Solid Waste Management

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ABSTRACT

This publication is a solid waste management planning guide for Defense Department personnel who are responsible for nonhazardous waste disposal.

This manual discusses managerial, engineering, and operational issues associated with:

- handling and storage of waste
- refuse collection
- transfer stations
- sanitary landfills
- volume reduction techniques
- resource recovery (material and/or energy)
- recycling centers at military bases.

A discussion of hazardous wastes relates to the impacts of hazardous waste materials that might enter a solid waste stream (e.g., contamination of housing wastes with hazardous household cleaning chemicals). This document is not meant to be a comprehensive review of hazardous waste practices in the military.

NAVY MANUAL
NO. NAVFAC MO-213
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NO. AFR 91-8
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DEPARTMENTS OF THE ARMY,
THE NAVY AND THE AIR FORCE
WASHINGTON, D.C.

FOREWORD

This publication is prepared as a solid waste management planning guide for Defense Department personnel who are responsible for waste disposal. THE principles prescribed conform to requirements of the Resource Conservation and Recovery Act (RCRA). Requirements defined reflect present U.S. Environmental Protection Agency (EPA) guidelines established as a result of RCRA. Through dissemination of this information in a joint service format, it is intended that uniformity in solid waste management will be introduced into all services. This guide serves as a primary solid waste manual for the Department of the Navy. For the Departments of Air Force and Army, the information contained in this guide supplements existing waste disposal operations manuals. When information in this publication varies from that contained in other manuals, advice concerning interpretation shall be obtained from:

1. Department of the Army - Office of the Chief of Engineers CEHSC-FU-S

2. Department of the Navy - Naval Facilities Engineering Command (Code 18) or its geographic
Engineering Field Division

3. Department of the Air Force - Air Force Engineering and Services Center HQ AFESC/DEMM

This publication addresses only nonhazardous solid waste management. Hazardous wastes are discussed briefly but in the context that they can enter otherwise nonhazardous solid waste streams, e.g., household cleaning chemicals and/or paint in housing area refuse. Pyrotechnics, radioactive wastes, explosives, and propellants are not discussed.

The document discusses the legal, managerial, and engineering issues associated with collection and disposal of nonhazardous solid wastes.

Legal requirements of the Resource Conservation and Recovery Act of 1976 and its amendments are discussed and referenced throughout the document. Managerial and engineering subjects include:

handling and storage of solid waste

refuse collection

transfer stations

sanitary landfills

volume reduction techniques

resource recovery (material and/or energy)

recycling centers at military bases.

A section on wastes requiring special handling discusses mainly infectious wastes and household chemical hazards.

Recommendations or suggestions for modification, or additional information and instructions that will improve the publication and motivate its use, shall be submitted through appropriate channels to the addressees listed above.

Cancellation. This publication cancels and supersedes Solid Waste Management NAVFAC MO-213, AFP 91-8, PAM 42047, June 1978 and Army TM5-634, July 1958.

By Order of the Secretaries of the Army, the Navy, and the Air Force

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CHAPTER 1. INTRODUCTION

1.1 EXECUTIVE SUMMARY

1.1.1 This update of the Solid Waste Management manual stresses operational changes brought about in waste handling practices as a result of the Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901) and its amendments. New sections are included on the legal implications of the act. The Military Construction Codification Act (PL 97-214) of 1982 is also discussed as it applies to recycling programs in the military.

1.1.2 This manual discusses managerial, engineering, and operational issues associated with:

- handling and storage of waste
- refuse collection
- transfer stations sanitary landfills
- volume reduction techniques
- resource recovery (material and/or energy)
- recycling centers at military bases.

Discussions are intentionally brief.

1.1.3 A serious shortage of suitable landfill sites especially near large metropolitan areas is forcing solid waste managers to look for ways to minimize the volume of buried wastes. Resource recovery, recycling compacting, incineration, and composting are examples of processes being implemented to reduce burdens on landfills. When hauling distances to landfills become excessive, transfer stations may be economically attractive.

1.1.4 The Military Construction Codification Act (PL 97-214) of 1982 provided increased incentives for recycling programs. Highly successful recycling programs already exist at several military installations. Implementation strategies for other installations are included in this document.

1.1.5 Section 4.4 on wastes requiring special handling emphasizes hospital wastes and other unique waste with specific handling and disposal requirements.

1.1.6 Section 4.5 on Hazardous Wastes relates to the impacts of hazardous materials or wastes that might enter a solid waste stream (e.g., contamination of housing wastes with hazardous household cleaning chemicals). It is not meant to be a comprehensive review of hazardous waste practices in the military.

