

STATUS OF DEPARTMENT OF ENERGY ORDER 5820,

RADIOACTIVE WASTE MANAGEMENT

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ABSTRACT

The Department of Energy (DOE) is preparing a comprehensive directive for managing radioactive waste that will apply to all elements of the Department and its contractors and subcontractors. The directive will be issued as DOE Order 5820 and will establish guidelines by which the Department manages operations and programs that handle, store and dispose of radioactive waste. The objective is to assure that any effluent releases and/or human exposures from managing radioactive waste are within nationally recognized radiation protection standards and are as low as reasonably achievable. Definitions are given for various waste types, and policies and requirements are discussed for high-level waste, TRU waste, low-level waste, waste contaminated with naturally occurring radioactivity, and for decontamination and decommissioning of the contaminated facilities and sites.

BACKGROUND

The Department of Energy (DOE) is responsible for managing radioactive waste generated by weapons production and nuclear research and developmental programs. These radioactive wastes have accumulated since the beginning of the U.S. Atomic Energy Program under the Manhattan Project and are stored and disposed of at major DOE storage/disposal sites, as shown in Fig. 1.

A comprehensive waste management directive was first issued under the Atomic Energy Commission (AEC) on September 19, 1973, as Manual Chapter 0511¹. Responsibility for the manual chapter rested within the safety and environmental arm of the AEC at that time. Although considerable progress has been made and many changes have taken place (congressional appropriations for nuclear waste management programs have increased dramatically, construction of the Waste Isolation Project Plant (WIPP) and Defense Waste Processing Facility has begun, a new Waste Calcining Facility has been built at the Idaho National Engineering Laboratory, the Nuclear Waste Policy Act of 1982 was passed and Nuclear Regulatory Commission (NRC) regulations and Environmental Protection Agency (EPA) standards have been issued either in draft or final), the Department's waste management programs still operated by and large under the policies contained in AEC Manual Chapter 0511 until last year.

With the separation of responsibility within DOE for civilian and defense waste, authority for drafting a new policy directive was assumed by the Office of Defense Waste and Byproducts Management. Subsequently, on September 30, 1982, DOE Order 5820.1² entitled "Management of Transuranic Contaminated Material" was approved. This Order was significant not only because it was the first new waste policy directive issued in 9 years, but because it raised the concentration limit for TRU waste from 10 nCi/g to 100 nCi/g. This change has made the management approach more

consistent with the risk and reduced the quantity of waste requiring retrievable storage and disposal in WIPP.

We are now reviewing a draft of an umbrella order on waste management which covers high-level and low-level waste, TRU waste, waste containing naturally occurring radioactivity, and surplus facilities. The order will provide for protection of public health and safety, adequate control, flexibility to address varying conditions at different storage/disposal sites, and the use of economic practices in managing the waste.

RELATED POLICIES

There are several standards and regulations concerning management of radioactive waste being developed by other agencies which relate to the development of the Order. These include NRC regulations for high-level waste³ and low-level waste⁴, EPA standards for disposal of high-level waste⁵, and a new draft of the NRC standards for protection of workers and the public against radiation exposure.⁶

Several other Departmental directives are related to waste management and form part of the basis for this Order. These include DOE 5480.1A, Environmental Protection, Safety, and Health Protection Program for DOE Operations⁷ and DOE 1540.1, "Materials Transportation and Traffic Management."⁸

The Nuclear Waste Policy Act of 1982 provides for the development of geologic repositories for the disposal of high-level radioactive waste and spent nuclear fuel from atomic energy defense and civilian nuclear activities.

