

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,

dwelt time, operating temperatures, and requirements for excess oxygen, carbon monoxide, and particulates. Air pollution control devices including cyclones, electrostatic precipitators, wet scrubbers, baghouses, and wetted baffles are used to remove particulate emissions. Proper emphasis on solid waste sorting should eliminate heavy metals from the incinerator feed, and thus reduce the quantities of particulate emissions.

2. Water quality standards are established by the Federal Water Pollution Control Act (FWPCA) and state and local regulations. The use of process water in incinerators varies considerably with the design of the plant. Water may be used in various stages of production for cooling charging chutes, fly ash sluicing, conveying residue, and controlling air pollution. Many plants require from 1000 to 2000 gal of water per ton of refuse processed; water treatment usually requires clarification and pH adjustment because of extreme acidity (less than 2.5 in some systems) and may require biological treatment. Process water contains suspended solids, inorganic materials in solution, and substantial organic material. Flow of nonrecycled process water to a sewage treatment plant shall be restricted to 2% to 5% of the wastewater entering the plant. When monitoring instrumentation indicates excessive discharge contamination, appropriate adjustment shall be made to lower the concentrations to acceptable levels.

3. Vector control is established by maintaining conditions unfavorable for the harboring, feeding, and breeding of vectors. Housekeeping schedules shall be established and maintained. These schedules should provide for cleaning the tipping and residue areas as spillage occurs, emptying the solid waste storage area at least weekly, and routinely cleaning the remainder of the facility.

4. Aesthetic quality of the incinerator facility is maintained through routine housekeeping and by regularly removing solid waste that cannot be processed by the facility.

2.2 IMPACTS OF SOLID WASTE GENERATION

2.2.1 Ecological impacts, such as air and water pollution around old landfills, have prompted new legislation requiring stringent standards for construction, operation, and closure of landfill sites. If present refuse generation rates continue, the cost of disposal of solid wastes will jump dramatically by the year 2000 in many parts of the country. Eastern metropolitan areas will suffer most as "nearby" landfills are closed. Military installations near these crowded areas could also experience a jump in costs for waste disposal. The scarcity of acceptable landfill sites has prompted municipalities and military installations to look at ways of minimizing solid wastes.

2.2.2 Municipal solid waste incineration is being considered and implemented at some larger military bases. Primary concerns with this volume reduction technique are hydrochloric acid and particulates. In many instances, hazardous organic chemicals have been found in incinerator fly ash from large-capacity units. This problem is delaying the acceptance of incineration at many locations.

2.2.3 Generally, incineration at military bases is appropriate only if the heat generated can be used effectively at the base. Generating electricity and selling power are not common practices at military installations.

2.2.4 Mandatory resource recovery is being tried in many states. Oregon, New Jersey, and Rhode Island are examples. Most programs are too new to judge success yet. In states requiring local recycling programs, installations that use the local landfill may be required to participate in some manner. Military installations have special monetary incentives for implementing recycling programs. Details are given in Section 4.3.

2.3 INVOLVEMENT OF BASE PERSONNEL

2.3.1 Landfill Operations. When existing sanitary landfills on military bases become unusable, new sites must be selected or new disposal options must be considered (e.g., incineration), specific engineering personnel in the military will be heavily involved. Other base staff become involved only from an education standpoint. All base personnel must be kept informed of any new regulations regarding wastes that can no longer be sent to a landfill or cannot be incinerated. Used motor oil, batteries, tires, pesticides, and liquid paints are examples of chemicals that shall no longer be sent to ordinary sanitary landfills. All base personnel must be informed of these requirements. Also, the base shall provide a central drop-off point or provide a regular specific collection time for such chemicals. When sufficient quantities of such wastes have been segregated and properly containerized, they can be shipped to the Defense Reutilization and Marketing Office (DRMO) for disposal. Detailed requirements are given in Section 4.5.

2.3.1.1 When military bases dispose of wastes in public landfills, they abide by the requests of the operator of the landfill. Military personnel are not usually involved in the decision-making processes associated with municipal landfills. Presently, interaction with the landfill operators is infrequent and usually occurs only when there has been an infraction of accepted disposal practices, e.g., improper bagging of asbestos wastes. In the future, frequent interactions may be necessary to avoid problems in the areas of household chemical wastes. Ultimately, each military base remains responsible for the waste it sends to a landfill. Landfills are inspected by environmental regulatory agencies; therefore, waste generators must be certain they are not sending improper materials to disposal facilities.

2.3.2 Resource Recovery. Resource recovery is usually the most visible waste reduction technique on military bases. The keys to success are education and simplicity. Base personnel must be educated and convinced of the worthiness of any recycling effort. Widespread participation demands a simple method for segregation of wastes. Recyclers will participate if the effort is simple and there is a reward for them.

2.3.2.1 A very successful approach has been to involve people in their work place first. Recycling bins are placed so staff can easily drop off recyclable materials on their way out of a building. As recycling programs grow and show real benefit to the participants, the participation rate climbs. A key to the benefits is publicizing how proceeds are spent.

Contests with generous prizes for the winning unit can sustain interest in recycling activities.

2.3.3 Hazardous Wastes. The increasingly stringent guidelines on hazardous wastes demand frequent information updates for base personnel. The base newsletter shall be a routine source of information on new developments. Special meetings may be necessary for groups most directly affected by new rulings. Initiation sessions for new arrivals shall stress hazardous waste handling/storage procedures at a base. Hazardous waste minimization is the most effective strategy for reducing hazardous waste generation. This is done by substitution of less hazardous materials, process changes, and reuse or other recovery procedures.