1.1.7 Appendices provide information on:

- landfill permit requirements
- solid waste management contracts
- regional U.S. Environmental Protection Agency (EPA) offices
- state solid waste agencies
- organizations involved in recycling
- estimation of waste generation rates.

A list of acronyms, a glossary, and a subject index are also included.

1.2 PURPOSE. The purpose of the document is to provide technical information for personnel responsible for managing solid waste on military installations in the United States. Installations outside of the United States must abide by technical standards and practices of the host jurisdiction to ensure that environmental protection requirements are fulfilled. These requirements are set forth in status of forces agreements, treaties, and executive orders pertaining to U.S. activities overseas. Good sanitation practices are necessary at all locations regardless of regulatory requirements.

1.3 SCOPE

1.3.1 Management and technical procedures are presented as guides that will ensure:

- conservation of resources
- protection of the environment
- systematic collection of solid wastes
- efficient operation of disposal systems
- minimum expenditure of funds, personnel, equipment, and materials
- compliance with applicable regulations.

1.3.2 The sections discussing legal issues are guidelines only and based on interpretation of regulatory requirements. They are not intended to be legal advice.

CHAPTER 2. BACKGROUND

This background chapter touches on the legal requirements for solid waste handling, the impact of solid waste generation and involvement of base personnel. The discussions under Statutory and Regulatory Requirements focus on:

- RCRA
- other federal statutes
- Defense Logistics Agency
- generic state permit and regulatory requirements for landfills
- regulations relevant to incineration.

Section 2.3 focuses on the need to educate base personnel on specific solid waste issues; i.e., who has to know what and when. Periodic updates of the regulatory requirements must be an integral part of training at military bases.

2.1 STATUTORY AND REGULATORY CONSIDERATIONS.

Solid waste disposal activities at military installations must abide by federal, state, local, and military regulations. Military policy is to abide by the most stringent of the applicable regulations.

2.1.1 Federal Regulations

2.1.1.1 *Resource Conservation and Recovery Act (RCRA).* Prior to the enactment of the Resource Conservation and Recovery Act in September of 1976, solid waste management was governed by the Solid Waste Disposal Act of 1965 (42 USC 3251). Few states, however, had enacted any type of solid waste law. RCRA now sets certain minimum standards for waste management that all states must meet or exceed. Since 1976 many states have adopted their own waste management plans. Often these state plans are more restrictive than RCRA requirements. Military installations must abide by all state and local statutes where they are located. Within DoD regulations governing the sale of recyclable materials are found in the Military Construction Codification Act (PL 97-214).

2.1.1.2 The three main objectives that RCRA addresses are: (1) hazardous waste management; (2) solid waste management; and (3) procurement of materials made from recovered wastes. RCRA was Congress' first attempt at an environmental statute to have the free market mechanism work for environmental protection. Such a mechanism would work by mandating certain standards for disposal of solid and hazardous waste that would protect public health and safety. This action would require those benefitting from the functions that create the waste to pay the cost of its disposal. In effect, the new standards would incorporate costs of health and safety along with the cost of land into the cost of disposal. Then, as the cost of land disposal increased, there would be incentive to provide other more environmentally protective technologies.

2.1.1.3 Solid waste issues have been receiving national attention lately because of dwindling landfill sites and stringent regulatory requirements. A revised set of EPA guidelines for solid waste management is expected in 1989. The new guidelines are expected to focus on landfill design and operation as well as incineration practices.

2.1.1.4 *Procurement of Products Containing Recovered Materials (Robinson 1986).* One of the prime goals of RCRA is to require each federal procuring agency to procure items composed of the highest percentage of recovered materials practicable. The requirement is applicable to procurements in excess of $10,000. Each federal procuring agency is also required to develop an affirmative procurement program which will ensure that items composed of recovered materials will be purchased to the maximum extent practicable. The affirmative procurement program shall contain a promotional and preference program for recovered materials.

2.1.1.5 The EPA is required to provide each federal agency with information on the availability, sources of supply, and potential uses of materials recovered from solid waste. It should be noted that the definition of recovered material includes only material recovered from solid waste and does not include energy recovered from solid waste.

2.1.1.6 RCRA also mandates that the Office of Procurement Policy coordinate the various federal agencies to ensure that items composed of the highest percentage of recovered goods practicable are procured. Furthermore, the Office of Procurement Policy is to coordinate all other policies for federal procurement in such a way as to maximize the use of recovered resources.

