the thresholds set out in Table C5.T2, "Thresholds for the Classification of Preparations Containing Hazardous Substances."

C5.2.4. Hazardous Material Information Resource System (HMIRS). The computer-based information system developed to accumulate, maintain, and disseminate important information on hazardous material used by the Department of Defense (DoD) in accordance with DoD Instruction 6050.05.

C5.2.5. Hazardous Material Shipment. Any movement of hazardous material in a DoD land vehicle either from an installation to a final destination off the installation, or from a point of origin off the installation to a final destination on the installation, in which certification of the shipment is involved.

C5.2.6. Material Safety Data Sheet (MSDS). A form prepared by manufacturers or importers of chemical products to communicate to users the chemical and physical properties and the hazardous effects of a particular product.

C5.2.7. Packaging. All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the users or consumers, including non-returnable items used for the same purposes.

C5.3. CRITERIA

C5.3.1. Storage and handling of hazardous materials will adhere to requirements covered within this Chapter and DoD Component policies, including Joint Service Publication on Storage and Handling of Hazardous Materials. Defense Logistics Agency Instruction (DLAI 4145.11), Army Technical Manual (TM) 38-410, Naval Supply Publication (NAVSUP PUB) 573, Air Force Joint Manual (AFJMAN) 23-209, and Marine Corps Order (MCO) 4450.12A provide additional guidance on the storage and handling of hazardous materials. In addition, MSDSs will be reviewed to determine whether additional handling and storage requirements are required for individual products. The International Maritime Dangerous Goods (IMDG) Code and appropriate DoD and Component instructions provide requirements for international maritime transport of hazardous materials originating from DoD installations. International air shipments of hazardous materials originating from DoD installations are subject to International Civil Aviation Organization Technical Instructions or DoD Component guidance, including Air Force Interservice Manual 24-204(I), Army Technical Order (TO) 38-250, NAVSUP PUB 505, MCO P4030.19I, and DLAI 4145.3, DCMAD1, Ch3.4 (HM24), "Preparing Hazardous Materials for Military Air Shipments." Road shipments of hazardous materials originating from DoD installations within Portugal and internationally are subject to Joint Publication Army in Europe (AER) 55-4 and U.S. Air Force in Europe (USAFE) Instruction 24-203, "Safe Movement of Hazardous Goods by Surface Modes, May 1, 2003," and the Joint Publication AER 55-355, USAFE Instruction 24-201, and US Naval Forces Europe (USNAVEUR) Instruction 4600.7F, "Joint Transportation and Traffic Management Regulation, 30 August 2002."

C5.3.2. Non-DoD entities transporting hazardous materials on behalf of the DoD are required to adhere fully to the requirements of the applicable Portuguese and international transportation legislation.

C5.3.3. Hazardous material dispensing areas will be properly maintained. Drums/containers must not be leaking. Drip pans/absorbent materials will be placed under containers as necessary to collect drips or spills. Container contents will be clearly marked in accordance with paragraph C5.3.8. Dispensing areas will be located away from catch basins and floor/storm drains.

C5.3.4. Installations will ensure that for each hazardous material shipment:

C5.3.4.1. The shipment is accompanied throughout by shipping papers that clearly describe the quantity and identity of the material and include an MSDS;

C5.3.4.2. All drivers are briefed on the hazardous material included in the shipment, including health risks of exposure and the physical hazards of the material, including potential for fire, explosion, and reactivity;

C5.3.4.3. Drivers will be trained on spill control and emergency notification procedures;

C5.3.4.4. For any hazardous material, the shipping papers and briefing for the driver include identification of the material in terms of the nine United Nations (UN) Hazard Classes;

C5.3.4.5. The transport vehicles are subjected to a walk-around inspection by the driver before and after the hazardous material is loaded; and

C5.3.4.6. Packages are labeled in accordance with paragraph C5.3.8.

C5.3.5. Each installation will maintain a master listing of all storage locations for hazardous material as well as an inventory of all hazardous materials contained therein (see Chapter 18, "Spill Prevention and Response Planning").

C5.3.6. Each MSDS shall be in English or the predominant language in the work place, and contain at least the following information:

C5.3.6.1. The identity used on the label.

C5.3.6.1.1. If the hazardous chemical is a single substance, its chemical and common name;

C5.3.6.1.2. If the hazardous chemical is a mixture that has been tested as a whole to determine its hazards, the chemical and common name(s) of the ingredients that contribute to these known hazards, and the common name(s) of the mixture itself; or

C5.3.6.1.3. If the hazardous chemical is a mixture that has not been tested as a whole:

C5.3.6.1.3.1. The chemical and common name(s) of all ingredients that have been determined to be health hazards, and that comprise 1% or greater of the composition, except that chemicals identified as carcinogens shall be listed if the concentrations are 0.1% or greater;

C5.3.6.1.3.2. The chemical and common name(s) of all ingredients that have been determined to be health hazards, and that comprise less than 1% (0.1% for carcinogens) of the mixture, if there is evidence that the ingredient(s) could be released from the mixture in concentrations that would exceed an established Occupational Safety and Health Administration (OSHA)-permissible exposure limit, or could present a health hazard to employees; and

C5.3.6.1.3.3. The chemical and common name(s) of all ingredients that have been determined to present a physical hazard when present in the mixture.

C5.3.6.2. Physical and chemical characteristics of the hazardous chemical (such as vapor pressure, flash point);

C5.3.6.3. The physical hazards of the hazardous chemical, including the potential for fire, explosion, and reactivity;

C5.3.6.4. The health hazards of the hazardous chemical, including signs and symptoms of exposure, and any medical conditions that are generally recognized as being aggravated by exposure to the chemical;

C5.3.6.5. The primary route(s) of entry (inhalation, skin absorption, ingestion, etc.);

C5.3.6.6. The appropriate occupational exposure limit recommended by the chemical manufacturer, importer, or employer preparing the MSDS, where available;

C5.3.6.7. Whether the hazardous chemical has been found to be a potential carcinogen;

C5.3.6.8. Any generally applicable precautions for safe handling and use that are known to the chemical manufacturer, importer or employer preparing the MSDS, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for clean-up of spills and leaks;

C5.3.6.9. Any generally applicable control measures that are known to the chemical manufacturer, importer, or employer preparing the MSDS, such as appropriate engineering controls, work practices, or personal protective equipment;

C5.3.6.10. Emergency and first aid procedures;

C5.3.6.11. The date of preparation of the MSDS or the last change to it; and

C5.3.6.12. The name, address and telephone number of the chemical manufacturer, importer, employer, or other responsible party preparing or distributing the MSDS who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

C5.3.7. Each work center will maintain a file of MSDSs for each hazardous material procured, stored, or used at the work center. MSDSs that are not contained in the HMIRS and those MSDSs prepared for locally purchased items should be incorporated into the HMIRS. A file of MSDS information not contained in the HMIRS should be maintained on site.

C5.3.8. All containers of hazardous materials on DoD installations will have a manufacturer-generated labels or, in lieu of manufacturer-generated labels, Hazardous Chemical Warning Label in accordance with DoD Instruction 6050.05 and have MSDS information either available or in the HMIRS in accordance with DoD Instruction 6050.05 and other DoD Component instructions. These requirements apply throughout the life-cycle of these materials.

C5.3.9. DoD installations will reduce the use of hazardous materials where practical through resource recovery, recycling, source reduction, acquisition, or other minimization strategies in accordance with Service guidance on improved hazardous material management processes and techniques.

C5.3.10. All excess hazardous material will be processed through the DLA Disposition Services in accordance with the procedures in DoD 4160.21-M, "Defense Materiel Disposition Manual." DLA Disposition Services will only donate, transfer, or sell hazardous material to environmentally responsible parties. This paragraph is not intended to prohibit the transfer of usable hazardous material between DoD activities participating in a regional or local pharmacy or exchange program.

C5.3.11. All personnel who use, handle or store hazardous materials will be trained in accordance with DoD Instruction 6050.05 and other DoD Component instructions. Personnel who transport hazardous material by vehicle will also be trained in accordance with AER 55-4 / USAFEI 24-203, and AER 55-355 / USAFEI 24-201 / USNAVEUR 4600.7f.

C5.3.12. The installation must prevent the unauthorized entry of persons or livestock into hazardous materials storage areas.

C5.3.13. Installations will only use hazardous materials authorized for use by the DoD. Table C5.T3. lists the chemicals that shall not be used in Portugal.

C5.3.14. Hazardous materials shall be handled and stored in designated areas and shall be separated from foodstuffs, animal feed, medicinal products and cosmetic products to avoid confusion or cross contamination and for health and safety purposes.

C5.3.15. Areas used for the storage and handling of hazardous materials, to include associated piping, shall meet current US and Portuguese industry standards.

C5.3.16. Areas used for the storage and handling of compressed gas cylinders shall meet current US and Portuguese industry standards.

C5.3.17. Packaging of hazardous materials. Packaging and containers storing hazardous materials:

C5.3.17.1. Must be designed and constructed so that the contents cannot escape;

C5.3.17.2. Must not be susceptible to adverse attack by the contents, or liable to form dangerous compounds with the contents;

C5.3.17.3. Must be strong and solid throughout to ensure they will not loosen and will safely meet the normal stresses and strains of handling; and

C5.3.17.4. Containers fitted with replaceable fastening devices shall be designed so that the packaging can be refastened repeatedly without the contents escaping.

Table C5.T1. – Classification of Dangerous Substances and Dangerous Preparations

Category of danger	Property	Symbol letter
PHYSICO-CHEMICAL PROPERTIES		
Explosive	Solid, liquid, pasty or gelatinous substances and preparations which may react exothermically without atmospheric oxygen thereby quickly evolving gases, and which under defined test conditions detonate, quickly deflagrate or upon heating explode when partially confined.	**E**
Oxidizing	Substances and preparations which give rise to a highly exothermic reaction in contact with other substances, particularly flammable substances.	**O**
Extremely flammable	Liquid substances and preparations having an extremely low flash point and a low boiling point and gaseous substances and preparations which are flammable in contact with air at ambient temperature and pressure.	**F+**
Highly flammable	The following substances and preparations, namely— (a) substances and preparations which may become hot and finally catch fire in contact with air at ambient temperature without any application of energy, (b) solid substances and preparations which may readily catch fire after brief contact with a source of ignition and which continue to burn or to be consumed after removal of the source of ignition, (c) liquid substances and preparations having a very low flash point, or (d) substances and preparations which, in contact with water or damp air, evolve extremely flammable gases in dangerous quantities.	**F**
Flammable	Liquid substances and preparations having a low flash point.	**None**
HEALTH EFFECTS		
Very toxic	Substances and preparations which in very low quantities cause death or acute or chronic damage to health when inhaled, swallowed or absorbed via the skin.	**T+**
Toxic	Substances and preparations which in low quantities cause death or acute or chronic damage to health when inhaled, swallowed or absorbed via the skin.	**T**

Category of danger	Property	Symbol letter
Harmful	Substances and preparations which may cause death or acute or chronic damage to health when inhaled, swallowed or absorbed via the skin.	**Xn**
Corrosive	Substances and preparations which may, on contact with living tissues, destroy them.	**C**
Irritant	Non-corrosive substances and preparations which, through immediate, prolonged or repeated contact with the skin or mucous membrane, may cause inflammation.	**Xi**
Sensitizing	Substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction by hyper-sensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced.	
Sensitizing by inhalation		**Xn**
Sensitizing by skin contact		**Xi**
Carcinogenic (The categories are specified in the approved classification and labeling guide.)	Substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence	
- Category 1		**T**
- Category 2		**T**
- Category 3		**Xn**
Mutagenic	Substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce heritable genetic defects or increase their incidence.	
- Category 1		**T**
- Category 2		**T**
- Category 3		**Xn**
Toxic for reproduction	Substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may produce or increase the incidence of non-heritable adverse effects in the progeny and/or of male or female reproductive functions or capacity.	
- Category 1		**T**
- Category 2		**T**

Category of danger	Property	Symbol letter
- Category 3		Xn
ENVIRONMENTAL EFFECTS		
Dangerous for the environment (In certain cases specified in the European Chemicals list and in the approved classification and labeling guide substances and preparations classified as dangerous for the environment do not require to be labeled with the symbol and indication of danger.)	Substances and preparations which, were they to enter into the environment, would present or might present an immediate or delayed danger for one or more components of the environment.	N

Table C5.T2. Thresholds for the Classification of Preparations Containing Hazardous Substances

Danger Category of the Substance	**Concentration:**	
	Gaseous preparations (%vol/vol)	**Other preparations (%w/w)**
Very toxic	≥0.02	≥0.1
Carcinogenic Category 1 or 2	≥0.02	≥0.1
Mutagenic Category 1 or 2	≥0.02	≥0.1
Toxic for Reproduction Category 1 or 2	≥0.02	≥0.1
Harmful	≥0.2	≥1.0
Corrosive	≥0.02	≥1.0
Irritant	≥0.2	≥1.0
Sensitizing	≥0.2	≥1.0
Carcinogenic Category 3	≥0.2	≥1.0
Mutagenic Category 3	≥0.2	≥1.0
Toxic for Reproduction Category 3	≥0.2	≥1.0
Dangerous for the Environment N		≥0.1
Dangerous for the Environment Ozone	≥0.1	≥0.1
Dangerous for the Environment		≥1.0

Note:

1. Categories:
   - Category 1: Substances confirmed to cause hazard to humans
   - Category 2: Substances very likely to cause hazard to humans
   - Category 3: Substances suspected to cause hazard to humans
2. Substances with more than one health effect shall be characterized by the specific concentration limits of each of its properties.

Table C5.T3. Hazardous Materials Banned from Use in Portugal

Substance	CAS Number	EC Number	Specific Exemption on Intermediate Use or Other Specification
Aldrin	309-00-2	206-215-8	-
Chlordane	57-74-9	200-349-0	-
Dieldrin	60-57-1	200-484-5	-
Endrin	72-20-8	200-775-7	-
Heptachlor	76-44-8	200-962-3	-
Hexachlorobenzene	118-74-1	200-273-9	-
Mirex	2385-85-5	219-196-6	-
Toxaphene	8001-35-2	232-283-3	-
Polychlorinated Biphenyls (PCB)	1336-36-3 and others	215-648-1 and others	Articles already in use. See Chapter 15.
DDT (1,1,1-trichloro-2,2bis(4-chlorophenyl) ethane)	50-29-3	200-024-3	Existing production and use of DDT as a closed-system site-limited intermediate for the production of dicofol until 1 January 2014.
Chlordecone	143-50-0	205-601-3	-
Hexabromobiphenyl	36355-01-8	252-994-2	-
HCH, including lindane	608-73-1, 58-89-9	210-168-9, 200-401-2	-

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Chapter 6

HAZARDOUS WASTE

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CHAPTER 6

HAZARDOUS WASTE

C6.1. SCOPE

This Chapter contains criteria for a comprehensive management program to ensure that hazardous waste is identified, stored, transported, treated, disposed and recycled in an environmentally sound manner.

C6.2. DEFINITIONS

C6.2.1. Acute Hazardous Waste. Those wastes listed in Appendix AP1.T1., “List of Hazardous Waste/Substances/Material,” with the “P” designator, or with Hazard Code “H.”

C6.2.2. Disposal. Any of the applicable operations listed in Table C7.T1., “Waste Disposal Operations.”

C6.2.3. DoD Hazardous Waste Generator. The DoD considers a generator to be the installation, or activity on an installation, that produces an HW.

C6.2.4. Elementary Neutralization. A process of neutralizing a HW, that is hazardous only because of the corrosivity characteristic. It must be accomplished in a tank, transport vehicle, or container.

C6.2.5. USEUCOM Waste List. A categorical list of wastes and associated classification codes that is required for shipping and labeling hazardous wastes within the European Command. Contact the EEA for a copy of the USEUCOM Waste List.

C6.2.6. Generator. The organization, unit, or shop within a DoD installation that generates wastes, treats or mixes wastes or conducts other operations that modify the nature or composition of wastes.

C6.2.7. Hazardous Constituent. A chemical compound that possesses the characteristics described in Appendix C6.A1., “Properties of Wastes that render them Hazardous.”

C6.2.8. Hazardous Waste (HW). A controlled waste that may be solid, semi-solid, liquid, or contained gas, that either:

C6.2.8.1. is listed as a 6-digit waste code and marked with an asterisk in the USEUCOM Waste List, but without a specific or general reference to “dangerous substances,” or

C6.2.8.2. is listed as a 6-digit waste code and marked with an asterisk in the USEUCOM Waste List with a specific or general reference to “dangerous substances” and presents 1 or more hazardous properties listed in Appendix C6.A1. and contains hazardous constituents in concentrations at or above the thresholds listed in Appendix C6.A2., or

C6.2.8.3. presents 1 or more hazardous properties listed in Appendix C6.A1. and contains hazardous constituents in concentrations at or above the thresholds listed in Appendix C6.A2.

C6.2.9. Hazardous Waste Accumulation Point (HWAP). A shop, site, or other work center where hazardous wastes are accumulated until removed to a Hazardous Waste Storage Area (HWSA) or shipped for treatment or disposal. A HWAP may be used to accumulate no more than 208 liters (55 US gallons) of hazardous waste, or 1 liter (1 quart) of acute hazardous waste, from each waste stream. The HWAP must be at or near the point of generation and under the control of the operator.

C6.2.10. Hazardous Waste Generation. Any act or process that produces hazardous waste (HW) as defined in this Chapter.

C6.2.11. Hazardous Waste Log. A listing of HW deposited and removed from a HWSA. Information such as the waste type, volume, location, and storage removal dates should be recorded.

C6.2.12. Hazardous Waste Profile Sheet (HWPS). A document that identifies and characterizes the waste by providing user’s knowledge of the waste, and/or lab analysis, and details the physical, chemical, and other descriptive properties or processes which created the hazardous waste.

C6.2.13. Hazardous Waste Storage Area (HWSA). One or more locations on a DoD installation where HW is collected prior to shipment for treatment or disposal. A HWSA may store more than 208 liters (55 US gallons) of a HW stream, and more than one quart of an acute HW stream.

C6.2.14. Hazardous Waste Storage Area Manager. A person, or agency, on the installation assigned the operational responsibility for receiving, storing, inspecting, and general management of the installation’s HWSA or HWSA program.

C6.2.15. Landfill. A waste disposal site for the controlled deposit of wastes onto or into land (i.e., underground).

C6.2.16. Land Disposal. Placement in or on the land, including, but not limited to, land treatment, facilities, surface impoundments, underground injection wells, salt dome formations, salt bed formations, underground mines or caves.

C6.2.17. PCB-Containing Waste. Waste polychlorinated biphenyls, polychlorinated terphenyls, halogenated monomethyldiphenylmethane, and wastes containing more than 50 mg/kg (ppm) of these substances are referred to as PCB-containing wastes.

C6.2.18. Recovery. Any of the applicable operations listed in Table C7.T2., “Waste Recovery Operations.”

C6.2.19. Treatment. Any method, technique, or process, excluding elementary neutralization, designed to change the physical, chemical, or biological characteristics or composition of any hazardous waste that would render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.

C6.2.20. Unique Identification Number. A number assigned to generators of hazardous waste to identify the generator and used to assist in tracking the waste from point of generation to ultimate disposal. The number could be the Unit Identification Code (UIC), the DoD Activity Address Code (DoDAAC) or the Waste Code depending on whether the HW movement is by DOD or Contract means.

C6.2.21. Used Oil. Any mineral-based lubrication or industrial oils that have become unfit for the use for which they were originally intended, and in particular used combustion engine oils and gearbox oils, and also mineral lubricating oils, oils for turbines and hydraulic oils. Note: used oil is considered a hazardous waste when packaged and tendered for disposal.

C6.2.22. Used Oil Burned for Energy Recovery. Used oil that is burned for energy recovery is termed "used oil fuel." Used oil fuel includes any fuel produced from used oil by processing, blending, or other treatment.

C6.2.23. Waste. Any substance or object which the holder discards, intends to discard, or is required to discard.

C6.2.24. Waste Code. A unique alpha-numeric identifier used on consignments of HW comprised of a 6-digit HW registration number, or "premises code," according to the USEUCOM Waste List.

C6.3. CRITERIA

C6.3.1. DoD Hazardous Waste Generators

C6.3.1.1. Hazardous Waste Determination and Characterization. Generators will identify and characterize the wastes generated at their site using their knowledge of the materials and processes that generated the waste, or through laboratory analysis of the waste. Generators will identify inherent hazardous characteristics associated with a waste in terms of physical properties (e.g., solid, liquid, contained gases), chemical properties (e.g., chemical constituents, technical or chemical name), and/or other descriptive properties (e.g., ignitable, corrosive, reactive, toxic) in accordance with this chapter.

C6.3.1.2. An HWPS will be used to identify each hazardous waste stream. The HWPS must be updated by the generator, as necessary, to reflect any new waste streams or process modifications that change the character of the hazardous waste being handled at the storage area.

C6.3.1.3. Each generator will use a unique identification number for all recordkeeping~~,~~ reports, and manifests for hazardous waste.

C6.3.1.4. Pre-Transport Requirements

C6.3.1.4.1. Transportation. National and international transportation of hazardous wastes by road or by sea shall be conducted in accordance with the Joint Publication Army in Europe (AER) 55-4 and US Air Force in Europe (USAFE) Instruction 24-203, "Safe Movement of Hazardous Goods by Surface Modes, May 1, 2003," and the Joint Publication AER 55-355, USAFE Instruction24-201, and US Naval Forces Europe (USNAVEUR) Instruction 4600.7F, "Joint Transportation and Traffic Management Regulation, 30 August 2002." Additionally, off-installation hazardous waste shipments shall comply with the following:

C6.3.1.4.1.1. The phrase 'Used oil transportation' ('Transporte de óleos usados') shall be clearly and legibly indicated on tank vehicles transporting used oil.

C6.3.1.4.2. Manifesting. All HW leaving the installation will be accompanied by a manifest to ensure a complete audit trail from point of origin to ultimate disposal. A copy of the waste manifest is included in the appendices to Chapter 7. Manifests must include at least the following:

C6.3.1.4.2.1. Generator's name, address, fax and telephone number;

C6.3.1.4.2.2. Generator's unique identification number;

C6.3.1.4.2.3. Transporter's name, address, fax and telephone number;

C6.3.1.4.2.4. Destination name, address, fax and telephone number;

C6.3.1.4.2.5. Description of waste, including:

C6.3.1.4.2.5.1. Waste designation;

C6.3.1.4.2.5.2. Waste code;

C6.3.1.4.2.5.3. Physical form (liquid, sludge, solid); and

C6.3.1.4.2.5.4. Container type, material and number.

C6.3.1.4.2.6. Total quantity of waste;

C6.3.1.4.2.7. Date of shipment; and

C6.3.1.4.2.8. Date of receipt.

C6.3.1.4.3. Generators will maintain an audit trail of HW from the point of generation to disposal. Generators using DLA Disposition Services disposal services will obtain a signed copy of the manifest from the initial DLA Disposition Services recipient of the waste, at which time DLA Disposition Services will assume responsibility. A generator, as provided in a host-tenant agreement, that uses the HW management and/or disposal program of a DoD Component that has a different unique identification number will obtain a signed copy of the manifest from the receiving component, at which time the receiving component will assume responsibility for subsequent storage, transfer and disposal of the waste. Activities desiring to dispose of their HW outside the DLA Disposition Services system will develop their own manifest tracking system to provide an audit trail from point of generation to ultimate disposal.

C6.3.2. Hazardous Waste Accumulation Point (HWAP)

C6.3.2.1. An HWAP is defined in section C6.2. Each HWAP must be designed and operated to provide appropriate segregation for different waste streams, including those that are chemically incompatible. Each HWAP will have warning signs appropriate for the waste being accumulated at that site.

C6.3.2.2. An HWAP will comply with the storage limits in paragraph C6.2.9. When these limits have been reached, the generator will make arrangements within five working days to move the HW to an HWSA or ship it off-site for treatment or disposal. Arrangements must include submission of all appropriate turn-in documents to initiate the removal (e.g., DD 1348-1A or Portuguese manifest) to appropriate authorities responsible for removing the HW (e.g., DLA Disposition Services). Wastes intended to be recycled or used for energy recovery (for example, used oil or antifreeze) are exempt from the 208-liter (55-US gallon)/1-liter (1-quart) volume accumulation limits, but must be transported off-site to a final destination facility within one year.

C6.3.2.3. All criteria of paragraph C6.3.4., "Use and Management of Containers," apply to HWAPs with the exception of subparagraph C6.3.4.1.5., "Weekly Inspections."

C6.3.2.4. The following provisions of paragraph C6.3.5., "Recordkeeping Requirements," apply to HWAPs: C6.3.5.1. ("Turn-in Documents"), C6.3.5.5. ("Manifests"), and C6.3.5.6. ("Waste Analysis/Characterization Records").

C6.3.2.5. Personnel Training. Personnel assigned HWAP duty must successfully complete appropriate HW training necessary to perform their assigned duties. At a minimum, this must include pertinent waste handling and emergency response procedures. Generic HW training requirements are described in paragraph C6.3.9.

C6.3.3. Hazardous Waste Storage Area (HWSA)

C6.3.3.1. Location Standards. To the maximum extent possible, all HWSA will be located to minimize the risk of release due to seismic activity, floods, or other natural events. For facilities located where they may face such risks, the installation spill prevention and control plan must address the risk.

C6.3.3.2. Design and Operation of HWSAs. HWSAs must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned release of HW or HW constituents to air, soil, groundwater or surface water that could threaten human health or the environment. Hazardous waste should not be stored longer than one year in an HWSA.

C6.3.3.3. Waste Analysis and Verification

C6.3.3.3.1. Waste Analysis Plan. The HWSA manager, in conjunction with the installation(s) served, will develop a plan to determine how and when wastes are to be analyzed. The waste analysis plan will include procedures for characterization and verification testing of both on-site and off-site hazardous waste. The plan should include: parameters for testing and rationale for choosing them, frequency of analysis, test methods, and sampling methods.

C6.3.3.3.2. Maintenance of Waste Analysis File. The HWSA must have, and keep on file, an HWPS for each waste stream that is stored at each HWSA.

C6.3.3.3.3. Waste Verification. Generating activities will provide identification of incoming waste on the HWPS to the HWSA manager. Prior to accepting the waste, the HWSA manager will:

C6.3.3.3.3.1. Inspect the waste to ensure it matches the description provided;

C6.3.3.3.3.2. Ensure that no waste is accepted for storage unless a HWPS is provided, or available and properly referenced.

C6.3.3.3.3.3. Request a new HWPS from the generator if there is reason to believe that the process generating the waste has changed;

C6.3.3.3.4. Analyze waste shipments in accordance with the waste analysis plan to determine whether it matches the waste description on the accompanying manifest and documents; and

C6.3.3.3.4.1. Reject shipments that do not match the accompanying waste descriptions unless the generator provides an accurate description.

C6.3.3.4. Security

C6.3.3.4.1. General. The installation must prevent the unknowing entry, and minimize the possibility for unauthorized entry, of persons or livestock onto the HWSA grounds.

C6.3.3.4.2. Security System Design. An acceptable security system for an HWSA consists of either:

C6.3.3.4.2.1. A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or other designated personnel) that continuously monitors and controls entry into the HWSA; or

C6.3.3.4.2.2. An artificial or natural barrier (e.g., a fence in good repair or a fence combined with a cliff) that completely surrounds the HWSA, combined with a means to control entrance at all times (e.g., an attendant, television monitors, locked gate, or controlled roadway access).

C6.3.3.4.3. Required Signs. A sign with the legend "Danger Unauthorized Personnel Keep Out," ("Perigo, Proibida a Entrada ao Pessoal Não Autorizado") must be posted at each entrance to the HWSA, and at other locations, in sufficient numbers to be seen from any approach to the HWSA. The legend must be written in English and Portuguese, and must be legible from a distance of at least 25 feet. Existing signs with a legend other than "Danger Unauthorized Personnel Keep Out," may be used if the legend on the sign indicates that only authorized personnel are allowed to enter the HWSA, and that entry to can be dangerous.

C6.3.3.5. Required Aisle Space. Aisle space must allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency. Containers must not obstruct an exit.

C6.3.3.6. Access to Communications or Alarm System

C6.3.3.6.1. General. Whenever HW is being poured, mixed, or otherwise handled, all personnel involved in the operation must have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another person.

C6.3.3.6.2. If there is only one person on duty at the HWSA premises, that person must have immediate access to a device, such as a telephone (immediately available at the scene of operation) or a hand-held two-way radio, capable of summoning external emergency assistance.

C6.3.3.7. Required Equipment. All HWSAs shall have fire safety equipment signs of rectangular or square shape consisting of a legible white pictogram on a red background, the latter of which shall occupy at least 50% of the sign area (refer to Appendix C6.A3.) and equipped with the following:

C6.3.3.7.1. An internal communications or alarm system capable of providing immediate emergency instruction (voice or signal) to HWSA personnel. Fire alarm sounds shall differ in quality and tone from any other on-site acoustical device and shall be provided with an independent energy supply.

C6.3.3.7.2. A device, such as an intrinsically safe telephone (immediately available at the scene of operations) or a hand-held two-way radio, capable of summoning emergency assistance from installation security, fire departments, or emergency response teams.

C6.3.3.7.3. Portable fire extinguishers, fire control equipment appropriate to the material in storage (including special extinguishing equipment as needed, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment.

C6.3.3.7.4. Water at adequate volume and pressure to supply water hose streams, foam-producing equipment, automatic sprinklers, or water spray systems. An adequate number of personnel trained in the use of this equipment shall be present on the installation (e.g., at the base fire department) during normal working hours.

C6.3.3.7.5. Readily available personal protective equipment appropriate to the materials stored, eyewash and emergency showers.

C6.3.3.7.6. Testing and Maintenance of Equipment. All HWSA communications alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, where required, must be maintained to ensure its proper operation in time of emergency.

C6.3.3.8. General Inspection Requirements

C6.3.3.8.1. General. The installation must inspect the HWSA for malfunctions and deterioration, operator errors, and discharges that may be causing, or may lead to, a release of HW constituents to the environment or threat to human health. The inspections must be conducted often enough to identify problems in time to correct them before they harm human health or the environment.

C6.3.3.8.2. Types of Equipment Covered. Inspections must include all equipment and areas involved in storage and handling of HW, including all containers and container storage areas, tank systems and associated piping, and all monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment (such as dikes and sump pumps) that are important to preventing, detecting, or responding to environmental or human health hazards.

C6.3.3.8.3. Inspection Schedule. Inspections must be conducted according to a written schedule that is kept at the HWSA. The schedule must identify the types of problems (e.g., malfunctions or deterioration) that are to be looked for during the inspection (e.g., inoperative sump pump, leaking fitting, eroding dike, etc.).

C6.3.3.8.4. Frequency of Inspections. Minimum frequencies for inspecting containers and container storage areas are found in subparagraph C6.3.4.1.5. Minimum frequencies for inspecting tank systems are found in subparagraph C6.3.7.5.2. For equipment not covered by those paragraphs, inspection frequency should be based on the rate of possible deterioration of the equipment and probability of an environmental or human health incident if the deterioration or malfunction or any operator error goes undetected between inspections. Areas subject to spills, such as loading and unloading areas, must be inspected daily when in use.

C6.3.3.8.5. Remedy of Problems Revealed by Inspection. The installation must remedy any deterioration or malfunction of equipment or structures that the inspection reveals on a schedule, which ensures that the problem does not lead to an environmental or human health hazard. Where a hazard is imminent or has already occurred, action must be taken immediately.

C6.3.3.8.6. Maintenance of Inspection Records. The installation must record inspections in an inspection log or summary, and keep these records for at least three years from the date of inspection. At a minimum, these records must include the date and time of inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions.

C6.3.3.9. Personnel Training. Personnel assigned HWSA duty must successfully complete an appropriate HW training program in accordance with the training requirements in paragraph C6.3.9.

C6.3.3.10. Storage Practices

C6.3.3.10.1. Compatible Storage. The storage of ignitable, reactive, or incompatible wastes must be handled so that it does not threaten human health or the environment. Dangers resulting from improper storage of incompatible wastes include generation of extreme heat, fire, explosion and generation of toxic gases.

C6.3.3.10.2. General requirements for ignitable, reactive, or incompatible wastes. The HWSA manager must take precautions to prevent accidental ignition or reaction of ignitable or reactive waste. This waste must be separated and protected from sources of ignition or reaction including but not limited to: open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. While ignitable or reactive waste is being handled, the HWSA personnel must confine smoking and open flame to specially designated locations. “No Smoking” signs, or appropriate icon, must be conspicuously placed wherever there is a hazard from ignitable or reactive waste. In areas where access by non-English speaking persons is expected, the “No Smoking” (“Não Fumar”) legend must be written in English and Portuguese. Water reactive waste cannot be stored in the same area as flammable and combustible liquid.

C6.3.3.11. Closure and Closure Plans

C6.3.3.11.1. Closure. At closure of a HWSA, HW and HW residues must be removed from the containment system including remaining containers, liners, and bases. Closure should be done in a manner which eliminates or minimizes the need for future maintenance or the potential for future releases of HW and according to the Closure Plan.

C6.3.3.11.2. Closure Plan. Closure plans will be developed before a new HWSA is opened. Each existing HWSA will also develop a Closure Plan. The Closure Plan will be implemented concurrent with the decision to close the HWSA. The Closure Plan will include: estimates of the storage capacity of the HW, steps to be taken to remove or decontaminate all waste residues, and estimate of the expected date for closure.

C6.3.4. Use and Management of Containers

C6.3.4.1. Container Handling and Storage. The packaging of hazardous waste for national and international transportation by road or by sea shall comply with the Joint Publication Army in Europe (AER) 55-4 and US Air Force in Europe (USAFE) Instruction 24-203, “Safe Movement of Hazardous Goods by Surface Modes, May 1, 2003,” and the Joint Publication AER 55-355, USAFE Instruction24-201, and US Naval Forces Europe (USNAVEUR) Instruction 4600.7F, “Joint Transportation and Traffic Management Regulation, 30 August 2002.” Additionally, to protect human health and the environment, the following guidelines will apply when handling and storing hazardous waste containers.

C6.3.4.1.1. Containers holding HW will be in good condition, free from severe rusting, bulging or structural defects.

C6.3.4.1.2. Containers used to store HW, including over pack containers, must be compatible with the materials stored.

C6.3.4.1.3. <u>Management of Containers</u>

C6.3.4.1.3.1. A container holding HW must always be closed during storage, except when it is necessary to add or remove waste.

C6.3.4.1.3.2. A container holding HW must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.

C6.3.4.1.3.3. Containers of flammable liquids must be grounded when transferring flammable liquids from one container to the other.

C6.3.4.1.4. Containers holding HW will be marked with a HW marking, and a label indicating the hazard class of the waste contained (i.e., flammable, corrosive, etc.).

C6.3.4.1.5. Areas where containers are stored must be inspected weekly for leaking and deteriorating containers as well as deterioration of the containment system caused by corrosion or other factors. Secondary containment systems will be inspected for defects and emptied of accumulated releases or retained storm water.

C6.3.4.2. <u>Containment</u>. Container storage areas must have a secondary containment system meeting the following:

C6.3.4.2.1. Must be sufficiently impervious to contain leaks, spills and accumulated precipitation until the collected material is detected and removed,

C6.3.4.2.2. The secondary containment system must have sufficient capacity to contain 10% of the volume of stored containers or the volume of the largest container, whichever is greater.

C6.3.4.2.3. Storage areas that store containers holding only wastes that do not contain free liquids need not have a containment system as described in subparagraph C6.3.4.2.1., provided the storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation, or the containers are elevated or are otherwise protected from contact with accumulated liquid.

C6.3.4.2.4. Rainwater captured in secondary containment areas should be inspected and/or tested prior to release. The inspection or testing must be reasonably capable of detecting contamination by the HW in the containers. Contaminated water shall be treated as HW until determined otherwise.

C6.3.4.3. Special Requirements for Ignitable or Reactive Waste. Areas that store containers holding ignitable or reactive waste must be located at least 15 meters (50 feet) inside the installation's boundary.

C6.3.4.4. Special Requirements for Incompatible Wastes

C6.3.4.4.1. Incompatible wastes and materials must not be placed in the same container.

C6.3.4.4.2. Hazardous waste must not be placed in an unwashed container that previously held an incompatible waste or material.

C6.3.4.4.3. A storage container holding HW that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other materials or protected from them by means of a dike, berm, wall, or other device.

C6.3.5. Recordkeeping Requirements

C6.3.5.1. Turn-in Documents. Turn-in documents, e.g., DD 1348-1A or manifests, must be maintained for 3 years.

C6.3.5.2. Hazardous Waste Log. A written HW log will be maintained at the HWSA to record all HW handled and should consist of the following:

C6.3.5.2.1. Name/address of generator;

C6.3.5.2.2. Description and hazard class of the hazardous waste;

C6.3.5.2.3. Number and types of containers;

C6.3.5.2.4. Quantity of hazardous waste;

C6.3.5.2.5. Date stored;

C6.3.5.2.6. Storage location; and

C6.3.5.2.7. Disposition data, to include: dates received, sealed and transported and transporter used.

C6.3.5.3. The HW log will be available to emergency personnel in the event of a fire or spill. Logs will be maintained until closure of the installation.

C6.3.5.4. Inspection Logs. Records of inspections should be maintained for a period of 3 years.

C6.3.5.5. Manifests. Manifests of incoming hazardous wastes will be retained for a period of 3 years and manifests of hazardous wastes that are transported off-site will be retained for 5 years.

C6.3.5.6. Waste Analysis/Characterization Records. These records will be retained until 3 years after closure of the HWSA.

C6.3.5.7. The installation will maintain records, identified in paragraphs C6.3.5.1, C6.3.5.5., and C6.3.5.6., for all HWAPs on the installation.

C6.3.5.8. Upon request, DoD installations shall report to the Portuguese Base Commander the information of HW generated on the previous calendar year, including: quantity, waste code, final disposal location and disposal operations.

C6.3.6. Contingency Plan

C6.3.6.1. Each installation will have a contingency plan that describes actions to be taken to contain and clean up spills and releases of HW in accordance with the provisions of Chapter 18., “Spill Prevention and Response Planning.”

C6.3.6.2. A current copy of the installation contingency plan must be:

C6.3.6.2.1. Maintained at each HWSA and HWAP, (HWAPs need maintain only portions of the contingency plan which are pertinent to their facilities and operation); and

C6.3.6.2.2. Submitted to all police departments, fire departments, hospitals, and emergency response teams identified in the plan, and upon which the plan relies to provide emergency services. Contingency Plans should be available in both English and Portuguese.

C6.3.7. Tank Systems. The following criteria apply to all storage tanks containing HW. See Chapter 19, “Underground Storage Tanks,” for criteria dealing with underground storage tanks containing POLs and hazardous substances.

C6.3.7.1. Application. The requirements of this subparagraph apply to HWSAs that use tank systems for storing or treating HW. Tank systems that are used to store or treat HW which contain no free liquids and are situated inside a building with an impermeable floor are exempted from the requirements in paragraph C6.3.7.4., titled “Containment and Detection of Releases.” Tank systems, including sumps that serve as part of a secondary containment system to collect or contain releases of HW, are exempted from the requirements in paragraph C6.3.7.4.

C6.3.7.2. Assessment of the Integrity of an Existing Tank System. For each existing tank system that does not have secondary containment meeting the requirements of paragraph C6.3.7.4., installations must determine annually whether the tank system is leaking or is fit for use. Installations must obtain, and keep on file at the HWSA, a written assessment of tank system integrity reviewed and certified by a competent authority.

C6.3.7.3. Design and Installation of New Tank Systems or Components. Managers of HWSAs installing new tank systems or components must obtain a written assessment, reviewed and certified by a competent authority attesting that the tank system has sufficient structural integrity and is acceptable for the storing and treating of HW. The assessment must show that the foundation, structural support, seams, connections, and pressure controls (if applicable) are adequately designed and that the tank system has sufficient structural strength, compatibility with the waste(s) to be stored or treated, and corrosion protection to ensure that it will not collapse, rupture, or fail.

C6.3.7.4. Containment and Detection of Releases. To prevent the release of HW or hazardous constituents to the environment, secondary containment that meets the requirements of this subparagraph must be:

C6.3.7.4.1. Provided for all new tank systems or components, prior to their being put into service;

C6.3.7.4.2. Provided for those existing tank systems when the tank system annual leak test detects leakage;

C6.3.7.4.3. Provided for tank systems that store or treat HW by 1 January 1999;

C6.3.7.4.4. Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during the use of the tank system; and capable of detecting and collecting releases and accumulated liquid until the collected material is removed; and

C6.3.7.4.5. Constructed to include one or more of the following; a liner external to the tank, a vault, or double-walled tank.

C6.3.7.5. General Operating Requirements

C6.3.7.5.1. Hazardous wastes or treatment reagents must not be placed in a tank system if they could cause the tank, its ancillary equipment, or the containment system to rupture, leak, corrode, or otherwise fail.

C6.3.7.5.2. The installation must inspect and log at least once each operating day:

C6.3.7.5.2.1. The above-ground portions of the tank system, if any, to detect corrosion or releases of waste;

C6.3.7.5.2.2. Data gathered from monitoring and leak detection equipment (e.g., pressure or temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and

C6.3.7.5.2.3. The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of HW (e.g., wet spots, dead vegetation).

C6.3.7.5.3. The installation must inspect cathodic protection systems to ensure that they are functioning properly. The proper operation of the cathodic protection system must be confirmed within 6 months after initial installation and annually thereafter. All sources of impressed current must be inspected and/or tested, as appropriate, or at least every other month. The installation manager must document the inspections in the operating record of the HWSA.

C6.3.7.6. Response to Leaks or Spills and Disposition of Leaking or Unfit-For-Use Tank Systems. A tank system or secondary containment system from which there has been a leak or spill, or that is unfit for use, must be removed from service immediately and repaired or closed. Installations must satisfy the following requirements:

C6.3.7.6.1. Cessation of use; prevention of flow or addition of wastes. The installation must immediately stop the flow of HW into the tank system or secondary containment system and inspect the system to determine the cause of the release.