PURPOSE AND OBJECTIVE

The purpose of the Order is to establish policies and guidelines for managing the Department's operations and programs that handle,

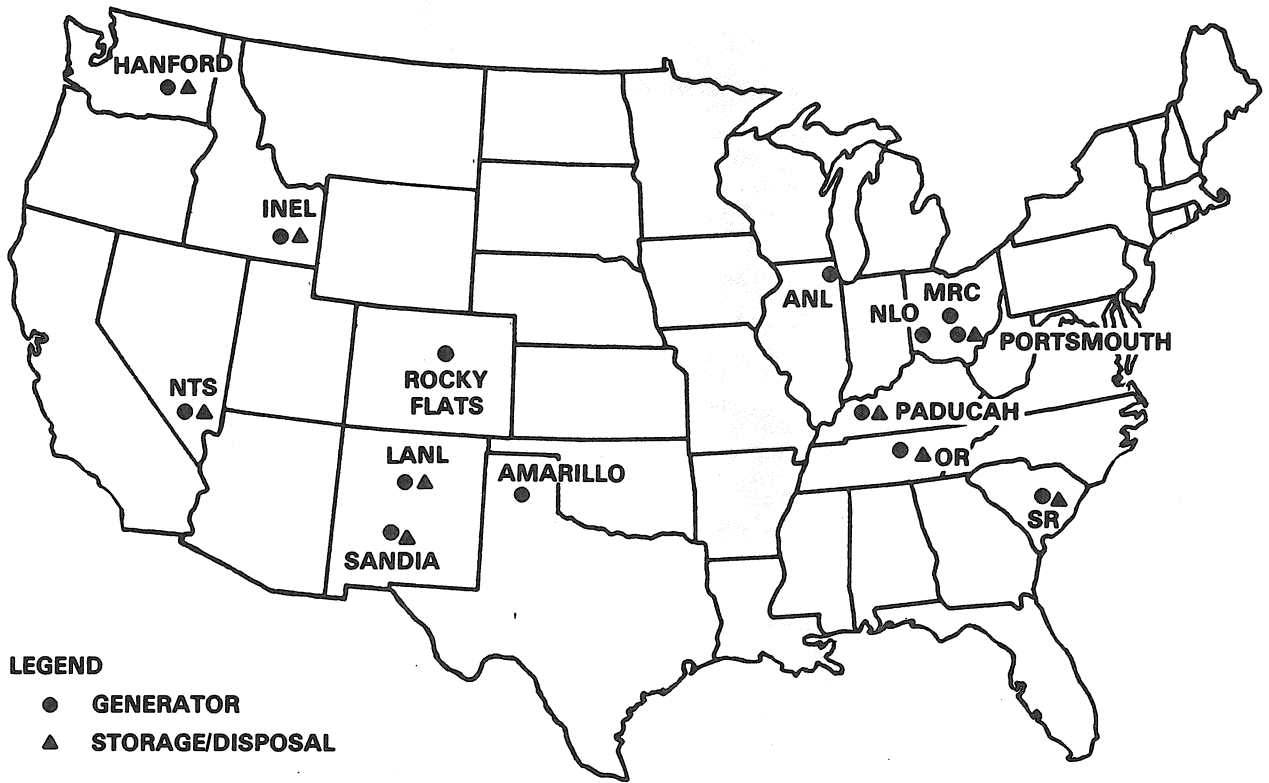


Fig. 1. Major DOE Waste Generating and Storage/Disposal Sites.

store and dispose of radioactive waste and waste byproducts. The objective of the Order is to establish requirements to assure that any environmental releases and human exposures from waste management operations are within the requirements of Chapter 11 of the DOE Order on environmental, safety and health protection,⁷ and are as low as reasonably achievable. Our goal is to maintain annual thyroid exposures below 75 millirems and annual whole body and other organ exposures below 25 millirems. The order will provide an equivalent level of protection for DOE facilities as is provided for commercial facilities by NRC regulations and EPA standards.

RESPONSIBILITIES

The Order provides broad policy outlines and objectives and directs field organizations to prepare supplemental guidance to further define their requirements and practices within the scope of the Order. The field organizations are responsible for the implementation of the requirements of the Order, and there is some flexibility to take account of site-specific factors. At Headquarters, the two primary organizations responsible for the requirements of the Order are the Office of Civilian Radioactive Waste Management and the Office of Defense Waste and Byproducts Management.