2.1.1.7 **Energy Security Act. Public Law 96-294.** The primary goals of Title II of the Act are to reduce the dependence of the United States on imported oil. One portion of the Act dealt with municipal waste-to-energy facilities and the securing of loans to speed their implementation. The Secretary of Energy was prohibited from making loans to any facility unless he first determined that the project was technically and economically sound. Furthermore, the Secretary must ensure that the necessary municipal waste feedstocks are available and will continue to be available for the expected economic life of the project.

2.1.1.8 **Department of Energy Organization Act. Public Law 95-91.** The U.S. Department of Energy developed a National Energy Plan that summarizes all research and development efforts to:

- forestall energy shortages
- reduce waste
- foster recycling
- encourage conservation
- protect the environment.

2.1.1.9 The plan reviewed and appraised the adequacy and appropriateness of available technologies for the treatment of solid waste and developed strategies to maximize private production and investment in significant supply sectors.

2.1.2 State Regulations (General)

2.1.2.1 Section 6001 of the Resource Conservation and Recovery Act of 1976 requires any federal facility engaged in any activity resulting or which may result, in the disposal of solid waste to comply with all federal, state, and local disposal requirements. RCRA sets minimum standards for landfills. States must adopt these or establish more restrictive ones. Although details will differ from state to state, the general permitting procedures and requirements are quite similar.

2.1.2.2 Most state regulations will address the following issues and will likely have similar requirements.

1. Primary responsibility for solid waste handling is assigned to the local government, reserving to the state those functions necessary to ensure effective programs.

2. State regulations require each county, city, or jurisdictional board of health to adopt regulations or ordinances governing solid waste handling. These regulations or ordinances are to protect the public health, prevent air and water pollution, and avoid the creation of nuisance.

3. State laws establish requirements for permits for any solid waste facility from the appropriate state agency.

4. State regulations may define requirements for:

   - storage containers
   - waste collection and transportation
   - plan of operation
   - recordkeeping
   - reporting
   - inspections recycling.

5. Important regulations list minimum functional standards for landfill:

   - performance
   - design
   - maintenance and operation
   - closure and post-closure.

6. Special laws will describe requirements for:

   - operating and closing of inert and demolition waste sites
   - monitoring groundwater
   - establishing a corrective action program in the event of contamination of groundwater.

2.1.3 Department of Defense

2.1.3.1 This document will serve as primary guidance on Solid Waste Management for the Army, Air Force, and Naval branches of the military. Other major documents include:

DoD DIRECTIVE 4165.60, Solid Waste Management--Collection Disposal, Resource Recovery and Recycling Program - Provides DoD policies and procedures relative to the DoD comprehensive solid waste program.

ARMY: AR 420-47, Solid and Hazardous Waste Management - Defines responsibilities, regulatory requirements, and procedures for environmentally safe management of solid and hazardous wastes at Army installations. Describes procedures for collection, storage, and disposal of solid waste.

NAVY: DESIGN MANUAL 5.10, Civil Engineering Solid Waste Disposal - The manual is for use by qualified engineers in selection of a base-specific disposal method of solid waste.

AIR FORCE: AFM 91-11, Solid Waste Management - This manual describes procedures to use in accomplishing solid waste management in an efficient and economical manner consistent with good environmental engineering principles. The information provided on practicable equipment and methods is a basis for implementing a system of refuse collection and disposal.

2.1.3.2 Supplemental information can be found in other military references given in the Bibliography of this report.

2.1.3.3 These guidelines address the environmental and personnel health and safety requirements to be followed in the daily operation of a landfill facility and, therefore, shall be the basis for the development of any operations and maintenance manual for a landfill.

2.1.4 Regulations Relevant to Incineration

2.1.4.1 Solid wastes are to be incinerated in facilities designed for that purpose. The most stringent of federal, state, and local requirements apply to military installation incinerator operations.

2.1.4.2 *Environmental.* The design and operation of incinerator facilities must conform with the EPA guidelines published in 40 CFR 240, the Clean Air Act (42 USC 740/et seq.), the Clean Water Act (33 USC 125/et seq.), and pertinent state regulations. The processing of residue and nonhazardous wastes that cannot be thermally processed is subject to EPA guideline 40 CFR 241.

1. Air quality guidelines established by the federal government are contained in 40 CFR 60. Air pollutants from incinerator operations include particulates, carbon monoxide, sulfur oxides, nitrogen oxides, hydrogen chloride, and various heavy metals. Instrumentation and controls are used to monitor and regulate the incineration process in order to protect air quality. Incinerator design criteria are established including the number of chambers,