C6.3.7.6.2. Containment of visible releases to the environment. The installation must immediately conduct an inspection of the release and, based upon that inspection:

C6.3.7.6.2.1. Prevent further migration of the leak or spill to soils or surface water;

C6.3.7.6.2.2. Remove and properly dispose of any contamination of the soil or surface water;

C6.3.7.6.2.3. Remove free product to the maximum extent possible; and

C6.3.7.6.2.4. Continue monitoring and mitigating for any additional fire and safety hazards posed by vapors or free products in subsurface structures.

C6.3.7.6.3. Make required notifications and reports.

C6.3.7.7. Closure. At closure of a tank system, the installation must remove or decontaminate HW residues, contaminated containment system components (liners, etc.), contaminated soil to the extent practicable, and structures and equipment.

C6.3.8. Standards for the Management of Used Oil, and Batteries

C6.3.8.1. Used Oil. Ensure all used oils collected on DoD installations are relinquished to either DLA Disposition Services or a properly permitted management entity or operator who can document compliance with applicable recovery requirements.

C6.3.8.1.1. Used Oil Burned for Energy Recovery. Used oil fuel may be burned only in permitted facilities approved through the Portuguese Base Commander (see Chapter 1 of these FGS).

C6.3.8.2. The following operations are prohibited in Portugal:

C6.3.8.2.1. Any discharge of used oils onto inland surface waters, groundwater, coastal and sea waters and drainage systems;

C6.3.8.2.2. Any deposit and/or discharge of used oils harmful to the soil and any uncontrolled discharge of residues resulting from the processing of used oils;

C6.3.8.2.3. The use of used oil, HW or used oil contaminated with any HW for dust suppression or road treatment;

C6.3.8.2.4. The management of used oils beyond the simple collection for off-site disposal or any residues resulting from the processing of used oils without the necessary permit (see paragraph C6.3.11);

C6.3.8.2.5. Any processing of used oils causing air pollution which exceeds applicable emission limits (refer to Chapter 2); and

C6.3.8.2.6. Any mixture of used oils presenting different characteristics or any mixture of used oil with other wastes or substances that poses an obstacle to their regeneration in environmentally sound conditions.

C6.3.8.3. <u>Batteries</u>

C6.3.8.3.1. Installations shall conduct recovery of spent batteries when technically feasible. Batteries, regardless of whether they are recycled or disposed of, will be managed as HW.

C6.3.8.3.2. <u>Special Requirements for Batteries.</u> Spent batteries shall be stored in leak-proof containers, and the materials of containers shall not react with the battery compounds. Spent vehicle, industrial or similar batteries shall be stored with the liquid inside and in a vertical position, with the openings tightly closed and facing upwards.

C6.3.8.3.3. Ensure all spent batteries collected on DoD installations are relinquished to DLA Disposition Services or to properly permitted waste management entities who can document compliance with applicable recycling requirements.

C6.3.8.3.4. Upon request, DoD installations shall report to the Portuguese Base Commander the quantities of spent vehicle, industrial or similar batteries collected or transferred to authorized contractors for recovery or elimination in accordance with Appendices C6.A4. and C6.A5.

C6.3.8.3.5. DoD installations shall accept spent batteries from installation personnel.

C6.3.9. <u>Hazardous Waste Training</u>

C6.3.9.1. <u>Application</u>. Personnel and their supervisors that are assigned duties involving actual or potential exposure to HW must successfully complete an appropriate training program prior to assuming those duties. Personnel assigned to such duty after the effective date of these FGS must work under direct supervision until they have completed appropriate training. Additional guidance is contained in DoDI 6050.5, "DoD Hazard Communication Program." All DoD personnel with responsibilities under the Joint Publication Army in Europe (AER) 55-4 and US Air Force in Europe (USAFE) Instruction 24-203, "Safe Movement of Hazardous Goods by Surface Modes, May 1, 2003," and the Joint Publication AER 55-355, USAFE Instruction 24-201, and US Naval Forces Europe (USNAVEUR) Instruction 4600.7F, "Joint Transportation and

Traffic Management Regulation, 30 August 2002," shall be trained to meet those responsibilities. This also applies to national transportation within Portugal.

C6.3.9.2. Refresher Training. All personnel performing HW duties must successfully complete annual refresher HW training.

C6.3.9.3. Training Contents and Requirements. The training program must:

C6.3.9.3.1. Include sufficient information to enable personnel to perform their assigned duties and fully comply with pertinent HW requirements;

C6.3.9.3.2. Be conducted by qualified trainers who have completed an instructor training program in the subject, have comparable academic credentials, or experience;

C6.3.9.3.3. Be designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems;

C6.3.9.3.4. Address the following areas in particular for personnel whose duties include hazardous waste handling and management:

C6.3.9.3.4.1. Emergency procedures (response to fire/explosion/ spills; use of communications/alarm systems; body and equipment clean up);

C6.3.9.3.4.2. Drum/container handling/storage; safe use of HW equipment; proper sampling procedures;

C6.3.9.3.4.3. Employee protection, to include Personal Protective Equipment (PPE), safety and health hazards, hazard communication, worker exposure; and

C6.3.9.3.4.4. Recordkeeping, security, inspections, contingency plans, storage requirements, transportation requirements.

C6.3.9.4. Documentation of Training. Installations must document all HW training for each individual assigned duties involving actual or potential exposure to HW. Updated training records on personnel assigned duties involving actual or potential exposure to HW must be kept by the HWSA manager or the responsible installation office and retained for at least three years after termination of duty of these personnel.

C6.3.10. Hazardous Waste Disposal

C6.3.10.1. All DoD HW should normally be disposed of through the DLA Disposition Services. A decision not to use DLA Disposition Services for HW disposal may be made in accordance with DoD Directive 4001.1, "Installation Management," to best accomplish the installation mission, but should be concurred with by the component chain of command to ensure that installation contracts and disposal criteria are at least as protective as criteria used by DLA Disposition Services.

C6.3.10.2. DoD Components must ensure that the disposal of hazardous wastes generated by DoD operations within Portugal is conducted by appropriately permitted waste contractors in accordance with criteria C6.3.10.4. and the following.

C6.3.10.2.1. When HW cannot be disposed of in accordance with these FGS within Portugal, it will be either retrograded to the US or, if permissible under international agreements transferred to another country outside the US where it can be disposed of in an environmentally-sound manner and in compliance with the FGS applicable to the country of disposal, if any exist. Transshipment of hazardous wastes to a country other than the US for disposal must be approved by, at a minimum, the Deputy Under Secretary of Defense for Installations and Environment [DUSD(I&E)]. If hazardous wastes are exported, the Portuguese Base Commander shall be notified of hazardous waste movement outside of the country. If the exportation of hazardous waste is carried out by contract, DoD personnel shall ensure those contractors are properly permitted and meet these requirements.

C6.3.10.2.2. The determination of whether particular DoD-generated HW may be disposed of in Portugal will be made by the EEA, in coordination with the unified combatant commander, the Director of Defense Logistics Agency, other relevant DoD Components, and the Chief of the US Diplomatic Mission.

C6.3.10.3. Disposal Procedures

C6.3.10.3.1. The determination of whether HW may be disposed of in a host nation must include consideration of whether the means of treatment and/or containment technologies employed in the HN program, as enacted and enforced, effectively mitigate the hazards of such waste to human health and the environment, and must consider whether the HN program includes:

C6.3.10.3.1.1. An effective system for tracking the movement of HW to its ultimate destination.

C6.3.10.3.1.2. An effective system for granting authorization or permission to those engaged in the collection, transportation, storage, treatment, and disposal of HW.

C6.3.10.3.1.3. Appropriate standards and limitations on the methods that may be used to treat and dispose of HW.

C6.3.10.3.1.4. Standards designed to minimize the possibility of fire, explosion, or any unplanned release or migration of HW or its constituents to air, soil, surface, or groundwater.

C6.3.10.3.2. The EEA must also be satisfied, either through reliance on the HN regulatory system and/or provisions in the disposal contracts, that:

C6.3.10.3.2.1. Persons and facilities in the waste management process have demonstrated the appropriate level of training and reliability; and

C6.3.10.3.2.2. Effective inspections, monitoring, and recordkeeping will take place.

C6.3.10.4. Host nation facilities that either store, treat, or dispose of DoD-generated waste must be evaluated and approved by the host nation as being in compliance with their regulatory requirements. This evaluation and approval may consist of having a valid permit or HN equivalent for the HW that will be handled.

C6.3.10.5. The management of hazardous wastes will be consistent with the waste management hierarchy (waste minimization at source, reuse, recycling, recovery, treatment and/or disposal). To minimize risks to health and the environment, safe and environmentally acceptable methods will be used to identify, store, prevent leakage, and dispose of hazardous waste.

C6.3.10.6. Land Disposal Requirements. Hazardous waste may only be land disposed in appropriately permitted landfill facilities.

C6.3.10.7. Incinerator Standards. This subparagraph applies to incinerators that incinerate HW as well as boilers and industrial furnaces that burn HW for any recycling purposes.

C6.3.10.7.1. Incinerators used to dispose of HW must be licensed by a competent Portuguese authority through the Portuguese Base Commander. This license must comply with the criteria listed in subparagraph C6.3.10.7.2.

C6.3.10.7.2. A license for incineration of HW must require the incinerator to be designed to include appropriate equipment as well as to be operated according to management practices (including proper combustion temperature, waste feed rate, combustion gas velocity, and other relevant criteria) to effectively destroy hazardous constituents and control harmful emissions. A licensing scheme that would require an incinerator to achieve the standards set forth in either subparagraphs C6.3.10.7.2.1. or C6.3.10.7.2.2. is acceptable.

C6.3.10.7.2.1. The incinerator achieves a destruction and removal efficiency of 99.99% for the organic hazardous constituents that represent the greatest degree of difficulty of incineration in each waste or mixture of waste. The incinerator must minimize carbon monoxide in stack exhaust gas, minimize emission of particulate matter, and emit no more than 1.8 kg (4 pounds) of hydrogen chloride per hour.

C6.3.10.7.2.2. The incinerator has demonstrated, as a condition for obtaining a license, the ability to effectively destroy the organic hazardous constituents that represent the greatest degree of difficulty of incineration in each waste or mixture of waste to be burned. For example, this standard may be met by requiring the incinerator to conduct a trial burn, submit a waste feed analysis and detailed engineering description of the facility, and provide any other information that may be required to enable the competent Portuguese authority to conclude that the incinerator will effectively destroy the principal organic hazardous constituents of each waste to be burned.

C6.3.10.8. DoD generators of hazardous waste shall not treat hazardous waste at the point of generation except for elementary neutralization. Treatment of hazardous wastes in Portugal shall only be conducted in appropriately permitted facilities.

C6.3.11. Contractor Licensing Verification. If transportation, treatment and/or disposal of hazardous waste is carried out by contract, DoD personnel shall ensure those contractors are properly licensed.

Appendix C6.A1. Properties of Wastes that render them Hazardous

H1 'Explosive': substances and preparations that may explode under the effect of flame or that are more sensitive to shocks or friction than dinitrobenzene.

H2 'Oxidizing': substances and preparations that exhibit highly exothermic reactions when in contact with other substances, particularly flammable substances.

H3-A * 'Highly flammable':

liquid substances and preparations having a flash point below 21°C (including extremely flammable liquids), or

substances and preparations that may become hot and finally catch fire in contact with air at ambient temperature without any application of energy, or

solid substances and preparations that may readily catch fire after brief contact with a source of ignition and that continue to burn or to be consumed after removal of the source of ignition, or

gaseous substances and preparations that are flammable in air at normal pressure, or

substances and preparations that, in contact with water or damp air, evolve highly flammable gases in dangerous quantities.

H3-B * 'Flammable': liquid substances and preparations having a flash point equal to or greater than 21°C and less than or equal to 55°C.

H4 'Irritant': non-corrosive substances and preparations that, through immediate, prolonged or repeated contact with the skin or mucous membrane, can cause inflammation.

H5 'harmful': substances and preparations that, if they are inhaled or ingested or if they penetrate the skin, may involve limited health risks.

H6 'Toxic': substances and preparations (including very toxic substances and preparations) that, if they are inhaled or ingested or if they penetrate the skin, may involve serious, acute or chronic health risks and even death.

H7 'Carcinogenic': substances and preparations that, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence.

H8 * 'Corrosive': substances and preparations that may destroy living tissue on contact.

H9 'Infectious': substances containing viable micro-organisms or their toxins that are known or reliably believed to cause disease in man or other living organisms.

H10 * 'Toxic for reproduction': substances and preparations that, if they are inhaled or ingested or if they penetrate the skin, may induce non-hereditary congenital malformations or increase their incidence.

H11 * ‘Mutagenic’: substances and preparations that, if they are inhaled or ingested or if they penetrate the skin, may induce hereditary genetic defects or increase their incidence.

H12 Substances and preparations that release toxic or very toxic gases in contact with water, air or an acid.

H13 Substances and preparations capable by any means, after disposal, of yielding another substance (e.g., a leachate, which possesses any of the characteristics listed above).

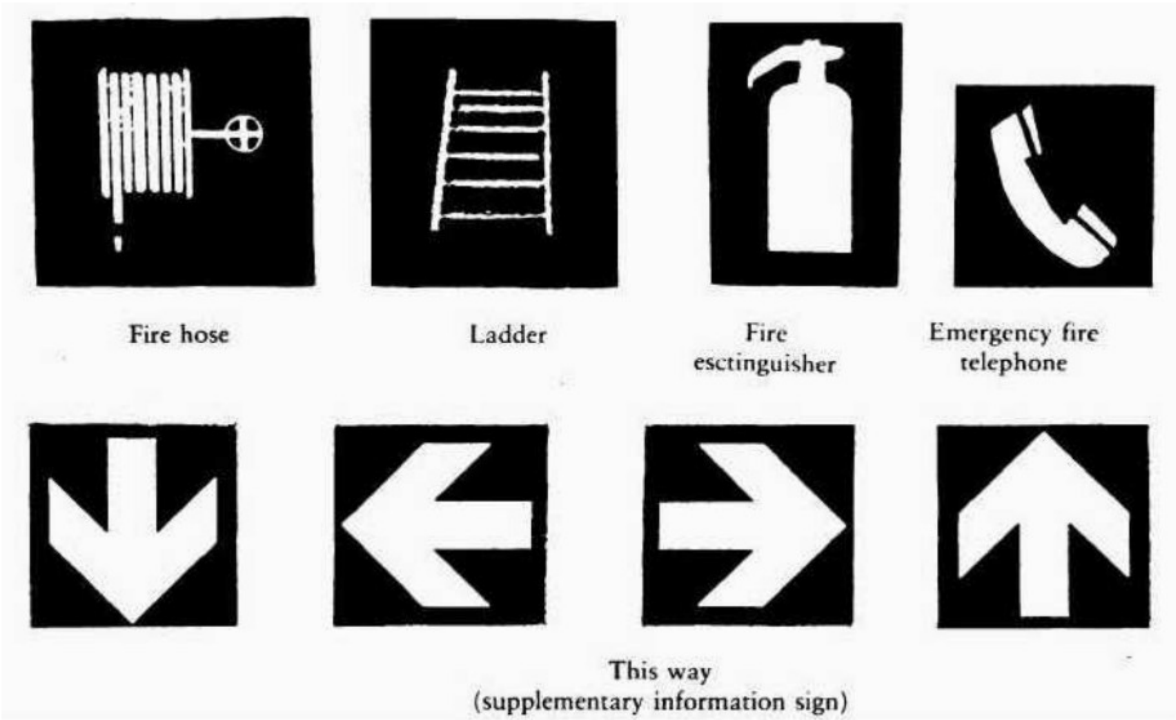
H14 ‘Ecotoxic’: substances and preparations that present or may present immediate or delayed risks for 1 or more sectors of the environment.

* See Appendix C6.A2. for characteristics of hazardous wastes with regard to H3 through H8, H10 and H11.

Appendix C6.A2. Characteristics of HW with regard to H3 to H8, H10 and H11

1. Flash point ≤ 55°C.
2. One or more substances classified (**) as very toxic at a total concentration ≥ 0.1%.
3. One or more substances classified as toxic at a total concentration ≥ 3%.
4. One or more substances classified as harmful at a total concentration ≥ 25%.
5. One or more corrosive substances classified as R35 at a total concentration ≥ 1%.
6. One or more corrosive substances classified as R34 at a total concentration ≥ 5%.
7. One or more irritant substances classified as R41 at a total concentration ≥ 10%.
8. One or more irritant substances classified as R36, R37, R38 at a total concentration ≥ 20%.
9. One substance known to be carcinogenic of category 1 or 2 at a concentration ≥ 0.1%.
10. One substance known to be carcinogenic of category 3 at a concentration ≥ 1%.
11. One substance toxic for reproduction of category 1 or 2 classified as R60, R61 at a concentration ≥ 0.5%.
12. One substance toxic for reproduction of category 3 classified as R62, R63 at a concentration ≥ 5%.
13. One mutagenic substance of category 1 or 2 classified as R46 at a concentration ≥ 0.1%.
14. One mutagenic substance of category 3 classified as R40 at a concentration ≥ 1%.

Appendix C6.A3. Fire Fighting Signs



Appendix C6.A.4. Example Register of Vehicle, Industrial or Similar Batteries

REGISTO PARA PRODUTORES / IMPORTADORES DE ACUMULADORES DE VEÍCULOS, INDUSTRIAIS E SIMILARES

(Anexo I da Portaria n.º 572/2001, 6 de Junho – Programa de acção relativo a acumuladores de veículos, industriais e similares)

Dados relativos ao ano

I - IDENTIFICAÇÃO DA EMPRESA

Nome:			
CAE:		N.º Contribuinte:	
Endereço:			
Código Postal:	-	Localidade:	
Concelho:		Distrito:	
Telefone:		Fax:	

II - ACUMULADORES COLOCADOS NO MERCADO

TIPO DE ACUMULADOR (ver lista I)[1]	TIPO DE EQUIPAMENTO EM QUE FOI INCORPORADO / A QUE SE DESTINA (ver lista II)[1]	N.º DE ACUMULADORES	QUANTIDADE TOTAL (Kg)
ACUMULADORES INCORPORADOS EM EQUIPAMENTO			
ACUMULADORES NÃO INCORPORADOS EM EQUIPAMENTO			

Marcas de acumuladores comercializadas:

III - ACUMULADORES USADOS RECOLHIDOS

TIPO DE ACUMULADOR (ver lista I)[1]	TIPO DE EQUIPAMENTO EM QUE FOI UTILIZADO (ver lista II)[1]	N.º DE ACUMULADORES	QUANTIDADE TOTAL (Kg)

IV – ACUMULADORES ENTREGUES PARA VALORIZAÇÃO OU ELIMINAÇÃO

DESTINATÁRIO		TIPO DE ACUMULADOR[1]	TIPO DE OPERAÇÃO[2]	N.º DE ACUMULADORES	QUANTIDADE TOTAL (Kg)
Nome	N.º de Contribuinte				

V - RESPONSÁVEL PELO PREENCHIMENTO DO REGISTO:

Nome:		
Cargo:		
Telefone:		**Fax:**
Data:		
Assinatura:		

VI - CARIMBO DA EMPRESA:

[1]

Lista I - TIPO DE ACUMULADOR
Chumbo (Pb)
Niquel – Cádmio (Ni- Cd)
Niquel – Metal hidrido (Ni – MH)
Iões Lítio (Li)
Outros (especifique a natureza)

Lista II - TIPO DE EQUIPAMENTO EM QUE VEM INCORPORADO / A QUE SE DESTINA	
Veículos	Ligeiros
	Pesados
	Motociclos
	Máquinas Industriais
	Outro (especifique)
Industrial (especifique o tipo de equipamento)	
Outros (especifique o tipo de equipamento)	

[2] Operação de Valorização (V) / Operação de Eliminação (E)

Appendix C6.A5. Example Register of Batteries Other Than Those Included in Appendix C6.A4

REGISTO PARA PRODUTORES/IMPORTADORES DE PILHAS E OUTROS ACUMULADORES

(Anexo II da Portaria n.º572/2001, 6 de Junho - Programa de acção relativo a pilhas e outros acumuladores)

Dados relativos ao ano | | | | |

I - IDENTIFICAÇÃO DA EMPRESA

Nome:			
CAE:		N.º Contribuinte:	
Endereço:			
Código Postal:	-	Localidade:	
Concelho:		Distrito:	
Telefone:		Fax:	

II – PILHAS / ACUMULADORES COLOCADOS NO MERCADO

Tipo de Pilhas / acumuladores			Tipo de equipamento	N.º de pilhas / Acumuladores	Quantidade Total (Kg)
Incorporadas em Equipamento					
Pilhas	Zinco - Carvão (Salinas)				
	Dióxido de Manganésio (Alcalinas)				
	Lítio				
	Botão	Manganésio			
		Lítio			
		Zinco - ar			
		Óxido de Prata			
		Outras			
	Outras				
Acumuladores	Níquel - Cádmio				
	Níquel - Metal Hidrido				
	Iões de Lítio				
	Outras				
Não incorporadas em equipamento					
Pilhas	Zinco - Carvão (Salinas)				
	Dióxido de Manganésio (Alcalinas)				
	Lítio				
	Botão	Manganésio			
		Lítio			
		Zinco - ar			
		Óxido de Prata			
		Outras			
	Outras				
Acumuladores	Níquel - Cádmio				
	Níquel - Metal Hidrido				
	Iões de Lítio				
	Outras				

Marcas de pilhas e acumuladores comercializados:

III - RESPONSÁVEL PELO PREENCHIMENTO DO REGISTO :

Nome:			
Cargo:			
Telefone:		**Fax:**	
Data:			
Assinatura:			

IV - CARIMBO DA EMPRESA:

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Chapter 7

SOLID WASTE

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CHAPTER 7

SOLID WASTE

C7.1. SCOPE

This chapter contains criteria to ensure that solid wastes are identified, classified, collected, transported, stored, treated and disposed of safely and in a manner protective of human health and the environment. These criteria apply to residential and commercial solid waste generated at the installation level. These criteria are part of integrated waste management. Policies concerning the recycling portion of integrated waste management are found in DoD Instruction 4715.4, "Pollution Prevention," and service solid waste management manuals. The criteria in this chapter deal with general solid waste. Criteria for specific types of solid waste that require special precautions are located in Chapter 6, "Hazardous Waste," Chapter 8, "Medical Waste," Chapter 11, "Pesticides," and Chapter 14, "Polychlorinated Biphenyls."

C7.2. DEFINITIONS

C7.2.1. Animal By-Product. Entire bodies or parts of animals or products of animal origin not intended for human consumption, including ova, embryo and semen. There are three categories of animal byproducts. Applicable DoD wastes within these categories are as follows:

C7.2.1.1. Category 1. Dead pets (including stray pets), catering waste from means of transport operating internationally, and mixtures of Category 1 waste with Category 2 and/or 3 waste and/or any other type of waste;

C7.2.1.2. Category 2. High-risk material, including diseased animals, and animals which are not slaughtered for human consumption; or,

C7.2.1.3. Category 3. Catering waste destined for animal feed, catering waste destined for use in a biogas or composting facility and former foodstuffs, or a mixture of Category 3 wastes with any non-animal by-product waste. Former foodstuff includes food containing products of animal origin, other than catering waste, which is no longer intended for human consumption for commercial reasons, due to problems of manufacturing, packaging defects or other defects which do not present any risk to humans or animals. Former foodstuffs may include cooked meat products, pre-packed sandwiches, ready-made meals, products that are meant to be eaten without further cooking or any other cooked products that contain animal by-products.

C7.2.2. Bulky Waste. Large items of solid waste such as household appliances, furniture, large auto parts, trees, branches, stumps, and other oversize wastes whose large size precludes or complicates their handling by normal solid waste collection, processing or disposal methods.

C7.2.3. Carry-out Collection. Collection of solid waste from a storage area proximate to the dwelling unit(s) or establishment where generated.

C7.2.4. Catering Waste. All waste food (including used cooking oil, raw meat and raw fish) originating in restaurants, catering facilities or catering kitchens.

C7.2.5. Collection. The act of consolidating solid wastes (or materials which have been separated for the purpose of recycling) from various locations.

C7.2.6. Collection Frequency. The number of times collection is provided in a given period of time.

C7.2.7. Commercial Solid Waste. All types of solid wastes generated by stores, offices, restaurants, warehouses, and other non-manufacturing activities, excluding residential and industrial wastes.

C7.2.8. Compactor Collection Vehicle. A vehicle with an enclosed body containing mechanical devices that convey solid waste into the main compartment of the body and compress it into a smaller volume of greater density.

C7.2.9. Construction and Demolition Waste. The waste building materials, packaging, and rubble resulting from construction, remodeling, repair and demolition operations on pavements, houses, commercial buildings, and other structures.

C7.2.10. Curb Collection. Collection of solid waste placed adjacent to a street.

C7.2.11. Cover Material. Material that is used to cover compacted solid wastes in a land disposal site.

C7.2.12. Daily Cover. Soil that is spread and compacted or synthetic material that is placed on the top and side slopes of compacted solid waste at least at the end of each operating day to control vectors, fire, moisture, and erosion and to assure an aesthetic appearance. Mature compost or other natural material may be substituted for soil if soil is not reasonably available in the vicinity of the landfill and the substituted material will control vectors, fire, moisture, and erosion and will assure an aesthetic appearance.

C7.2.13. Destruction Certificate. Document issued by a properly permitted waste operator (e.g., shredder or dismantler) indicating the destruction or dismantlement of an end-of-life vehicle has been conducted under environmentally safe conditions.

C7.2.14. Disposal. Any of the applicable operations listed in Table C7.T1.

C7.2.15. End-of-Life Vehicle. Any vehicle that is regarded as waste.

C7.2.16. Final Cover. A layer of soil, mature compost, other natural material (or synthetic material with an equivalent minimum permeability) that is applied to the landfill after completion of a cell or trench, including a layer of material that will sustain native vegetation, if any.

C7.2.17. Food Waste. The organic residues generated by the handling, storage, sale, preparation, cooking and serving of foods, commonly called garbage.

C7.2.18. Generator. The organization, unit, or shop within a DoD installation that generates wastes or carries out pre-processing, mixing, or other operations that modify the nature or composition of wastes.

C7.2.19. Hazardous Waste. A controlled waste that may be solid, semi-solid, liquid, or contained gas, and meets criteria under the definition of Hazardous Waste in Chapter 6, “Hazardous Waste.”

C7.2.20. Holder. Any natural or legal person, including generators, who possesses waste.

C7.2.21. Industrial Solid Waste. The solid waste generated by industrial processes and manufacturing.

C7.2.22. Institutional Solid Waste. Solid waste generated by educational, health care, correctional, and other institutional facilities.

C7.2.23. Land Application Unit. An area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for agricultural purposes or for treatment or disposal.

C7.2.24. Lower Explosive Limit. The lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25°C (77°F) and atmospheric pressure.

C7.2.25. Municipal Solid Waste (MSW). Normally, residential and commercial solid waste generated within a community, not including yard waste (see also definition in Chapter 2, “Air Emissions”).

C7.2.26. Municipal Solid Waste Landfill (MSWLF) Unit. A discrete area of land or an excavation, on or off an installation, that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile. An MSWLF unit also may receive other types of wastes, such as commercial solid waste and industrial waste.

C7.2.27. Open Burning. Burning of solid wastes in the open, such as in an open dump.

C7.2.28. Open Dump. A land disposal site at which solid wastes are disposed of in a manner that does not protect the environment, is susceptible to open burning, and is exposed to the elements, vectors and scavengers.

C7.2.29. Packaging. All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the users or consumers, including non-returnable items used for the same purposes.

C7.2.30. Packaging Waste. Any packaging or packaging material regarded as waste with the exception of production wastes.

C7.2.31. Recovery. Any of the applicable operations listed in Table C7.T2.

C7.2.32. Residential Solid Waste. The wastes generated by normal household activities, including, but not limited to, food wastes, rubbish, ashes and bulky wastes.

C7.2.33. Rubbish. A general term for solid waste, excluding food wastes and ashes, taken from residences, commercial establishments and institutions.

C7.2.34. Sanitary Landfill. A land disposal site employing an engineered method of disposing of solid wastes on land in a manner that minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying and compacting cover material at the end of each operating day.

C7.2.35. Satellite Vehicle. A small collection vehicle that transfers its load into a larger vehicle operating in conjunction with it.

C7.2.36. Scavenging. The uncontrolled and unauthorized removal of materials at any point in the solid waste management system.

C7.2.37. Service Solid Waste Management Manual. Navy Facility Manual (NAVFAC MO) 213, Air Force Regulation (AFR) 91-8, Army Technical Manual 5-634, "Solid Waste Management," or their successor documents.

C7.2.38. Sludge. The accumulated semi-liquid suspension of settled solids deposited from wastewater or other fluids in tanks or basins. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluent, dissolved materials in irrigation return flows or other common water pollutants.

C7.2.39. Solid Wastes. Garbage, refuse, sludge and other discarded materials, including solid, semi-solid, liquid and contained gaseous materials resulting from industrial and commercial operations and from community activities. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluent, dissolved materials in irrigation return flows or other common water pollutants.

C7.2.40. Solid Waste Storage Container. A receptacle used for the temporary storage of solid waste while awaiting collection.

C7.2.41. Stationary Compactor. A powered machine that is designed to compact solid waste or recyclable materials and that remains stationary when in operation.

C7.2.42. Storage. The interim containment of solid waste after generation and prior to collection for ultimate recovery or disposal.

C7.2.43. Street Wastes. Material picked up by manual or mechanical sweepings of alleys, streets, and sidewalks; wastes from public waste receptacles; and material removed from catch basins.

C7.2.44. Tires. The tires used on motor vehicles, aircraft, trailers, motorcycles and any other equipment, motorized or non-motorized.

C7.2.45. Transfer Station. A site at which solid wastes are concentrated for transport to a processing facility or land disposal site. A transfer station may be fixed or mobile.

C7.2.46. Treatment. Any manual, mechanical, physical, chemical or biological process that modifies the characteristics of the waste in order to reduce its volume or hazard as well as facilitate its transfer, recovery or elimination.

C7.2.47. Urban Solid Waste. Household waste, as well as other waste which, by nature or composition, is similar to waste from households.

C7.2.48. USEUCOM Waste List. A categorical list of wastes and associated classification codes that is required for shipping and labeling hazardous wastes within the European Command. Contact the EEA for a copy of the USEUCOM Waste List.

C7.2.49. Vector. A carrier that is capable of transmitting a pathogen from one organism to another.

C7.2.50. Vehicle. Any commercially available motor vehicle that is not adapted to military use which is self-propelled and used for the carriage of passengers, any vehicle used for the carriage of goods and having a maximum weight not exceeding 3.5 tonnes (7,700 pounds) and 3-wheeled vehicles, excluding motor tricycles.

C7.2.51. Waste. Any substance or object that the holder discards, intends to discard, or is required to discard.

C7.2.52. Waste Management. The operations of collection, transport, storage, treatment, recovery and disposal of wastes, including monitoring of disposal sites after closure, as well as the planning of these operations.

C7.2.53. Yard Waste. Grass and shrubbery clippings, tree limbs, leaves, and similar organic materials commonly generated in residential yard maintenance (also known as green waste).

C7.3. CRITERIA

C7.3.1. DOD solid waste will be treated, stored, and disposed of in facilities that have been evaluated against paragraphs C7.3.12., C7.3.14., and C7.3.15. or within a licensed Portuguese facility.

C7.3.1.1. The treatment, disposal, and off-base transportation of solid waste shall be conducted by entities authorized/permitted by competent Portuguese authorities. If installations treat, recover or dispose of solid waste on-site, a description of those operations will be provided to the Portuguese Base Commander, who will determine whether a permit for such operations is required.

C7.3.1.2. Installations will complete waste transfer registers set forth in Appendix C7.A1., the wastes being characterized and classified as solid waste in accordance with the USEUCOM Waste List (see Chapter 6), and, upon request, will make available waste records to the Portuguese Base Commander. Waste registers will be retained for at least 5 years from the date of recording.

C7.3.2. DoD installations will, to the extent possible, cooperate with the Portuguese Base Commander in the solid waste management process.

C7.3.3. Installations will develop and implement a solid waste management strategy to reduce solid waste disposal. This strategy will follow the waste management hierarchy (waste minimization at source, reuse, recycling, recovery, composting and disposal).

C7.3.4. All solid wastes or materials that have been separated for the purpose of recycling will be stored in such a manner that they do not constitute a fire, health, or safety hazard or provide food or harborage for vectors, and will be contained or bundled to avoid spillage.

C7.3.5. Storage of bulky wastes will include, but will not be limited to, removing all doors from large household appliances and covering the items to reduce both the problems of an attractive nuisance, and the accumulation of solid waste and water in and around the bulky items. Bulky wastes will be screened for the presence of ozone depleting substances as defined in Chapter 2, "Air Emissions," or hazardous constituents as defined in Chapter 6, "Hazardous Waste." Readily detachable or removable hazardous waste will be segregated and disposed of in accordance with Chapter 6, "Hazardous Waste," Chapter 14, "Polychlorinated Biphenyls," and Chapter 15, "Asbestos."

C7.3.6. In the design of all buildings or other facilities that are constructed, modified or leased after March 2006, there will be provisions for storage in accordance with these guidelines that will accommodate the volume of solid waste anticipated. Storage areas will be easily cleaned and maintained and will allow for safe, efficient collection. Additionally, design and operation of storage areas for end-of-life vehicles shall be conducted in accordance with the following:

C7.3.6.1. Installations treating end-of-life vehicles in permitted dismantling facilities prior to transfer to a properly permitted disposal facility shall:

C7.3.6.1.1. Document receipt of end-of-life vehicles, to include as a minimum the registration of the date of acceptance, vehicle identification (registration, frame number, Category, trademark, model) and owner/holder identification (name, address and nationality);

C7.3.6.1.2. Document that registration of the final destination of all end-of-life vehicles was received; and

C7.3.6.1.3. Coordinate all required paperwork for the disposal of end-of-life vehicles with the appropriate competent Portuguese authorities.

C7.3.6.2. Installations, tenant organizations and/or contracted entities shall ensure all end-of-life vehicles are disposed of either through appropriate DoD channels or through an appropriately authorized/permitted Portuguese contractor.

C7.3.6.3. Installation and tenant organizations (e.g., DeCA, AAFES, etc.) shall comply with distribution/sale and disposal requirements.

C7.3.6.4. Reception, transport and dismantling operators of end-of-life vehicles are responsible for ensuring that their activity does not pose a risk to public health or the environment.

C7.3.6.5. End-of-life vehicles may only be transported by licensed transport operators. Transportation from dismantling facilities shall be accompanied by a destruction certificate for the vehicle issued by the dismantling facility and a waste transfer note.

C7.3.6.6. All end-of-life vehicle storage (including temporary storage) and dismantling shall occur only at sites meeting the following criteria:

C7.3.6.6.1. Document control system in place;

C7.3.6.6.2. Appropriate fencing to prevent unauthorized access;

C7.3.6.6.3. Fire-fighting equipment;

C7.3.6.6.4. Sufficient capacity in storage areas to avoid the storage of end-of-life vehicles in layers (stacking) or on their sides; and

C7.3.6.6.5. Impervious surfaces, for appropriate areas, and a system for the collection and treatment of water, including storm waters and rainwater, spills and wash/cleaning waters, including decanters and grease/oil separators in order to comply with requirements of Chapter 4.

C7.3.6.7. The treatment of end-of-life vehicles shall only be carried out at properly permitted dismantling sites that, in addition to the requirements of C7.3.6.6., possess:

C7.3.6.7.1. Appropriate storage for dismantled spare parts, including impermeable storage for oil-contaminated spare parts,

C7.3.6.7.2. Appropriate containers for storage of batteries (with electrolyte neutralization on site or elsewhere), filters and PCB/PCT-containing condensers in accordance with Chapter 6, “Hazardous Waste,” and

C7.3.6.7.3. Appropriate storage tanks for the segregated storage of end-of-life vehicle fluids (fuel, motor oil, gearbox oil, transmission oil, hydraulic oil, cooling liquids, antifreeze, brake fluids, battery acids, air-conditioning system fluids and any other fluid contained in end-of-life vehicles) in accordance with Chapter 6, “Hazardous Waste.”

C7.3.6.7.4. Appropriate storage for used tires, including the prevention of fire hazards and excessive stockpiling.

C7.3.6.8. Treatment operation for end-of-life vehicles shall consist of:

C7.3.6.8.1. The removal of the battery or batteries;

C7.3.6.8.2. The removal of the liquefied gas tank;

C7.3.6.8.3. The removal or neutralization of all potentially explosive components (including air bags);

C7.3.6.8.4. The removal and separate collection and storage of all:

C7.3.6.8.4.1. Fuel;

C7.3.6.8.4.2. Motor oil;

C7.3.6.8.4.3. Transmission oil;

C7.3.6.8.4.4. Gearbox oil;

C7.3.6.8.4.5. Hydraulic oil;

C7.3.6.8.4.6. Cooling liquids;

C7.3.6.8.4.7. Antifreeze;

C7.3.6.8.4.8. Brake fluids;

C7.3.6.8.4.9. Air-conditioning system fluids;

C7.3.6.8.4.10. Any other fluid contained in the said vehicle, but excluding any fluid that is necessarily retained for the re-use of the part concerned; and

C7.3.6.8.4.11. The removal, so far as is feasible, of all components identified as containing mercury.

C7.3.6.9. All hazardous wastes resulting from the dismantling of end-of-life vehicles shall be managed in accordance with Chapter 6, "Hazardous Waste."

C7.3.6.10. To promote recycling to the maximum extent practicable, no treatment of end-of-life vehicles shall prevent the removal of:

C7.3.6.10.1. Catalysts;

C7.3.6.10.2. Metal components containing copper, aluminum and/or magnesium (either during the shredding process or otherwise);

C7.3.6.10.3. Tires;

C7.3.6.10.4. Large plastic components (including bumpers, the dashboard, and any fluid container) in such a way that they can be effectively recycled as materials (either during shredding or otherwise); and

C7.3.6.10.5. Glass.

C7.3.6.11. Storage operations shall be carried out in such a manner as avoids damage to components containing fluids or to recoverable components and spare parts.

C7.3.6.12. The dismantling operator shall issue a destruction certificate, a copy of which shall be kept for a minimum of 5 years, and shall submit the following information within 5 days from the date of acceptance of the end-of-life vehicle:

C7.3.6.12.1. Original certificate of destruction to the owner or holder of the end-of-life vehicle;

C7.3.6.12.2. A copy of the destruction certificate to the management entity or, if not applicable, to producers or importers of vehicles that have implemented an individual system; and

C7.3.6.13. A copy of the destruction certificate along with the identification of the vehicle, the registration certificate and the application form for the cancellation of the registration whenever the cancellation of the car registration is required.

C7.3.7. Storage containers should be leak-proof, waterproof and vermin-proof, including sides, seams and bottoms and be durable enough to withstand anticipated usage and environmental conditions without rusting, cracking or deforming in a manner that would impair serviceability. Storage containers should have functional lids.

C7.3.8. Containers should be stored on a firm, level, well-drained surface that is large enough to accommodate all of the containers and that is maintained in a clean, spillage-free condition.

C7.3.9. Recycling programs will be instituted on DoD installations in accordance with the policies in DoDI 4715.4, "Pollution Prevention," and solid waste management objectives set forth in criteria C7.3.3.

C7.3.10. Installations will not initiate new or expand existing waste landfill units without approval of the Combatant Commander with responsibility for the area where the landfill would be located, and only after justification that unique circumstances mandate a new unit.

C7.3.11. New DoD MSWLF, inert waste landfill, and hazardous waste landfill units will be designed and operated in a manner that incorporates the following broad factors:

C7.3.11.1. Meet all Portuguese and local design criteria. Contact the EEA for further information regarding these criteria;

C7.3.11.2. Location restrictions with regard to airport safety (i.e., bird hazards), floodplains, wetlands, aquifers, seismic zones, residential and agricultural areas, natural protected areas and unstable areas;

C7.3.11.3. Inert waste landfill sites shall only be used for inert waste and must meet local criteria for waste acceptable in inert waste landfills in order to prevent contamination;

C7.3.11.4. MSWLF may be used for municipal waste; non-hazardous waste that fulfills the waste acceptance criteria for that MSWLF; and stable non-reactive hazardous waste, such as solidified or vitrified, with leaching behavior equivalent to that of non-hazardous waste, which fulfills the waste acceptance criteria for that MSWLF. Such stable non-reactive hazardous waste must not be deposited in cells destined for biodegradable non-hazardous waste;

C7.3.11.5. Prevent rainwater, surface water and/or groundwater from entering the landfill or leachate collection system;

C7.3.11.6. Procedures for excluding hazardous waste;

C7.3.11.7. Cover material criteria (e.g., daily cover), disease vector control, explosive gas control, air quality criteria (e.g., no open burning), access requirements, liquids restrictions, and record keeping requirements;

C7.3.11.8. Inspection program;

C7.3.11.9. Liner and leachate collection system designed consistent with location and local regulations to prevent groundwater and soil contamination that would adversely affect human health; and

C7.3.11.10. A groundwater monitoring system unless the installation operating the landfill, after consultation with the EEA, determines that there is no reasonable potential for migration of hazardous constituents from the MSWLF to the uppermost aquifer during the active life of the facility and the post-closure care period.

C7.3.12. Installations operating MSWLF, inert waste landfill, or hazardous waste landfill units will:

C7.3.12.1. Use standard sanitary landfill techniques of spreading and compacting solid wastes and placing daily cover over disposed solid waste at the end of each operating day.

C7.3.12.2. Establish criteria for unacceptable wastes based on site-specific factors such as hydrology, chemical and biological characteristics of the waste, available alternative disposal methods, environmental and health effects, and the safety of personnel.

C7.3.12.3. Implement a program to detect and prevent the disposal of hazardous wastes; infectious wastes; liquid wastes; PCBs; whole tires, with the exception of those tires used as engineering material; bicycle tires and tires with an outside diameter above 1,400 mm (55 inches); shredded tires, with the exception of bicycle tires and tires with an outside diameter above 1,400 mm (55 inches); and wastes determined unsuitable for the specific landfill unit.

C7.3.12.4. Investigate options for composting of MSW as an alternative to landfilling or treatment prior to landfilling.