HIGH-LEVEL WASTE

The Order defines high-level waste as the highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced in reprocessing and any solid waste, derived from the liquid, that contains fission products or other radioactive contamination in concentrations which require permanent isolation. Requirements are given for interim storage, treatment and disposal of high-level waste. The interim storage requirements stress safety and maintaining options for final disposal and recovery of waste byproducts for beneficial use. Treatment involves converting high-level waste to stable forms to help assure isolation from the human environment. Disposal must satisfy EPA criteria and will be in a geologic repository, probably a commercial repository constructed and licensed under the Nuclear Waste Policy Act of 1982.

TRU WASTE

The Order defines TRU waste as radioactive waste that at the end of the institutional control period is contaminated with alpha-emitting radionuclides with atomic number greater than 92, half-lives greater than 20 years, and concentrations greater than 100 nCi/g (or 4000 dpm/cm² for smearable contamination averaged over the accessible surface). Radioactive waste contaminated with other alpha-emitting radionuclides having half-lives greater than 20 years and similar toxicity, such as ²³³U or ²²⁶Ra, in concentrations greater than 100 nCi/g, may also be designated as TRU waste.

The draft Order incorporates the technical and administrative requirements for packaging, handling, storage and disposal of TRU waste from the DOE Order on Management of Transuranic Contaminated Material.²

LOW-LEVEL WASTE

The definition of low-level waste is any gaseous, liquid, or solid radioactive waste not classified as high-level waste, TRU waste, spent nuclear fuel, or mill tailings. The Chapter on low-level waste provides general guidance for developing requirements for waste acceptance and for shallow land burial site selection, design, operation, and closure/post-closure. Field organizations have the responsibility of developing site-specific requirements within the general framework of the guidance.

A separate chapter is provided for management of wastes containing naturally occurring radionuclides, including uranium mill tailings, contaminated soils, process residues and depleted uranium. Mill tailings are defined as waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface waste resulting from uranium solution extraction processes. These wastes may be disposed of as low-level waste or according to applicable EPA standards⁹ issued pursuant to the Uranium Mill Tailings Radiation Control Act of 1978.

DECONTAMINATION AND DECOMMISSIONING

Finally, the Order contains a chapter which establishes requirements for managing and disposing of the Department's surplus radioactively contaminated sites and facilities. The requirements cover pre-project planning and surveillance and maintenance, as well as project activities such as decommissioning mode selection, recovery and reuse of equipment and facilities, assessment of priorities, waste handling, and effluent control.

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REFERENCES

1. "Management of Radioactive Waste," Atomic Energy Commission Manual Chapter 0511, September 19, 1973.
2. "Management of Transuranium Contaminated Material," Department of Energy Order 5820.1, September 30, 1982.
3. 10 CFR Part 60, Disposal of High-level Wastes in Geologic Repositories, 48 FR 35280, July 8, 1981.
4. Final Environmental Statement on 10 CFR Part 61 "Licensing Requirements for Land Disposal of Radioactive Waste," NUREG-0945, Appendix F.
5. 40 CFR Part 191, Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-level and Transuranic Radioactive Wastes, 47 FR 58196, December 29, 1982.
6. 10 CFR Part 20, Standards for Protection Against Radiation, General Services Administration, Washington, D.C., January 1, 1982, p. 206 ff.

7. "Environmental Protection, Safety and Health Protection Program for DOE Operations," Department of Energy Order 5480.1A, Chapter 11, August 31, 1981.
8. "Materials Transportation and Traffic Management," Department of Energy Order 1540.1, May 3, 1982.
9. 40 CFR Part 192, Standards for Remedial Actions at Inactive Uranium Processing Sites, 48 FR 590, January 5, 1983.