C7.3.12.5. Prohibit open burning, except for infrequent burning of agricultural wastes, silvicultural wastes, land-clearing debris, diseased trees, or debris from emergency clean-up operations.

C7.3.12.6. Develop procedures for dealing with yard waste and construction debris that keeps it out of landfill units to the maximum extent possible (e.g., composting, recycling).

C7.3.12.7. Operate the landfill unit in a manner to protect the health and safety of personnel associated with the operation.

C7.3.12.8. Maintain conditions that are unfavorable for the harboring, feeding and breeding of disease vectors.

C7.3.12.9. Collect, process, and use the methane gas generated in order to minimize the adverse effects or deterioration of the environment and risk to human health. If the captured gas cannot be used, it must be flared.

C7.3.12.10. Operate in an aesthetically acceptable manner.

C7.3.12.11. Operate in a manner to protect aquifers.

C7.3.12.12. Control public access to landfill facilities.

C7.3.12.13. Prohibit the disposal of bulk or non-containerized liquids if possible.

C7.3.12.14. Maintain landfill infrastructure in good operating condition.

C7.3.12.15. Maintain records on the preceding criteria.

C7.3.12.16. Undertake laboratory analysis of the waste sent to landfills.

C7.3.12.17. During closure and post-closure operations, installations will:

C7.3.12.17.1. Install a final cover system that is designed to minimize infiltration and erosion.

C7.3.12.17.2. Ensure that the infiltration layer is composed of a minimum of 0.5 m (1.64 feet) of earthen material, geotextiles, or a combination thereof, that have a permeability less than or equal to the permeability of any bottom liner system or natural subsoil present, or a permeability no greater than 0.00005 cm/sec, whichever is less.

C7.3.12.17.3. Ensure that the final layer consists of a minimum of 21 cm (8 inches) of earthen material that is capable of sustaining native plant growth.

C7.3.12.17.4. If possible, revegetate the final cap with native plants that are compatible with the landfill design, including the liner.

C7.3.12.17.5. Prepare a written Closure Plan that includes, at a minimum, a description of the monitoring and maintenance activities required to ensure the integrity of the final cover, a description of the planned uses of the site during the post-closure period, plans for continuing (during the post-closure period) leachate collection, groundwater monitoring, and methane monitoring, and a survey plot showing the exact site location. The plan will be kept as part of the installation's permanent records. The post-closure period will be a minimum of 5 years.

C7.3.13. Where incineration is used as the method of waste disposal, only incinerators meeting air quality requirements in Chapter 2, “Air Emissions,” will be used. Open burning is not permitted as a method of solid waste disposal.

C7.3.14. <u>Composting</u>. A composting facility that is located on a DoD installation and that processes annually more than 5,000 tons of sludge from a domestic wastewater treatment plant (see Chapter 4, “Wastewater”) will comply with the following criteria:

C7.3.14.1. Operators must maintain a record of the characteristics of the waste composted, sewage sludge, and other materials, such as nutrient or bulking agents being composted, including the source and volume or weight of the material.

C7.3.14.1.1. Access to the facility must be controlled. All access points must be secured when the facility is not in operation.

C7.3.14.1.2. By-products, including residuals and materials that can be recycled, must be stored to prevent vector intrusion and aesthetic degradation. Materials that are not composted must be removed periodically.

C7.3.14.1.3. Run-off water that has come in contact with composted waste, materials stored for composting, or residual waste must be diverted to a leachate collection and treatment system.

C7.3.14.1.4. The temperature and retention time for the material being composted must be monitored and recorded.

C7.3.14.1.5. Periodic analysis of the compost must be completed for the following parameters: percentage of total solids, volatile solids as a percentage of total solids, pH, ammonia, nitrate, nitrogen, total phosphorous, cadmium, chromium, copper, lead, nickel, zinc, mercury, and PCBs.

C7.3.14.1.6. Compost must be produced by a process to further reduce pathogens. Two such acceptable methods are:

C7.3.14.1.6.1. Windrowing, which consists of an unconfined composting process involving periodic aeration and mixing to maintain aerobic conditions during the composting process; and

C7.3.14.1.6.2. The enclosed vessel method, which involves mechanical mixing of compost under controlled environmental conditions. The retention time in the vessel must be at least 72 hours with the temperature maintained at 55°C (131°F). A stabilization period of at least 7 days must follow the decomposition period.

C7.3.15. Classification and Use of Compost from DoD Composting Facilities. Compost produced at a composting facility that is located on a DoD installation and that processes annually more than 5,000 tons of sludge from a domestic wastewater treatment plant (see Chapter 4, "Wastewater") must be classified as "Class A" or "Class B" based on the criteria below and, depending on this classification, shall be subject to the restrictions on certain uses.

C7.3.15.1. Class A compost must be stored until the compost is matured (i.e., 60 % decomposition has been achieved). Class A compost may contain contaminant levels no greater than the levels indicated below. The compost must be stabilized and contain no greater amounts of inert material than indicated. Allowable average contaminant concentrations in milligrams per kilogram on a dry weight basis are:

PCB	1
Cadmium	10
Chromium	1,000
Copper	500
Lead	500
Mercury	5
Nickel	100
Zinc	1,000

C7.3.15.2. Class B compost consists of any compost generated that fails to meet Class A standards.

C7.3.15.3. Compost distribution and end use:

C7.3.15.3.1. Class A compost may be distributed for unrestricted use, including agricultural applications.

C7.3.15.3.2. Class B compost may not be distributed for agricultural applications.

C7.3.16. Installations will prevent and minimize the generation of packaging waste and will develop systems for the reuse, recycling or other forms of recovery of packaging waste.

C7.3.17. Used tires will be appropriately collected and managed through DLA Disposition Services or an authorized/permitted contractor.

C7.3.18. Treatment, storage and disposal of end-of-life vehicles will be conducted only at permitted Portuguese facilities and in accordance with C7.3.6.

C7.3.19. Installations should coordinate with the Portuguese Base Commander to determine if registration of waste disposal operations is required. If required, the installation shall provide the Portuguese Base Commander with the required and requested information.

C7.3.20. When disposing of solid waste off-base, installations and tenant organizations will:

C7.3.20.1. Ensure that if waste disposal is done by contract, waste is transferred to a contractor who is properly licensed and permitted according to Portuguese law.

C7.3.20.2. Provide a description of the waste. A waste transfer note (Appendix C7.A1.) must be completed in triplicate and accompany a waste shipment leaving the installation. The generator shall fill in the first field, ensure that the other two copies are filled by the collector and receiver of the waste, and keep a record of one copy for 5 years. The waste transfer note will contain the following information:

C7.3.20.2.1. The appropriate six-digit code, per the USEUCOM Waste List;

C7.3.20.2.2. Quantity of the waste;

C7.3.20.2.3. Whether the waste is loose or in a container, and type of container;

C7.3.20.2.4. Time and place of transfer;

C7.3.20.2.5. Name and address of the transferor and transferee;

C7.3.20.2.6. Role of both parties (i.e., if one is the producer or collector);

C7.3.20.2.7. If the transfer is for authorized transport purposes; and

C7.3.20.2.8. If applicable, the license/registration number of the waste collector.

C7.3.20.3. The transfer of urban solid waste is exempt from the use of a transfer note, (except for the separated fraction destined for recycling or recovery).

C7.3.21. <u>Animal By-Products</u>. Installation and tenant organizations (e.g., DeCA, AAFES, etc.) shall ensure that management of animal by-products complies with the criteria in this chapter. Flow charts in Figures C7.F1. through C7.F3. provide guidance on assignment of the correct animal by-product category and the most common approved disposal outlets for catering waste (domestic and international) and wastes from retail facilities.

C7.3.21.1. Installations shall transport animal by-products to properly permitted treatment and disposal establishments. If intermediate storage or handling is necessary, animal by-products shall be transported to properly permitted intermediate handling and storage establishments of the same category. These materials shall be immediately identified, collected and transported for storage, incineration, processing or recovery (i.e., biogas and composting) in permitted Portuguese facilities. If the DoD intends to treat or dispose of animal by-products on the installation other than waste collection, contact the EEA for facility design, operation and permitting guidance.

C7.3.21.2. Ensure that animal by-product materials are identifiable and kept separate during collection and transportation.

C7.3.21.3. <u>Vehicle and containers for handling animal by-products</u>

C7.3.21.3.1. Animal by-products must be collected and transported in sealed, new packaging or covered, leak-proof containers or vehicles.

C7.3.21.3.2. Vehicles and reusable containers, and all reusable items of equipment or appliances that come into contact with animal by-products or processed products must be:

C7.3.21.3.2.1. Cleaned, washed and disinfected after each use;

C7.3.21.3.2.2. Maintained in a clean condition; and

C7.3.21.3.2.3. Dried before use.

C7.3.21.3.3. Reusable containers must be dedicated to the transport of a particular product to the extent necessary to avoid cross-contamination.

C7.3.21.3.4. Unprocessed Category 3 material destined for the production of feed material or pet food must be transported chilled or frozen, unless processed within 24 hours of departure.

C7.3.21.3.5. Vehicles used for refrigerated transport must ensure the maintenance of an appropriate temperature throughout transport.

C7.3.21.4. During transport, the label attached to the vehicle, container, carton or other packaging material shall clearly indicate:

C7.3.21.4.1. The Category of the animal by-products,

C7.3.21.4.2. In the case of Category 3 material, the words ‘not for human consumption’;

C7.3.21.4.3. In the case of Category 2 material (other than manure and digestive tract content), the words ‘not for animal consumption’;

C7.3.21.4.4. In the case of Category 1 material, the words ‘for disposal only.’

C7.3.21.5. <u>Commercial documents and health certificates.</u>

C7.3.21.5.1. Installations shall ensure that commercial documents or, when necessary, a health certificate issued by the competent Portuguese authority accompany animal by-products during transportation. Commercial documents must specify:

C7.3.21.5.1.1. The date on which the material was taken from the premises;

C7.3.21.5.1.2. The description of the material, including the waste category and labels described in C7.3.21.4.;

C7.3.21.5.1.3. The quantity of the material;

C7.3.21.5.1.4. The place of origin of the material;

C7.3.21.5.1.5. The name and the address of the carrier;

C7.3.21.5.1.6. The name and the address of the receiver and, if applicable, its approval number; and

C7.3.21.5.1.7. If appropriate, the approval number of the plant of origin, and the nature and the methods of the treatment.

C7.3.21.5.2. Installations shall ensure that the commercial documents are produced at least in triplicate (one original and two copies), of which producer and transporter each must retain one copy and the original shall accompany the transported material to its final destination and shall be retained by the receiver.

C7.3.21.5.3. Commercial documents, health certificates and consignment records must be kept for a period of at least 2 years.

C7.3.21.6. Dead pets may be buried on site or disposed of as Category 1 animal by-products.

Table C7.T1. Waste Disposal Operations

D 1	Deposit into or onto land (e.g., landfill, etc.)
D 2	Land treatment (e.g., biodegradation of liquid or sludgy discards in soils, etc.)
D 3	Deep injection (e.g., injection of pumpable discards into wells, salt domes or naturally occurring repositories, etc.)
D 4	Surface impoundment (e.g., placement of liquid or sludgy discards into pits, ponds or lagoons, etc.)
D 5	Specially engineered landfill (e.g., placement into lined discrete cells, which are capped and isolated from one another and the environment, etc.)
D 6	Release into a water body, except seas/oceans
D 7	Release into seas/oceans, including seabed insertion
D 8	Biological treatment not specified elsewhere in this table that results in final compounds or mixtures that are discarded by means of any of the operations numbered D 1 to D 12
D 9	Physico-chemical treatment not specified elsewhere in this table that results in final compounds or mixtures that are discarded by means of any of the operations numbered D 1 to D 12 (e.g., evaporation, drying, calcination, etc.)
D 10	Incineration on land
D 11	Incineration at sea
D 12	Permanent storage (e.g., emplacement of containers in a mine, etc.)
D 13	Blending or mixing prior to submission to any of the operations numbered D 1 to D 12
D 14	Repackaging prior to submission to any of the operations numbered D 1 to D 13
D 15	Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where it is produced)

Table C7.T2. Waste Recovery Operations

R 1	Use principally as a fuel or other means to generate energy
R 2	Solvent reclamation/regeneration
R 3	Recycling/reclamation of organic substances that are not used as solvents (including composting and other biological transformation processes)
R 4	Recycling/reclamation of metals and metal compounds
R 5	Recycling/reclamation of other inorganic materials
R 6	Regeneration of acids and bases
R 7	Recovery of components used for pollution abatement
R 8	Recovery of components from catalysts
R 9	Oil re-fining or other reuses of oil
R 10	Land treatment resulting in benefit to agriculture or ecological improvement
R 11	Use of wastes obtained from any of the operations numbered R 1 to R 10
R 12	Exchange of wastes for submission to any of the operations numbered R 1 to R 11
R 13	Storage of wastes pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where it is produced)

Appendix C7.A1. Waste Transfer Note

1 - PRODUTOR/DETENTOR

Nome e endereço: ______

Telefone: ______ Fax: ______ Telex: ______

Pessoa a contactar: ______

Designação do resíduo ______

Indique o código correspondente(1) |_|_|_|_|_|_|_|

Assinale com um X qual o estado que melhor descreve o resíduo :

Líquido ☐ Pastoso ☐ Sólido ☐

(1) Utilize a lista de resíduos em vigor.

Destino do resíduo ______

Quantidade

______ kg / litros

Declaração: certifico a exatidão das declarações prestadas e que o destinatário está devidamente autorizado a receber este resíduo.

Data ___/___/___ ______ (Assinatura)

2 - TRANSPORTADOR

Nome e endereço: ______

Telefone: ______ Fax: ______ Telex: ______

Pessoa a contactar: ______

Identificação do meio de transporte

Condições de acondicionamento do resíduo

TIPO

☐ Tambor
☐ Barrica de madeira
☐ Jerricane
☐ Caixa
☐ Saco
☐ Embalagem composite
☐ Tanque
☐ Granel
☐ Embalagem metálica leve
☐ Outro (indique qual)

MATERIAL

☐ Aço
☐ Alumínio
☐ Madeira
☐ Matéria plástica
☐ Vidro, porcelana ou grés
☐ Outro (indique qual)

Nº DE EMBALAGENS OU RECIPIENTES

☐

Data ___/___/___ ______ (Assinatura do motorista)

3 - DESTINATÁRIO

Nome e endereço: ______

Telefone: ______ Fax: ______ Telex: ______

Pessoa a contactar: ______

Data de recepção do resíduo ___/___/___. Identificação do meio de transporte

Recepção aceite

Quantidade

______ kg / litros

Recepção recusada

Motivo:

Data ___/___/___ ______ (Assinatura)

Appendix C7.A2. Construction and Demolition Waste Materials Produced and Reused

I — Materiais reutilizados e RCD produzidos

Materiais reutilizados — tipologia	Em obra		Outra	
	Tipo de utilização	(Ton ou l)	Tipo de utilização	(Ton ou l)
Materiais reutilizados (ton ou l)				

RCD — codigo LER (*)						Incorporação em obra		Operador de gestão (**) (ton ou l)
						Tipo de utilização	(Ton ou l)	
RCD *total* (ton ou l)								
Total (ton ou l)								

(*) De acordo com a Portaria n.º 209/2004, de 3 de Março (lista europeia de resíduos).
(**) Anexar cópia dos certificados de recepção emitidos pelos operadores de gestão devidamente legalizados.

II — Responsável pelo preenchimento

Assinatura:	Data:

ANEXO III

(a que se refere o artigo 16.º)

Certificado de recepção de RCD

1 — Entidade que emite certificado de recepção:

Denominação;
Sede social;
Telefone e fax;
Número da licença;
Número de contribuinte;
Número de registo no SIRER.

2 — Produtor/detentor:

Denominação;
Sede social;
Número de contribuinte;
Alvará ou título de registo do InCI.

3 — Transportador:

Denominação;
Sede social;
Número de contribuinte.

Appendix C7.A3. Transport of Construction and Demolition Waste

I - Identificação do transportador

Nome:		Morada:
Localidade:		Concelho:
Código Postal:	CAE:	NIF:
Tel.:	Fax.:	E-mail
Matricula do Camião ou Tractor:		Matrícula do Reboque ou Semi-Reboque:

Data: / / Assinatura do Motorista:

II – Identificação da obra

Nome:		
Morada:		
Alvará nº:	Localidade:	Concelho:
Código Postal:	Tel.:	Fax.:

III – Identificação do Produtor ou detentor

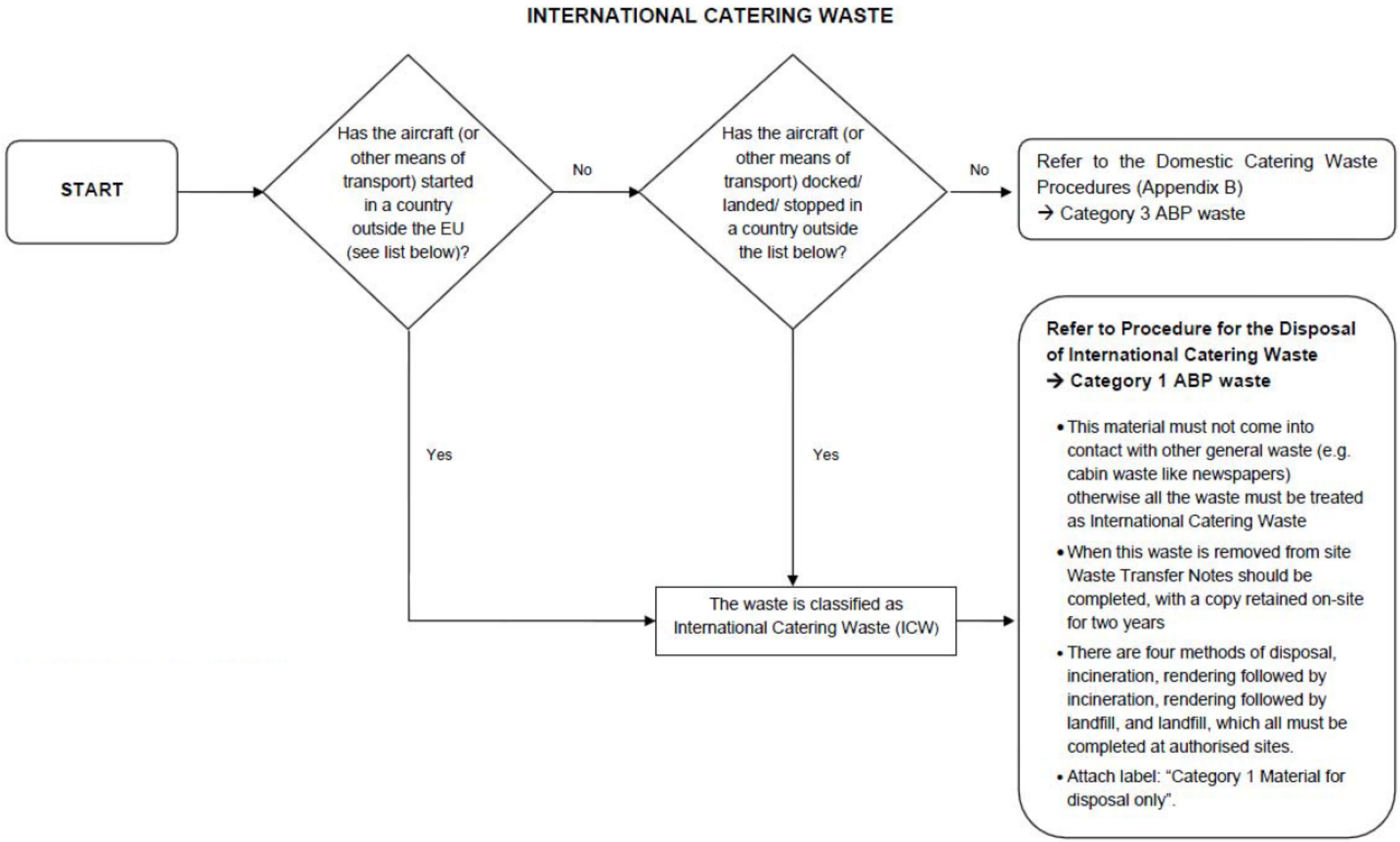
Nome:		
Morada:		Localidade:
Concelho:	Alvará ou Título de registo do InCI:	
Código Postal:	Tel.:	Fax.:

IV - Classificação* e quantificação dos RCD e identificação do respectivo destinatário

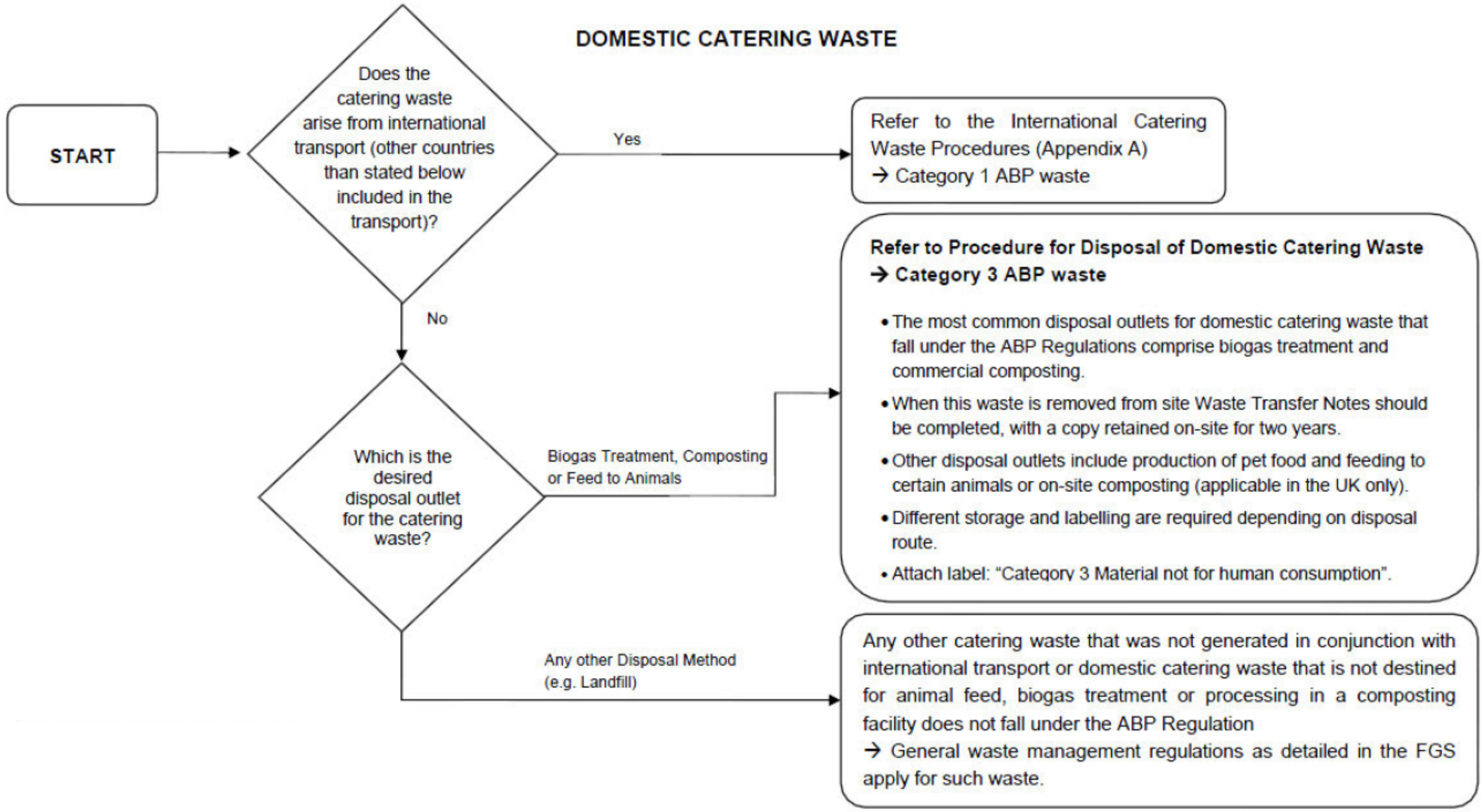
Movimentos	Código LER						Quantidade (t ou m³)	Destinatário	Assinatura do Destinatário
1									
2									
3									

* De acordo com a Portaria nº 209/2004, de 3 de Março (Lista Europeia de Resíduos)

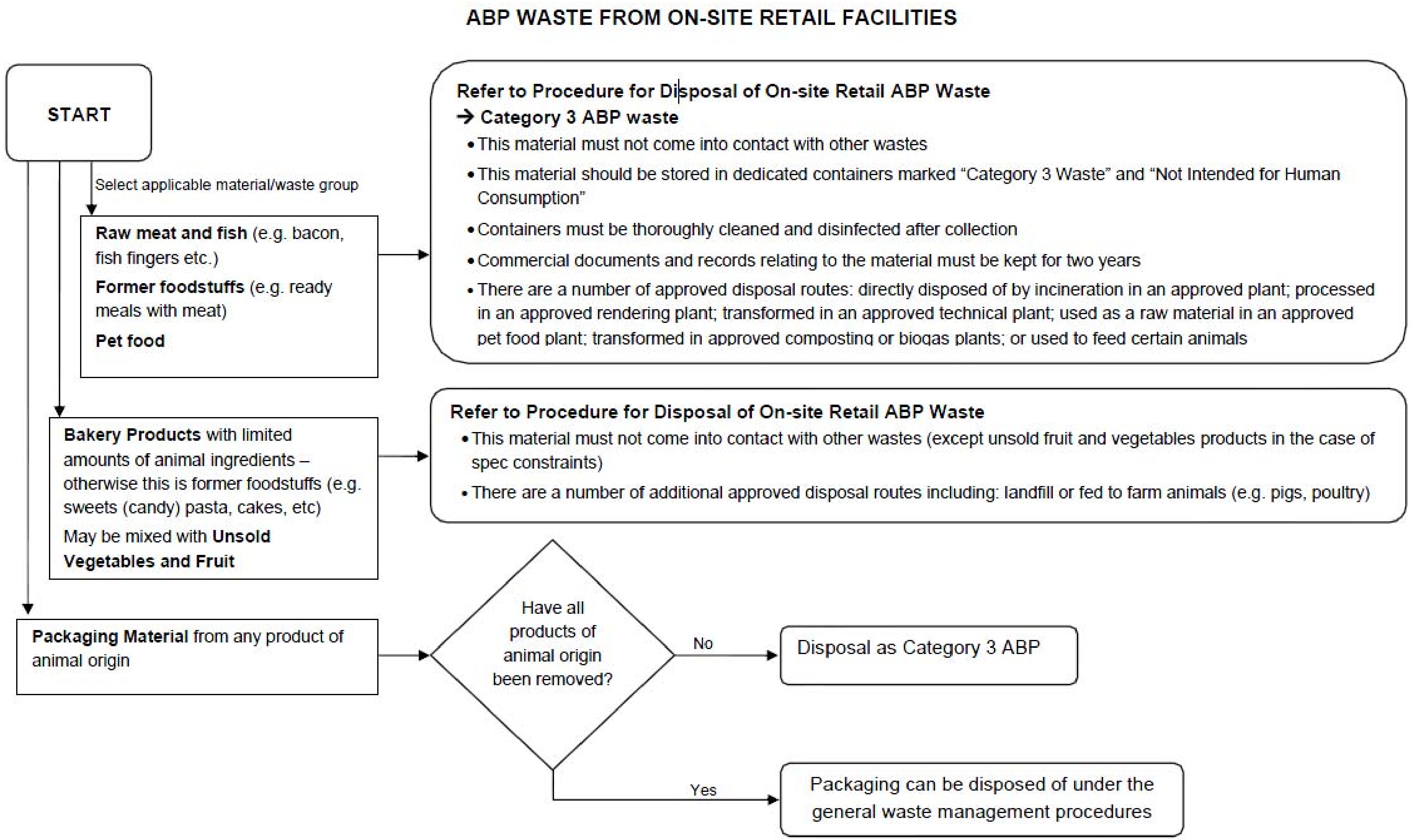
C7.F1. Category 1: International Catering Waste Disposal Flow Diagram



C7.F2. Category 3: Domestic Catering Waste Disposal Flow Diagram



C7.F3. Category 3: On-site Retail Waste Disposal Flow Diagram



Chapter 8

MEDICAL WASTE

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CHAPTER 8

MEDICAL WASTE

C8.1. SCOPE

This Chapter contains criteria for the management of medical waste at medical, dental, research and development, and veterinary facilities generated in the diagnosis, treatment or immunization of human beings or animals or in the production or testing of biologicals subject to certain exclusions. This waste also includes mixtures of medical waste and hazardous waste. It does not apply to what would otherwise be household waste.

C8.2. DEFINITIONS

C8.2.1. Generator. The organization, unit, or shop within a DoD installation that generates wastes, treats or mixes wastes or conducts other operations that modify the nature or composition of wastes.

C8.2.2. Hazardous Waste. A controlled waste that may be solid, semi-solid, liquid, or contained gas, and meets criteria under the definition of Hazardous Waste in Chapter 6, “Hazardous Waste.”

C8.2.3. Infectious Agent. Any organism (such as a virus or a bacterium) that is capable of being communicated by invasion and multiplication in body tissues and capable of causing disease or adverse health impacts in humans.

C8.2.4. Infectious Hazardous Waste. Mixture of infectious medical waste and hazardous waste to include solid waste such as fluids from a parasitology laboratory.

C8.2.5. Infectious Medical Waste. Solid Waste produced by medical and dental treatment facilities that is specifically managed because it has the potential for causing disease in humans and may pose a risk to both individuals or community health if not managed properly, and that is grouped in Appendix C8.A1., “Medical Waste Classification System.”

C8.2.6. Medical Waste. Wastes produced in health facilities (i.e., medical clinics, dental clinics, veterinary clinics, hospitals) and related research facilities, including those produced during activities of diagnosis, prevention, treatment and rehabilitation of humans or animals.

C8.2.7. Non-infectious Hazardous Waste. Medical wastes that meet the definition of hazardous waste in Chapter 6, “Hazardous Waste,” but which are non-infectious.

C8.2.8. Non-infectious Medical Waste. Group I and II waste created that does not require special management because it has been determined to be incapable of causing disease in humans or which has been treated to render it noninfectious.

C8.2.9. Treatment. Any method, technique or process designed to change the physical, chemical, or biological character or composition of any infectious hazardous or infectious waste so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. Treatment methods for infectious waste must eliminate infectious agents so that they no longer pose a hazard to persons who may be exposed. Examples of typical treatment processes include:

C8.2.9.1. Chemical Disinfection. The elimination or reduction of infectious agents on inanimate objects by applying or immersing in chemicals. Disinfection may not kill bacterial spores.

C8.2.9.2. Chemical Sterilization. The complete destruction or elimination of all microbial life using chemicals.

C8.2.9.3. Cremation. Reducing a corpse or parts of a corpse to its basic elements by burning in a licensed crematorium.

C8.2.9.4. Incineration. High temperature combustion of wastes in which toxins are destroyed. Medical waste incinerators must meet the requirements specified within Chapter 2, "Air Emissions," for design and operation.

C8.2.9.5. Steam Sterilization. The complete destruction or elimination of all microbial life using steam.

C8.2.10. Wastes. Any substance or object which the holder discards, intends to discard, or is required to discard, namely those identified under the USEUCOM Waste List.

C8.2.11. USEUCOM Waste List. A categorical list of wastes and associated classification codes that is required for shipping and labeling wastes within the USEUCOM.

C8.3. CRITERIA

C8.3.1. All medical waste will be separated at the point of origin according to its group classification in Appendix C8.A1. It will be assigned a 6-digit waste code in accordance with the USEUCOM Waste List.

C8.3.2. Medical waste shall be handled and stored in a manner that allows for clear and rapid identification of its origin and group, in accordance with the following procedures:

C8.3.2.1. Group I and II Waste (from Appendix C8.A1.)

C8.3.2.1.1. Medical waste that is comparable to solid waste (Groups I and II from Appendix C8.A1.) will be segregated from hazardous and/or infectious waste at the point of origin.

C8.3.2.1.2. When possible, adequate treatment of Group I and II medical wastes from Appendix C8.A1.will be conducted in order to allow for recycling. Particular attention will be given to the segregation of reusable or recyclable materials, including paper and paperboard, glass, ferrous and non-ferrous metals, x-ray films, batteries and mercury.

C8.3.2.1.3. Groups I and II wastes must be stored in black containers.

C8.3.2.1.4. Groups I and II wastes shall be stored separately from Groups III and IV medical wastes from Appendix C8.A1.

C8.3.2.2. <u>Group III and IV Waste (from Appendix C8.A1.)</u>

C8.3.2.2.1. Mixtures of Groups I and II wastes and infectious (Group III and Group IV from Appendix C8.A1.) medical waste will be handled as infectious medical waste.

C8.3.2.2.2. Mixtures of infectious (Group III and IV from Appendix C8.A1.) medical waste and hazardous waste will be handled as infectious hazardous waste under DoD 4160.21-M, "Defense Material Disposition Manual," and are the responsibility of the generating DoD Component. Priority will be given to the hazard that presents the greatest risk. DLA Disposition Services have no responsibility for this type of property until it is rendered noninfectious as determined by the appropriate DoD medical authority.

C8.3.2.2.3. Infectious (Group III and Group IV from Appendix C8.A1.) medical waste will be transported and stored in bags or receptacles a minimum of 3 mils thick having such durability, puncture resistance and burst strength as to prevent rupture or leaks during ordinary use. In addition, containers will be easy to handle and hermetically closed. Containers intended for reuse will be designed to be washed and disinfected. Sharps will be managed in accordance with criterion C8.3.6.

C8.3.2.2.4. Infectious (Group III and Group IV from Appendix C8.A1.) medical waste will be placed directly in the disposal unit without previous mixture with other types of waste and without direct manipulation. In addition, infectious medical waste will be transported and stored to minimize human exposure, and will not be placed in chutes or dumbwaiters.

C8.3.2.2.5. Group III medical wastes from Appendix C8.A1. must be stored in white containers with proper identification of biological risks.

C8.3.2.2.6. Group IV medical wastes from Appendix C8.A1. must be stored in red containers, with the exception of sharps which must be packaged according to requirements in paragraph C8.3.6.

C8.3.3. Non-infectious medical waste (Groups I and II) that is classified as a hazardous waste will be managed in accordance with criteria in Chapter 6, "Hazardous Waste."

C8.3.4. Radioactive medical waste will be segregated at the point of origin and managed in accordance with Service Directives.

C8.3.5. All bags or receptacles used to segregate, transport or store infectious medical waste will be clearly marked with the universal biohazard symbol and the word "BIOHAZARD" in English and Portuguese ("Risco Biologico"), and will include marking that identifies the generator, date of generation and the contents.

C8.3.6. Sharps will only be discarded into rigid, puncture resistant receptacles. Needles shall not be clipped, cut, bent or recapped before disposal. Waste sharps are considered Group IV medical waste from Appendix C8.A1. and shall be managed accordingly.

C8.3.7. Infectious (Group III and IV from Appendix C8.A1.) medical waste will not be compacted unless converted to noninfectious medical waste by treatment as described in paragraph C8.3.15. Containers holding sharps will not be compacted.

C8.3.8. All anatomical pathology waste (i.e., large body parts) must be placed in containers lined with plastic bags that comply with paragraph C8.3.5., and may only be disposed of in a landfill or by burial after being treated for disposal by incineration or cremation. Dead pets may be buried in a properly designated area. Dead pets that are not buried must be incinerated in a properly licensed facility.

C8.3.9. Blood, blood products and other liquid infectious wastes will be handled as follows:

C8.3.9.1. Bulk blood or blood products may be decanted into a sewer system connection (sinks, drains, etc.) unless pre-treatment is required. If pre-treatment is required, the methods contained in Table C8.T1., "Treatment Methods for Infectious Medical Waste," will be employed prior to discharge to the sewer system. The emptied containers will continue to be managed as infectious medical waste.

C8.3.9.2. Wastes contaminated with blood, blood derivates or other liquid infectious wastes or presenting blood vestiges shall be managed as infectious (Group III and IV from Appendix C8.A1.) medical waste.

C8.3.9.3. Suction canister waste from operating rooms will either be decanted into a clinical sink or be sealed into leak-proof containers and incinerated.

C8.3.10. All personnel handling infectious medical waste will wear appropriate protective apparel or equipment such as gloves, coveralls, mask, and goggles sufficient to prevent the risk of exposure to infectious agents or pathogens.

C8.3.11. If infections (Group III and IV from Appendix C8.A1.) medical waste cannot be treated on site, it will be managed during storage as follows:

C8.3.11.1. Infectious (Group III and IV from Appendix C8.A1.) medical waste will be maintained in a nonputrescent state, using refrigeration as necessary. At a minimum, wastes stored for more than 3 days shall be refrigerated. Medical wastes shall be collected at least once per week.

C8.3.11.2. Infectious (Group III and IV from Appendix C8.A1.) medical waste with multiple hazards (i.e., infectious hazardous waste or infectious radioactive waste) will be segregated from the general infectious waste stream when additional or alternative treatment is required.

C8.3.12. Storage sites must be:

C8.3.12.1. Specifically designated;

C8.3.12.2. Adequately designed. The capacity of the medical waste storage area shall be calculated based on the frequency of collection and disposal. At a minimum, the capacity of storage areas shall be sufficient to contain the volume of waste produced over a period of 3 days;

C8.3.12.3. Designed and constructed in such a way that facilitates cleaning operations, allows for easy personnel access and prevents the entry of insects, rodents and other pests;

C8.3.12.4. Prevent access by unauthorized personnel;

C8.3.12.5. Marked on the outside with the universal biohazard symbol and the word "BIOHAZARD" ("Risco Biologico") in both English and Portuguese; and

C8.3.12.6. A site-specific emergency plan shall be in place at the storage site.

C8.3.13. Bags and receptacles containing infectious medical waste must be placed into rigid or semi-rigid, leak-proof containers before being transported off-site.

C8.3.14. Transportation of medical waste shall be conducted by authorized waste transporters and shall be conducted in order to prevent dispersion or spills.

C8.3.14.1. The transportation of infectious (Group III and IV from Appendix C8.A1.) medical waste by DoD personnel shall be conducted in accordance with the Joint Publication Army in Europe (AER) 55-4 and US Air Force in Europe (USAFE) Instruction 24-203, "Safe Movement of Hazardous Goods by Surface Modes, May 1, 2003," and the Joint Publication AER 55-355, USAFE Instruction24-201, and US Naval Forces Europe (USNAVEUR) Instruction 4600.7F, "Joint Transportation and Traffic Management Regulation, 30 August 2002."

C8.3.15. Infectious (Group III and IV from Appendix C8.A1.) medical waste must be treated in accordance with Table C8.T1., "Treatment and Disposal Methods for Infectious Medical Waste," and the following criteria before disposal:

C8.3.15.1. If sterilization is conducted on a DoD installation, the Portuguese Base Commander shall be consulted to determine permitting requirements. If a permit is needed for these operations and the permit conditions require a more protective standard than those listed below, the standards in the permit shall be the compliance standard. However, if a permit allows a less protective standard, those listed below shall be the compliance standard.

C8.3.15.1.1. Sterilizers must maintain the temperature at 121°C (250°F) for at least 30 minutes at 15 psi.

C8.3.15.1.2. The effectiveness of sterilizers must be checked at least weekly using *Bacillus stearo thermophilus* spore strips or an equivalent biological performance test.

C8.3.15.2. If the DoD intends to construct a new incineration unit, coordinate with the Portuguese Base Commander for permitting guidance.

C8.3.15.2.1. Incinerators used to treat medical waste must be designed and operated to maintain a minimum temperature and retention time sufficient to destroy all infectious agents and pathogens, and must meet applicable criteria in Chapter 2, ”Air Emissions.”

C8.3.15.2.2. Ash or residue from the incineration of infectious (Group III and IV from Appendix C8.A1.) medical waste must be assessed for classification as hazardous waste in accordance with the criteria in Chapter 6, “Hazardous Waste.” Ash that is determined to be hazardous waste must be managed in accordance with Chapter 6, “Hazardous Waste.” All other residue that has been rendered safe will be disposed of in a landfill that complies with the criteria of Chapter 7, “Solid Waste.”

C8.3.15.3. Chemical disinfection must be conducted using procedures and compounds approved by appropriate DoD medical authority for use on any pathogen or infectious agent suspected to be present in the waste.

C8.3.16. Installations will develop contingency plans for treatment or disposal of infectious medical waste should the primary means become inoperable.

C8.3.17. Spills of medical waste will be cleaned up as soon as possible in accordance with the following:

C8.3.17.1. Response personnel must comply with subsection C8.3.10.

C8.3.17.2. Blood, body fluid and other infectious fluid spills shall be removed with an absorbent material and managed as infectious (Group III or IV medical wastes from Appendix C8.A1.) medical waste, accordingly.

C8.3.17.3. Surfaces contacted by infectious (Group III and IV from Appendix C8.A1.) medical waste must be washed with soap and water and chemically decontaminated in accordance with subparagraph C8.3.15.3.

C8.3.18. Installations will keep records, for at least 5 years after the date of disposal, of the following information concerning medical waste in accordance with Forms C8.F1. and C8.F2.:

C8.3.18.1. Type of waste;

C8.3.18.2. Amount of waste (volume or weight);

C8.3.18.3. Treatment, if any, including date of treatment; and

C8.3.18.4. Disposition, including date of disposition, and if the waste was transferred to Portuguese facilities, and receipts acknowledging paragraphs C8.3.18.1. through C8.3.18.3. for each transfer in accordance with Forms C8.F1. and C8.F2. (Group I and II and Group III and IV medical wastes from Appendix C8.A1.) and Form C8.F3. (for hazardous medical waste), accordingly.

C8.3.19. If transportation, treatment and/or disposal of medical waste are conducted through contract, DoD personnel shall ensure those contractors are authorized by competent Portuguese authorities to perform the activities.

C8.3.20. If installations treat, transport or dispose of medical waste, the Portuguese Base Commander shall be consulted to determine permitting requirements.

C8.3.21. Personnel who handle medical waste shall be provided training for safety issues, personal protection and adequate operational procedures.

Table C8.T1. Treatment and Disposal Methods for Infectious Medical Waste

Type of Medical Waste	Method of Treatment	Method of Disposal
Microbiological (Group III)	[1] Steam sterilization	[2] Municipal solid waste landfill (MSWLF)
	Incineration	MSWLF
Pathological (Group IV)	[3] Incineration	MSWLF
Bulk blood & suction canister waste (Group III)	[5] Steam sterilization Chemical disinfection	[4] Domestic wastewater treatment plant (DWTP)
	[5] Incineration	MSWLF
Sharps in sharps containers (Group IV)	Incineration	MSWLF

Notes:

1. Preferred method for cultures and stocks because they can be treated at point of generation.
2. See Chapter 7, “Solid Waste,” for criteria for solid waste landfills.
3. Anatomical pathology waste (i.e., large body parts) must be treated either by incineration or cremation prior to disposal.
4. See Chapter 4, “Wastewater,” for criteria for domestic wastewater treatment plants.
5. Bulk blood or suction canister waste known to be infectious must be treated by incineration or steam sterilization before disposal.

Appendix C8.A1. Medical Waste Classification System

Group I: General waste comparable to solid waste – Wastes that do not present specific treatment requirements, comprising of:

(a) Wastes derived from general services such as cabinets, meeting rooms, conference rooms, sanitary rooms, dressing rooms, etc.;

(b) Wastes from ancillary activities such as workshop, gardens, warehouses, etc.;

(c) Packaging wastes such as paper, cardboard, etc.; and

(d) Wastes from kitchens and dining rooms not served to patients of Group III.

Group II: Non infectious medical waste – Waste comparable to solid waste that is not included under Group III and Group IV due to the absence of real or potential infectious properties. These wastes include:

(a) Orthopedic material (splices, plasters/casts without blood vestiges);

(b) Diapers (non-contaminated and without blood vestiges);

(c) General personal protective equipment, except equipment used in waste collection;

(d) Empty, discarded containers, of medical or other clinic products with the exception of those included in Group III and Group IV; and

(e) Non-contaminated bottles containing serum, with the exception of those included in Group IV.

Group III: Bio-hazard medical waste – This category includes both infectious and potentially infectious waste that can be subject to incineration or other efficient treatment to be disposed of as solid waste. These wastes include:

(a) Waste from rooms or infirmaries of infectious or suspected infectious pathologies, hemodialysis units, operation rooms, treatment rooms, autopsy and pathological anatomy rooms, clinical pathology rooms and laboratories, with the exception of those of Group IV;

(b) All materials used in dialysis;

(c) Unidentifiable anatomic parts;

(d) Residues from the administration of blood or blood derivates;

(e) Systems used in the administration of serum and medicines, with the exception of those in Group IV;

(f) Bags for the collection of organic fluids and their correspondent systems;

(g) Orthopedic material: splints, plasters/casts contaminated or containing blood vestiges and used prosthesis material;

(h) Diapers contaminated or presenting blood vestiges; and

(i) Personal protective material used in health care and general support services that have come in contact with contaminated products (gloves, masks, aprons and others).

Group IV: Specific medical waste – This group comprises various types of wastes that require mandatory incineration, including the following:

(a) Identifiable anatomic parts, embryos and placentas;

(b) Bodies of experimental animals;

(c) Cutting and puncturing waste (needles, catheters and invasive material, regardless of its origin);

(d) Rejected chemicals and pharmaceuticals not subject to additional requirements; and

(e) Cytostatic wastes along with all material used in its manipulation and administration.

Form C8.F1. Waste Register (Groups I and II)

Impresso B.1

FICHA DE RESÍDUOS DOS GRUPOS I + II

Dados relativos ao ano |__|__|__|__|

1. Identificação do estabelecimento de saúde

N.º de Contribuinte |__|__|__|__|__|__|__|__|__|

Denominação do estabelecimento de saúde

___

2. Identificação e caracterização do resíduo

Descrição dos principais componentes dos resíduos

3. Dados de produção do resíduo

Quantidades produzidas no ano respeitante ao registo:

___ (kg ou litros)

Quantidade prevista para o ano do registo seguinte:

___ (kg ou litros)

4. Destino do resíduo

1. Método de eliminação:	2. Transportador:	3. Destinatário:
☐ Incineração		
☐ Aterro		
☐ Outro (indique qual)		

1. Recolha selectiva para reciclagem/reutilização:	2. Quantidade (kg ou l):	3. Transportador:	4. Destinatário:
☐ Cartão e papel			
☐ Vidro			
☐ Películas de raio X			
☐ Pilhas e baterias			
☐ Mercúrio			
☐ Metais ferrosos e não ferrosos			

Form C8.F2. Waste Register (Groups III and IV)

Impresso B.2

FICHA DE RESÍDUOS DOS GRUPOS III e IV

Dados relativos ao ano |__|__|__|__|

1. Identificação do estabelecimento de saúde

N.º de Contribuinte |_|_|_|_|_|_|_|_|_|

Denominação do estabelecimento de saúde

____

2. Resíduos do Grupo III

2.1 Identificação e caracterização do resíduo

Descrição dos principais componentes dos resíduos

2.2 Dados de produção do resíduo

Quantidades produzidas no ano respeitante ao registo:

______________ (kg ou litros)

Quantidade prevista para o ano do registo seguinte:

______________ (kg ou litros)

2.3 Destino do resíduo

1. Método de eliminação:	2. Quantidade (kg ou l):	3. Transportador:	4. Destinatário:
☐ Incineração			
☐ Autoclavagem			
☐ Microondas			
☐ Outro (indique qual)			

3. Resíduos do Grupo IV

3.1 Identificação e caracterização do resíduo

Descrição dos principais componentes dos resíduos

3.2 Dados de produção do resíduo

Quantidades produzidas no ano respeitante ao registo:

______________ (kg ou litros)

Quantidade prevista para o ano do registo seguinte:

______________ (kg ou litros)

3.3 Destino do resíduo

1. Método de eliminação:	2. Quantidade (kg ou l):	3. Transportador:	4. Destinatário:
☐ Incineração			
☐ Outro (indique qual)			

Form C8.F3. Waste Register for Hazardous Medical Waste

Página nº:______Número total de páginas: ______

1.TRANSPORTADOR

Nome: ______________________________

Endereço: ______________________________

Identificação do meio de transporte: ______________________________

Tel.: ______________ Fax: ______________ Telex: ______________

Pessoa a contactar: ______________________________

Data: ______ /_____ /_____

____
(Assinatura do motorista)

CONDIÇÕES DE ACONDICIONAMENTO DO RESÍDUO

TIPO	MATERIAL
1 - Tambor 2 - Barrica de madeira 3 - Jerricane 4 - Caixa 5 - Saco 6 - Embalagem composite 7 - Tanque 8 - Granel 9 - Embalagem metálica leve 10 - Outro (indique qual)	A - Aço B - Alumínio C - Madeira D - Matéria plástica E - Vidro, porcelana ou grês F - Outro (indique qual)

2.PRODUTOR/DETENTOR			3.TRANSPORTADOR				4.DESTINATÁRIO	
(Nome e endereço)	QUANTIDADE POR GRUPO DE RESÍDUOS (Kg ou litros)		ACONDICIONAMENTO				(Nome e endereço)	
			GRUPO III		GRUPO IV			
	GRUPO III	GRUPO IV	Código: tipo de material (vd caixa acima)	Número de embalagens ou recipientes	Código: tipo de material (vd caixa acima)	Número de embalagens ou recipientes	GRUPO III	GRUPO IV

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Chapter 9

PETROLEUM, OIL, AND LUBRICANTS

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CHAPTER 9

PETROLEUM, OIL AND LUBRICANTS

C9.1. SCOPE

This chapter contains criteria to control and abate pollution resulting from the storage, transport and distribution of petroleum products. Criteria for POL vapor recovery are addressed in Chapter 2, "Air Emissions." Criteria for Underground Storage Tanks (USTs) containing POL products are addressed in Chapter 19, "Underground Storage Tanks." POL spill prevention and response planning criteria are contained in Chapter 18, "Spill Prevention and Response Planning."

C9.2. DEFINITIONS

C9.2.1. Aboveground Storage Container. POL storage containers, exempt from UST criteria, that are normally placed on or above the surface of the ground. POL storage containers located above the floor and contained in vaults or basements, bunkered containers, and also partially buried containers are considered aboveground storage containers. For the purposes of this Chapter, this includes any mobile or fixed structure, tank, equipment, pipe, or pipeline (other than a vessel or a public vessel) used in oil well drilling operations, oil production, oil refining, oil storage, oil gathering, oil processing, oil transfer, and oil distribution. This also includes equipment in which oil is used as an operating fluid, but excludes equipment in which oil is used solely for motive power.

C9.2.2. Below Ground Storage Container. Completely buried POL storage containers, including deferred USTs, that are exempt from all criteria in Chapter 19, "Underground Storage Tanks."

C9.2.3. Buried Tanks. Tanks that are buried in natural or artificial excavations where the absence of empty air spaces makes accumulating explosive vapors around the tank impossible.

C9.2.4. Combustible Oils. Oils designed for combustion motors, like diesel and fuel-oil.

C9.2.5. Dangerous Zones. Zones of a POL Facility of risk of fire or explosion, which comprise:

C9.2.5.1. Areas for the storage or handling of Class III products.

C9.2.5.2. The vicinity of tanks up to distances of 5.0 meters containing Class III products.

C9.2.6. Density of Buildings. The number of inhabited buildings located within an area of 0.4 km from the central axis of a pipeline (width) and extending a length of 1 linear km.

C9.2.7. Gasoline Station. Facility for the dispensing of gasoline, gas oil or liquid petroleum gas (LPG) to vehicles for private, public or cooperative use. The gasoline station is considered the dispensing pumps and their corresponding tanks, the gasoline station complex and the pavement necessary for the movement of vehicles around the station. This definition includes, by extension, similar installations for the filling of ships or planes, but not hydrant fueling systems.

C9.2.8. Highly Dangerous Zones. Zones of a POL Facility of immediate risk of fire or explosion, which comprise:

C9.2.8.1. Areas for the storage or handling of Class I and Class II products.

C9.2.8.2. The vicinity of tanks up to distances of 10.0 meters and 5.0 meters for Class I products and Class II products, respectively.

C9.2.8.3. The areas around the exit points of gases or vapors up to distances of 10.0 meters and 5.0 meters for Class I products and Class II products, respectively.

C9.2.9. Inhabited Building. Buildings where people reside on a permanent basis.

C9.2.10. Loading/ Unloading Racks. Location where tanker trucks/rail cars are loaded and unloaded by pipes, pumps, and loading arms.

C9.2.11. Loading/ Unloading Areas. Any location where POL is authorized to be loaded or unloaded to or from a POL storage container.

C9.2.12. Petroleum, Oil, and Lubricants (POL). Refined petroleum, oils, and lubricants, including, but not limited to, petroleum, fuel, lubricant oils, synthetic oils, mineral oils, animal fats, vegetable oil, sludge, and POL mixed with wastes other than dredged spoil. Petroleum products are classified as follows:

C9.2.12.1. Class I - Products giving off gases or vapors, which form explosive mixtures at ambient air temperature. All petroleum products with a flash point below 25ºC (77ºF) and combustible mixtures with a flash point below 25ºC (77ºF);

C9.2.12.2. Class II - Flammable products. All petroleum products with a flash point between 25ºC (77ºF) and 65ºC (149ºF); and

C9.2.12.3. Class III - Combustible products. Petroleum products with a flash point above 65ºC (149ºF).

C9.2.13. Pipeline Facility. Includes new and existing pipes, pipeline rights of way, auxiliary equipment (e.g., valves and manifolds), and buildings or other facilities used in the transportation of POL.

C9.2.14. POL Facility. A complex generally comprised of one or more of the following:

C9.2.14.1. factories or offices for the industrial treatment of POL by physical or chemical processes,

C9.2.14.2. aboveground storage container/below ground storage container farms comprising one or more tanks, C9.2.14.3. storage areas for POL products (e.g., drums of POL),

C9.2.14.4. pump houses,

C9.2.14.5. loading/unloading stations for train cars, ships or other vessels,

C9.2.14.6. their annexes, and

C9.2.14.7. a pipeline facility as identified in paragraph C9.2.13.

C9.2.15. POL Storage Container. POL containers with capacities GREATER than 200 liters (55 US gallons) (mobile/portable and fixed; and above and below ground storage containers). USTs required to meet all requirements of Chapter 19 are EXCLUDED from the definition of POL storage containers.

C9.2.16. Tanks in Underground Spaces. Tanks placed in natural or artificial underground spaces, such as tunnels or pits, where the existence of empty air spaces between the walls of the tank and the walls of the underground space is present.

C9.2.17. Usable Capacity of a Tank. Capacity of a tank reduced by 2%.

C9.3. CRITERIA

C9.3.1. Applicability. The below criteria apply only at POL Facilities as defined in paragraph C9.2.14.

C9.3.2. General POL Storage Container Criteria

C9.3.2.1. Inspection and Testing. Inspection and testing shall be conducted on all POL storage containers in accordance with recognized industry standards.

C9.3.2.2. Secondary Containment. All POL storage containers must be provided with a secondary means of containment (dike and basin) in accordance with the following criteria:

C9.3.2.2.1. For containment areas with a single POL storage container, the secondary containment must be capable of holding the entire contents of the tank plus sufficient freeboard to allow for precipitation and expansion of product. Alternatively, POL storage containers that are equipped with adequate technical spill and leak prevention options (such as overfill alarms and flow shutoff or restrictor devices) may provide secondary containment by use of a double wall container. Below ground storage containers may meet this criterion by use of a leak barrier with a leak detection pipe and basin. A licensed technical authority may waive these secondary containment criteria for below ground storage containers.

C9.3.2.2.2. When multiple POL storage containers are present in a single containment system, the capacity of the secondary containment system must equal to the larger of the following values:

C9.3.2.2.2.1. For Class I products: 100% of the total contents of all tanks.

C9.3.2.2.2.2. For Class II products: 100% of the largest single tank plus enough freeboard to allow for precipitation or expansion of the product; or 50% of the total contents of the tanks, whichever is greater.

C9.3.2.2.2.3. Within a containment area for multiple POL storage containers, if any POL storage container has a capacity greater than 200 m^3 (52,800 US gallons) containing Class III products: 100% of the largest tank plus enough freeboard to allow for precipitation or expansion of the product; or 25% of the total contents of the tanks (for combustible oils) or 10% of the total contents of the tanks (for other Class III products), whichever is greater.

C9.3.2.2.2.4. Within a containment area for multiple POL storage containers, where no single POL storage container has a capacity of greater than 200 m^3 (52,800 US gallons) containing Class III products: 100% of the largest tank plus enough freeboard to allow for precipitation or expansion of the product.

C9.3.2.2.3. These secondary containment criteria do not apply when aggregate POL storage capacity in storage area is less than 5m^3 (1,320 US gallons).

C9.3.2.2.4. The total capacity of the POL storage containers present within a single containment system must not exceed 20,000 m^3 (5,283,000 US gallons) for Class I products, 40,000 m^3 (10,566,000 US gallons) for Class II products and 50,000 m^3 (13,208,000 US gallons) for Class III products.

C9.3.2.2.5. For adjacent secondary containment systems, a corridor shall be in place around every single system, accessible from at least three quarters of the perimeter and with a minimum width of 1 meter. This corridor can be constructed over walls separating containment basins.

C9.3.2.2.6. The installation of equipment within the secondary containment other than the tanks and their respective fittings and piping is forbidden.

C9.3.2.3. Permeability. Permeability for containment areas will be a maximum of 10^{-7} cm/sec.

C9.3.2.4. Containment Area Drainage. Drainage of stormwater from containment areas will be controlled by a valve that is locked closed when not in active use. Stormwater will be inspected for petroleum sheen before being drained from containment areas. If a petroleum sheen is present it must be collected with sorbent materials prior to drainage, or treated using an oil-water separator. Disposal of sorbent material exhibiting hazardous characteristics will be in accordance with Chapter 6, “Hazardous Waste.”

C9.3.2.4.1. All drains/sewer exits from containment areas not located at gasoline stations must allow for a hermetic seal from outside of the containment area.

C9.3.2.5. Valves and Piping. All aboveground valves, piping, and appurtenances associated with POL storage containers shall be periodically inspected in accordance with recognized industry standards.

C9.3.2.5.1. Buried Tanks

C9.3.2.5.1.1. All openings (ventilation and measurement openings) will be provided with steel pipes and control devices.

C9.3.2.5.1.2. All tanks will be provided with a gas outlet for the exit of vapors generated during normal operations or filling of the tank as well as for the entrance of air during emptying operations. This vent will be equipped with a device to avoid flame propagation to the interior of the tank in the event of a fire.

C9.3.2.5.1.3. The top of the tank (for example the roof, caps, etc.) will be located at a minimum depth of 0.50 meters below ground level to prevent a significant rise in the temperature of the contained liquid in the event of a nearby fire.

C9.3.2.5.1.4. Tightness testing shall be conducted in all buried tanks prior to their use by filling the tank with air or water with a pressure of 1 kilogram per square centimeter. The testing must meet the leak detection requirements of criterion C19.3.2.3.

C9.3.2.5.2. Tanks in Underground Spaces

C9.3.2.5.2.1. Every underground space will be provided with at least 1 exhaust vent, properly located to remove all vapors that may be contained within. Vent ends will be protected against rain and vandalism and will be provided with flame protection devices.

C9.3.2.5.2.2. Underground spaces for the installation of tanks will not include depressions or other locations where gases or liquids from leaking tanks could accumulate.

C9.3.2.5.2.3. Underground spaces will be designed to contain at least 100% of the largest tank and will include a pumping system for the removal of the spilled liquid. The walls of underground spaces will be designed to hold the surrounding earth in place and will be liquid tight.

C9.3.2.6. Storage, transfer and mixing operations must be undertaken in well ventilated locations, preferably not covered, and separated from the rest of the facility by a non-combustible and fire-resistant wall with an independent entrance. These locations must be provided with impermeable pavement at least 20 cm lower than the adjacent surfaces or provided with 20 cm high walls and doorsteps. Locations for the transfer of Class III products other than combustible oils are not required to meet this requirement.

C9.3.2.7. Smoking and open flames are not permitted in dangerous zones and highly dangerous zones of the facility as well as in the vicinity of aboveground pipelines. Personnel carrying lighters, matches, or loaded arms shall leave them at a designated location at the entrance of the facility and will be able to collect them when leaving the facility. Moreover, ferrous-containing shoes are not permitted within highly dangerous zones of the facility. Signs displaying these requirements shall be conspicuously posted in the appropriate zones.

C9.3.2.8. Facilities shall maintain good housekeeping. Highly dangerous zones shall be free of weeds and flammable materials. All residues, oil-contaminated cloths or other flammable materials from cleaning or housekeeping operations must be collected and disposed of according to requirements of Chapter 6, "Hazardous Waste," of these FGS. This also applies to non-reusable wastes of flammable or combustible products.

C9.3.2.9. Facilities storing and handling POL products shall be located within designated areas. It must be properly isolated by a perimeter wall at least 2.5 meters high from the ground, constructed of non-combustible materials and ensure sufficient protection against the entry of non-authorized personnel, except for below ground storage containers containing Class I products with capacities of 20 m^3 (5,280 US gallons) or less. The perimeter wall, when adjoining public roads, open sea, industrial facilities or inhabited buildings, shall be designed to avoid potential spills to the exterior of the facility in the event of a fire, explosion or leak. In addition, the number of access roads shall be kept to a minimum. This requirement does not apply to below ground storage containers.

C9.3.3. Additional POL Storage Container Criteria

C9.3.3.1. Testing. Buried piping associated with POL storage containers shall be tested for integrity and leaks at the time of installation, modification, construction, relocation, or replacement. New buried piping must be protected against corrosion in accordance with recognized industry standards.

C9.3.3.2. Storage Container Design. POL storage containers shall be designed or modernized in accordance with good engineering practice to prevent unintentional discharges by use of overflow prevention devices.

C9.3.3.3. Completely and Partially Buried Metallic POL Storage Containers. These must be protected from corrosion in accordance with recognized industry standards.

C9.3.4. Additional Requirements for Gasoline Stations

C9.3.4.1. The installation of aboveground storage containers for gasoline storage is prohibited.

C9.3.4.2. Secondary Containment for Diesel Storage Tanks at Gasoline Stations. All diesel aboveground POL storage containers located at gasoline stations must be provided with a secondary means of containment (dike and basin).

C9.3.4.3. Storm water management at gasoline stations:

C9.3.4.3.1. Oil/water separators shall be located so as to provide easy access for inspection and cleaning operations;

C9.3.4.3.2. Oil/water separators shall be siphoned to avoid the circulation of gases; and

C9.3.4.3.3. In areas where there is the possibility of spills (distribution areas, liquid filling areas and containment basins) pavements shall be impervious and drain to a wastewater treatment system.

C9.3.4.4. Testing requirements

C9.3.4.4.1. Initial integrity tests for new piping and fiberglass reinforced plastic aboveground storage containers must be conducted in an open excavation once its assembly is complete and a final test must be conducted prior to its use. In addition, initial integrity tests for aboveground storage containers must be conducted in accordance with conditions set out in their respective construction code.

C9.3.4.4.2. Testing of aboveground storage containers shall be conducted in accordance with the following specifications:

C9.3.4.4.2.1. Periodic leak testing shall be conducted every 10 years.

C9.3.4.4.2.2. Leak testing must be undertaken should any of the following situations occur:

C9.3.4.4.2.2.1. A repair to an aboveground storage container and/or

C9.3.4.4.2.2.2. If an aboveground storage container was out of service for greater than 24 months.

C9.3.4.4.2.3. Leak tests based on pressure variations are prohibited.

C9.3.5. Storage Container Wastes. POL container cleaning wastes frequently have hazardous characteristics and must be handled and disposed of in accordance with requirements of Chapter 6, “Hazardous Waste.” POL container waste and handling procedures include:

C9.3.5.1. POL container cleaning wastes (sludge and washwaters) must be disposed of in accordance with the criteria of Chapter 6, unless sampling and testing confirms the waste does not exhibit hazardous waste characteristics.

C9.3.5.2. POL container bottom waters, which are periodically drained, must be collected and disposed of in accordance with Chapter 6, unless sampling and testing determine that the waste does not exhibit hazardous waste characteristics.

C9.3.6. General Transport and Distribution Criteria

C9.3.6.1. Loading/Unloading Racks and Areas

C9.3.6.1.1. Secondary Containment. Loading/unloading racks shall be designed to handle discharges of at least the maximum capacity of any single compartment of a rail car or tank truck loaded or unloaded at the loading/unloading rack.

C9.3.6.1.2. Departing Vehicle Warning Systems. Provide an interlocked warning light or physical barrier system, warning signs, wheel chocks, or vehicle break interlock system at loading/unloading racks to prevent vehicles from departing before complete disconnection of flexible or fixed oil transfer lines.

C9.3.6.1.3. Vehicle Inspections. Prior to filling and prior to departure of any tank car or tank truck, closely inspect for discharges from the lowermost drain and all outlets of such vehicles, and if necessary, ensure that they are tightened, adjusted, or replaced to prevent liquid discharge while in transit.

C9.3.6.1.4. Loading/Unloading Areas. Provide appropriate containment and/or diversionary structures (dikes, berms, culverts, spill diversion ponds, etc.) or equipment (sorbent materials, weirs, booms, other barriers, etc.) at loading/unloading areas to prevent a discharge of POL, which reasonably could be expected to cause a sheen on waters of the host nation defined in Chapter 4, “Wastewater.”

C9.3.6.2. POL Pipeline Facilities

C9.3.6.2.1. No work can be undertaken in the vicinity of a pipeline that could directly or indirectly affect it without taking precautions to avoid environmental risks.

C9.3.6.2.2. The entity in charge of the operation of the installation shall keep records of construction material specifications, results of tests, and certificates of materials.

C9.3.6.2.3. Whenever a pipeline may be placed temporarily out of service or when a pipeline system will be decommissioned, the Portuguese Base Commander shall be informed.

C9.3.6.2.4. Measures shall be implemented to avoid environmental risks during removal of the pipelines.

C9.3.6.3. Provisions for Testing and Maintenance. All pipeline facilities carrying POL must be tested and maintained in accordance with recognized Portuguese or US industry standards, including:

C9.3.6.3.1. Each pipeline operator handling POL will prepare and follow a procedural manual for operations, maintenance, and emergencies.

C9.3.6.3.2. All new POL pipeline facilities must be designed and constructed to meet recognized Portuguese or US industry construction standards.

C9.3.6.3.3. Each new pipeline facility and each facility in which pipe has been replaced or relocated must be tested in accordance with recognized Portuguese or US industry standards, without leakage before being placed in service.

C9.3.7. Personnel Training. At a minimum, all personnel handling POL shall be trained annually in the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; general facility operations; and the applicable contents of the facility Spill Plan.

Chapter 10

RESERVED

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Chapter 11

PESTICIDES

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CHAPTER 11

PESTICIDES

C11.1. SCOPE

This Chapter contains criteria regulating the use, storage and handling of pesticides and plant protection products, but does not address the use of these materials by individuals acting in an unofficial capacity in a residence or garden. The disposal of pesticides and plant protection products is covered in Chapters 6, "Hazardous Waste," and Chapter 7, "Solid Waste."

C11.2. DEFINITIONS

C11.2.1. Active Substances. Substances or microorganisms, including viruses or fungus, having general or specific action against pests or plants or plant products.

C11.2.2. Applicator. The person that applies pesticides or plant protection products for an installation.

C11.2.3. Adjuvants. Products added to plant protection products during application in order to improve their specific action.

C11.2.4. Certified Pesticide Applicators. Personnel who apply pesticides or supervise the use of pesticides, and who have been formally certified in accordance with DoD 4150.7, "DoD Pest Management Training and Certification" (which accepts Portuguese certification in appropriate circumstances).

C11.2.5. Excess Plant Protection Products. Plant Protection Products that are no longer intended to be used or cannot be used.

C11.2.6. Integrated Pest Management (IPM). A planned program, incorporating continuous monitoring, education, record-keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, material, or the environment. IPM uses targeted, sustainable (effective, economical, environmentally sound) methods including education, habitat modification, biological control, genetic control, cultural control, mechanical control, physical control, regulatory control, and where necessary, the judicious use of least-hazardous pesticides.

C11.2.7. Pests. Arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds, undesirable vegetation, and other organisms (except for microorganisms that cause human or animal disease) that adversely affect the well being of humans or animals, attack real property, supplies, equipment or vegetation, or are otherwise undesirable.

C11.2.8. Pest Management Consultant. Professional DoD pest management personnel located at component headquarters, field operating agencies, major commands, facilities engineering field divisions or activities, or area support activities who provide technical and management guidance for the conduct of installation pest management operations. Some pest management consultants may be designated by their component as certifying officials.

C11.2.9. Pesticide. Any substance or mixture of substances, including biological control agents and disinfectants, that may prevent, destroy, repel, or mitigate pests.

C11.2.10. Pesticide Waste. Materials subject to pesticide disposal restrictions including:

C11.2.10.1. Any pesticide that has been identified by the pest management consultant as cancelled under US or Portuguese authority;

C11.2.10.2. Any pesticide that does not meet specifications, is contaminated, has been improperly mixed, or otherwise unusable, whether concentrated or diluted;

C11.2.10.3. Any material used to clean up a pesticide spill; or

C11.2.10.4. Any containers, equipment, or material contaminated with pesticides. Empty pesticide containers that have been triple rinsed are not considered hazardous waste, and can be disposed of as normal solid waste according to the requirements of paragraph C11.3.12.

C11.2.11. Plants. Living plants and living parts of plants, including fresh fruit and seeds.

C11.2.12. Plant Products. Parts of plants or products derived from plants in the unprocessed state that have undergone only simple preparation such as milling, drying or pressing.

C11.2.13. Plant Protection Products. Substances and preparations containing 1 or more active substances intended to:

C11.2.13.1. Protect plants or plant products against pests or prevent the action of such organisms, as far as such substances or preparations are not otherwise defined below;

C11.2.13.2. Influence the life processes of plants, other than as a nutrient, (e.g., growth regulators);

C11.2.13.3. Assure preservation of plant products from pests;

C11.2.13.4. Destroy undesired plants;

C11.2.13.5. Destroy parts of plants and/or reduce or prevent undesired growth of plants; or

C11.2.13.6. Be used like adjuvants.

C11.2.14. Registered Pesticide. A pesticide or plant protection product registered and approved for sale or use within the US or Portugal, subject to the restrictions found in paragraph C11.3.6.

C11.3. CRITERIA

C11.3.1. All pesticide and plant protection product applications, excluding arthropod skin and clothing repellents, will be recorded using DD Form 1532-1 “Pest Management Maintenance Report,” or a computer-generated equivalent. These records will be archived for permanent retention in accordance with specific service procedures. The Pest Management Maintenance Report has been assigned Report Control Symbol DD-A&T (A&AR) 1080 in accordance with DoD 8910-M, “DoD Procedures for Management of Information Requirements.”

C11.3.2. Installations will implement and maintain a current pest management plan that includes measures for all installation activities and satellite sites that perform pest control. This written plan will include IPM procedures for preventing pest problems in order to minimize the use of pesticides. The plan must be reviewed and approved in writing by the appropriate pest management consultant.

C11.3.3. All pesticide and plant protection product applications will be made by certified applicators, with the following exceptions:

C11.3.3.1. New DoD employees who are not certified may apply pesticides during an apprenticeship period not to exceed 2 years and only under the supervision of a certified pesticide applicator;

C11.3.3.2. Arthropod skin and clothing repellents; and

C11.3.3.3. Pesticides applied as part of an installation’s self-help program.

C11.3.4. All pesticide and plant protection product applicators will be included in a medical surveillance program to monitor the health and safety of persons occupationally exposed to pesticides.

C11.3.5. All pesticide and plant protection product applicators will be provided with personal protective equipment (PPE) appropriate for the work they perform and the types of pesticides to which they may be exposed in accordance with label specifications.

C11.3.6. Installations will only use registered pesticides found on the Armed Forces Pesticide Management Board’s (AFPMB) Standard Pesticide List which have Portuguese-approved equivalents (i.e., same manufacturer and same formulation), or Portuguese registered pesticides approved in writing by the appropriate pest management consultant. This shall be documented as part of the approval of the pest management plan.

C11.3.6.1. AFPMB standard pesticides and adjuvants shall be labeled in accordance with Chapter 5.

C11.3.6.2. Registered pesticides will only be used for the process and purpose for which they are intended, as specified on the product labels and documentation. Further, the registered pesticides shall be used sparingly and in a manner that combines physical, biological, chemical, and other measures, as appropriate, to control the target pest.

C11.3.7. Pesticides will be included in the installation spill contingency plan (See Chapter 18, “Spill Prevention and Response Planning”).

C11.3.8. Pest management facilities, including mixing and storage areas, will comply with Armed Forces Pest Management Board Technical Guide Number 17 “Design of Pest Management Facilities” (August 2009).

C11.3.9. Labels will bear the appropriate use instructions and precautionary message based on the toxicity category of the pesticide ("danger," "warning," or "caution").

C11.3.10. Material Safety Data Sheets (MSDSs) and manufacturer-generated labels for all pesticides will be available at the storage and holding facility.

C11.3.11. Pesticide and plant protection product storage areas will contain a readily-visible current inventory of all items in storage, including items awaiting disposal, should be regularly inspected and shall be secured to prevent unauthorized access.

C11.3.12. Unless otherwise restricted or canceled, pesticides and plant protection products in excess of installation needs will be redistributed within the supply system or disposed of in accordance with procedures outlined below.

C11.3.12.1. The generator of pesticide wastes will determine if waste is considered hazardous or not in accordance with Chapter 6, “Hazardous Waste.”

C11.3.12.2. Pesticide waste determined to be hazardous waste will be disposed of in accordance with the criteria for hazardous waste disposal in Chapter 6, “Hazardous Waste.”

C11.3.12.3. Pesticide waste that is determined not to be a hazardous waste will be disposed of in accordance with the label instructions, through DLA Disposition Services, as a solid waste. Pesticide containers shall be crushed or the top and bottom portions shall be removed to prevent reuse.

C11.3.12.4. Additional Requirements on Plant Protection Product Wastes

C11.3.12.4.1. Management of plant protection product containers:

C11.3.12.4.1.1. Rigid containers that have contained plant protection products intended for the preparation of a liquid pesticide, weighing less than 25 kg, shall be washed three times, and the washing water shall be used in the preparation. Thereafter, the containers shall be emptied, tightly closed and put in transparent and impermeable bags and stored in a proper storage area.

C11.3.12.4.1.2. Containers that have contained plant protection products, weighing more than 250 kg, shall not be washed. They shall be stored in a proper storage area.

C11.3.12.4.1.3. All other containers not covered by C11.3.12.4.1.1. and C11.3.12.4.1.2. shall be emptied without being washed, tightly closed and stored in a proper storage area.

C11.3.12.4.1.4. All excess plant protection products and packaging waste that has been contaminated with plant protection products shall be considered as hazardous waste and managed in accordance with Chapter 6, “Hazardous Waste.”

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Chapter 12

HISTORIC AND CULTURAL RESOURCES

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CHAPTER 12

HISTORIC AND CULTURAL RESOURCES

C12.1. SCOPE

This Chapter contains criteria for required plans and programs needed to ensure proper protection and management of historic and cultural resources, such as properties included on the World Heritage List or on the Portuguese Register of Cultural Heritage.

C12.2. DEFINITIONS

C12.2.1. Adverse Effect. Changes that diminish the quality or significant value of cultural resources.

C12.2.2. Archeological Resource. Any material remains of prehistoric or historic human life or activities. Such resources include, but are not limited to: pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion of any of the foregoing items.

C12.2.3. Cultural Mitigation. Specific steps designed to lessen the adverse effects of a DoD action on cultural heritage including:

C12.2.3.1. Limiting the magnitude of the action;

C12.2.3.2. Relocating the action in whole or in part;

C12.2.3.3. Repairing, rehabilitating, or restoring the affected resources, affected property; and

C12.2.3.4. Recovering and recording data from cultural properties that may be destroyed or substantially altered.

C12.2.4. Historical or Cultural Resources. Physical remains of any prehistoric or historic district, site, building, structure, or object significant in world, national, or local history, architecture, archaeology, engineering, culture, paleontology, linguistic, artistic, ethnographical, industrial or technical. The term includes artifacts, archaeological resources, records, and material remains that are related to such a district, site, building, structure, or object, and also includes natural resources (plants, animals, landscape features, etc.) that may be considered important as a part of a country's traditional culture, history, authenticity, originality, antiquity, rarity, individuality, or exemplariness. The term also includes any property listed on the World Heritage List or the Portuguese Register of Cultural Heritage. In Portugal, cultural and historic resources are often referred to as "Cultural Heritage."

C12.2.5. Historic and Cultural Resources Program. Identification, evaluation, documentation, curation, acquisition, protection, rehabilitation, restoration, management, stabilization, maintenance, recording, and reconstruction of historic and cultural resources and any combination of the foregoing.

C12.2.6. Immovable Cultural and Historic Resources. Historical or cultural resources of architectural, urban or landscape type with meaningful collective, social or cultural value.

C12.2.7. Inventory. To determine the location of historic and cultural resources that may have world, national, or local significance.

C12.2.8. Material Remains. Physical evidence of human habitation, occupation, use, or activity, including the site, loci, or context in which such evidence is situated including:

C12.2.8.1. Surface or subsurface structures;

C12.2.8.2. Surface or subsurface artifact concentrations or scatters;

C12.2.8.3. Whole or fragmentary tools, implements, containers, weapons, clothing, and ornaments;

C12.2.8.4. By-products, waste products, or debris resulting from manufacture or use;

C12.2.8.5. Organic waste;

C12.2.8.6. Human remains;

C12.2.8.7. Rock carvings, rock paintings, and intaglios;

C12.2.8.8. Rock shelters and caves;

C12.2.8.9. All portions of shipwrecks; or

C12.2.8.10. Any portion or piece of any of the foregoing.

C12.2.9. Preservation. The act or process of applying measures to sustain the existing form, integrity, and material of a building or structure, and the existing form and vegetative cover of a site. It may include initial stabilization work where necessary, as well as ongoing maintenance of the historic building materials.

C12.2.10. Protection. The act or process of applying measures designed to affect the physical condition of a property by safeguarding it from deterioration, loss, attack or alteration, or to cover or shield the property from danger or injury. In the case of buildings and structures, such treatment is generally temporary and anticipates future historic preservation treatment; in the case of archaeological sites, the protective measure may be temporary or permanent.

C12.2.11. Protection Zone for Immovable Cultural and Historic Resources. Areas of restricted activity for the protection of immovable items or artifacts, either classified or in the process of being classified.

C12.2.12. Supplemental Protection Zone for Immovable Cultural and Historic Resources. Areas of restricted activity that supplement the protection zones and are determined on a case by case basis.

C12.3. CRITERIA

C12.3.1. Installation commanders shall take into account the effect of any action on any property listed on the World Heritage List or on the Portuguese Register of Cultural Heritage for purposes of avoiding or mitigating any adverse effects.

C12.3.2. Installations shall have access to the World Heritage List and the Portuguese Register of Cultural Heritage.

C12.3.3. Installation commanders shall ensure that personnel performing historic or cultural resource functions have the requisite expertise in world, national, and local history and culture. This may be in-house, contract, or through consultation with another agency. Government personnel directing such functions must have training in historic or cultural resource management.

C12.3.4. Installations shall, after coordination with the Portuguese installation commander or similar appropriate Portuguese authorities, prepare, maintain, and implement a cultural resources management plan that contains information needed to make appropriate decisions about cultural and historic resources identified on the installation inventory, and for mitigation of any adverse effects.

C12.3.5. Installations shall, after coordination with the Portuguese Base Commander or similar appropriate Portuguese authorities, and if financially and otherwise practical:

C12.3.5.1. Inventory historic and cultural resources in areas under DoD control. An inventory shall be developed from a records search and visual survey. At a minimum, protection zones and supplemental protection zones for immovable cultural and historic resources listed under the DoD inventory will be identified as part of the inventory.

C12.3.5.2. Establish measures sufficient to protect known historic or cultural resources until appropriate mitigation or preservation can be completed.

C12.3.5.3. Establish measures sufficient to protect known archeological resources until appropriate mitigation or preservation can be completed.

C12.3.6. Installation commanders shall establish measures to prevent DoD personnel from disturbing or removing historic or cultural resources without permission of the appropriate Portuguese authorities.

C12.3.7. Installations shall request permits to disturb or remove any historic or cultural resources through the Portuguese Base Commander.

C12.3.8. In addition to municipal permits, any work that modifies the topography, alignment and, in general, the landscapes and the external facades of buildings situated within Protection Zones and Supplemental Protection Zones for Immovable Cultural and Historic Resources requires prior permission from the competent cultural heritage authority in the area. Request the Portuguese Base Commander to apply for permission on behalf of the installation.

C12.3.9. Installation commanders shall ensure that planning for major actions includes consideration of possible effects on historic or cultural resources.

C12.3.10. If potential historic or cultural resources not previously inventoried are discovered in the course of a DoD action, the newly-discovered items will be preserved and protected pending a decision on final disposition by the installation commander. The decision on final disposition will be made by the installation commander after coordination with the Portuguese Base Commander or similar appropriate Portuguese authorities.

Chapter 13

NATURAL RESOURCES AND ENDANGERED SPECIES

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CHAPTER 13

NATURAL RESOURCES AND ENDANGERED SPECIES

C13.1. SCOPE

This Chapter contains criteria for required plans and programs needed to ensure proper protection, enhancement, and management of natural resources and any species (flora or fauna) declared endangered or threatened by either the US or Portuguese governments.

C13.2. DEFINITIONS

C13.2.1. Adverse Effect. Changes that diminish the quality or significant value of natural resources. For biological resources, adverse effects include significant decreases in overall population diversity, abundance, and fitness.

C13.2.2. Conservation. Planned physical, ecological, sociological or economic management, use, protection, and restoration; continued benefit for present and future generations; and prevention of exploitation, destruction and/or neglect of natural values and natural resources.

C13.2.3. Conservation Status of a Species. The sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within designated territories within Europe. The conservation status will be taken as favorable when:

C13.2.3.1. Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;

C13.2.3.2. The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and

C13.2.3.3. There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

C13.2.4. Harmful Organism. Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products.

C13.2.5. Management Plan. A document describing natural resources, their quantity, condition, and actions necessary to ensure their conservation and good stewardship.

C13.2.6. Natural Habitats. Terrestrial or aquatic areas designated by Portuguese authorities, distinguished by geographic, biotic and biotic features, whether entirely natural or semi-natural.

C13.2.7. Natural Resource. All living and inanimate materials supplied by nature that are of aesthetic, ecological, educational, historical, recreational, and scientific or other value.

C13.2.8. Natural Resources Management. Action taken that combine science, economics, and policy to study, manage, and restore natural resources to strike a balance with the needs of peope and the ability of the ecosystem to support soil, water, forest, fish, wildlife, and coastal resources.

C13.2.9. Plants. Plants and parts of plants, including fresh fruit and seeds.

C13.2.10. Significant Land or Water Area. Land or water area that is normally 500 or more acres outside the cantonment area; areas of smaller size are included if they have natural resources that are especially vulnerable to disturbance.

C13.2.11. Portuguese Protected Species. Any species of flora or fauna listed or designated by Portugal, because the species' continued existence is, or is likely to be, threatened and is therefore subject to special protection from destruction or adverse modification of associated habitat. Lists of Portuguese Protected Species can be obtained from the EEA.

C13.2.12. Specimen. Any animal or plant, whether alive or dead, of Community Interest, any part or derivative as well as any other goods which appear, from an accompanying document, the packaging or a mark or label, or from any other circumstances, to be parts or derivatives of animals or parts of those species.

C13.3. CRITERIA

C13.3.1. Installations that have land and water areas shall take reasonable steps to protect and enhance known Portuguese protected species and their habitat. At a minimum, the following prohibitions concerning Portuguese protected animal and plant species to include all species of naturally occurring birds, including migratory birds, in the wild along with their eggs, nests and habitats, shall be complied with at all stages of their biological cycle:

C13.3.1.1. Capture, kill, abate, or detain protected animals, regardless of the method.

C13.3.1.2. Disturb Portuguese protected wild animals and any species of wild bird, during the period of breeding, rearing, hibernation and migration.

C13.3.1.3. Destroy, damage, collect or take eggs or nests from the wild even if the nest is empty.

C13.3.1.4. Damage or destroy breeding sites or resting places of Portuguese protected animals.

C13.3.1.5. Exhibit commercially, sell, supply, trade, keep, transport for sale, or exchange and offer for sale or exchange of Portuguese Protected animal species taken from the wild, dead or alive, or any of their parts.

C13.3.1.6. Pick, collect, cut, uproot or destroy of Portuguese protected plants in their natural environment or natural range in the wild; and

C13.3.1.7. Keep, transport and sell or exchange and offer for sale or exchange of plant specimens of such species taken in the wild.

C13.3.2. Disturb protected wild animals or birds of any species so as to significantly affect the ability of a species to survive, breed, or rear or nurture their young; or to significantly affect the local distribution or abundance of that species. Installations shall maintain, or have access to, a current list of Portuguese protected species and habitats. Contact the EEA for the Protected Species of Portugal annex to the Chapter.

C13.3.3. Installations with significant land or water areas shall, after coordination with the Portuguese Base Commander or similar appropriate Portuguese authorities, develop natural resources management plans. At a minimum, natural resources management plans shall include Portuguese designated natural resource management areas within the operational area of the DoD installation or that may be impacted by the DoD installation, and shall detail land use plans and restrictions as applicable.

C13.3.4. Installations having natural resources management plans shall, after coordination with the Portuguese Base Commander or similar appropriate Portuguese authorities, and if financially and otherwise practical, and in such a way that there is no net loss of mission capability:

C13.3.4.1. Conduct a survey to determine the presence of any Portuguese protected species, or support Portuguese surveys.

C13.3.4.2. Implement natural resources management plans.

C13.3.5. The Portuguese Base Commander, will be notified of the discovery of any protected species not previously known to be present on the installation. If the installation at issue does not appear to fall under the responsibility of any Portuguese Base Commander, the DoD installation shall request clarification from the EEA via the chain of command.

C13.3.6. Installations shall maintain grounds to meet designated mission use and ensure harmony with the natural landscape and/or the adjacent Portuguese facilities where practical.

C13.3.7. Installations shall ensure that personnel performing natural resource functions have the requisite expertise in the management of their discipline (i.e., endangered or threatened species, Portuguese protected species, wetlands, soil stabilization). This may be in-house, contract, or through consultation with another agency. Government personnel directing such functions must have training in natural resources management.

C13.3.8. Installations shall place emphasis on the maintenance and protection of habitats favorable to the reproduction and survival of indigenous flora and fauna.

C13.3.9. Land and vegetative management activities will be consistent with current conservation and land use principles (e.g., ecosystem protection, biodiversity conservation, and mission-integrated land use).

C13.3.10. Installations shall utilize protective vegetative cover or other standard soil erosion/sediment control practices to control dust, stabilize sites, and avoid silting of streams.

C13.3.11. The introduction, dissemination, or liberation of non-indigenous species is prohibited (contact the EEA for the Protected Species of Portugal annex, which contains a list of Portuguese Invasive Species and Species of High Ecological Risk).

Chapter 14

POLYCHLORINATED BIPHENYLS

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CHAPTER 14

POLYCHLORINATED BIPHENYLS

C14.1. SCOPE

This Chapter contains criteria to control and abate threats to human health and the environment from the handling, use, storage and disposal of polychlorinated biphenyls (PCBs). These criteria include specific requirements for most uses of PCBs, including, but not limited to, transformers, capacitors, heat transfer systems, hydraulic systems, electromagnets, switches and voltage regulators, circuit breakers, reclosers and cables.

C14.2. DEFINITIONS

C14.2.1. Capacitor. A device for accumulating and holding a charge of electricity and consisting of conducting surfaces separated by a dielectric.

C14.2.2. Decontamination. All operations that enable equipment, objects, materials or fluids contaminated with PCBs to be reused, recycled or disposed.

C14.2.3. In or Near Commercial Buildings. Within the interior of, on the roof of, attached to the exterior wall of, in the parking area serving, or within 30 meters of a non-industrial, non-substation building.

C14.2.4. Incinerator. An engineered device using controlled flame combustion to thermally degrade PCBs and PCB items. Examples include rotary kilns, liquid injection incinerators, cement kilns, and high temperature boilers.

C14.2.5. Leak or Leaking. Any instance in which a PCB article, PCB container, or PCB equipment has any PCBs on any portion of its external surface.

C14.2.6. Mark. The descriptive name, instructions, cautions, or other information applied to PCBs and PCB items, or other objects subject to these standards.

C14.2.7. Marked. PCB items and PCB storage areas and transport vehicles marked by a legible indelible, embossed or engraved sign or by any other method that meets these criteria.

C14.2.8. Non-PCB Transformers. Any transformer that contains less than 50 ppm PCB.

C14.2.9. PCB. Any of the following substances, including mixtures where the concentration of any of the listed chemicals below is more than 50 ppm:

C14.2.9.1. polychlorinated biphenyls (PCBs);

C14.2.9.2. polychlorinated terphenyls (PCTs);

C14.2.9.3. monomethyl-tetrachloro-diphenyl methane;

C14.2.9.4. monomethyl-dichloro-diphenylmethane; and

C14.2.9.5. monomethyl-dibromo-diphenyl methane

C14.2.10. PCB Article. Any manufactured article, other than a PCB container, that contains PCBs and whose surface(s) has been in direct contact with PCB. This includes capacitors, transformers, electric motors, pumps, and pipes.

C14.2.11. PCB Article Container. Any package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB articles or PCB equipment, and whose surface(s) has not been in direct contact with PCBs.

C14.2.12. PCB Container. Any package, can, bottle, bag, barrel, drum, tank, or other device that contains PCBs or PCB articles, and whose surface(s) has been in direct contact with PCBs.

C14.2.13. PCB-Contaminated Equipment. Any equipment including, but not limited to, transformers, capacitors, circuit breakers, reclosers, voltage regulators, switches, electromagnets, and cable, or receptacle containing residual stocks that:

C14.2.13.1. Contains 5 liters (1.32 US gallons) or more PCB, or

C14.2.13.2. Such equipment having contained 5 liters (1.32 US gallons) or more PCB that has not been decontaminated.

C14.2.14. PCB Equipment. Any manufactured item, other than a PCB container or a PCB article container, which contains a PCB article or other PCB equipment, and includes microwave ovens, electronic equipment, and fluorescent light ballasts and fixtures.

C14.2.15. PCB Item. Any PCB article, PCB article container, PCB container, transformers, capacitors, receptacles containing residual stocks or PCB equipment that deliberately or unintentionally contains or has contained or has as a part of it any PCB, or PCBs at a concentration of 50 ppm or greater and has not been decontaminated. All items that may contain PCBs shall be treated as PCB-containing, unless it is reasonable to assume the contrary.

C14.2.16. PCB Large High Voltage Capacitor. A capacitor that contains 1.36 kg (3 lbs) or more of dielectric fluid and which operates at 2,000 volts (alternating current (ac) or direct current (dc)) or above.

C14.2.17. PCB Large Low Voltage Capacitor. A capacitor that contains 1.36 kg (3 lbs) or more of dielectric fluid and which operates below 2,000 volts (ac or dc).

C14.2.18. PCB Transformer. Any transformer that contains 50 ppm PCB or greater.

C14.2.19. Restricted Access Area. Areas where access by unauthorized personnel is controlled by fences, other man-made structures or naturally-occurring barriers such as mountains, cliffs, or rough terrain.

C14.2.20. Substantial Contact Area. An area that is subject to public access on a routine basis or which could result in substantial dermal contact by employees.

C14.3. CRITERIA

C14.3.1. PCB Restrictions

C14.3.1.1. Transformers containing less than 500 ppm PCB of dielectric fluid may be used until taken out of use, recycled or disposed of.

C14.3.1.2. PCB items that are a component of another piece of equipment (neither of which are PCB-contaminated equipment) may be used until that piece of equipment is taken out of use, recycled or disposed of.

C14.3.1.3. The separation of PCBs from other substances with the intent to re-use the PCBs is prohibited.

C14.3.1.4. All other existing PCB items shall immediately be removed from service and disposed of according to C14.3.6. Storage prior to disposal shall be in accordance with C14.3.5.

C14.3.2. General

C14.3.2.1. The installation spill contingency plan will address PCB items, including temporary storage items. Chapter 18, "Spill Prevention and Response Planning," provides criteria on how to prepare these plans.

C14.3.2.2. Spills of PCB liquids at concentrations of 50 ppm or greater will be responded to immediately upon discovery and cleaned up in accordance with the following:

C14.3.2.2.1. Surfaces that are located in substantial contact areas will be cleaned to 10 micrograms (ųg) per 100 square centimeters (cm^2).

C14.3.2.2.2. Surfaces in all other contact areas will be cleaned to 100 ųg/100 cm^2.

C14.3.2.2.3. Contaminated soil located in restricted access areas will be removed until the soil tests no higher than 25 ppm PCBs and will be backfilled with clean soil containing less than 1 ppm PCBs. Restricted access areas in which PCB spills have been cleaned up shall have annotated on installation real property records the level of PCBs remaining in the soil, including the extent, date and type of sampling and a reference to any reports documenting the site conditions.

C14.3.2.2.4. Contaminated soil located in unrestricted access areas will be removed to a minimum depth of 10 inches or until the soil tests no higher than 10 ppm PCBs, whichever is deeper, and will be backfilled with clean soil containing less than 1 ppm PCBs.

C14.3.2.3. All PCB transformers, PCB large high voltage capacitors, PCB containers, and certain PCB items containing PCBs at concentrations 50 ppm or greater (i.e., electric motors using PCB coolants, hydraulic systems using PCB hydraulic fluid, and heat transfer systems using PCBs), as well as any PCB article containers used to store the preceding items, must be prominently marked in English and Portuguese. The marking must identify the item as containing PCBs, warn against improper disposal and handling, and provide a phone number in case of spills or if questions arise about disposal. This marking criterion also applies to rooms, vaults, and storage areas containing PCB transformers or storing PCBs or PCB items for disposal. In addition, the following PCB items must be marked at the time of items' removal from use if not already marked: PCB large low voltage capacitors and equipment containing a PCB transformer or PCB large high voltage capacitor.

C14.3.2.3.1. All equipment containing or assumed to contain PCBs at concentrations between 50 and 500 ppm PCBs shall be labelled as 'PCB-contaminated < 500 ppm' ('PCB contaminados < 500 ppm').

C14.3.2.3.2. Additionally, PCB-Contaminated Equipment (e.g., PCB-items containing greater than 5 liters [1.3 US gallons] in volume of PCBs), shall bear the following specifications:

C14.3.2.3.2.1. Harmful Hazard Symbol (Xn) (refer to Chapter 5, "Hazardous Materials");

C14.3.2.3.2.2. Risk phrases and safety procedures;

C14.3.2.3.2.3. 'Contains polychlorinated biphenyls – PCB' ('Contém policlorobifenilos – PCB');

C14.3.2.3.2.4. 'Danger of accumulative effects' ('Perigo de efeitos cumulativos');

C14.3.2.3.2.5. 'Do not dispose of this product or its container without the necessary precautions' ('Não se desfazer deste produto ou do recipiente sem tomar as devidas precauções');

C14.3.2.3.2.6. 'In the event of fire or explosion, do not inhale the smoke' ('Em caso de incêndio e ou explosão, não respirar os fumos'); and

C14.3.2.3.2.7. Additional information:

C14.3.2.3.2.7.1. Name, address and telephone and fax numbers of the contact persons in case of leaks or spills, and

C14.3.2.3.2.7.2. 'To be disposed of in authorized facilities' ('Quando da eliminação, enviar para instalação autorizada para o efeito').

C14.3.2.3.3. Each item of decontamination equipment must be clearly marked with a legible indelible, embossed or engraved sign that must include the information listed in Appendix C14.A1. in both Portuguese and English.

C14.3.2.4. Each installation having PCB items will maintain a written inventory that includes a current list by type of all marked PCB items in use and PCB items (whether or not marked) placed into storage for reuse, disposal or disposed of for that year (refer to Appendix C14.A2.). For PCB items where the content of PCB is 500 ppm or greater, the inventory shall also include the quantity of PCB contained in that item and specifying, as far as practicable, the particular substance or mixture concerned, contact information including name, date, telephone and address, dates and types of treatment or replacement carried out or envisaged. Inventories shall be regularly updated whenever a modification occurs, and inventory records should be maintained for a period of time at least 3 years after disposal of the last item on the list.

C14.3.2.5. Disposal of PCB items will only be through the servicing DLA Disposition Service in accordance with DoD 4160.21-M, "Defense Material Management Regulation," or subsection C14.3.6.

C14.3.2.6. All periodic inspections required in this Chapter will be documented at the installation. Records of inspections and maintenance history will be maintained for three years after disposal of the transformer.

C14.3.3. <u>PCB transformers</u>

C14.3.3.1. Transformers containing 500 ppm PCBs or greater will immediately be decontaminated to below 500 ppm or taken out of service and disposed of. If practicable, decontamination should reduce PCB levels to below 50 ppm. The replacement fluid not containing PCBs must entail markedly less risks, and must not compromise the subsequent disposal of PCBs. Decontaminated transformers must be clearly labeled with an indelible and embossed or engraved sign containing the information listed in Appendix C14.A1.

C14.3.3.2. PCB transformers that are in use or in storage for reuse will not be used in any application that poses a risk of contamination to food, water or feed.

C14.3.3.3. All PCB transformers, including those in storage for reuse, will be registered with the servicing fire department.

C14.3.3.4. PCB transformers in use in or near commercial buildings or located in sidewalk vaults will be equipped with electrical protection to minimize transformer failure that would result in the release of PCBs.

C14.3.3.5. PCB transformers removed and stored for reuse will only be returned to their original application and location and will not be used at another location unless there is no practical alternative; and any such alternative use will not exceed one year.

C14.3.3.6. The maintenance of PCB-containing transformers is prohibited, except those transformers that are in good working order and do not leak and where such maintenance is for the purpose of ensuring that PCBs comply with technical standards or specifications regarding dielectric quality. If replacement of fluid is necessary, dielectric replacement fluid must contain less than 500 ppm; where practicable, use dielectric fluid containing less than 50 ppm PCBs.

Refer to criterion C14.3.7 regarding the elimination of PCB products. When required, PCB transformers will be serviced as follows:

C14.3.3.6.1. The topping off of PCB-containing transformers and PCB-contaminated equipment with PCB-containing fluids is prohibited;

C14.3.3.6.2. Any servicing of PCB transformers requiring removal of the transformer coil is prohibited;

C14.3.3.6.3. PCBs removed during servicing will be captured and disposed of in accordance with subsection C14.3.6. of this Chapter; and

C14.3.3.6.4. The dielectric fluid from a PCB transformer will not be mixed with the dielectric fluid from PCB-contaminated equipment.

C14.3.3.7. If any PCB transformer is involved in a fire and was subjected to heat and/or pressure sufficient to result in violent or nonviolent rupture, the installation will take measures to control water runoff, such as blocking floor drains. Runoff water will be tested and treated if required.

C14.3.3.8. Leaking PCB transformers shall be repaired or replaced within 48 hours or as soon as possible. Leaking PCB transformers not repaired or replaced will be inspected daily. Leaking PCB fluid will be containerized.

C14.3.3.9. All transformers will be considered and treated as PCB transformers unless information to the contrary exists.

C14.3.4. <u>Other PCB Items</u>

C14.3.4.1. Electromagnets, switches, and voltage regulators that may contain PCBs at any concentration are serviced as follows:

C14.3.4.1.1. The topping off of PCB items and PCB-contaminated equipment with PCB containing fluids is prohibited;

C14.3.4.1.2. Servicing any electromagnet, switch, or voltage regulator with a PCB concentration of 500 ppm or greater which requires the removal and rework of the internal components is prohibited;

C14.3.4.1.3. PCBs removed during servicing will be captured and disposed of properly; and

C14.3.4.1.4. PCBs from electromagnets, switches, and voltage regulators with a PCB concentration of 500 ppm or greater will not be mixed with or added to dielectric fluid from PCB-contaminated equipment.

C14.3.4.2. Capacitors containing PCBs at any concentration must be managed as follows:

C14.3.4.2.1. Use and storage for reuse of PCB large high-voltage capacitors and PCB large low-voltage capacitors which pose an exposure risk to food or feed is prohibited;

C14.3.4.2.2. Use of PCB large high-voltage and PCB large low-voltage capacitors is prohibited unless the capacitor is used within a restricted-access electrical substation or in a contained and restricted-access indoor installation. The indoor installation will not have public access and will have an adequate roof, walls, and floor to contain any release of PCBs; and

C14.3.4.3. Any PCB item removed from service will be marked with the date it is removed from service.

C14.3.5. Storage

C14.3.5.1. PCBs and PCB items at concentrations 50 ppm or greater that have been removed from service and are awaiting disposal shall be stored in accordance with the requirements of Chapter 6, "Hazardous Waste." These items shall be transferred as soon as possible for their subsequent decontamination and/or disposal at licensed facilities, but may not be stored more than the maximum period of one year in a facility that will assure the containment of PCBs, including:

C14.3.5.1.1. Roofs and walls of storage buildings that exclude rainfall;

C14.3.5.1.2. A containment berm, at least 15.25 centimeters (6 inches) high, sufficient to contain twice the internal volume of the largest PCB article or 25% of the total internal volume of all PCB articles or containers stored, whichever is greater;

C14.3.5.1.3. Drains, valves, floor drains, expansion joints, sewer lines or other openings constructed to prevent any release from the bermed area;

C14.3.5.1.4. Continuous, smooth and impervious flooring material; and

C14.3.5.1.5. To the maximum extent possible, a new PCB storage area will be located to minimize the risk of release due to seismic activity, floods, or other natural events. For facilities located where there is a high possibility of such risks, the installation spill prevention and control plan will address the risk.

C14.3.5.2. The following items may be stored temporarily in an area, subject to weekly inspection, that does not comply with the above requirements for up to 30 days from the date of removal from service:

C14.3.5.2.1. Non-leaking PCB items, marked to indicate whether it is a PCB article or PCB equipment;

C14.3.5.2.2. Leaking PCB articles and PCB equipment placed in a non-leaking PCB container that contains sufficient absorbent material to absorb fluid contained in the PCB article or equipment;

C14.3.5.2.3. PCB containers in which non-liquid PCBs have been placed; and

C14.3.5.2.4. PCB containers in which PCBs at a concentration between 50-499 ppm have been placed, and whose containers are marked to indicate there is less than 500 ppm PCB.

C14.3.5.3. Non-leaking and structurally-undamaged large high-voltage PCB capacitors and PCB-contaminated equipment that have not been drained of free-flowing dielectric fluid may be stored on pallets, or raised platforms, next to a storage area meeting subsection C14.3.5. criteria if they are inspected weekly.

C14.3.5.4. All other PCB storage areas will be inspected at least monthly.

C14.3.5.5. Containers used for the storage of PCBs will be at least as secure as those required for their transport for disposal by the servicing DLA Disposition Service.

C14.3.5.6. PCB and PCB items shall be kept away from flammable products and all the necessary precautions shall be adopted in order to prevent any risk of fire during storage.

C14.3.6. Disposal

C14.3.6.1. Installations that generate PCB waste of 50 ppm or greater PCB will maintain an audit trail for the wastes at least as stringent as that required in Chapter 6, “Hazardous Waste.” Installations will coordinate and obtain concurrence with Portugal for in-country PCB disposal as for HW disposal. Incineration and land disposal of PCBs and PCB Items shall only be conducted in properly permitted facilities approved to accept the waste.

C14.3.6.2. Disposal of PCB waste shall comply with the following:

C14.3.6.2.1. PCB-contaminated dielectric fluid with concentrations greater than 500 ppm will only be disposed in an incinerator with 99.9% combustion efficiency.

C14.3.6.2.2. PCB-contaminated dielectric fluid with concentrations 50 ppm or greater, but less than 500 ppm, will only be disposed of as follows:

C14.3.6.2.2.1. In an incinerator with 99.9% combustion efficiency; or

C14.3.6.2.2.2. In a high-efficiency boiler that is rated at a minimum of 14.64 MW (50 MBtu/hr) and is fuelled by natural gas, oil or coal.

C14.3.6.2.3. Rags, soil, and other debris with PCBs at concentrations of 50 ppm or greater will be disposed of:

C14.3.6.2.3.1. In an incinerator with 99.9% combustion efficiency; or

C14.3.6.2.3.2. In a chemical waste landfill.

C14.3.6.2.4. PCB transformers will be disposed of:

C14.3.6.2.4.1. In an incinerator with 99.9% combustion efficiency; or

C14.3.6.2.4.2. In a chemical waste landfill, provided the transformers, and all their inner workings, are first drained of all free-flowing liquids.

C14.3.6.2.5. PCB capacitors will be disposed of as follows:

C14.3.6.2.5.1. in an incinerator with 99.9% combustion efficiency, except,

C14.3.6.2.5.2. Intact non-leaking small PCB capacitors may be disposed of in a solid waste landfill unless large quantities (more than 100 pounds) are identified at the same time.

C14.3.6.2.6. PCB hydraulic machines containing PCBs may be disposed of as municipal solid waste if:

C14.3.6.2.6.1. The machines containing PCBs at concentrations of 50 ppm or greater are drained of all free-flowing liquid.

C14.3.6.2.6.2. The machines containing PCB liquid of 1,000 ppm or greater are flushed prior to disposal with a solvent containing less than 50 ppm PCB.

C14.3.6.2.7. PCB-contaminated equipment, except capacitors, will be disposed of as municipal solid waste only after draining all free-flowing liquid.

C14.3.6.2.8. PCB articles, other than those already described, will be disposed of:

C14.3.6.2.8.1. In an incinerator with 99.9% combustion efficiency; or

C14.3.6.2.8.2. In a chemical waste landfill, provided the articles are first drained of all free-flowing liquids.

C14.3.6.2.9. PCB containers with concentrations of 500 ppm or greater may be disposed of:

C14.3.6.2.9.1. In an incinerator with 99.9% combustion efficiency; or

C14.3.6.2.9.2. In a chemical waste landfill, provided the containers are first drained of all free-flowing liquids.

C14.3.6.2.10. Where PCB fluids, items, or articles are disposed of in a high-temperature boiler, the following procedures will be followed:

C14.3.6.2.10.1. The boiler must be rated at a minimum of 14.64 MW (50 million BTU hours);

C14.3.6.2.10.2. If the boiler uses natural gas or oil as the primary fuel, the carbon monoxide concentration in the stack must be 50 ppm or less and the excess oxygen is at least 3% when PCBs are being burned;

C14.3.6.2.10.3. If the boiler uses coal as the primary fuel, the carbon monoxide concentration in the stack is 100 ppm or less and the excess oxygen is at least 3% when PCBs are being burned;

C14.3.6.2.10.4. The mineral oil dielectric fluid does not comprise more than 10%, by volume, of the total fuel feed rate;

C14.3.6.2.10.5. The mineral oil dielectric fluid is not fed into the boiler unless the boiler is operating at its normal operating temperature and is not fed during start up or shut down operations;

C14.3.6.2.10.6. The performance of the boiler is continuously monitored for carbon monoxide and excess oxygen percentage in the stack gas while burning mineral oil dielectric fluid or, for boilers burning less than 112,500 liters (30,000 US gallons) of mineral oil dielectric fluid per year, monitoring is performed at least every 60 minutes;

C14.3.6.2.10.7. The primary fuel feed rates, mineral oil dielectric fluid feed rates, and the total quantities of both primary fuel and mineral oil dielectric fluid fed to the boiler are measured and recorded at least every 15 minutes; and

C14.3.6.2.10.8. The flow of mineral oil dielectric fluid is stopped if the criteria respecting carbon monoxide or excess oxygen are exceeded.

C14.3.6.2.11. Where PCB fluids, items or articles are disposed of in an incinerator, the following procedures will be followed:

C14.3.6.2.11.1. Combustion criteria shall maintain the introduced liquids for a 2-second dwell time at 1,200°C, plus or minus 100°C (2,200°F +/- 212°F), and 3% excess oxygen in the stack gas or maintenance of the introduced liquids for 1-1/2 second dwell time at 1,600°C, plus or minus 100°C (3,050°F +/- 212°F) and 2% oxygen in the stack gas;

C14.3.6.2.11.2. Combustion efficiency, measured by the ratio of concentration of carbon dioxide to the total concentration of both carbon dioxide and carbon monoxide, will be maintained at least 99.9%;

C14.3.6.2.11.3. The rate and quantity of PCBs that are fed to the combustion system shall be measured and recorded at regular intervals not greater than 15 minutes;

C14.3.6.2.11.4. The temperatures of the incineration process shall be continuously measured and recorded;

C14.3.6.2.11.5. The flow of PCBs to the incinerator shall stop automatically if temperature criteria are not met;

C14.3.6.2.11.6. Monitoring is conducted sufficient to determine that an incinerator to be used for disposal the first time will operate within the criteria above; and

C14.3.6.2.11.7. Continuous monitoring is conducted during incineration of PCBs for oxygen and carbon monoxide and periodic monitoring for carbon dioxide.

C14.3.6.2.12. PCB containers used to contain only PCBs at a concentration less than 500 ppm may be disposed of as municipal solid waste only after draining all free-flowing liquid.

C14.3.6.2.13. Other methods for disposing of PCBs, PCB items and/or PCB-containing equipment may be accepted, provided that they achieve equivalent environmental safety standards and fulfill the technical requirements referred to above.

C14.3.6.3. The regeneration of PCB-containing oils is permitted whenever the total destruction of PCBs in the regenerated oil is guaranteed.

C14.3.6.4. Retrogrades of PCB Items. DoD-generated PCB items manufactured in the US will be returned to the US for delivery to a permitted disposal facility if Portuguese or third country disposal is not possible, is prohibited, or will not be managed in an environmentally sound manner. Ensure that all PCB items and equipment are marked in accordance with criteria in subsection C14.3.2.3.

C14.3.7. Elimination of PCB Products

C14.3.7.1. Installations shall minimize the use of PCBs and PCB items without degrading mission performance.

C14.3.7.2. Installations shall not purchase or otherwise take control of PCBs or PCB items for use. Installations shall not distribute or sell PCB items.

C14.3.7.3. All procurement of transformers or any other equipment containing dielectric or hydraulic fluid shall be accompanied by a manufacturer's certification that the equipment contains no detectable PCBs (less than 2 ppm) at the time of shipment.

C14.3.7.4. Such newly procured transformers and equipment shall have permanent labels affixed stating they are PCB-free (no detectable PCBs).

C14.3.8. The transportation, treatment and disposal of PCB waste shall be conducted by licensed entities. If DoD intends to operate a treatment and/or disposal facility, contact the EEA for further guidance.

APPENDIX C14.A1. Decontamination Equipment Marking Information

List of information to be included on a legible, embossed, or engraved sign for decontamination equipment.

1. Decontaminated PCB equipment when
   a. Fluid containing PCBs was replaced will contain the following information:
      i. With________________________(Name of the substitute fluid)
      ii. On__________________________(Date the fluid was replaced)
      iii. By__________________________(Name of the company that replaced the fluid)
      iv. The concentration of PCBs in
         1. old fluid________________(ppm)
         2. new fluid_______________(ppm)

1. Equipamento descontaminado que tenha contido PCB
   a. fluido que continha PCB foi substituído
      i. por _________________________(name of the substitute)
      ii. em__________________________(date)
      iii. por _________________________(company name)
      iv. Concentração de PCB:
         1. no fluido anterior_________(ppm)
         2. no novo fluido___________(ppm)

Appendix C14.A2. Information to be included in the PCB Inventory

(a) Responsible office and point of contact information (name, address, telephone number, installation and contact person), municipality information and date of declaration.

(b) Information concerning PCB equipment in service in accordance with Table C14.T1.

(c) Information concerning PCB equipment out of service in accordance with Table C14.T1.

Table C14.T1. Description of PCB Equipment

Type of equipment [1]	Location[2]	End of use [3]	Municipality [4]	Quantity of PCBs (Kg) [5, 8]	Type of treatment /repair [6, 8]	Date [7, 8]

Notes:

1. Transformer, capacitor, resistor, induction coil, hydraulic instruments with fluids, others.
2. Inside or outside of buildings.
3. Estimated end of the useful life of the equipment.
4. Municipality where the equipment is installed or stored. The term municipality is meant to indicate location (community, district, council, area, etc. [i.e., Angra do Heroísmo]). The name of the DoD installation should also be included.
5. Quantity of PCBs present within the equipment.
6. Type of treatment or repair conducted or planned for the equipment
7. Date of treatment or repair conducted or planned for the equipment.
8. This information is optional for equipment containing PCBs in volumes greater than 5 liters (1.3 US gallons) which presents PCB concentrations of between 50 and 500 ppm.

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Chapter 15

ASBESTOS

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CHAPTER 15

ASBESTOS

C15.1. SCOPE

This Chapter contains criteria to control and abate threats to human health and the environment from asbestos, and describes management of asbestos during maintenance, removal and disposal activities. Policy requirements for a comprehensive Occupational Health and Safety program are not covered in this chapter. To protect DoD personnel from asbestos exposure, refer to DoDI 6055.1, "DoD Safety and Occupational Health (SOH) Program," and DoDI 6055.5, "Industrial Hygiene and Occupational Health," and concomitant service instructions.

C15.2. DEFINITIONS

C15.2.1. Adequately Wet. Sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions coming from ACM are observed, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.

C15.2.2. Asbestos. Generic term used to describe six distinctive varieties of fibrous mineral silicates, including chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any other of these materials that has been chemically treated and/or altered.

C15.2.3. Asbestos Action Level. A regulatory airborne concentration value set for asbestos at 0.1 fibers per cubic centimeter (f/cm^3) as an 8-hour time-weighted average and that when exceeded generally requires additional actions to be taken (i.e., increased personal air monitoring, posting of warning/hazard signs, implementation of engineering controls).

C15.2.4. Asbestos-Containing Material (ACM). Any material containing more than 1% asbestos by weight.

C15.2.5. Asbestos Dust. Airborne particles of asbestos or settled particles of asbestos that are likely to become airborne in the working environment.

C15.2.6. Breathable Asbestos Fibers. Asbestos fibers having a diameter of less than 3 micrometers (µm) and a length-to-diameter ratio greater than 3:1. Only fibers of a length greater than 5 µm shall be taken into account for purposes of measurement.

C15.2.7. Category I Nonfriable ACM. Means asbestos containing packaging, gaskets, resilient floor covering, and asphalt roofing products containing more than 1% asbestos.

C15.2.8. Category II Nonfriable ACM. Means any material, excluding Category I nonfriable ACM, containing more than 1% asbestos that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

C15.2.9. Exposed Worker. Any worker undertaking an activity that might present a risk of exposure to asbestos dust.

C15.2.10. Exposure to Asbestos. Exposure at work to airborne breathable asbestos fibers or asbestos dust, whether originating from asbestos or from minerals, materials or products containing asbestos.

C15.2.11. Friable Asbestos. Any material containing more than 1% asbestos that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure.

C15.2.12. Regulated ACM. Means (a) Friable asbestos material, (b) Category I nonfriable ACM that has become friable, (c) Category I nonfriable ACM that will be or has been subjected to sanding grinding, cutting, or abrading, or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

C15.2.13. Worker's Representatives. The worker´s representatives recognized as such by Portuguese national law or practice.

C15.3. CRITERIA

C15.3.1. Installations will appoint an asbestos program manager to serve as the single point of contact for all asbestos-related activities.

C15.3.2. Installations will prepare and implement an asbestos management plan. As a minimum, the plan will include the following:

C15.3.2.1. An ACM inventory, conducted by sample and analysis or visual determination.

C15.3.2.2. A notification and education program to tell workers, tenants, and building occupants where ACM is located, how and why to avoid disturbing the ACM; all persons affected should be properly informed.

C15.3.2.3. Regular ACM surveillance to note, assess, and document any changes in the ACM's condition;

C15.3.2.4. Work control/permit systems to control activities that might disturb ACM.

C15.3.2.4.1. The work control/permit systems shall include communication details for notifying the Portuguese Base Commander of all activities in which workers may be exposed to asbestos or ACM. The notification shall include as a minimum:

C15.3.2.4.1.1. Name of organization and location;

C15.3.2.4.1.2. Description of activities involving risk of exposure to asbestos, including date and duration of work activities;

C15.3.2.4.1.3. Types of asbestos present or handled in the facility;

C15.3.2.4.1.4. Number of workers exposed or potentially exposed to asbestos;

C15.3.2.4.1.5. Preventive measures to be implemented to limit workers' exposure to asbestos; and

C15.3.2.4.1.6. Air monitoring results.

C15.3.2.4.1.7. Further notifications shall be submitted whenever a significant modification in the use of asbestos or ACM is implemented or when the activity ends.

C15.3.2.4.2. The work control/permit systems shall include communication details for notifying the workers potentially exposed to asbestos (including maintenance workers, asbestos abatement personnel, etc.) and their representatives during maintenance and repair activities in which asbestos is likely to be disturbed. Notification to workers shall be provided with the following information, at a minimum:

C15.3.2.4.2.1. The potential risks to health derived from exposure to dust arising from asbestos or ACM, including cancer, information on the danger derived from smoking due to its synergistic effect with asbestos and the instruments and services set for that purpose;

C15.3.2.4.2.2. Types of products or materials likely to contain asbestos, including operations that may cause exposure to asbestos and the importance of preventive measures to minimize exposure;

C15.3.2.4.2.3. Regulatory limit values and the need for medical surveillance and air monitoring in the workplace;

C15.3.2.4.2.4. Hygiene measures;

C15.3.2.4.2.5. The safety precautions to be taken with regard to wearing and using personal protective equipment and clothing;

C15.3.2.4.2.6. Emergency procedures;

C15.3.2.4.2.7. Waste disposal procedures;

C15.3.2.4.2.8. Special precautions designed to minimize exposure to asbestos; and

C15.3.2.4.2.9. Results of airborne asbestos monitoring and the significance of those results. Whenever the regulated air limits are exceeded, the workers concerned and their representatives shall be informed as quickly as possible of the exceedance of these levels as well as the cause of the exceedance and the measures to be taken or, when measures are implemented for emergency reasons, they shall be informed of the adopted measures.

C15.3.2.5. Operations and maintenance (O&M) work practices to avoid or minimize fiber release during activities affecting ACM. At a minimum, the following should be included to address situations when the action level is exceeded:

C15.3.2.5.1. A description of how work areas will be isolated.

C15.3.2.5.2. Requirements for posting the following warning signs in English and Portuguese: "Risk of inhalation of asbestos. No smoking. Do not stay in this area if not required for job reasons" ("Risco de inalação de amianto. Proibido fumar. Não permanecer neste local se não for necessário ao seu trabalho.").

C15.3.2.5.3. Methods for the identification of the causes of the exceedance and for the implementation of corrective measures.

C15.3.2.5.4. A description of protective clothing and respirators that will be issued to workers.

C15.3.2.5.5. Procedures for monitoring to determine the airborne asbestos concentration.

C15.3.2.5.6. Procedures to ensure facilities and equipment that are used for asbestos treatment are cleaned and regularly maintained.

C15.3.2.6. Work practices to be implemented when the asbestos action level is expected to be exceeded and when exposure to asbestos cannot reasonably be reduced by other means. At a minimum the following should be included to address such situations:

C15.3.2.6.1. Minimize the number of workers exposed or likely to be exposed to asbestos;

C15.3.2.6.2. Issue and require the use of suitable respiratory equipment and other personal protective equipment to workers; and

C15.3.2.6.3. Post warning signs at the areas of concern.

C15.3.2.7. Record keeping to document O&M activities related to asbestos identification management and abatement. Record keeping shall include the following:

C15.3.2.7.1. The results of risk assessment (C15.3.9.8.) and the criteria and procedures used in the assessment;

C15.3.2.7.2. The methods of collection, dates, number, duration, location, results and analysis of each of the samples taken to determine the level of overall exposure and of each individual employee;

C15.3.2.7.3. The identification of exposed workers, indicating for each, the job held, the nature and duration of activity and degree of exposure to which the employee was subject;

C15.3.2.7.4. The results of health surveillance for each employee, with reference to their job; and

C15.3.2.7.5. Identify the physician responsible for health surveillance;

C15.3.2.7.6. Records and files referred to above must be kept for at least 40 years after worker's exposure to which the records relate to.

C15.3.2.8. Documentation of training for the asbestos program manager as well as custodial, maintenance staff, and any other workers exposed or likely to be exposed to asbestos. At a minimum, the training program must address:

C15.3.2.8.1. Information and education of all concerned with regard to health hazards due to exposure to asbestos and methods for the prevention and control.

C15.3.2.8.2. Information and training of all workers exposed or likely to be exposed to asbestos about the health hazards related to their work, preventive measures and correct work practices (refer to criteria C15.3.2.2.).

C15.3.2.9. Policies and procedures on measures for the education and periodic training of workers on asbestos hazards and methods of prevention and control.

C15.3.2.10. Procedures to assess and prioritize identified hazards for abatement.

C15.3.2.11. Procedures to prevent the use of ACM in new construction.

C15.3.3. Prior to demolition or renovation of a facility, the installation will make a determination whether or not the activity will remove or disturb ACM, and will record this determination on the project authorization document (e.g., work order).

C15.3.4. Prior to the demolition or renovation of a facility that involves removing or disturbing ACM, a written assessment of the action will be prepared and furnished to the installation commander. A copy of the assessment will also be kept on permanent file.

C15.3.5. Installations will remove friable ACM when it poses a threat to release airborne asbestos fibers and cannot be reliably repaired or isolated. The removal work in which asbestos is liable to become airborne shall be undertaken by employees or contractors who are recognized by the Portuguese Base Commander or competent Portuguese authority as qualified to conduct such work and who have been empowered to undertake such work.

C15.3.6. The removal of products containing asbestos, including demolition of facilities, structures, buildings, or equipment, involving the release of asbestos fibers or asbestos dust into the atmosphere causing a release greater than the asbestos action level shall require implementation of procedures outlined in paragraphs C15.3.2.5. and C15.3.2.6.

C15.3.7. Before disturbing or demolishing a facility or part of a facility, installations will remove all regulated ACM.

C15.3.8. All regulated ACM will be removed at the end of its useful life.

C15.3.9. The demolition or removal of asbestos or ACM in buildings, structures, machines, facilities or ships, requires the submission of a written work plan to the Portuguese Base Commander in place of the notification requirements under criterion C15.3.2.4.1. The work plan will be prepared by employees or contractors who are recognized by the Portuguese Base Commander or competent Portuguese authority as qualified to conduct such work and who have been properly permitted to undertake such work. The work plan shall contain, at a minimum, the following information:

C15.3.9.1. Trade name;

C15.3.9.2. Name of the person in charge of the work;

C15.3.9.3. Type of work;

C15.3.9.4. Type of asbestos;

C15.3.9.5. Working methodology;

C15.3.9.6. Protection measures, including personal protection;

C15.3.9.7. Number of workers that may be potentially exposed; and

C15.3.9.8. An evaluation of the risk of exposure to asbestos dust, the determination of the type of asbestos and the exposure level to which workers are subject (risk assessment). This evaluation shall be repeated or reviewed whenever:

C15.3.9.8.1. There is a reason to believe that the evaluation is incorrect; and/or

C15.3.9.8.2. Existing conditions in the workplace are modified.

C15.3.9.9. Measures to limit the release of asbestos dust into the air; and

C15.3.9.10. Provisions for the disposal of waste containing asbestos.

C15.3.10. Workers or their representatives shall be consulted on the work plan described in C15.3.8. A copy of the work plan will also be kept on permanent file.

C15.3.11. When disposing of asbestos waste, installations will adequately wet all ACM waste, seal it in a leak proof container, and properly dispose of it in a special facility with asbestos material confined or a hazardous waste landfill. Containers will be labeled in English and Portuguese: "DANGER - CONTAINS ASBESTOS FIBERS - AVOID CREATING DUST - CANCER AND LUNG DISEASE HAZARD." (“PERIGO – CONTÉM FIBRAS DE ASBESTOS – EVITE FAZER PÓ – RISCO DE CONTRAÇÃO DE CANCRO E DOENÇAS PULMONARES”). Permanent records documenting the disposal action and site will be maintained.

C15.3.12. DoD schools will comply with applicable requirements of Section 2643 of Title 15, United States Code and implementing regulations in Title 40, Code of Federal Regulations, Part 763, Subpart E, “Asbestos – Containing Materials in Schools,” current edition.

C15.3.13. ACM shall be labeled in English and Portuguese using Figure C15.F1.

C15.3.13.1. Labeling shall be undertaken by utilizing one of the following methods:

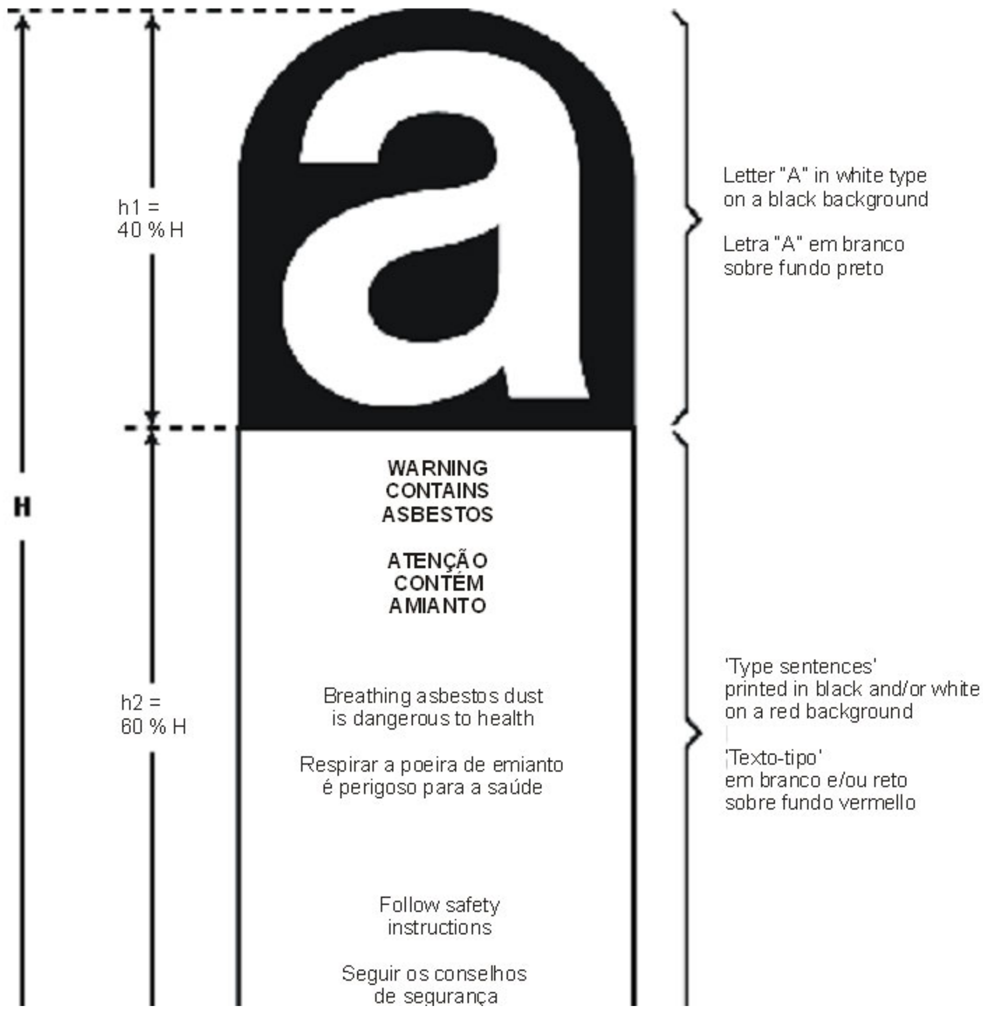
C15.3.13.1.1. A label, firmly fixed to the package or ACM;

C15.3.13.1.2. A mobile label firmly linked to the package or ACM; or

C15.3.13.1.3. Directly typed on the package or ACM.

C15.3.14. Storage and transport of asbestos shall be conducted in closed, labeled containers.

Figure C15.F1. Asbestos Label



Chapter 16

RESERVED

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Chapter 17

LEAD-BASED PAINT

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CHAPTER 17

LEAD-BASED PAINT

C17.1. SCOPE

This Chapter contains criteria to establish and implement a lead hazard management program to identify, control or eliminate lead-based paint hazards, through interim controls or abatement, in child-occupied facilities and military family housing, in a manner protective of human health and the environment. Policy requirements for a comprehensive Occupational Health and Safety program are not covered in this Chapter. To protect personnel from lead exposure, refer to DoD Instruction 6055.1, "DoD Safety and Occupational Health (SOH) Program," and DoD Instruction 6055.5, "Industrial Hygiene and Occupational Health," and concomitant service instructions.

C17.2. DEFINITIONS

C17.2.1. Abatement. Any set of measures designed to permanently eliminate lead-based paint or lead-based paint hazards. Abatement includes the removal of lead-based paint and lead-contaminated dust, the permanent enclosure or encapsulation of lead-based paint, the replacement of components or fixtures painted with lead-based paint, and the removal or covering of lead-contaminated soil. Abatement also includes all preparation, cleanup, disposal, and post-abatement clearance activities associated with such measures.

C17.2.2. Accessible Surface. An interior or exterior surface painted with lead-based paint that is accessible for a young child to mouth or chew.

C17.2.3. Bare Soil. Soil, including sand, not covered by grass, sod, or other live ground covers, or by wood chips, gravel, artificial turf, or similar covering.

C17.2.4. Child-Occupied Facility. A facility, or portion of a facility, visited regularly by the same child, 6 years of age or under, on at least 2 different days within any week, provided that each day's visit lasts at least 3 hours and the combined weekly visits last at least 6 hours, and the combined annual visits last at least 60 hours. Child-occupied facilities may include, but are not limited to, day-care centers, preschools, playgrounds, and kindergarten classrooms.

C17.2.5. Clearance. Visual evaluation and testing (collection and analysis of environmental samples) conducted after lead-based paint hazard reduction activities, interim controls, and standard treatments to determine that the work is complete and no lead-contaminated bare soil or lead-contaminated settled dust exist in a facility frequented by children under the age of 6.

C17.2.6. Deteriorated Paint. Any interior or exterior paint or other coating that is peeling, chipping, chalking, cracking or is otherwise damaged or separated from the substrate.

C17.2.7. Elevated Blood Lead Level. A confirmed concentration of lead in whole blood of 20 micrograms of lead per deciliter (µg/dL) for a single test, or of 15-19 µg/dL in two tests taken at least 3 months apart.

C17.2.8. Encapsulation. The application of any covering or coating that acts as a barrier between the lead-based paint and the environment. Encapsulation may be used as a method of abatement if it is designed to be permanent.

C17.2.9. Enclosure. The use of rigid, durable construction materials that are mechanically fastened to the substrate in order to act as a barrier between lead-based paint and the environment. Enclosure may be used as a method of abatement if it is designed to be permanent.

C17.2.10. Evaluation. A visual evaluation, risk assessment, risk assessment screen, paint inspection, paint testing, or a combination of risk assessment and paint inspection to determine the presence of deteriorated paint, lead-based paint, or a lead-based paint hazard.

C17.2.11. Friction Surface. An interior or exterior surface that is subject to abrasion or friction, including but not limited to, window, floor, and stair surfaces.

C17.2.12. Hazard Reduction. Measures designed to reduce or eliminate human exposure to lead-based paint hazards through methods including interim controls or abatement or a combination of the two.

C17.2.13. Impact Surface. An interior or exterior surface that is subject to damage by repeated sudden force, such as certain parts of doorframes.

C17.2.14. Interim Controls. A set of measures designed to temporarily reduce human exposure or likely exposure to lead-based paint hazards. Interim controls include, but are not limited to, repairs, occasional and ongoing maintenance, painting, temporary containment, specialized cleaning, clearance, ongoing activities, and the establishment and operation of management and resident education programs.

C17.2.15. Lead. Metallic lead and all its ionic compounds.

C17.2.16. Lead Action Level. A regulatory airborne concentration value set for lead at 30 micrograms per cubic meter ($\mu g/m^3$) as an 8-hour time-weighted average and that when exceeded generally requires additional actions to be taken (i.e., increased personal air monitoring, posting of warning/hazard signs, implementation of engineering controls).

C17.2.17. Lead-Based Paint. Paint or other surface coatings that contain lead equal to or exceeding 1.0 milligram per square centimeter (mg/cm^2), or 0.5% by weight or 5,000 parts per million (ppm) by weight.

C17.2.18. Lead-Based Paint Hazard includes paint-lead hazard, dust-lead hazard or soil-lead hazard as identified below:

C17.2.18.1. Paint-lead hazard. A paint-lead hazard is any of the following:

C17.2.18.1.1. Any lead-based paint on a friction surface that is subject to abrasion and where the lead dust levels on the nearest horizontal surface underneath the friction surface (e.g., the window sill, or floor) or equal to or greater than the dust-lead hazard levels identified in subparagraph C17.2.18.2.

C17.2.18.1.2. Any damaged or otherwise deteriorated lead-based paint on an impact surface that is caused by impact from a related building component (such as a doorknob that knocks into a wall or a door that knocks against its doorframe).

C17.2.18.1.3. Any chewable lead-based painted surface on which there is evidence of teeth marks.

C17.2.18.1.4. Any other deteriorated lead-based paint in any residential building or child-occupied facility or on the exterior of any residential building or child-occupied facility.

C17.2.18.2. Dust-lead hazard (previously defined as lead-contaminated dust). Surface dust in a residential dwelling or child-occupied facility that contains a mass-per-area concentration of lead equal to or exceeding 40 µg/ft^2 on floors or 250 µg/ft^2 on interior window sills or wipe samples.

C17.2.18.3. Soil-lead hazard (previously defined as lead-contaminated soil). Bare soil on residential real property or on the property of a child-occupied facility that contains total lead equal to or exceeding 400 ppm (µg/g) in a play area, or an average of 1,200 ppm of bare soil in the rest of the yard based on soil samples.

C17.2.19. Lead-Based Paint Inspection. A surface-by-surface investigation to determine the presence of lead-based paint and the provision of a report explaining the results of the investigation.

C17.2.20. Permanent. An expected design life of at least 20 years.

C17.2.21. Reevaluation. A visual evaluation of painted surfaces and limited dust and soil sampling conducted periodically following lead-based paint hazard reduction where lead-based paint is still present.

C17.2.22. Replacement. A strategy of abatement that entails removing building components that have surfaces coated with lead-based paint (such as windows, doors, and trim) and installing new components free of lead-based paint.

C17.2.23. Risk Assessment. An on-site investigation to determine the existence, nature, severity, and location of lead-based paint hazards and the provision of a report explaining the results of the investigation and options for reducing lead-based paint hazards.

C17.2.24. Risk Assessment Screen. A sampling protocol that is used in dwellings that are in relatively good condition and where the probability of finding lead-based hazards are low. The protocol involves inspecting such dwellings and collecting samples from representative locations on the floor, interior windowsills, and window troughs to determine whether conducting a risk assessment is warranted.

C17.3. <u>CRITERIA</u>

C17.3.1. Installations will:

C17.3.1.1. Develop and implement a multi-disciplinary lead-based paint hazard management program to identify, evaluate, and reduce lead-based paint hazards in child-occupied facilities and military family housing.

C17.3.1.2. Manage identified lead-based paint hazards through interim controls or abatement.

C17.3.1.3. Identify lead-based paint hazards in child-occupied facilities and military family housing using any or all of the following methods:

C17.3.1.3.1. Lead-based paint risk assessment screen. If screen identifies dust-lead levels >25 µg/ft^2 for floors, >125 µg/ft^2 for interior window sills, a lead based paint risk assessment should be performed.

C17.3.1.3.2. Lead-based paint risk assessments.

C17.3.1.3.3. Routine facility inspection for fire and safety.

C17.3.1.3.4. Occupant, facility manager, and worker reports of deteriorated paint.

C17.3.1.3.5. Results of childhood blood lead screening or reports of children identified to have elevated blood lead levels.

C17.3.1.3.6. Lead-based paint reevaluations.

C17.3.1.3.7. Review of construction, painting, and maintenance histories.

C17.3.1.4. Ensure occupants and worker protection measures are taken during all maintenance, repair, and renovation activities that disturb areas known or assumed to have lead-based paint.

C17.3.1.4.1. When the lead action level is exceeded during any maintenance, repair, and renovation activity, work areas shall be posted with a danger sign stating the following ‘Toxic substances’ (‘Substâncias tóxicas’) along with the warning ‘Lead-contaminated work area’ (‘Área de trabalho com chumbo’).

C17.3.1.5. Disclose the presence of any known lead-based paint or lead-based paint hazards to occupants of child-occupied facilities and military family housing and provide information on lead-based paint hazard reduction. In addition, inform occupants of military family housing, prior to conducting remodeling or renovation projects, of the hazards associated with these activities, and provide information on protection family members from the hazards of lead-based paint.

C17.3.1.6. Ensure that all personnel involved in lead-based activities, including paint inspection, risk assessment, specification or design, supervision, and abatement, are properly trained. Contractors involved in lead-based paint activities shall be trained or certified in accordance with US or Portuguese standards.

C17.3.1.7. Lead-contaminated waste shall be collected, treated and transferred out of work areas in such a way that they do not constitute a source of contamination for the workers and work areas.

C17.3.1.8. Dispose of lead-contaminated waste that meets the definition of a hazardous waste in accordance with Chapter 6, "Hazardous Waste." All other lead contaminated waste will be disposed of in accordance with Chapter 7, "Solid Waste."

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Chapter 18

SPILL PREVENTION AND RESPONSE PLANNING

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CHAPTER 18

SPILL PREVENTION AND RESPONSE PLANNING

C18.1. SCOPE

This Chapter contains criteria to plan for, prevent, control and report spills of POL and hazardous substances. It is DoD policy to prevent spills of these substances due to DoD activities and to provide for prompt, coordinated response to contain and clean up spills that might occur. Remediation beyond that required for the initial response is conducted pursuant to DoDI 4715.8, "Environmental Remediation for DoD Activities Overseas."

C18.2. DEFINITIONS

C18.2.1. Aboveground Storage Container. POL storage containers, exempt from UST criteria, that are normally placed on or above the surface of the ground. POL storage containers located above the floor and contained in vaults or basements, bunkered containers, and also partially buried containers are considered aboveground storage containers. For the purposes of this Chapter, this includes any mobile or fixed structure, tank, equipment, pipe, or pipeline (other than a vessel or a public vessel) used in oil well drilling operations, oil production, oil refining, oil storage, oil gathering, oil processing, oil transfer, and oil distribution. This also includes equipment in which oil is used as an operating fluid but excludes equipment in which oil is used solely for motive power.

C18.2.2. Decontamination Wastes. Waste materials generated during the decontamination of equipment and personnel used during spill response including but not limited to purging water, rinsing water, plastic containers, rags, gloves, and other personal protective equipment.

C18.2.3. Facility Incident Commander (FIC) (previously known as the Installation On-scene Coordinator). The official who coordinates and directs DoD control and cleanup efforts at the scene of a POL or hazardous substance spill due to DoD activities on or near the installation. This official is designated by the installation commander.

C18.2.4. Facility Response Team (FRT) (previously known as the Installation Response Team). A team performing emergency functions as defined and directed by the FIC.

C18.2.5. Hazardous Substance. Any hazardous material (as defined in Chapter 5, "Hazardous Material") or hazardous waste (as defined in Chapter 6, "Hazardous Waste") having the potential to do serious harm to human health or the environment if spilled or released in reportable quantity. A list of many of these substances and the corresponding reportable quantities is contained in Table AP1.T1., "Lists of Hazardous Waste and Hazardous Material for Spill Reporting." Hazardous substances do not include:

C18.2.5.1. Petroleum, including crude POL or any fraction thereof, that is not otherwise specifically listed or designated as a hazardous substance above.

Natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas) that are not otherwise specifically listed or designated as a hazardous substance above.

C18.2.6. Petroleum, Oils and Lubricants (POL). Refined petroleum, oils, and lubricants (See definition in Chapter 9, "Petroleum, Oil, and Lubricants").

C18.2.7. Significant Spill. An uncontained release to the land or water in excess of any of the following quantities:

C18.2.7.1. For any hazardous waste, hazardous substance or hazardous material, any quantity in excess of the reportable quantity listed in Table AP1.T1.;

C18.2.7.2. For POL, liquid or semi-liquid hazardous material*s*, hazardous wastes or hazardous substances, in excess of 400 liters (110 US gallons);

C18.2.7.3. For other solid hazardous material, in excess of 225 kg (500 pounds);

C18.2.7.4. For combinations of POL and liquid, semi-liquid and solid hazardous materials, hazardous waste or hazardous substance, in excess of 340 kg (750 pounds); or

C18.2.7.5. If a spill is contained inside an impervious berm, or on a nonporous surface, or inside a building and is not volatilized and is cleaned up, the spill is considered a contained release and is not considered a significant spill.

C18.2.8. Worst Case Discharge. The largest foreseeable discharge from the facility, under adverse weather conditions, as determined using as a guide the worst case discharge planning volume criteria in Appendix AP2 "Determination of Worst Case Discharge Planning Volume."

C18.3. CRITERIA

C18.3.1. Spill Prevention Control and Reporting Plan Requirement. All DoD installations will prepare, maintain and implement a Spill Prevention and Response Plan which provides for the prevention, control and reporting of all spills of POL and hazardous substances. The plan will provide measures to prevent, and to the maximum extent practicable, to remove a worst case discharge from the facility. The plan should be kept in a location easily accessible to the FIC and FRT.

C18.3.1.1. The plan will be updated at least every 5 years or:

C18.3.1.1.1. Within 6 months of any significant changes to operations;

C18.3.1.1.2. When there have been two significant spills to navigable waters in any 12-month period;

C18.3.1.1.3. When there has been a spill of 3,785 liters (1,000 US gallons) or greater.

C18.3.1.2. The plan shall be certified by an appropriately licensed or certified technical authority ensuring that the plan considers applicable industry standards for spill prevention and environmental protection, that the plan is prepared in accordance with good engineering practice, and is adequate for the facility. Technical changes (i.e., non-administrative) to the plan require recertification.

C18.3.2. Prevention Section. The prevention section of the plan will, at a minimum, contain the following:

C18.3.2.1. Name, title, responsibilities, duties and telephone number of the designated FIC and an alternate.

C18.3.2.2. General information on the installation including name, type or function, location and address, charts of drainage patterns, designated water protection areas, maps showing locations of facilities described in paragraph C18.3.2.3., critical water resources, land uses and possible migration pathways.

C18.3.2.3. An inventory of storage, handling and transfer sites that could possibly produce a significant spill. For each listing, using maps as appropriate, a prediction of the direction and rate of flow should be included, as well as the total quantity of POL or hazardous substance that might be spilled as a result of a major failure.

C18.3.2.4. An inventory of all POL and hazardous substances at storage, handling and transfer facilities described in subparagraph C18.3.2.3.

C18.3.2.5. Procedures for the periodic integrity testing of all aboveground storage containers, including visual inspection and where deemed appropriate, another form of non-destructive testing. The frequency and type of inspection and testing must take into account container size and design (floating/fixed roof, skid-mounted, elevated, cut-and cover, partially buried, vaulted above-ground, etc.) and industry standards.

C18.3.2.6. Procedures for periodic inspection for all above ground valves, piping, and appurtenances associated with POL storage containers, in accordance with Chapter 9, “Petroleum, Oil, and Lubricants.”

C18.3.2.7. Arrangements for Emergency Services. The plan will describe arrangements with installation and/or local police departments, fire departments, hospitals, contractors and emergency response teams to coordinate emergency services.

C18.3.2.8. Means to Contact Emergency Services. The plan will include a telephone number or other means to contact the appropriate emergency service provider (e.g., installation fire department) on a 24-hour basis.

C18.3.2.9. A detailed description of the facility’s prevention, control and countermeasures, including structures and equipment for diversion and containment of spills, for each site listed in the inventory. For pipeline systems and facilities, the plan should state security procedures for the temporary or permanent, total or partial closure of the pipeline system or facility. Measures should permit, as far as practical, reclamation of spilled substances. Chapters governing hazardous materials, hazardous waste, POL, underground storage tanks, pesticides and PCBs provide specific criteria for containment structure requirements.

C18.3.2.10. When secondary containment is not feasible for any container listed in the inventory, the plan shall include a detailed explanation of measures that will be taken to prevent spills (e.g., pre-booming, integrity testing, frequent inspection), as determined by the licensed or certified technical authority.

C18.3.2.11. A list of all emergency equipment (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external) and decontamination equipment) at each site listed in the inventory where this equipment is required. This list will be kept up-to-date. In addition, the plan will include the location and a physical description of each item on the list, and a brief outline of its capabilities.

C18.3.2.12. An evacuation plan for each site listed in the inventory, where there is a possibility that evacuation would be necessary. This plan will describe signal(s) to be used to begin evacuation, evacuation routes, alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires), and a designated meeting place.

C18.3.2.13. A description of deficiencies in spill prevention and control measures at each site listed in the inventory, to include corrective measures required, procedures to be followed to correct listed deficiencies and any interim control measures in place. Corrective actions must be implemented within 24 months of the date of plan preparation or revision.

C18.3.2.14. Written Procedures:

C18.3.2.14.1. Operations to preclude spills of POL and hazardous substances;

C18.3.2.14.2. Inspections; and

C18.3.2.14.3. Record keeping requirements.

C18.3.2.15. Site-specific procedures should be maintained at each site on the facility where significant spills could occur.

C18.3.3. Spill Control Section. The control section of the plan (which may be considered a contingency plan) will identify resources for cleaning up spills at installations and activities, and to provide assistance to other agencies when requested. At a minimum, this section of the plan will contain:

C18.3.3.1. Provisions specifying the responsibilities, duties, procedures and resources to be used to contain and clean up spills.

C18.3.3.2. A description of immediate response actions that should be taken when a spill is first discovered.

C18.3.3.3. The responsibilities, composition, and training requirements of the FRT.

C18.3.3.4. The command structure that will be established to manage a worst case discharge. Include an organization chart and the responsibilities and composition of the organization.

C18.3.3.5. Procedures for FRT alert and response to include provisions for:

C18.3.3.5.1. Access to a reliable communications system for timely notification of a POL spill or hazardous substance spill.

C18.3.3.5.2. Public affairs involvement.

C18.3.3.6. A current roster of the persons, and alternates, who must receive notice of a POL or hazardous substance spill, including a DLA-Energy representative if applicable. The roster will include name, organization mailing address, and work and home telephone number. Without compromising security, the plan will include provisions for the notification of the emergency coordinator after normal working hours.

C18.3.3.7. The plan will provide for the notification of the FIC, installation commander and Portuguese Base Commander in the event of hazard to human health or environment.

C18.3.3.8. Assignment of responsibilities for making the necessary notifications including notification to the emergency services providers.

C18.3.3.9. Surveillance procedures for early detection of POL and hazardous substance spills.

C18.3.3.10. A prioritized list of various critical water and natural resources that will be protected in the event of a spill.

C18.3.3.11. Other resources addressed in prearranged agreements that are available to the installation to clean up or reclaim a large spill due to DoD activities, if such spill exceeds the response capability of the installation.

C18.3.3.12. Cleanup methods, including procedures and techniques used to identify, contain, disperse, reclaim and remove POL and hazardous substances used in bulk quantity on the installation.

C18.3.3.13. Procedures for the proper reuse and disposal of recovered substances, decontamination wastes, contaminated POL and absorbent materials, and procedures to be accomplished prior to resumption of operations.

C18.3.3.14. A description of general health, safety and fire prevention precautions for spill cleanup actions.

C18.3.3.15. A public affairs section that describes the procedures, responsibilities, and methods for releasing information in the event of a spill.

C18.3.4. Reporting Section. The reporting section of the spill plan will address the following:

C18.3.4.1. Recordkeeping when emergency procedures are invoked.

C18.3.4.2. Any significant spill will be reported to the FIC immediately. Immediate actions will be taken to eliminate the source and contain the spill.

C18.3.4.3. The FIC will immediately notify the appropriate In-Theater Component Commander and/or Defense Agency, the In-Theater Component Commander and/or Defense Agency will inform the EEA, USEUCOM, and submit a follow-up written report when:

C18.3.4.3.1. A spill occurs inside a DoD installation and cannot be contained within any required berm or secondary containment;

C18.3.4.3.2. The spill exceeds 400 liters (110 US gallons) of POL;

C18.3.4.3.3. A water resource has been polluted; or

C18.3.4.3.4. The FIC has determined that the spill is significant.

C18.3.4.4. When a significant spill occurs inside a DoD installation and cannot be contained within the installation boundaries or threatens the Portuguese drinking water resource, the appropriate In-Theater Component Commander and/or Defense Agency, the EEA, USEUCOM, and Portuguese Authorities (Portuguese Base Commander) will be notified immediately.

C18.3.4.5. If a significant spill occurs outside of a DoD installation, the person in charge at the scene will immediately notify the authorities listed in subparagraph C18.3.4.4, and additionally will notify the local fire departments and obtain necessary assistance.

C18.3.5. Installations will provide the necessary training and spill response drills to ensure the effectiveness of personnel and equipment.

C18.3.6. After completion of the initial response, any remaining free product and/or obviously contaminated soil will be appropriately removed and managed. Further action will be governed by DoDI 4715.8, “Environmental Remediation for DoD Activities Overseas.”

Chapter 19

UNDERGROUND STORAGE TANKS

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CHAPTER 19

UNDERGROUND STORAGE TANKS

C19.1. SCOPE

This Chapter contains criteria to control and abate pollution resulting from POL products and hazardous materials stored in underground storage tanks (USTs). Standards for USTs containing hazardous wastes are covered in Chapter 6, “Hazardous Waste.” Criteria for aboveground and below ground POL storage containers are addressed in Chapter 9, “Petroleum, Oil, and Lubricants.”

C19.2. DEFINITIONS

C19.2.1. Gasoline Station. Facility for the dispensing of gasoline, gas oil or liquid petroleum gas (LPG) to vehicles for private, public or cooperative use. The gasoline station is considered the dispensing pumps and their corresponding tanks, the gasoline station complex and the pavement necessary for the movement of vehicles around the station. This definition includes, by extension, similar installations for the filling of ships or planes, but not hydrant fueling systems.

C19.2.2. Gasoline Station Complex. A facility consisting of a gasoline station, complementary facilities (i.e., restaurant, coffee shop or snack store), administrative offices and storage areas co-located in one structure.

C19.2.3. Hazardous Material. Any material defined as a hazardous material in Chapter 5, “Hazardous Material.” The term does not include:

C19.2.3.1. Petroleum, including crude POL or any fraction thereof, that is not otherwise specifically listed or designated as a hazardous material within Chapter 5; and

C19.2.3.2. Natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

C19.2.4. Hazardous Material UST. A UST that contains a hazardous material as defined in Chapter 5, “Hazardous Materials,” of these FGS (but not including hazardous waste as defined in Chapter 6, “Hazardous Waste,” of these FGS).

C19.2.5. Petroleum, Oil and Lubricants (POL). Refined petroleum, oils, and lubricants. Petroleum products are classified as follows:

C19.2.5.1. Class I - All petroleum products with a flash point below 25ºC (77ºF) and combustible mixtures with a flash point below 25ºC (77ºF);

C19.2.5.2. Class II - Flammable products. All petroleum products with a flash point between 25ºC (77ºF) and 65ºC (149ºF); and

C19.2.5.3. Class III - Combustible products. Petroleum products with a flash point above 65 ºC (149ºF).

C19.2.6. Tank Tightness Testing. A test which must be capable of detecting a 0.38 liter (0.1 US gallon) per hour leak from any portion of the tank that routinely contains product while accounting for the effects of thermal expansion or contraction of the product, vapor pockets, tank deformation, evaporation or condensation, and the location of the water table.

C19.2.7. Underground Storage Tank. Any tank, including underground piping connected thereto, larger than 416 liters (110 US gallons), that is used to contain POL products or hazardous material and the volume of which, including the volume of connected pipes, is 10% or more beneath the surface of the ground. Field constructed tanks meeting these criteria are considered Underground Storage Tanks (USTs). USTs are divided into two categories:

C19.2.7.1. Buried Tanks. Tanks that are buried in natural or artificial excavations where the absence of empty air spaces makes accumulating explosive vapors around the tank impossible.

C19.2.7.2. Tanks in Underground Spaces. Tanks placed in natural or artificial underground spaces, such as tunnels or pits, where the existence of empty air spaces between the walls of the tank and the walls of the underground space is present.

C19.2.7.3. The definition of UST does not include:

C19.2.7.3.1. Tanks containing heating oil used for consumption on the premises where it is stored;

C19.2.7.3.2. Septic tanks;

C19.2.7.3.3. Stormwater or wastewater collection systems;

C19.2.7.3.4. Flow through process tanks;

C19.2.7.3.5. Surface impoundments, pits, ponds, or lagoons;

C19.2.7.3.6. Hydrant fueling systems;

C19.2.7.3.7. UST containing *de minimis* concentrations of regulated substances, except where subparagraph C19.3.2.7. is applicable; and

C19.2.7.3.8. Emergency spill or overflow containment UST systems that are expeditiously emptied after use.

C19.2.8. Usable Capacity of a Tank. Capacity of a tank reduced by 2%.

C19.2.9. Deferred UST. A hydrant fuel distribution system.

C19.3. CRITERIA

C19.3.1. UST Inventory. All installations will maintain a UST inventory.

C19.3.2. General POL UST Requirements. All POL UST systems will be properly installed, to include siting, protected from corrosion, provided with spill/overfill prevention and will incorporate leak detection as described below. On the covering area of the UST, road vehicles and accumulation of weights should be avoided.

C19.3.2.1. Corrosion Protection

C19.3.2.1.1. All petroleum USTs and piping must be provided with corrosion protection unless constructed of fiberglass or other non-corrodible materials. Both construction materials and the corrosion protection system must be certified by a competent authority.

C19.3.2.1.2. External surfaces of buried tanks shall be isolated by means of a non-water-soluble protective substance.

C19.3.2.2. Spill/Overflow Protection. All POL USTs will be provided with spill and overfill prevention equipment, except where transfers are made in the amounts of 95 liters (25 US gallons) or less. Where spill and over-fill protection are required, a spill containment box must be installed around the fill pipe. Overfill prevention will be provided by one of the following methods:

C19.3.2.2.1. Automatic shut-off device (set at 95% of tank capacity).

C19.3.2.2.2. High level alarm (set at 90% of tank capacity).

C19.3.2.3. Leak Detection. Leak detection systems must be capable of detecting a 0.38 liter (0.1 US gallon) per hour leak rate or a release of 568 liters (150 US gallons) (or 1% of tank volume, whichever is less) within 30 days with a probability of detection of 0.95 and a probability of false alarm of not more than 0.05.

C19.3.2.3.1. USTs will use at least one of the following leak detection methods:

C19.3.2.3.1.1. Automatic tank gauging;

C19.3.2.3.1.2. Vapor monitoring:

C19.3.2.3.1.2.1. At a minimum, vapor monitoring of POL tanks in underground spaces shall meet the following requirements:

C19.3.2.3.1.2.1.1. Gas sampling, using gas analyzers approved for use in Portugal, shall be undertaken in those locations with the highest probability of accumulating vapors;

C19.3.2.3.1.2.1.2. A ventilation device shall also be in place for the elimination of toxic or explosive atmospheres when confirmed by the gas analyzer; and

C19.3.2.3.1.2.1.3. Both ventilation devices and gas analyzers shall be certified by an properly permitted company to verify good working order and its good functioning checked regularly.

C19.3.2.3.1.3. Groundwater monitoring; or

C19.3.2.3.1.4. Interstitial monitoring.

C19.3.2.3.2. All pressurized UST piping must be equipped with automatic line leak detectors and utilize either an annual tightness test or monthly monitoring.

C19.3.2.3.3. Suction piping will either have a line tightness test conducted every three years or use monthly monitoring.

C19.3.2.4. POL USTs and piping must be properly closed if not needed or be upgraded or replaced to meet the requirements of this Chapter.

C19.3.2.5. Any POL UST and piping not incorporating a functioning leak detection system will require immediate corrective action. Such systems will be tightness tested. Such systems will be tightness tested annually in accordance with recognized Portuguese or US industry standards and inventoried monthly to determine system tightness.

C19.3.2.6. Any verified leaking USTs and UST piping will be immediately removed from service. Any UST and piping suspected of leaking (e.g., leak detection equipment), will be verified for leakage to ensure there is not a false positive, or alternately, will immediately be removed from service. If the UST is still required, it will be repaired or replaced. If the UST is no longer required it will be removed from the ground. When a leaking UST is removed, exposed free product and/or obviously contaminated soil in the immediate vicinity of the tank will be appropriately removed and managed. Additional action will be governed by DoDI 4715.8, “Environmental Remediation for DoD Activities Overseas.” Under extenuating circumstances (e.g., where the UST is located under a building), the UST will be cleaned and filled with an inert substance, and left in place.

C19.3.2.7. When a UST has not been used for one year, or is determined to no longer be required, all of the product and sludges must be removed. Subsequently, the tank must be either cleaned and filled with an inert substance, or removed. UST wastes must be sampled and tested in accordance with Chapter 9, “Petroleum, Oil, and Lubricants,” paragraph C9.3.5.

C19.3.2.8. When the product stored in a UST is changed, the UST must be emptied and cleaned by removing all liquid and accumulated sludge.

C19.3.2.9. When a UST system is temporarily closed, corrosion protection and leak detection systems (if the UST is not empty) must be operated and maintained. If a UST system is temporarily closed for 3 months or greater, the following must be complied with:

C19.3.2.9.1. Vent lines must be left open and functioning; and

C19.3.2.9.2. All other lines, pumps, manways, and ancillary equipment must be secured and capped.

C19.3.2.10. Maximum Size. The maximum tank volume for class I products is 20,000 m^3 (5,283,600 US gallons). The maximum tank volume for class II products is 40,000 m^3 (10,567,200 US gallons). The maximum tank volume for class III products is 50,000 m^3 (13,209,000 US gallons).

C19.3.3. UST Recordkeeping. Installations will maintain a tank system inventory to include tank system installation, repair, removal, replacement, or upgrade, and operation of corrosion protection equipment for the life of the tank.

C19.3.4. Hazardous Material USTs

C19.3.4.1. All hazardous material USTs and piping must meet the same design and construction standards as required for POL USTs and piping, and in addition must be provided with secondary containment for both tank and piping. Secondary containment can be met by using double-walled tanks and piping, liners, or vaults.

C19.3.4.2. Leak Detection. The interstitial space (space between the primary and secondary containment) for tanks and piping must be monitored monthly for liquids or vapors.

C19.3.4.3. Hazardous material USTs and piping that do not incorporate the criteria contained in subparagraph C19.3.4.1. shall be immediately removed from service and properly closed if not needed or be upgraded or replaced as necessary.

C19.3.5. Additional criteria for USTs Located at Gasoline Stations. In addition to the requirements provided in section C19.3.2., the following additional requirements apply to USTs located at gas stations:

C19.3.5.1. Tanks in Underground Spaces are forbidden on gasoline stations.

C19.3.5.2. Spill/Overflow Prevention. USTs located at gasoline stations will be provided with an automatic shut-off device set at 95% of tank capacity, and a spill containment box must be installed around the fill pipe. The fill control device cannot be subject to pressure above its maximum allowable working pressure and must be approved by a competent authority.

C19.3.5.3. Leak Detection. If tank gauging devices are used for leak detection of POL USTs at gasoline stations, they shall indicate at any time the volume of the liquid contained within and meet the following requirements:

C19.3.5.3.1. Gauging devices shall be specifically designed to avoid deformation of the tank walls; and

C19.3.5.3.2. Measurements are forbidden during filling activities.

C19.3.5.4. Integrity and tightness testing

C19.3.5.4.1. Initial integrity tests for USTs at gasoline stations must be conducted in accordance with conditions described in their respective construction code. For new piping and fiberglass reinforced plastic tanks, initial integrity tests must be conducted in an open excavation once assembled and a final test must be conducted prior to use.

C19.3.5.4.2. Single-walled tanks, and/or fiberglass reinforced plastic USTs will be tightness tested annually in accordance with recognized Portuguese or US industry standards and inventoried monthly to determine system tightness. Tightness testing is also required when tank are repaired. Existing single–walled tanks may only be left in operation when they satisfactorily pass tightness testing. Tightness testing based on pressure variations is prohibited.

C19.3.6. Additional Criteria for POL USTs Not Located at Gasoline Stations. In addition to the requirements provided in section C19.3.2., the following requirements apply to POL USTs not located at gasoline stations, with a volume greater than 25 m^3 (6,605 US gallons):

C19.3.6.1. Buried Tanks

C19.3.6.1.1. All openings (ventilation and measurement openings) will be provided with steel or bronze pipes and control devices.

C19.3.6.1.2. All tanks will be provided with a gas outlet for the exit of vapors generated during normal operations or filling of the tank as well as for the entrance of air during emptying operations. This vent will be equipped with a device to avoid flame propagation to the interior of the tank in the event of a fire.

C19.3.6.1.3. The top of the tank (for example the roof, caps, etc.) will be located at a minimum depth of 0.50 meters (1.6 feet) below ground level to prevent a significant rise in the temperature of the contained liquid in the event of a nearby fire.

C19.3.6.1.4. Tightness testing shall be conducted in all buried tanks prior to their use by filling the tank with air or water with a pressure of 1 kilogram per square centimeter. The testing must meet the leak detection requirements of criterion C19.3.2.3.

C19.3.6.2. Tanks in Underground Spaces

C19.3.6.2.1. Every underground space will be provided with at least 1 exhaust vent, properly located to remove all vapors that may be contained within. Vent ends will be protected against rain and vandalism and will be provided with flame protection devices.

C19.3.6.2.2. Underground spaces for the installation of tanks will not include depressions or other locations where gases or liquids from leaking tanks could accumulate.

C19.3.6.2.3. Underground spaces will be designed to contain at least 100% of the largest tank and will include a pumping system for the removal of the spilled liquid. The walls of underground spaces will be designed to hold the surrounding earth in place and will be liquid tight.

C19.3.7. Deferred USTs. Deferred USTs constructed after 8 May 1985 must be designed and constructed with corrosion protection, non-corrodible materials, or be otherwise designed and constructed to prevent releases from corrosion or structural failure. UST materials must be compatible with the substance(s) to be stored.

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Appendix AP1

CHARACTERISTICS OF HAZARDOUS WASTES AND LISTS OF HAZARDOUS WASTES AND HAZARDOUS MATERIALS

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Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Acenaphthene	83329			100
Acenaphthylene	208968			5,000
Acetaldehyde (I)	75070		U001	1,000
Acetaldehyde, chloro-	107200		P023	1,000
Acetaldehyde, trichloro-	75876		U034	5,000
Acetamide	60355			100
Acetamide, N-(aminothioxomethyl)-	591082		P002	1,000
Acetamide, N-(4-ethoxyphenyl)-	62442		U187	100
Acetamide, 2-fluoro-	640197		P057	100
Acetamide, N-9H-fluoren-2-yl-	53963		U005	1
Acetic acid	64197			5,000
Acetic acid (2,4-dichlorophenoxy)-salts and esters	94757		U240	100
Acetic acid, lead(2+) salt	301042		U144	10
Acetic acid, thallium(1+) salt	563688		U214	1000
Acetic acid, (2,4,5-trichlorophenoxy)	93765		U232	1,000
Acetic acid, ethyl ester (I)	141786		U112	5,000
Acetic acid, fluoro-, sodium salt	62748		P058	10
Acetic anhydride	108247			5,000
Acetone (I)	67641		U002	5,000
Acetone cyanohydrin	75865	1,000	P069	10
Acetone thiosemicarbazide	1752303	1,000/10,000		1
Acetonitrile (I,T)	75058		U003	5,000
Acetophenone	98862		U004	5,000
2-Acetylaminofluorene	53963		U005	1
Acetyl bromide	506967			5,000
Acetyl chloride (C,R,T)	75365		U006	5,000
1-Acetyl-2-thiourea	591082		P002	1
Acrolein	107028	500	P003	1
Acrylamide	79061	1,000/10,000	U007	5,000
Acrylic acid (I)	79107		U008	5,000
Acrylonitrile	107131	10,000	U009	100
Acrylyl chloride	814686	100		1
Adipic acid	124049			5,000
Adiponitrile	111693	1,000		1
Aldicarb	116063	100/10,000	P070	1

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(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Aldrin	309002	500/10,000	P004	1
Allyl alcohol	107186	1,000	P005	100
Allylamine	107119	500		1
Allyl chloride	107051			1,000
Aluminum phosphide (R,T)	20859738	500	P006	100
Aluminum sulfate	10043013			5,000
4-Aminobiphenyl	92671			1
5-(Aminomethyl)-3-isoxazolol	2763964		P007	1,000
Aminopterin	54626	500/10,000		1
4-Aminopyridine	504245		P008	1,000
Amiton	78535	500		1
Amiton oxalate	3734972	100/10,000		1
Amitrole	61825		U011	10
Ammonia	7664417	500		100
Ammonium acetate	631618			5,000
Ammonium benzoate	1863634			5,000
Ammonium bicarbonate	1066337			5,000
Ammonium bichromate	7789095			10
Ammonium bifluoride	1341497			100
Ammonium bisulfite	10192300			5,000
Ammonium carbamate	1111780			5,000
Ammonium carbonate	506876			5,000
Ammonium chloride	12125029			5,000
Ammonium chromate	7788989			10
Ammonium citrate, dibasic	3012655			5,000
Ammonium fluoborate	13826830			5,000
Ammonium fluoride	12125018			100
Ammonium hydroxide	1336216			1,000
Ammonium oxalate	6009707			5,000
	5972736			
	14258492			
Ammonium picrate (R)	131748		P009	10
Ammonium silicofluoride	16919190			1,000
Ammonium sulfamate	7773060			5,000
Ammonium sulfide	12135761			100

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Ammonium sulfite	10196040			5,000
Ammonium tartrate	14307438			5,000
	3164292			
Ammonium thiocyanate	1762954			5,000
Ammonium vanadate	7803556		P119	1,000
Amphetamlne	300629	1,000		1
Amyl acetate	628637			5,000
Iso-Amyl acetate	123922			
Sec-Amyl acetate	626380			
Tert-Amyl acetate	625161			
Aniline (I,T)	62533	1,000	U012	5,000
Aniline, 2,4,6- trimethyl	88051	500		1
o-Anisidine	90040			100
Anthracene	120127			5,000
Antimony++	7440360			5,000
Antimony pentachloride	7647189			1,000
Antimony pentafluoride	7783702	500		1
Antimony potassium tartrate	28300745			100
Antimony tribromide	7789619			1,000
Antimony trichloride	10025919			1,000
Antimony trifluoride	7783564			1,000
Antimony trioxide	1309644			1,000
Antimycin A	1397940	1,000/10,000		1
ANTU (Thiourea 1-Naphthalenyl)	86884	500/10,000		100
Argentate(1-), bis(cyano-C)-, potassium	506616		P099	1
Aroclor 1016	12674112			1
Aroclor 1221	11104282			1
Aroclor 1232	11141165			1
Aroclor 1242	53469219			1
Aroclor 1248	12672296			1
Aroclor 1254	11097691			1
Aroclor 1260	11096825			1
Aroclors	1336363			1
Arsenic++	7440382			1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.**[1]	**Threshold Planning Quantity (Pounds)**	**HW No.** [2]	**RQ (Pounds)** [3]
Arsenic acid H_3AsO_4	1327522		P010	1
	7778394			
Arsenic disulfide	1303328			1
Arsenic oxide As_2O_3	1327533		P012	1
Arsenic oxide As_2O_5	1303282		P011	1
Arsenic pentoxide	1303282	100/10,000	P011	1
Arsenic trichloride	7784341			1
Arsenic trioxide	1327533		P012	1
Arsenic trisulfide	1303339			1
Arsenous oxide	1327533	100/10,000	P012	1
Arsenous trichloride	7784341	500		5,000
Arsine	7784421	100		1
Arsine, diethyl-	692422		P038	1
Arsinic acid, dimethyl-	75605		U136	1
Arsorous dichloride, phenyl-	696286		P036	1
Asbestos+++	1332214			1
Auramine	492808		U014	100
Azaserine	115026		U015	1
Aziridine	151564		P054	1
Azindine, 2-methyl-	75558		P067	1
Azirino[2',3',3,4]pyrrolo[1,2-a]indole-4, 7-dione,6-amino-8-[[aminocarbonylooxy) methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-,[1aS-(1a-alpha, 8-beta, 8a-alpha, 8b-alpha)]-	50077		U010	10
Azinphos-ethyl	2642719	100/10,000		100
Azinphos-methyl	86500	10/10,000		1
Barium cyanide	542621		P013	10
Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	56495		U157	10
Benz[c]acridine	225514		U016	100
Benzal chloride	98873	500	U017	5,000
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	23950585		U192	5,000
Benz[a]anthracene	56553		U018	10
1,2-Benzanthracene	56553		U018	10
Benz[a]anthracene, 7,12-dimethyl-	57976		U094	1
Benzenamine (I,T)	62533		U012	5,000

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Benzenamine, 3-(Trifluoromethyl)	98168	500		1
Benzenamine, 4,4'-carbonimidoylbis (N,N-dimethyl-	492808		U014	100
Benzenamine, 4-chloro-	106478		P024	1,000
Benzenamine, 4-chloro-2-methyl-, hydrochloride	3165933		U049	100
Benzenamine, N,N-dimethyl-4-(phenylazo-)	60117		U093	10
Benzenamine, 2-methyl-	95534		U328	100
Benzenamine, 4-methyl-	106490		U353	100
Benzenamine, 4,4'-methylenebis(2-chloro-	101144		U158	10
Benzenamine, 2-methyl-, hydrochloride	636215		U222	100
Benzenamine, 2-methyl-5-nitro-	99558		U181	100
Benzenamine, 4-nitro-	100016		P077	5,000
Benzene (I,T)	71432		U109	10
Benzene, 1-(Chloromethyl)-4-Nitro-	100141	500/10,000		1
Benzeneacetic acid, 4-chloro-alpha- (4-chlorophenyl)-alpha-hydroxy-, ethyl ester	510156		U038	10
Benzene, 1-bromo-4-phenoxy-	101553		U030	100
Benzenearsonic Acid	98055	10/10,000		1
Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-	305033		U035	10
Benzene, chloro-	108907		U037	100
Benzene, chloromethyl-	100447		P028	100
Benzenediamin, ar-methyl-	25376458		U221	10
	95807			
	496720			
	823405			
1,2-Benzenedicarboxylic acid, dioctyl ester	117840		U107	5,000
1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)]-ester	117817		U028	100
1,2-Benzenedicarboxylic acid, dibutyl ester	84742		U069	10
1,2-Benzenedicarboxylic acid, diethyl ester	84662		U088	1,000
1,2-Benzenedicarboxylic acid, dimethyl ester	131113		U102	5,000
Benzene, 1,2-dichloro-	95501		U070	100
Benzene, 1,3-dichloro-	541731		U071	100
Benzene, 1,4-dichloro-	106467		U072	100
Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	72548		U060	1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Benzene, dichloromethyl-	98873		U017	5,000
Benzene, 1,3-diisocyanotomethyl- (R,T)	584849		U223	100
	91087			
	264716254			
Benzene, dimethyl (I,T)	1330207		U239	100
m-Benzene, dimethyl	108383			1,000
o-Benzene, dimethyl	95476			1,000
p-Benzene, dimethyl	106423			100
1,3-Benzenediol	108463		U201	5,000
1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]- (R) -	51434		P042	1,000
Benzeneethanamine, alpha, alpha-dimethyl-	122098		P046	5,000
Benzene, hexachloro-	118741		U127	10
Benzene, hexahydro- (I)	110827		U056	1,000
Benzene, hydroxy-	108952		U188	1,000
Benzene, methyl-	108883		U220	1,000
Benzene, 2-methyl-1,3-dinitro-	606202		U106	100
Benzene, 1-methyl-2,4-dinitro-	121142		U105	10
Benzene, 1-methylethyl- (I)	98828		U055	5,000
Benzene, nitro-	98953		U169	1,000
Benzene, pentachloro-	608935		U183	10
Benzene, pentachloronitro-	82688		U185	100
Benzenesulfonic acid chloride (C,R)	98099		U020	100
Benzenesulfonyl chloride	98099		U020	100
Benzene, 1,2,4,5-tetrachloro-	95943		U207	5,000
Benzenethiol	108985		P014	100
Benzene, 1,1'-(2,2,2-tri-chloroethylidene)bis[4-chloro-	50293		U061	1
Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-methoxy-	72435		U247	1
Benzene, (trichloromethyl)-	98077		U023	10
Benzene, 1,3,5-trinitro-	99354		U234	10
Benzidine	92875		U021	1
Benzimidazole, 4,5-Dichloro-2-(Trifluoromethyl)-	3615212	500/10,000		1
1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide	81072		U202	100

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(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Benzo[a]anthracene	56553		U018	10
Benzo[b]fluoranthene	205992			1
Benzo[k]fluoranthene	207089			5,000
Benzo[j,k]fluorene	206440		U120	100
1,3-Benzodioxole, 5-(1-propenyl)-	120581		U141	100
1,3-Benzodioxole, 5-(2-propenyl)-	94597		U203	100
1,3-Benzodioxole, 5-propyl-	94586		U090	10
Benzoic acid	65850			5,000
Benzonitrile	100470			5,000
Benzo[rst]pentaphene	189559		U064	10
Benzo[ghi]perylene	191242			5,000
2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations greater than 0.3%	81812		P001	100
Benzo[a]pyrene	50328		U022	1
3,4-Benzopyrene	50328		U022	1
p-Benzoquinone	106514		U197	10
Benzotrichloride (C,R,T)	98077	500	U023	10
Benzoyl chloride	98884			1,000
1,2-Benzphenanthrene	218019		U050	100
Benzyl chloride	100447	500	P028	100
Benzyl cyanide	140294	500		1
Beryllium++	7440417		P015	10
Beryllium chloride	7787475			1
Beryllium fluoride	7787497			1
Beryllium nitrate	13597994			1
	7787555			
alpha-BHC	319846			10
beta-BHC	319857			1
delta-BHC	319868			1
gamma-BHC	58899		U129	1
Bicyclo [2,2,1]Heptane-2-carbonitrile, 5-chloro-6-(((Methylamino)Carbonyl) Oxy)Imino)-,(1s-(1-alpha, 2-beta, 4-alpha, 5-alpha, 6E))-	15271417	500/10,000		1
2,2'-Bioxirane	1464535		U085	10
Biphenyl	92524			100

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(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
(1,1'-Biphenyl)-4,4'diamine	92875		U021	1
(1,1'-Biphenyl)-4,4'diamine, 3,3'dichloro-	91941		U073	1
(1,1'-Biphenyl)-4,4'diamine, 3,3'dimethoxy-	119904		U091	10
(1,1'-Biphenyl)-4,4'diamine, 3,3'dimethyl-	119937		U095	10
Bis(chloromethyl) ketone	534076	10/10,000		1
Bis(2-chloroethyl)ether	111444		U025	10
Bis(2-chloroethoxy)methane	111911		U024	1,000
Bis(2-ethylhexyl)phthalate	117817		U028	100
Bitoscanate	4044659	500/10,000		1
Boron trichloride	10294345	500		1
Boron trifluoride	7637072	500		1
Boron trifluoride compound with methyl ether (1:1)	353424	1,000		1
Bromoacetone	598312		P017	1,000
Bromadiolone	28772567	100/10,000		1
Bromine	7726956	500		1
Bromoform	75252		U225	100
4-Bromophenyl phenyl ether	101553		U030	100
Brucine	357573		P018	100
1,3-Butadiene	106990			10
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87683		U128	1
1-Butanamine, N-butyl-N-nitroso-	924163		U172	10
1-Butanol	71363		U031	5,000
2-Butanone	78933		U159	5,000
2-Butanone peroxide (R,T)	1338234		U160	10
2-Butanone, 3,3-dimethyl-1-(methylthio)-, O[(methylamno)carbonyl] oxime	39196184		P045	100
2-Butenal	123739		U053	100
	4170303			
2-Butene, 1,4-dichloro- (I,T)	764410		U074	1
2-Butenoic acid, 2-methyl-, 7[[2,3-dihydroxy-2-(1-meth- oxyethyl)-3-methyl-1-oxobutoxy] methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1-alpha(Z),7(2S*,3R*), 7a-alpha]]-	303344		U143	10

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Butyl acetate	123864			5,000
iso-Butyl acetate	110190			
sec-Butyl acetate	105464			
tert-Butyl acetate	540885			
n-Butyl alcohol (I)	71363		U031	5,000
Butylamine	109739			1,000
iso-Butylamine	78819			
sec-Butylamine	513495			
tert-Butylamine	13952846			
	75649			
Butyl benzyl phthalate	85687			100
n-Butyl phthalate	84742		U069	10
Butyric acid	107926			5,000
iso-Butyric acid	79312			
Cacodylic acid	75605		U136	1
Cadmium++ (2+)	7440439			10
Cadmium acetate	543908			10
Cadmium bromide	7789426			10
Cadmium chloride	10108642			10
Cadmium oxide	1306190	100/10,000		1
Cadmium stearate	2223930	1,000/10,000		1
Calcium arsenate	7778441	500/10,000		1
Calcium arsenite	52740166			1
Calcium carbide	75207			10
Calcium chromate	13765190		U032	10
Calcium cyanamide	156627			1,000
Calcium cyanide Ca(CN)2	592018		P021	10
Calcium dodecylbenzenesulfonate	26264062			1,000
Calcium hypochlorite	7778543			10
Camphechlor	8001352	500/10,000		1
Camphene, octachloro-	8001352		P123	1
Cantharidin	56257	100/10,000		1
Carbachol chloride	51832	500/10,000		1
Caprolactum	105602			5,000
Captan	133062			10

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.**[1]	**Threshold Planning Quantity (Pounds)**	**HW No.** [2]	**RQ (Pounds)** [3]
Carbamic acid, ethyl ester	51796		U238	100
Carbamic acid, methylnitroso-, ethyl ester	615532		U178	1
Carbamic acid, Methyl-, 0-(((2,4-Dimethyl-1, 3-Dithiolan-2-yl)Methyllene)Amino)-	26419738	100/10,000		1
Carbamic chloride, dimethyl-	79447		U097	1
Carbamodithioic acid, 1,2-ethaneiylbis, salts & esters	111546		U114	5,000
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	2303164		U062	100
Carbaryl	63252			100
Carbofuran	1563662	10/10,000		10
Carbon disulfide	75150	10,000	P022	100
Carbon oxyfluoride (R,T)	353504		U033	1,000
Carbon tetrachloride	56235		U211	10
Carbonic acid, dithallium(1+) salt	6533739		U215	100
Carbonic dichloride	75445		P095	10
Carbonic difluoride	353504		U033	1,000
Carbonochloridic acid, methyl ester	79221		U156	1,000
Carbonyl Sulfide	463581			100
Carbophenothion	786196	500		1
Catechol	120809			100
Chloral	75876		U034	5,000
Chlorambem	133904			100
Chlorambucil	305033		U035	10
Chlordane	57749	1,000	U036	1
Chlordane, alpha & gamma isomers	57749		U036	1
Chlordane, technical	57749		U036	1
Chlorfenvinfos	470906	500		1
Chlorinated champhene (Campheclor)	8001352			1
Chlorine	7782505	100		10
Chlormephos	24934916	500		1
Chlormequat chloride	999815	100/10,000		1
Chlornaphazine	494031		U026	100
Choroacetaldehyde	107200		P023	1,000
Chloroacetophenone	532274			100
Chloroacetic acid	79118	100/10,000		100

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
p-Chloroaniline	106478		P024	1,000
Chlorobenzene	108907		U037	100
Chlorobenzilate	510156		U038	10
p-Chloro-m-cresol (4)	59507		U039	5,000
1-Chloro-2,3-epoxypropane	106898		U041	100
Chlorodibromomethane	124481			100
Chloroethane	75003			100
Chloroethanol	107073	500		1
Chloroethyl chlorofomate	627112	1,000		1
2-Chloroethyl vinyl ether	110758		U042	1,000
Chloroform	67663	10,000	U044	10
Chloromethane	74873		U045	100
Chloromethyl ether	542881	100	P016	1
Chloromethyl methyl ether	107302	100	U046	1
beta-Chloronaphthalene	91587		U047	5,000
2-Chloronaphthalene	91587		U047	5,000
Chlorophacinone	3691358	100/10,000		1
o-Chlorophenol (2)	95578		U048	100
4-Chlorophenyl phenyl ether	7005723			5,000
1-(o-Chlorophenyl)thiourea	5344821		P026	100
Chloroprene	126998			100
3-Chloropropionitrile	542767		P027	1,000
Chlorosulfonic acid	7790945			1,000
4-Chloro-o-toluidine, hydrochloride	3165933		U049	100
Chlorpyrifos	2921882			1
Chloroxuron	1982474	500/10,000		1
Chlorthiophos	21923239	500		1
Chromic acetate	1066304			1,000
Chromic acid	11115745			10
	7738945			
Chromic acid H_2CrO_4, calcium salt	13765190		U032	10
Chromic chloride (Chromium chloride)	10025737	1/10,000		1
Chromic sulfate	10101538			1,000
Chromium++	7440473			5,000
Chromous chloride	10049055			1,000

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.**[1]	**Threshold Planning Quantity (Pounds)**	**HW No.** [2]	**RQ (Pounds)** [3]
Chrysene	218019		U050	100
Cobalt, ((2,2'-(1,2-ethanediylbis (Nitrilo-methylidyne))Bis(6-fluoro-phenolato))(2-)-N,N',O,O')-,	62207765	100/10,000		1
Cobaltous bromide	7789437			1,000
Cobalt carbonyl	10210681	10/10,000		1
Cobaltous formate	544183			1,000
Cobaltous sulfamate	14017415			1,000
Coke Oven Emissions	NA			1
Colchicine	64868	10/10,000		1
Copper++	7440508			5,000
Copper cyanide	544923		P029	10
Coumaphos	56724	100/10,000		10
Coumatetralyl	5836293	500/10,000		1
Creosote	8001589		U051	1
Cresol(s) (Phenol, Methyl)	1319773		U052	100
m-Cresol	108394	1,000/10,000		100
o-Cresol	95487			100
p-Cresol	106445			100
Cresylic acid	1319773		U052	100
m-Cresylic acid	108394			100
o-Cresylic acid	95487			100
p-Cresylic acid	106445			100
Crimidine	535897	100/10,000		1
Crotonaldehyde	123739	1,000	U053	100
	4170303	1,000		100
Cumene (I)	98828		U055	5,000
Cupric acetate	142712			100
Cupric acetoarsenite	12002038			1
Cupric chloride	7447394			10
Cupric nitrate	3251238			100
Cupric oxalate	5893663			100
Cupric sulfate	7758987			10
Cupric sulfate, ammoniated	10380297			100
Cupric tartrate	815827			100

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(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Cyanides (soluble salts and complexes) not otherwise specified	57125		P030	10
Cyanogen	460195		P031	100
Cyanogen bromide	506683	500/10,000	U246	1,000
Cyanogen chloride	506774		P033	10
Cyanogen iodide (Iodine cyanide)	506785	1,000/10,000		1
Cyanophos	2636262	1,000		1
Cyanuric fluoride	675149	100		1
2,5-Cyclohexadiene-1,4-dione	106514		U197	10
Cyclohexane (I)	110827		U056	1,000
Cyclohexane, 1,2,3,4,5,6-hexachloro, (1-alpha, 2-alpha, 3-beta, 4-alpha, 5-alpha, 6-beta)-	58899		U129	1
Cyclohexanone (I)	108941		U057	5,000
2-Cyclohexanone	131895		P034	100
Cycloheximide	66819	100/10,000		1
Cyclohexylamine	108918	10,000		1
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77474		U130	10
Cyclophosphamide	50180		U058	10
2,4-D Acid	94757		U240	100
2,4-D Ester	94111			100
	94791			
	94804			
	1320189			
	1928387			
	1928616			
	1929733			
	2971382			
	25168267			
	53467111			
2,4-D, salts & esters (2,4-Dichlorophenoxyacetic Acid)	94757		U240	100
Daunomycin	20830813		U059	10
Decarborane(14)	17702419	500/10,000		1
Demeton	8065483	500		1
Demeton-S-Methyl	919868	500		1
DDD, 4,4'DDD	72548		U060	1

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(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
DDE, 4,4'DDE	72559			1
DDT, 4,4'DDT	50293		U061	1
DEHP (Diethylhexyl phthalate)	117817		U028	100
Diallate	2303164		U062	100
Dialifor	10311849	100/10,000		1
Diazinon	333415			1
Diazomethane	334883			100
Dibenz[a,h]anthracene	53703		U063	1
1,2:5,6-Dibenzanthracene	53703		U063	1
Dibenzo[a,h]anthracene	53703		U063	1
Dibenzofuran	132649			100
Dibenz[a,i]pyrene	189559		U064	10
1,2-Dibromo-3-chloropropane	96128		U066	1
Dibromoethane	106934		U067	1
Diborane	19287457	100		1
Dibutyl phthalate	84742		U069	10
Di-n-butyl phthalate	84742		U069	10
Dicamba	1918009			1,000
Dichlobenil	1194656			100
Dichlone	117806			1
Dichlorobenzene	25321226			100
m-Dichlorobenzene (1,3)	541731		U071	100
o-Dichlorobenzene (1,2)	95501		U070	100
p-Dichlorobenzene (1,4)	106467		U072	100
3,3'-Dichlorobenzidine	91941		U073	1
Dichlorobromomethane	75274			5,000
1,4-Dichloro-2-butene (I,T)	764410		U074	1
Dichlorodifluoromethane	75718		U075	5,000
1,1-Dichloroethane	75343		U076	1,000
1,2-Dichloroethane	107062		U077	100
1,1-Dichloroethylene	75354		U078	100
1,2-Dichloroethylene	156605		U079	1,000
Dichloroethyl ether	11444	10,000	U025	10
Dichloroisopropyl ether	108601		U027	1,000
Dichloromethoxy ethane	111911		U024	1,000

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Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Dichloromethyl ether	542881		P016	1
Dichloromethylphenylsilane	149746	1,000		1
2,4-Dichlorophenol	120832		U081	100
2,6-Dichlorophenol	87650		U082	100
Dichlorophenylarsine	696286		P036	1
Dichloropropane	26638197			1,000
1,1-Dichloropropane	78999			
1,3-Dichloropropane	142289			
1,2-Dichloropropane	78875		U083	1,000
Dichloropropane--Dichloropropene (mixture)	8003198			100
Dichloropropene	26952238			100
2,3-Dichloropropene	78886			
1,3-Dichloropropene	542756		U084	100
2,2-Dichloropropionic acid	75990			5,000
Dichlorvos	62737	1,000		10
Dicofol	115322			10
Dicrotophos	141662	100		1
Dieldrin	60571		P037	1
1,2:3,4-Diepoxybutane (I,T)	1464535	500	U085	10
Diethanolamine	111422			100
Diethyl chlorophosphate	814493	500		1
Diethylamine	109897			1,000
Diethylarsine	692422		P038	1
Diethylcarbmazine citrate	1642542	100/10,000		1
1,4-Diethylenedioxide	123911		U108	100
Diethylhexyl phthalate	117817		U028	100
N,N-Diethylaniline	91667			1,000
N,N'-Diethylhydrazine	1615801		U086	10
O,O-Diethyl S-methyl dithiophosphate	3288582		U087	5,000
Diethyl-p-nitrophenyl phosphate	311455		P041	100
Diethyl phthalate	84662		U088	1,000
O,O-Diethyl O-pyrazinyl phosphorothioate	297972		P040	100
Diethylstilbestrol	56531		U089	1
Diethyl sulfate	64675			10
Digitoxin	71636	100/10,000		1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.[1]**	**Threshold Planning Quantity (Pounds)**	**HW No. [2]**	**RQ (Pounds) [3]**
Diglycidyl ether	2238075	1,000		1
Digoxin	20830755	10/10,000		1
Dihydrosafrole	94586		U090	10
Diisopropyfluorophosphate	55914		P043	100
Diisopropylfluorophosphate, 1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1-alpha, 4-alpha, 4a-beta, 5-alpha, 8-alpha, 8a-beta)-	309002		P004	1
1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro, (1-alpha, 4-alpha, 4a-beta, 5a-beta, 8-beta, 8a-beta)-	465736		P060	1
2,7:3,6-Dimethanonaphth[2,3 b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1a-alpha, 2-beta, 2a-alpha, 3-beta, 6-beta, 6a-alpha, 7beta, 7aalpha)-	60571		P037	1
2,7:3,6 Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octa-hydro-, (1a-alpha, 2-beta, 2a-beta, 3-alpha, 6-alpha, 6a-beta, 7-beta, 7a-alpha)-	72208		P051	1
Dimethoate	60515		P044	10
3,3'-Dimethoxybenzidine	119904		U091	10
Dimefox	115264	500		1
Dimethoate	60515	500/10,000		10
Dimethyl Phosphorochloridothioate	2524030	500		1
Dimethyl sulfate	77781	500		100
Dimethylamine (I)	124403		U092	1,000
p-Dimethylaminoazobenzene	60117		U093	10
7,12-Dimethylbenz[a]anthracene	57976		U094	1
3,3'-Dimethylbenzidine	119937		U095	10
alpha,alpha-Dimethylbenzylhydroperoxide(R)	80159		U096	10
Dimethylcarbamoyl chloride	79447		U097	1
Dimethylformamide	68122			100
Dimethyldichlorosilane	75785	500		1
1,1-Dimethylhydrazine	57147	1,000	U098	10
1,2-Dimethylhydrazine	540738		U099	1
alpha, alpha-Dimethylphenethylamine	122098		P046	5,000
Dimethyl-p-phenylenediamine	99989	10/10,000		1
2,4-Dimethylphenol	105679		U101	100

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting
(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Dimethyl phthalate	131113		U102	5,000
Dimethyl sulfate	77781		U103	100
Dimetilan	644644	500/10,000		1
Dinitrobenzene (mixed)	25154545			100
m-Dinitrobenzene	99650			
o-Dinitrobenzene	528290			
p-Dinitrobenzene	100254			
4,6-Dinitro-o-cresol and salts	534521	10/10,000	P047	10
Dinitrophenol	25550587			10
2,5-Dinitrophenol	329715			
2,6-Dinitrophenol	573568			
2,4-Dinitrophenol	51285		P048	10
Dinitrotoluene	25321146			10
3,4-Dinitrotoluene	610399			
2,4-Dinitrotoluene	121142		U105	10
2,6-Dinitrotoluene	606202		U106	100
Dinoseb	88857	100/10,000	P020	1,000
Dinoterb	1420071	500/10,000		1
Di-n-octyl phthalate	117840		U107	5,000
1,4-Dioxane	123911		U108	100
Dioxathion	78342	500		1
Diphacinone	82666	10/10,000		1
1,2-Diphenylhydrazine	122667		U109	10
Diphosphoramide, octamethyl-	152169	100	P085	100
Diphosphoric acid, tetraethyl ester	107493		P111	10
Dipropylamine	142847		U110	5,000
Di-n-propylnitrosamine	621647		U111	10
Diquat	85007			1,000
	2764729			
Disulfoton	298044	500	P039	1
Dithiazanine iodide	514738	500/10,000		1
Dithiobiuret	541537	100/10,000	P049	100
Diuron	330541			100
Dodecylbenzenesulfonic acid	27176870			1,000
Emetine, Dihydrochloride	316427	1/10,000		1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Endosulfan	115297	10/10,000	P050	1
alpha-Endosulfan	959988			1
beta-Endosulfan	33213659			1
Endosulfant sulfate	1031078			1
Endothall	145733		P088	1,000
Endothion	2778043	500/10,000		1
Endrin	72208	500/10,000	P051	1
Endrin aldehyde	7421934			1
Endrin & metabolites	72208		P051	1
Epichlorohydrin	106898	1,000	U041	100
Epinephrine	51434		P042	1,000
EPN	2104645	100/10,000		1
1,2-Epoxybutane	106887			100
Ergocalciferol	50146	1,000/10,000		1
Ergotamine tartrate	379793	500/10,000		1
Ethanal	75070		U001	1,000
Ethanamine, N-ethyl-N-nitroso-	55185		U174	1
1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	91805		U155	5,000
Ethane, 1,2-dibromo-	106934		U067	1
Ethane, 1,1-dichloro-	75343		U076	1,000
Ethane, 1,2-dichloro-	107062		U077	100
Ethanedinitrile	460195		P031	100
Ethane, hexachloro-	67721		U131	100
Ethane, 1,1'-[methylenebis(oxy)]bis(2-chloro-	111911		U024	1,000
Ethane, 1,1'-oxybis-	60297		U117	100
Ethane, 1,1'-oxybis(2-chloro-	111444		U025	10
Ethane, pentachloro-	76017		U184	10
Ethanesulfonyl chloride, 2-chloro	1622328	500		1
Ethane, 1,1,1,2-tetrachloro-	630206		U208	100
Ethane, 1,1,2,2-tetrachloro-	79345		U209	100
Ethanethioamide	62555		U218	10
Ethane, 1,1,1-trichloro-	71556		U226	1,000
Ethane, 1,1,2-trichloro-	79005		U227	100
Ethanimidothioic acid, N-[[(methylamino) carbonyl]oxy]-, methyl ester	16752775		P066	100

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.[1]**	**Threshold Planning Quantity (Pounds)**	**HW No. [2]**	**RQ (Pounds) [3]**
Ethanol, 1,2-Dichloro-, acetate	10140871	1,000		1
Ethanol, 2-ethoxy-	110805		U359	1,000
Ethanol, 2,2'-(nitrosoimino)bis-	1116547		U173	1
Ethanone, 1-phenyl-	98862		U004	5,000
Ethene, chloro-	75014		U043	1
Ethene, 2-chloroethoxy-	110758		U042	1,000
Ethene, 1,1-dichloro-	75354		U078	100
Ethene, 1,2-dichloro- (E)	156605		U079	1,000
Ethene, tetrachloro-	127184		U210	100
Ethene, trichloro-	79016		U228	100
Ethion	563122	1,000		10
Ethoprophos	13194484	1,000		1
Ethyl acetate (I)	141786		U112	5,000
Ethyl acrylate (I)	140885		U113	1,000
Ethylbenzene	100414			1,000
Ethylbis(2-Chloroethyl)amine	538078	500		1
Ethyl carbamate (urethane)	51796		U238	100
Ethyl chloride	75003			100
Ethyl cyanide	107120		P101	10
Ethylenebisdithiocarbamic acid, salts & esters	111546		U114	5,000
Ethylenediamine	107153			5,000
Ethylenediamine-tetraacetic acid (EDTA)	60004			5,000
Ethylene dibromide	106934		U067	1
Ethylene dichloride	107062		U077	100
Ethylene fluorohydrin	371620	10		1
Ethylene glycol	107211			5,000
Ethylene glycol monoethyl ether	110805		U359	1,000
Ethylene oxide (I,T)	75218	1,000	U115	10
Ethylenediamine	107153	10,000		5,000
Ethylenethiourea	96457		U116	10
Ethyleneimine	151564	500	P054	1
Ethyl ether (I)	60297		U117	100
Ethylthiocyanate	542905	10,000		1
Ethylidene dichloride	75343		U076	1,000
Ethyl methacrylate	97632		U118	1,000

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Ethyl methanesulfonate	62500		U119	1
Famphur	52857		P097	1,000
Fenamlphos	22224926	10/10,000		1
Fenltrothion	122145	500		1
Fensulfothion	115902	500		1
Ferric ammonium citrate	1185575			1,000
Ferric ammonium oxalate	2944674			1,000
	55488874			
Ferric chloride	7705080			1,000
Ferric fluoride	7783508			100
Ferric nitrate	10421484			1,000
Ferric sulfate	10028225			1,000
Ferrous ammonium sulfate	10045893			1,000
Ferrous chloride	7758943			100
Ferrous sulfate	7720787			1,000
	7782630			
Fluenetil	4301502	100/10,000		1
Fluoranthene	206440		U120	100
Fluorene	86737			5,000
Fluorine	7782414	500	P056	10
Fluoroacetamide	640197	100/10,000	P057	100
Fluoracetic acid	144490	10/10,000		1
Fluoroacetic acid, sodium salt	62786		P058	10
Fluoroacetyl chloride	359068	10		1
Fluorouracil	51218	500/10,000		1
Fonofos	944229	500		1
Formaldehyde	50000	500	U122	100
Formaldehyde cyanohydrin	107164	1,000		1
Formetanate hydrochloride	23422539	500/10,000		1
Formothion	2540821	100		1
Formparanate	17702577	100/10,000		1
Formic acid (C,T)	64186		U123	5,000
Fosthletan	21548323	500		1
Fubendazole	3878191	100/10,000		1
Fulminic acid, mercury(2$^-$) salt (R,T)	628864		P065	10

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Fumaric acid	110178			5,000
Furan (I)	110009	500	U124	100
Furan, tetrahydro- (I)	109999		U213	1,000
2-Furancarboxaldehyde (I)	98011		U125	5,000
2,5-Furandione	108316		U147	5,000
Furfural (I)	98011		U125	5,000
Furfuran (I)	110009		U124	100
Gallium trichloride	13450903	500/10,000		1
Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-	18883664		U206	1
D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-	18883664		U206	1
Glycidylaldehyde	765344		U126	10
Glycol Ethers [4]				**
Guanidine, N-methyl-N'-nitro-N-nitroso-	70257		U163	10
Guthion	86500			1
Heptachlor	76448		P059	1
Heptachlor epoxide	1024573			1
Hexachlorobenzene	118741		U127	10
Hexachlorobutadiene	87683		U128	1
Hexachlorocyclohexane (gamma isomer)	58899		U129	1
Hexachlorocyclopentadiene	77474	100	U130	10
Hexachloroethane	67721		U131	100
Hexachlorophene	70304		U132	100
Hexachloropropene	1888717		U243	1,000
Hexaethyl tetraphosphate	757584		P062	100
Hexamethylene-1, 6-diisocyanate	822060			100
Hexamethylphosphoramide	680319			1
Hexamethylenediamine, N,N'-Dibutyl	4835114	500		1
Hexane	110543			5,000
Hexone (Methyl isobutyl ketone)	108101		U161	5,000
Hydrazine (R,T)	302012	1,000	U133	1
Hydrazine, 1,2-diethyl-	1615801		U086	10
Hydrazine, 1,1-dimethyl-	57147		U098	10
Hydrazine, 1,2-dimethyl-	540738		U099	1
Hydrazine, 1,2-diphenyl-	122667		U109	10

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Hydrazine, methyl-	60344		P068	10
Hydrazinecarbothioamide	79196		P116	100
Hydrochloric acid	7647010			5,000
Hydrocyanic acid	74908	100	P063	10
Hydrofluoric acid	7664393		U134	100
Hydrogen chloride (gas only)	7647010	500		5,000
Hydrogen cyanide	74908		P063	10
Hydrogen fluoride	7664393	100	U134	100
Hydrogen peroxide (Conc. >52%)	7722841	1,000		1
Hydrogen phosphide	7803512		P096	100
Hydrogen selenide	7783075	10		1
Hydrogen sulfide	7783064	500	U135	100
Hydroperoxide, 1-methyl-1-phenylethyl-	80159		U096	10
Hydroquinone	123319	500/10,000		100
2-Imidazolidinethione	96457		U116	10
Indeno(1,2,3-cd)pyrene	193395		U137	100
Iodomethane	74884		U138	100
Iron, Pentacarbonyl-	13463406	100		1
Isobenzan	297789	100/10,000		1
1,3-Isobenzofurandione	85449		U190	5,000
Isobutyronitrile	78820	1,000		1
Isobutyl alcohol (I,T)	78831		U140	5,000
Isocyanic acid, 3,4-Dichlorophenyl ester	102363	500/10,000		1
Isodrin	465736	100/10,000	P060	1
Isofluorphate	55914	100		100
Isophorone	78591			5,000
Isophorone Diisocyanate	4098719	100		1
Isoprene	78795			100
Isopropanolamine dodecylbenzene sulfonate	42504461			1,000
Isopropyl chloroformate	108236	1,000		1
Isopropylmethylpryrazolyl dimethylcarbamate	119380	500		1
Isosafrole	120581		U141	100
3(2H)-Isoxazolone, 5-(aminomethyl)-	2763964		P007	1,000
Kepone	143500		U142	1
Lactonitrile	78977	1,000		1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Lasiocarpine	303344		U143	10
Lead acetate	301042		U144	#
Lead arsenate	7784409			1
	7645252			
	10102484			
Lead, bis(acetato-O)tetrahydroxytri	1335326		U146	10
Lead chloride	7758954			10
Lead fluoborate	13814965			10
Lead fluoride	7783462			10
Lead iodide	10101630			10
Lead nitrate	10099748			10
Lead phosphate	7446277		U145	10
Lead stearate	7428480			10
	1072351			
	52652592			
	56189094			
Lead subacetate	1335326		U146	10
Lead sulfate	15739807			10
	7446142			
Lead sulfide	1314870			10
Lead thiocyanate	592870			10
Leptophos	21609905	500/10,000		1
Lewisite	541253	10		1
Lindane	58899	1,000/10,000	U129	1
Lithium chromate	14307358			10
Lithium hydride	7580678	100		1
Malathion	121755			100
Maleic acid	110167			5,000
Maleic anhydride	108316		U147	5,000
Maleic hydrazide	123331		U148	5,000
Malononitrile	109773	500/10,000	U149	1,000
Manganese, tricarbonyl methylcyclopentadienyl	12108133	100		1
MDI (Methylene diphenyl diisocyanate)	101688			5,000
Mechlorethamine	51752	10		1
MEK (Methyl ethyl ketone)	78933		U159	5,000

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(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Melphalan	148823		U150	1
Mephosfolan	950107	500		1
Mercaptodimethur	2032657			10
Mercuric acetate	1600277	500/10,000		1
Mercuric chloride	7487947	500/10,000		1
Mercuric cyanide	592041			1
Mercuric nitrate	10045940			10
Mercuric oxide	21908532	500/10,000		1
Mercuric sulfate	7783359			10
Mercuric thiocyanate	592858			10
Mercurous nitrate	10415755			10
	7782867			
Mercury	7439976		U151	1
Mercury (acetate-O)phenyl-	62384		P092	100
Mercury fulminate	628864		P065	10
Methacrolein diacetate	10476956	1,000		1
Methacrylic anhydride	760930	500		1
Methacrylonitrile (I,T)	126987	500	U152	1,000
Methacryloyl chloride	920467	100		1
Methacryloyloxyethyl isocyanate	30674807	100		1
Methamidophos	10265926	100/10,000		1
Methanamine, N-methyl-	124403		U092	1,000
Methanamine, N-methyl-N-nitroso-	62759		P082	10
Methane, bromo-	74839		U029	1,000
Methane, chloro- (I,T)	74873		U045	100
Methane, chloromethoxy-	107302		U046	1
Methane, dibromo-	74953		U068	1,000
Methane, dichloro-	75092		U080	1,000
Methane, dichlorodifluoro-	75718		U075	5,000
Methane, iodo-	74884		U138	100
Methane, isocyanato-	624839		P064	10
Methane, oxybis(chloro-	542881		P016	1
Methanesulfenyl chloride, trichloro-	594423		P118	100
Methanesulfonyl fluoride	558258	1,000		1
Methanesulfonic acid, ethyl ester	62500		U119	1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Methane, tetrachloro-	56235		U211	10
Methane, tetranitro- (R)	509148		P112	10
Methane, tribromo-	75252		U225	100
Methane, trichloro-	67663		U044	10
Methane, trichlorofluoro-	75694		U121	5,000
Methanethiol (I,T)	74931		U153	100
6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10, 10-hexa-chloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide	115297		P050	1
1,3,4-Metheno-2H-cyclobutal[cd]pentalen-2-one,1,1a,3,3a,4,5,5a,5b,6-decachloroctahydro-	143500		U142	1
4,7-Methano-1H-indene, 1,4,5,6,7,8,8 heptachloro-3a,4,7,7a-tetrahydro-	76448		P059	1
4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8 octachloro-2,3,3a,4,7,7a-hexahydro-	57749		U036	1
Methanol (I)	67561		U154	5,000
Methapyrilene	91805		U155	5,000
Methidathion	950378	500/10,000		1
Methiocarb	2032657	500/10,000	P199	10
Methomyl	16752775	500/10,000	P066	100
Methoxychlor	72435		U247	1
Methoxyethylmercuric acetate	151382	500/10,000		1
Methyl alcohol (I)	67561		U154	5,000
Methyl aziridine	75558		P067	1
Methyl bromide	74839	1,000	U029	1,000
1-Methylbutadiene (I)	504609		U186	100
Methyl chloride (I,T)	74873		U045	100
Methyl 2-chloroacrylate	80637	500		1
Methyl chlorocarbonate (I,T)	79221		U156	1,000
Methyl chloroform	71556		U226	1,000
Methyl chloroformate	79221	500	U156	1,000
3-Methylcholanthrene	56495		U157	10
4,4'-Methylenebis(2-chloroaniline)	101144		U158	10
Methylene bromide	74953		U068	1,000
Methylene chloride	75092		U080	1,000
4,4'-Methylenedianiline	101779			10
Methylene diphenyl diisocyanate (MDI)	101688			5,000

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.**[1]	**Threshold Planning Quantity (Pounds)**	**HW No.** [2]	**RQ (Pounds)** [3]
Methyl ethyl ketone (MEK) (I,T)	78933		U159	5,000
Methyl ethyl ketone peroxide (R,T)	1338234		U160	10
Methyl hydrazine	60344	500	P068	10
Methyl iodide	74884		U138	100
Methyl isobutyl ketone	108101		U161	5,000
Methyl isocyanate	624839	500	P064	10
Methyl isothiocyanate	556616	500		1
2-Methyllactonitrile	75865		P069	10
Methyl mercaptan	74931	500	U153	100
Methyl methacrylate (I,T)	80626		U162	1,000
Methyl parathion	298000		P071	100
Methyl phenkapton	3735237	500		1
Methyl phosphonic dichloride	676971	100		1
4-Methyl-2-pentanone (I)	108101		U161	5,000
Methyl tert-butyl ether	1634044			1,000
Methyl thiocyanate	556649	10,000		1
Methylthiouracil	56042		U164	10
Methyl vinyl ketone	78944	10		1
Methylmercuric dicyanamide	502396	500/10,000		1
Methyltrichlorosilane	75796	500		1
Metolcarb	1129415	100/10,000		1
Mevinphos	7786347	500		10
Mexacarbate	315184	500/10,000		1,000
Mitomycin C	50077	500/10,000	U010	10
MNNG	70257		U163	10
Monocrotophos	6923224	10/10,000		1
Monoethylamine	75047			100
Monomethylamine	74895			100
Muscimol	2763964	500/10,000	P007	1,000
Mustard gas	505602	500		1
Naled	300765			10
5,12-Naphthaacenedione, 8-acetyl-10-[3 amino-2,3,6-tri-deoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-	20830813		U059	10
1-Naphthalenamine	134327		U167	100

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
2-Naphthalenamine (beta-Naphthylamine)	91598		U168	1
Naphthalenamine, N,N'-bis(2-chloroethyl)-	494031		U026	100
Naphthalene	91203		U165	100
Naphthalene, 2-chloro-	91587		U047	5,000
1,4-Naphthalenedione	130154		U166	5,000
2,7-Naphthalenedisulfonic acid, 3,3' [(3,3'-dimethyl-(1,1'-biphenyl)-4,4'-dryl)-bis(azo)] bis(5-amino-4-hydroxy)-tetrasodium salt	72571		U236	10
Naphthenic acid	1338245			100
1,4-Naphthoquinone	130154		U166	5,000
alpha-Naphthylamine	134327		U167	100
beta-Naphthylamine (2-Naphthalenamine)	91598		U168	1
alpha-Naphthylthiourea	86884		P072	100
Nickel++	7440020			100
Nickel ammonium sulfate	15699180			100
Nickel carbonyl	13463393	1	P073	10
Nickel carbonyl Ni(CO)4, (T-4)-	13463393		P073	10
Nickel chloride	7718549			100
	37211055			
Nickel cyanide	557197		P074	10
Nickel hydroxide	12054487			10
Nickel nitrate	14216752			100
Nickel sulfate	7786814			100
Nicotine & salts	54115	100	P075	100
Nicotine sulfate	65305	100/10,000		1
Nitric acid	7697372	1,000		1,000
Nitric acid, thallium(1+) salt	10102451		U217	100
Nitric oxide	10102439	100	P076	10
p-Nitroaniline	100016		P077	5,000
Nitrobenzene (I,T)	98953	10,000	U169	1,000
4-Nitrobiphenyl	92933			10
Nitrocyclohexane	1122607	500		1
Nitrogen dioxide	10102440	100	P078	10
	10544726			
Nitrogen oxide	10102439		P076	10
Nitroglycerine	55630		P081	10

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Nitrophenol (mixed)	25154556			100
m-Nitrophenol	554847			100
o-Nitrophenol (2)	88755			100
p-Nitrophenol (4)	100027		U170	100
2-Nitropropane (I,T)	79469		U171	10
N-Nitrosodi-n-butylamine	924163		U172	10
N-Nitrosodiethanolamine	1116547		U173	1
N-Nitrosodiethylamine	55185		U174	1
N-Nitrosodimethylamine	62759	1,000	P082	10
N-Nitrosodiphenylamine	86306			100
N-Nitroso-N-ethylurea	759739		U176	1
N-Nitroso-N-methylurea	684935		U177	1
N-Nitroso-N-methylurethane	615532		U178	1
N-Nitrosomethylvinylamine	4549400		P084	10
N-Nitrosomorpholine	59892			1
N-Nitrosopiperidine	100754		U179	10
N-Nitrosopyrrolidine	930552		U180	1
Nitrotoluene	1321126			1,000
m-Nitrotoluene	99081			
o-Nitrotoluene	88722			
p-Nitrotoluene	99990			
5-Nitro-o-toluidine	99558		U181	100
Norbromide	991424	100/10,000		1
Octamethylpyrophosphoramide	152169		P085	100
Organorhodium complex (PMN-82-147)	0	10/10,000		1
Osmium tetroxide	20816120		P087	1,000
Ouabain	630604	100/10,000		1
7-Oxabicyclo[2,2,1]heptane-2,3-dicarboxylic acid	145733		P088	1,000
Oxamyl	23135220	100/10,000	P194	1
1,2-Oxathiolane, 2,2-dioxide	1120714		U193	10
2H-1,3,2-Oxazaphosphorin-2-amine, N,N bis (2-chloroethyl)tetrahydro-, 2-oxide	50180		U058	10
Oxetane, 3,3-bis(chloromethyl)-	78717	500		1
Oxirane (I,T)	75218		U115	10
Oxiranecarboxyaldehyde	765344		U126	10

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting
(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Oxirane, (chloromethyl)-	106898		U041	100
Oxydisulfoton	2497076	500		1
Ozone	10028156	100		1
Paraformaldehyde	30525894			1,000
Paraldehyde	123637		U182	1,000
Paraquat	1910425	10/10,000		1
Paraquat methosulfate	2074502	10/10,000		1
Parathion	56382	100	P089	10
Parathion-methyl	298000	100/10,000		100
Paris green	12002038	500/10,000		100
PCBs	1336363			
Aroclor 1016	12674112			1
Aroclor 1221	11104282			1
Aroclor 1232	11141165			1
Aroclor 1242	53469219			1
Aroclor 1248	12672296			1
Aroclor 1254	11097691			1
Aroclor 1260	11096825			1
PCNB (Pentachloronitrobenzene)	82688		U185	100
Pentaborane	19624227	500		1
Pentachlorobenzene	608935		U183	10
Pentachloroethane	76017		U184	10
Pentachlorophenol	87865		U242	10
Pentachloronitrobenzene (PCNB)	82688		U185	100
Pentadecylamine	2570265	100/10,000		1
Paracetic acid	79210	500		1
1,3-Pentadiene (I)	504609		U186	100
Perachloroethylene	127184		U210	100
Perchloromethylmercaptan	594423	500		100
Phenacetin	62442		U187	100
Phenanthrene	85018			5,000
Phenol	108952	500/10,000	U188	1,000
Phenol, 2-chloro-	95578		U048	100
Phenol, 4-chloro-3-methyl-	59507		U039	5,000
Phenol, 2-cyclohexyl-4,6-dinitro-	131895		P034	100

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting
(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Phenol, 2,4-dichloro-	120832		U081	100
Phenol, 2,6-dichloro-	87650		U082	100
Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)	56531		U089	1
Phenol, 2,4-dimethyl-	105679		U101	100
Phenol, 2,4-dinitro-	51285		P048	10
Phenol, methyl-	1319773		U052	1,000
m-Cresol	108394			
o-Cresol	95487			
p-Cresol	106445			
Phenol, 2-methyl-4,6-dinitro-and salts	534521		P047	10
Phenol, 2,2'-methylenebis[3,4,6-trichloro-	70304		U132	100
Phenol, 2,2'-thiobis(4-chloro-6-methyl)-	4418660	100/10,000		1
Phenol, 2-(1-methylpropyl)-4,6-dinitro	88857		P020	1,000
Phenol, 3-(1-methylethyl)-, methylcarbamate	64006	500/10,000		1
Phenol, 4-nitro-	100027		U170	100
Phenol, pentachloro-	87865		U242	10
Phenol, 2,3,4,6-tetrachloro-	58902		U212	10
Phenol, 2,4,5-trichloro-	95954		U230	10
Phenol, 2,4,6-trichloro-	88062		U231	10
Phenol, 2,4,6-trinitro-, ammonium salt	131748		P009	10
Phenoxarsine, 10,10'-oxydi-	58366	500/10,000		1
L-Phenylalanine, 4-[bis(2-chloroethyl)aminol]	148823		U150	1
Phenyl dichloroarsine	696286	500		1
1,10-(1,2-Phenylene)pyrene	193395		U137	100
p-Phenylenediamine	106503			5,000
Phenylhydrazine hydrochloride	59881	1,000/10,000		1
Phenylmercury acetate	62384	500/10,000	P092	100
Phenylsilatrane	2097190	100/10,000		1
Phenylthiourea	103855	100/10,000	P093	100
Phorate	298022	10	P094	10
Phosacetim	4104147	100/10,000		1
Phosfolan	947024	100/10,000		1
Phosgene	75445	10	P095	10
Phosmet	732116	10/10,000		1
Phosphamidon	13171216	100		1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Phosphine	7803512	500		100
Phosphorothioic acid, o,o-Dimethyl-s (2-Methylthio) ethyl ester	2587908	500		1
Phosphorothioic acid, methyl-, o-ethyl o-(4-(methylthio)phenyl) ester	2703131	500		1
Phosphorothioic acid, methyl-, s-(2-(bis(1-methylethyl)amino)ethyl o-ethyl ester	50782699	100		1
Phosphorothioic acid, methyl-, 0-(4-nitrophenyl) o-phenyl ester	2665307	500		1
Phosphoric acid	7664382			5,000
Phosphoric acid, diethyl 4-nitrophenyl ester	311455		P041	100
Phosphoric acid, dimethyl 4-(methylthio) phenyl ester	3254635	500		1
Phosphoric acid, lead(2+) salt (2:3)	7446277	500	U145	10
Phosphorodithioic acid, O,O-diethyl S-[2 (ethylthio)ethyl]ester	298044		P039	1
Phosphorodithioic acid, O,O-diethyl S-(ethylthio), methyl ester	298022		P094	10
Phosphorodithioic acid, O,O-diethyl S-methyl ester	3288582		U087	5,000
Phosphorodithoic acid, O,O-dimethyl S-[2(methyl-amino)-2-oxoethyl] ester	60515		P044	10
Phosphorofluondic acid, bis(1-methylethyl) ester	55914		P043	100
Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	56382		P089	10
Phosphorothioic acid, O,[4-[(dime-thylamino)sulfonyl]phenyl]O,O-dimethyl ester	52857		P097	1,000
Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	298000		P071	100
Phosphorothioic acid, 0,0-diethyl 0 pyrazinyl ester	297972		P040	100
Phosphorus	7723140	100		1
Phosphorus oxychloride	10025873	500		1,000
Phosphorous pentachloride	10026138	500		1
Phosphorus pentasulfide (R)	1314803		U189	100
Phosphorus pentoxide	1314563	10		1
Phosphorus trichloride	7719122	1,000		1,000
Phthalic anhydride	85449		U190	5,000
Physostigmine	57476	100/10,000	P204	1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Phosostigmine, salicylate (1:1)	57647	100/10,000		1
2-Picoline	109068		U191	5,000
Picotoxin	124878	500/10,000		1
Piperidine	110894	1,000		1
Piperidine, 1-nitroso-	100754		U179	10
Pirimifos-ethyl	23505411	1,000		1
Plumbane, tetraethyl-	78002		P110	10
Polychlorinated biphenyls (See PCBs or Aroclor)	1336363			1
Potassium arsenate	7784410			1
Potassium arsenite	10124502	500/10,000		1
Potassium bichromate	7778509			10
Potassium chromate	7789006			10
Potassium cyanide	151508	100	P098	10
Potassium hydroxide	1310583			1,000
Potassium permanganate	7722647			100
Potassium silver cyanide	506616	500	P099	1
Promecarb	2631370	500/10,000		1
Pronamide	23950585		U192	5,000
Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime	116063		P070	1
1-Propanamine (I,T)	107108		U194	5,000
1-Propanamine, N-propyl-	142847		U110	5,000
1-Propanamine, N-nitroso-N-propyl-	621647		U111	10
Propane, 1,2-dibromo-3-chloro	96128		U066	1
Propane, 2-nitro- (I,T)	79469		U171	10
1,3-Propane sultone	1120714		U193	10
Propane 1,2-dichloro-	78875		U083	1,000
Propanedinitrile	109773		U149	1,000
Propanenitrile	107120		P101	10
Propanenitrile, 3-chloro-	542767		P027	1,000
Propanenitrile, 2-hydroxy-2-methyl-	75865		P069	10
Propane, 2,2'-oxybis[2-chloro-	108601		U027	1,000
1,2,3-Propanetnol, trinitrate- (R)	55630		P081	10
1-Propanol, 2,3-dibromo-, phosphate (3:1)	126727		U235	10
1-Propanol, 2-methyl- (I,T)	78831		U140	5,000

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
2-Propanone (I)	67641		U002	5,000
2-Propanone, 1-bromo-	598312		P017	1,000
Propargite	2312358			10
Propargyl alcohol	107197		P102	1,000
Propargyl bromide	106967	10		1
2-Propenal	107028		P003	1
2-Propenamide	79061		U007	5,000
1-Propene, 1,1,2,3,3,3-hexachloro-	1888717		U243	1,000
1-Propene, 1,3-dichloro-	542756		U084	100
2-Propenenitrile	107131		U009	100
2-Propenenitrile, 2-methyl- (I,T)	126987		U152	1,000
2-Propenoic acid (I)	79107		U008	5,000
2-Prepenoic acid, ethyl ester (I)	140885		U113	1,000
2-Prepenoic acid, 2-methyl-, ethyl ester	97632		U118	1,000
2-Prepenoic acid, 2-methyl-, methyl ester (I,T)	80626		U162	1,000
2-Propen-1-o1	107186		P005	100
Propiolactone, beta-	57578	500		1
Propionaldehyde	123386			1,000
Propionic acid	79094			5,000
Propionic acid, 2-(2,4,5-trichlorophenoxyl)-	93721		U233	100
Propionic anhydride	123626			5,000
Propoxor (Baygon)	114261		U411	100
Propionitrile	107120	500		10
Propionitrile, 3-chloro-	542767	1,000		1,000
Propiophenone, 1, 4-amino phenyl	70699	100/10,000		1
n-Propylamine	107108		U194	5,000
Propyl chloroformate	109615	500		1
Propylene dichloride	78875		U083	1,000
Propylene oxide	75569	10,000		100
1,2-Propylenimine	75558	10,000	P067	1
2-Propyn-1-o1	107197		P102	1,000
Prothoate	2275185	100/10,000		1
Pyrene	129000	1,000/10,000		5,000

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting
(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Pyrethrins	121299			1
	121211			
	8003347			
3,6-Pyridazinedione, 1,2-dihydro-	123331		U148	5,000
4-Pyridinamine	504245		P008	1,000
Pyridine	110861		U196	1,000
Pyridine, 2-methyl-	109068		U191	5,000
Pyridine, 2-methyl-5-vinyl-	140761	500		1
Pyridine, 4-amino-	504245	500/10,000		1,000
Pyridine, 4-nitro-, 1-oxide	1124330	500/10,000		1
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)	54115		P075	100
2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-	66751		U237	10
4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	56042		U164	10
Pyriminil	53558251	100/10,000		1
Pyrrolidine, 1-nitroso-	930552		U180	1
Quinoline	91225			5,000
Quinone (p-Benzoquinone)	106514		U197	10
Quintobenzene	82688		U185	100
Reserpine	50555		U200	5,000
Resorcinol	108463		U201	5,000
Saccharin and salts	81072		U202	100
Salcomine	14167181	500/10,000		1
Sarin	107448	10		1
Safrole	94597		U203	100
Selenious acid	7783008	1,000/10,000	U204	10
Selenious acid, dithallium (1+) salt	12039520		P114	1,000
Selenium ++	7782492			100
Selenium dioxide	7446084		U204	10
Selenium oxychloride	7791233	500		1
Selenium sulfide (R,T)	7488564		U205	10
Selenourea	630104		P103	1,000
Semicarbazide hydrochloride	563417	1,000/10,000		1
L-Serine, diazoacetate (ester)	115026		U015	1
Silane, (4-aminobutyl)diethoxymethyl-	3037727	1,000		1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting
(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Silver ++	7440224			1,000
Silver cyanide	506649		P104	1
Silver nitrate	7761888			1
Silvex (2,4,5-TP)	93721		U233	100
Sodium	7440235			10
Sodium arsenate	7631892	1,000/10,000		1
Sodium arsenite	7784465	500/10,000		1
Sodium azide	26628228	500	P105	1,000
Sodium bichromate	10588019			10
Sodium bifluoride	1333831			100
Sodium bisulfite	7631905			5,000
Sodium cacodylate	124652	100/10,000		1
Sodium chromate	7775113			10
Sodium cyanide	143339	100	P106	10
Sodium dodecylbenzenesulfonate	25155300			1,000
Sodium fluoride	7681494			1,000
Sodium fluoroacetate	62748	10/10,000		10
Sodium hydrosulfide	16721805			5,000
Sodium hydroxide	1310732			1,000
Sodium hypochlorite	7681529			100
	10022705			
Sodium methylate	124414			1,000
Sodium nitrite	7632000			100
Sodium prentachlorophenate	131522	100/10,000		1
Sodium phosphate, dibasic	7558794			5,000
	10039324			
	10140655			
Sodium phosphate, tribasic	7601549			5,000
	7758294			
	7785844			
	10101890			
	10124568			
	10361894			
Sodium selenate	13410010	100/10,000		1

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(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Sodium selenite	10102188	100/10,000		100
	7782823			
Sodium tellurite	10102202	500/10,000		1
Stannane, acetoxytriphenyl	900958	500/10,000		1
Streptozotocin	18883664		U206	1
Strontium chromate	7789062			10
Strychnidin-10-one	57249		P108	10
Strychnidin-10-one, 2,3-dimethoxy-	357573		P018	100
Strychnine, & salts	572494	100/10,000	P108	10
Strychnine sulfate	60413	100/10,000		1
Styrene	100425			1,000
Styrene oxide	96093			100
Sulfotep	3689245	500		100
Sulfoxide, 3-chloropropyl octyl	3569571	500		1
Sulfur monochloride	12771083			1,000
Sulfur dioxide	7446095	500		1
Sulfur phosphide (R)	1314803		U189	100
Sulfur tetrafluoride	7783600	100		1
Sulfur trioxide	7446119	100		1
Sulfuric acid	7664939	1,000		1,000
	8014957			
Sulfuric acid, dithallium (1+) salt	7446186		P115	100
	10031591			
Sulfuric acid, dimethyl ester	77781		U103	100
Tabun	77816	10		1
2,4,5-T acid	93765		U232	1,000
2,4,5-T amines	2008460			5,000
	1319728			
	3813147			
	6369966			
	6369977			
Tellurium	13494809	500/10,000		1
Tellurium hexafluoride	7783804	100		1

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(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.**[1]	**Threshold Planning Quantity (Pounds)**	**HW No.** [2]	**RQ (Pounds)** [3]
2,4,5-T esters	93798			1,000
	1928478			
	2545597			
	25168154			
	61792072			
2,4,5-T salts	13560991			1,000
2,4,5-T	93765		U232	1,000
TDE (Dichloro diphenyl dichloroethane)	72548		U060	1
TEPP (Tetraethyl ester diphosphoric acid)	107493	100		10
Terbufos	13071799	100		1
1,2,4,5-Tetrachlorobenzene	95943		U207	5,000
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746016			1
1,1,1,2-Tetrachloroethane	630206		U208	100
1,1,2,2-Tetrachloroethane	79345		U209	100
Tetrachloroethene	127184		U210	100
Tetrachloroethylene	127184		U210	100
2,3,4,6-Tetrachlorophenol	58902		U212	10
Tetraethyl lead	78002	100	P110	10
Tetraethyl pyrophosphate	107493		P111	10
Tetraethyldithiopyrophosphate	3689245		P109	100
Tetraethyltin	597648	100		1
Tetramethyllead	75741	100		1
Tetrahydrofuran (I)	109999		U213	1,000
Tetranitromethane (R)	509148	500	P112	10
Tetraphosphoric acid, hexaethyl ester	757584		P062	100
Thallic oxide	1314325		P113	100
Thallium ++	7440280			1,000
Thallium acetate	563688		U214	100
Thallium carbonate	6533739		U215	100
Thallium chloride	7791120		U216	100
Thallium nitrate	10102451		U217	100
Thallium oxide	1314325		P113	100
Thallium selenite	12039520		P114	1,000
Thallium sulfate	7446186	100/10,000	P115	100
	10031591			

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting
(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Thallous carbonate (Thallium (I) carbonate)	6533739	100/10,000	U215	100
Thallous chloride (Thallium (I) chloride)	7791120	100/10,000	U216	100
Thallous malonate (Thallium (I) malonate)	2757188	100/10,000		1
Thallous sulfate (Thallium (I) sulfate)	7446186	100/10,000	P115	100
Thioacetamide	62555		U218	10
Thiocarbazide	2231574	1,000/10,000		1
Thiodiphosphoric acid, tetraethyl ester	3689245		P109	100
Thiofanox	39196184	100/10,000	P045	100
Thioimidodicarbonic diamide [(H2N)C(S)] 2NH	541537		P049	100
Thiomethanol (I,T)	74931		U153	100
Thionazin	297972	500		100
Thioperoxydicarbonic diamide [(H2N)C(S)] 2S2, tetra-methyl-	137268		U244	10
Thiophenol	108985	500	P104	100
Thiosemicarbazide	79196	100/10,000	P116	100
Thiourea	62566		U219	10
Thiourea, (2-chlorophenyl)-	5344821	100/10,000	P026	100
Thiourea, (2-methylphenyl)-	614788	500/10,000		1
Thiourea, 1-naphthalenyl-	86884		P072	100
Thiourea, phenyl-	103855		P093	100
Thiram	137268		U244	10
Titanium tetrachloride	7550450	100		1,000
Toluene	108883		U220	1,000
Toluenediamine	95807		U221	10
	496720			
	823405			
	25376458			
Toluene diisocyanate (R,T)	584849	500	U223	100
	91087	100		100
	26471625			
o-Toluidine	95534		U328	100
p-Toluidine	106490		U353	100
o-Toluidine hydrochloride	636215		U222	100
Toxaphene	8001352		P123	1
2,4,5-TP acid	93721		U233	100

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.[1]**	**Threshold Planning Quantity (Pounds)**	**HW No. [2]**	**RQ (Pounds) [3]**
2,4,5-TP acid esters	32534955			100
1H-1,2,4-Triazol-3-amine	61825		U011	10
Trans-1,4-dichlorobutene	110576	500		1
Triamiphos	1031476	500/10,000		1
Triazofos	24017478	500		1
Trichloroacetyl chloride	76028	500		1
Trichlorfon	52686			100
1,2,4-Trichlorobenzene	120821			100
1,1,1-Trichloroethane	71556		U226	1,000
1,1,2-Trichloroethane	79005		U227	100
Trichloroethene	79016		U228	100
Trichloroethylene	79016		U228	100
Trichloroethylsilane	115219	500		1
Trichloronate	327980	500		1
Trichloromethanesulfenyl chloride	594423		P118	100
Trichloromonofluoromethane	75694		U121	5,000
Trichlorophenol	21567822			10
2,3,4-Trichlorophenol	15950660			
2,3,5-Trichlorophenol	933788			
2,3,6-Trichlorophenol	933755			
2,4,5-Trichlorophenol	95954		U230	10
2,4,6-Trichlorophenol	88062		U231	10
3,4,5-Trichlorophenol	609198			
Trichlorophenylsilane	98135	500		1
Trichloro(chloromethyl)silane	1558254	100		1
Trichloro(dichlorophenyl)silane	27137855	500		1
Triethanolamine dodecylbenzene-sulfonate	27323417			1,000
Triethoxysilane	998301	500		1
Trifluralin	1582098			10
Triethylamine	121448			5,000
Trimethylamine	75503			100
Trimethylchlorsilane	75774	1,000		1
2,2,4-Trimethylpentane	540841			1,000
Trimethylolpropane phosphite	824113	100/10,000		1
Trimethyiltin chloride	1066451	500/10,000		1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	**CAS No.**[1]	**Threshold Planning Quantity (Pounds)**	**HW No.** [2]	**RQ (Pounds)** [3]
1,3,5-Trinitrobenzene (R,T)	99354		U234	10
1,3,5-Trioxane, 2,4,6-trimethyl-	123637		U182	1,000
Triphenyltin chloride	639587	500/10,000		1
Tris(2-chloroethyl)amine	555771	100		1
Tris(2,3-dibromopropyl) phosphate	126727		U235	10
Trypan blue	72571		U236	10
Unlisted Hazardous Wastes Characteristic of **Ignitability**	NA		D001	100
Unlisted Hazardous Wastes Characteristic of **Corrosivity**	NA		D002	100
Unlisted Hazardous Wastes Characteristic of **Reactivity**	NA		D003	100
Unlisted Hazardous Wastes Characteristic of **Toxicity**				

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Arsenic			D004	1
Barium			D005	1,000
Benzene			D018	10
Cadmium			D006	10
Carbon Tetrachloride			D019	10
Chlordane			D020	1
Chlorobenzene			D021	100
Chloroform			D022	10
Chromium			D007	10
o-Cresol			D023	100
m-Cresol			D024	100
p-Cresol			D025	100
Cresol			D026	100
2,4-D (Dichlorophenoxyacetic acid)			D016	100
1,4-Dichlorobenzene			D027	100
1,2-Dichloroethane			D028	100
1,1-Dichloroethylene			D029	100
2,4-Dinitrotoluene			D030	10
Endrin			D012	1
Heptachlor (and epoxide)			D031	1
Hexachlorobenzene			D032	10
Hexachlorobutadiene			D033	1
Hexachloroethane			D034	100
Lead			D008	10
Lindane			D013	1
Mercury			D009	1
Methoxychlor			D014	1
Methyl ethyl ketone			D035	5,000
Nitrobenzene			D036	1,000
Pentachlorophenol			D037	10
Pyridine			D038	1,000
Selenium			D010	10
Silver			D011	1
Tetrachloroethylene			D039	100
Toxaphene			D015	1

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Trichloroethylene			D040	100
2,4,5 Trichlorophenol			D041	10
2,4,5-TP			D017	100
Vinyl chloride			D043	1
Uracil mustard	66751		U237	10
Uranyl acetate	541093			100
Uranyl nitrate	10102064			100
	36478769			
Urea, N-ethyl-N-nitroso	759739		U176	1
Urea, N-methyl-N-nitroso	684935		U177	1
Urethane (Carbamic acid ethyl ester)	51796		U238	100
Valinomycin	2001958	1,000/10,000		1
Vanadic acid, ammonium salt	7803556		P119	1,000
Vanadic oxide V_20_5	1314621		P120	1,000
Vanadic pentoxide	1314621		P120	1,000
Vanadium pentoxide	1314621	100/10,000		1,000
Vanadyl sulfate	27774136			1,000
Vinyl chloride	75014		U043	1
Vinyl acetate	108054			5,000
Vinyl acetate monomer	108054	1,000		5,000
Vinylamine, N-methyl-N-nitroso-	4549400		P084	10
Vinyl bromide	593602			100
Vinylidene chloride	75354		U078	100
Warfarin, & salts, when present at concentrations greater than 0.3%	81812	500/10,000	P001	100
Warfarin sodium	129066	100/10,000		100
Xylene (mixed)	1330207		U239	100
m-Benzene, dimethyl	108383			1,000
o-Benzene, dimethyl	95476			1,000
p-Benzene, dimethyl	106423			100
Xylenol	1300716			1,000
Xylylene dichloride	28347139	100/10,000		1
Yohimban-16-carboxylic acid, 11,17 dimethoxy-18-[(3,4,5-trimethoxy-benzoyl)oxy]-, methyl ester (3-beta, 16-beta,17-alpha,18-beta,20-alpha)-	50555		U200	5,000
Zinc ++	7440666			1,000

Appendix AP1.T1. List of Hazardous Waste/Substances/Materials for Spill Reporting

(All notes appear at the end of the table.)

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)	HW No. [2]	RQ (Pounds) [3]
Zinc acetate	557346			1,000
Zinc ammonium chloride	52628258			1,000
	14639975			
	14639986			
Zinc borate	1332076			1,000
Zinc bromide	7699458			1,000
Zinc carbonate	3486359			1,000
Zinc chloride	7646857			1,000
Zinc cyanide	557211		P121	10
Zinc, dichloro(4,4-dimethyl-5((((methyl-amino)carbonyl)oxy)imino)pentaenitrile)-,(t-4)-	58270089	100/10,000		1
Zinc fluoride	7783495			1,000
Zinc formate	557415			1,000
Zinc hydrosulfite	7779864			1,000
Zinc nitrate	7779886			1,000
Zinc phenosulfonate	127822			5,000
Zinc phosphide	1314847	500	P122	100
Zinc phosphide Zn_3P_2, when present at concentrations greater than 10%	1314847		P122	100
Zinc silicofluoride	16871719			5,000
Zinc sulfate	7733020			1,000
Zirconium nitrate	13746899			5,000
Zirconium potassium fluoride	16923958			1,000
Zirconium sulfate	14644612			5,000
Zirconium tetrachloride	10026116			5,000

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
F001			**F001**	**10**
The following spent halogenated solvents used in degreasing; all spent solvent mixtures/blends used in degreasing containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
(a) Tetrachloroethylene	127184		U210	100
(b) Trichloroethylene	79016		U228	100
(c) Methylene chloride	75092		U080	1,000
(d) 1,1,1-Trichloroethane	71556		U226	1,000
(e) Carbon tetrachloride	56235		U211	10
(f) Chlorinated fluorocarbons	NA			5,000
F002			**F002**	**10**
The following spent halogenated solvents: all spent solvent mixtures/blends containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
(a) Tetrachloroethylene	127184		U210	100
(b) Methylene chloride	75092		U080	1,000
(c) Trichloroethylene	79016		U228	100
(d) 1,1,1-Trichloroethane	71556		U226	1,000
(e) Chlorobenzene	108907		U037	100
(f) 1,1,2-Trichloro-1,2,2 trifluoroethane	76131			5,000
(g) o-Dischlorobenzene	95501		U070	100
(h) Trichlorofluoromethane	75694		U121	5,000
(i) 1,1,2-Trichloroethane	79005		U227	100
F003			**F003**	**100**
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:				
(a) Xylene	1330207			1,000
(b) Acetone	67641			5,000
(c) Ethyl acetate	141786			5,000
(d) Ethylbenzene	100414			1,000
(e) Ethyl ether	60297			100
(f) Methyl isobutyl ketone	108101			5,000
(g) n-Butyl alcohol	71363			5,000
(h) Cyclohexanone	108941			5,000
(i) Methanol	67561			5,000
F004			**F004**	**100**
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:				
(a) Cresols/Cresylic acid	1319773		U052	100
(b) Nitrobenzene	98953		U169	1,000
F005			**F005**	**100**
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:				
(a) Toluene	108883		U220	1,000
(b) Methyl ethyl ketone	78933		U159	5,000
(c) Carbon disulfide	75150		P022	100
(d) Isobutanol	78831		U140	5,000
(e) Pyndine	110861		U196	1,000

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
F006 Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum, (2) tin plating on carbon steel, (3) zinc plating (segregated basis) on carbon steel, (4) aluminum or zinc-aluminum plating on carbon steel, (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel, and (6) chemical etching and milling of aluminum.			**F006**	**10**
F007 Spent cyanide plating bath solutions from electroplating operations.			**F007**	**10**
F008 Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.			**F008**	**10**
F009 Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.			**F009**	**10**
F010 Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.			**F010**	**10**
F011 Spent cyanide solution from salt bath pot cleaning from metal heat treating operations.			**F011**	**10**
F012 Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.			**F012**	**10**
F019 Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive coating process.			**F019**	**10**
F020 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri-or-tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)			**F020**	**1**
F021 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.			**F021**	**1**
F022 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.			**F022**	**1**
F023 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexa-chlorophene from highly purified, 2,4,5-tri-chlorophenol.)			**F023**	**1**

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
F024			**F024**	**1**
Wastes, including but not limited to distillation residues, heavy ends, tars, and reactor cleanout wastes, from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent dessicants(sic), wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in Section 261.32.)				
F025			**F025**	**1**
Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.				
F026			**F026**	**1**
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-penta-, or hexachlorobenzene under alkaline conditions.				
F027			**F027**	**1**
Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-tri-chlorophenol as the sole component.)				
F028			**K028**	**1**
Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Numbers F020, F021, F022, F023, F026, and F027.				
F032			**F032**	**1**
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used clorophenolic formulations (except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with 261.35 of this chapter or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				
F034			**F034**	**1**
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				
F035			**F035**	**1**
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
F037 Petroleum refinery primary oil/water/solids separation sludge--any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water/solids separators; tanks and impoundment; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment unites) and K051 wastes are not included in this listing.			**F037**	**1**
F038 Petroleum refinery secondary (emulsified) oil/water/solids separation sludge--any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from once-through non-contact cooling waters segregated from treatment from other process or oil cooling wastes, sludges and floats generated in aggressive biological treatment units as defined in 261.31(b) (2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.			**F038**	**1**
K001 Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.			**K001**	**1**
K002 Wastewater treatment sludge from the production of chrome yellow and orange pigments.			**K002**	**10**
K003 Wastewater treatment sludge from the production of molyodate orange pigments.			**K003**	**10**
K004 Wastewater treatment sludge from the production of zinc yellow pigments.			**K004**	**10**
K005 Wastewater treatment sludge from the production of chrome green pigments.			**K005**	**10**
K006 Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).			**K006**	**10**
K007 Wastewater treatment sludge from the production of iron blue pigments.			**K007**	**10**
K008 Oven residue from the production of chrome oxide green pigments.			**K008**	**10**
K009 Distillation bottoms from the production of acetaldehyde from ethylene.			**K009**	**10**
K010 Distillation side cuts from the production of acetaldehyde from ethylene.			**K010**	**10**
K011 Bottom stream from the wastewater stripper in the production of acrylonitrile.			**K011**	**10**
K013 Bottom stream from the acetonitrile column in the production of acrylonitrile.			**K013**	**10**
K014 Bottoms from the acetonitrile purification column in the production of acrylonitrile.			**K014**	**5,000**

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
K015 Still bottoms from the distillation of benzyl chloride.			**K015**	**10**
K016 Heavy ends or distillation residues from the production of carbon tetrachloride.			**K016**	**1**
K017 Heavy ends (still bottoms) from the purification column in the production of epi-chlorohydrin.			**K017**	**10**
K018 Heavy ends from the fractionation column in ethyl chloride production.			**K018**	**1**
K019 Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.			**K019**	**1**
K020 Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.			**K020**	**1**
K021 Aqueous spent antimony catalyst waste from fluoromethanes production.			**K021**	**10**
K022 Distillation bottom tars from the production of phenol/acetone from cumene.			**K022**	**1**
K023 Distillation light ends from the production of ophthalic anhydride from naphthalene.			**K023**	**5,000**
K024 Distillation bottoms from the production of phthalic anhydride from naphthalene.			**K024**	**5,000**
K025 Distillation bottoms from the production of nitrobenzene by the nitration of benzene.			**K025**	**10**
K026 Stripping still tails from the production of methyl ethyl pyridines.			**K026**	**1,000**
K027 Centrifuge and distillation residues from toluene diisocyanate production.			**K027**	**10**
K028 Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.			**K028**	**1**
K029 Waste from the product steam stripper in the production of 1,1,1-trichloroethane.			**K029**	**1**
K030 Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.			**K030**	**1**
K031 By-product salts generated in the production of MSMA and cacodylic acid.			**K031**	**1**
K032 Wastewater treatment sludge from the production of chlordane.			**K032**	**10**
K033 Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.			**K033**	**10**
K034 Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.			**K034**	**10**
K035 Wastewater treatment sludges generated in the production of creosote.			**K035**	**1**
K036 Still bottoms from toluene reclamation distillation in the production of disulfoton.			**K036**	**1**

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
K037 Wastewater treatment sludges from the production of disulfoton.			**K037**	**1**
K038 Wastewater from the washing and stripping of phorate production.			**K038**	**10**
K039 Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.			**K039**	**10**
K040 Wastewater treatment sludge from the production of phorate.			**K040**	**10**
K041 Wastewater treatment sludge from the production of toxaphene.			**K041**	**1**
K042 Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.			**K042**	**10**
K043 2,6-Dichlorophenol waste from the production of 2,4-D.			**K043**	**10**
K044 Wastewater treatment sludges from the manufacturing and processing of explosives.			**K044**	**10**
K045 Spent carbon from the treatment of wastewater containing explosives.			**K045**	**10**
K046 Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.			**K046**	**10**
K047 Pink/red water from TNT operations.			**K047**	**10**
K048 Dissolved air flotation (DAF) float from the petroleum refining industry.			**K048**	**10**
K049 Slop oil emulsion solids from the petroleum refining industry.			**K049**	**10**
K050 Heat exchanger bundle cleaning sludge from the petroleum refining industry.			**K050**	**10**
K051 API separator sludge from the petroleum refining industry.			**K051**	**10**
K052 Tank bottoms (leaded) from the petroleum refining industry.			**K052**	**10**
K060 Ammonia still lime sludge from coking operations.			**K060**	**1**
K061 Emission control dust/sludge from the primary production of steel in electric furnaces.			**K061**	**10**
K062 Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332).			**K062**	**10**
K064 Acid plant blowdown slurry/sludge resulting from thickening of blowdown slurry from primary copper production.			**K064**	**10**

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
K065 Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.			**K065**	**10**
K066 Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.			**K066**	**10**
K069 Emission control dust/sludge from secondary lead smelting.			**K069**	**10**
K071 Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.			**K071**	**1**
K073 Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.			**K073**	**10**
K083 Distillation bottoms from aniline extraction.			**K083**	**100**
K084 Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.			**K084**	**1**
K085 Distillation or fractionation column bottoms from the production of chlorobenzenes.			**K085**	**10**
K086 Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.			**K086**	**10**
K087 Decanter tank tar sludge from coking operations.			**K087**	**100**
K088 Spent potliners from primary aluminum reduction.			**K088**	**10**
K090 Emission control dust or sludge from ferrochromiumsilicon production.			**K090**	**10**
K091 Emission control dust or sludge from ferrochromium production.			**K091**	**10**
K093 Distillation light ends from the production of phthalic anhydride from ortho-xylene.			**K093**	**5,000**
K094 Distillation bottoms from the production of phthalic anhydride from ortho-xylene.			**K094**	**5,000**
K095 Distillation bottoms from the production of 1,1,1-trichloroethane.			**K095**	**100**
K096 Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.			**K096**	**100**
K097 Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.			**K097**	**1**
K098 Untreated process wastewater from the production of toxaphene.			**K098**	**1**

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
K099 Untreated wastewater from the production of 2,4-D.			**K099**	**10**
K100 Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.			**K100**	**10**
K101 Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.			**K101**	**1**
K102 Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.			**K102**	**1**
K103 Process residues from aniline extraction from the production of aniline.			**K103**	**100**
K104 Combined wastewater streams generated from nitrobenzene/aniline production.			**K104**	**10**
K105 Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.			**K105**	**10**
K106 Wastewater treatment sludge from the mercury cell process in chlorine production.			**K106**	**1**
K107 Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazines.			**K107**	**10**
K108 Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.			**K108**	**10**
K109 Spent filter cartridges from product purification from the production of 1.1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.			**K109**	**10**
K110 Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.			**K110**	**10**
K111 Product washwaters from the production of dinitrotoluene via nitration of toluene.			**K111**	**10**
K112 Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.			**K112**	**10**
K113 Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.			**K113**	**10**
K114 Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.			**K114**	**10**
K115 Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.			**K115**	**10**

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
K116 Organic condensate from the solvent recovery column in the production of toluene disocyanate via phosgenation of toluenediamine.			**K116**	**10**
K117 Wastewater from the reaction vent gas scrubber in the production of ethylene bromide via bromination of ethene.			**K117**	**1**
K118 Spent absorbent solids from purification of ethylene dibromide in the production of ethylene dibromide.			**K118**	**1**
K123 Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.			**K123**	**10**
K124 Reactor vent scrubber water from the production of ethylene- bisdithiocarbamic acid and its salts.			**K124**	**10**
K125 Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.			**K125**	**10**
K126 Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylene-bisdithiocarbamic acid and its salts.			**K126**	**10**
K131 Wastewater from the reactor and spent sulfuric acid from the acid dryer in the production of methyl bromide.			**K131**	**100**
K132 Spent absorbent and wastewater solids from the production of methyl bromide.			**K132**	**1,000**
K136 Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.			**K136**	**1**
K141 Process residues from the recovery of coal tar, including but not limited to, tar collecting sump residues from the production of coke or coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations).			**K141**	**1**
K142 Tar storage tank residues from the production of coke or from the recovery of coke by-products produced from coal.			**K142**	**1**
K143 Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.			**K143**	**1**
K144 Wastewater treatment sludges from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.			**K144**	**1**
K145 Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.			**K145**	**1**
K147 Tar storage tank residues from coal tar refining.			**K147**	**1**

Hazardous Waste/Substance/Material	CAS No.[1]	Threshold Planning Quantity (Pounds)[2]	HW No. [3]	RQ (Pounds)[4]
K148 Residues from coal tar distillation, including, but not limited to, still bottoms.			**K148**	**1**
K149 Distillation bottoms from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. [This waste does not include still bottoms from the distillation of benzyl chloride.]			**K149**	10
K150 Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.			**K150**	10
K151 Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.			**K151**	10
K157 Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (This listing does not include sludges derived from the treatment of these wastewaters.)			**K157**	++
K158 Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes.			**K158**	++
K159 Organics from the treatment of thiocarbamate wastes.			**K159**	++
K160 Solids (including filter wastes, separation solids, and spent catalysts) from the production of thio-carbamates and solids from the treatment of thiocarbamate wastes.			**K160**	++
K161 Purification solids (including filtration, evaporation, and centrifugation solids), bag house dust, and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126.)			**K161**	++

Notes:

1 Chemical Abstract Service (CAS) Registry Number.

2 USEPA Hazardous Waste Number. This number is to be used only as a reference for determining which wastes are considered to be “Acute Hazardous Wastes” per Chapter 6 criteria.

3 Reportable quantity release that requires notification. (See Chapter 18, “Spill Prevention and Response Planning”).

4 Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH2CH2)n-OR'. Where: n = 1, 2, or 3; R = alkyl C7 or less; or R = phenyl or alkyl substituted phenyl; R' = H or alkyl C7 or less; or OR' consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.

++ No reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 micrometers (0.004 inches).

+++ The reportable quantity (RQ) for asbestos is limited to friable forms only.

# Indicates that the RQ is subject to change when the assessment of potential carcinogenicity is completed.

The statutory RQ for this hazardous substance may be adjusted in a future rulemaking; until then the statutory RQ applies.

1* Indicates that the 1-pound RQ is a statutory RQ.

** Indicates that no RQ is being assigned to the generic or broad class.

(1+) Indicates that the statutory source for designation of this hazardous substance under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is Clean Water Act (CWA) Section 311(b)(4).

(2+) Indicates that the statutory source for designation of this hazardous substance under CERCLA is CWA section 30711(a)(4).

(3+) Indicates that the statutory source for designation of this hazardous substance under CERCLA is CAA section 112.

(4+) Indicates that the statutory source for designation of this hazardous substance under CERCLA is Resource Conservation and Recovery Act, Section 3001.

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Appendix AP2

DETERMINATION OF WORST CASE DISCHARGE PLANNING VOLUME

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AP2. APPENDIX 2

DETERMINATION OF WORST CASE DISCHARGE PLANNING VOLUME

AP2.1. This Appendix provides criteria to determine, on an installation-specific basis, the extent of a worst-case discharge (WCD).

AP2.2. This Appendix provides criteria to determine the volume of oil or hazardous substance to be used in planning for a WCD. Installations should calculate both WCD volumes that apply to the installation's design and operation and use the larger volume as the WCD planning volume.

AP2.3. For installations transferring oil to and from vessels with tank capacities of 10,500 gallons (250 barrels) or more, the WCD planning volume is calculated as follows:

AP2.3.1. Where applicable, the loss of the entire capacity of all in-line and break out tank(s) needed for the continuous operation of the pipelines used for the purposes of handling or transporting oil, in bulk, to or from a vessel regardless of the presence of secondary containment; plus

AP2.3.2. The discharge from all piping carrying oil between the marine transfer manifold and the valve or manifold adjacent to the POL storage container. The discharge from each pipe is calculated as follows: The maximum time to discover the release from the pipe in hours, plus the maximum time to shut down flow from the pipe in hours (based on historic discharge data or the best estimate in the absence of historic discharge data for the installation) multiplied by the maximum flow rate expressed in gallons per hour (based on the maximum relief valve setting or maximum system pressure when relief valves are not provided) plus the total line drainage volume expressed in gallons for the pipe between the marine transfer manifold and the valve or manifold adjacent to the POL storage container.

AP2.4. For installations with POL Storage Containers:

AP2.4.1. Single POL Storage Container Facilities. For facilities containing only one aboveground oil or hazardous substance storage container, the WCD planning volume equals the capacity of the oil or hazardous substance storage container. If adequate secondary containment (sufficiently large to contain the capacity of the above ground oil or hazardous substance storage container plus sufficient freeboard to allow for precipitation) exists for the oil storage container, multiply the capacity of the container by 0.8.

AP2.4.2. Multiple POL Storage Container Facilities

AP2.4.2.1. Facilities having no secondary containment. If none of the above ground storage containers at the facility have adequate secondary containment, the worst case planning volume equals the total above ground oil and hazardous substance storage capacity at the facility.

AP2.4.2.2. Facilities having complete secondary containment. If every above ground storage container at the facility has adequate secondary containment, the WCD planning volume equals the capacity of the largest single above ground oil or hazardous substance storage container.

AP2.4.2.3. Facilities having partial secondary containment. If some, but not all above ground storage containers at the facility have adequate secondary containment, the WCD planning volume equals the sum of:

AP2.4.2.3.1. The total capacity of the above ground oil and hazardous substance storage container that lacks adequate secondary containment; plus

AP2.4.2.3.2. The capacity of the largest single above ground oil or hazardous substance storage container that has adequate secondary containment.

AP2.4.3. For purposes of this Appendix, the term "adequate secondary containment" means an impervious containment system such as a dike, berm, containment curb, drainage system or other device that will prevent the escape of spilled material into the surrounding soil.