STATUS OF DOE DEFENSE WASTE MANAGEMENT POLICY

G. K., Oertel, Director
Office of Defense Waste and Byproducts Management

Randal S. Scott, Physical Scientist
Office of Defense Waste and Byproducts Management

ABSTRACT

This paper very briefly traces the statutory basis for DOE management of atomic energy defense activity wastes, touches on the authority of the Federal agencies involved in the regulation of defense nuclear waste management, and addresses the applicable regulations and their status. This background sets the stage for a fairly detailed discussion of management and disposal strategies of the Defense Waste and Byproducts Management Program.

This paper will briefly discuss the statutory basis for the Defense Waste and Byproducts Management (DWBM) program, mention the roles of other Federal agencies in the management and disposal of defense nuclear wastes, and review the souces of their authority and the roles they play. Next, it will touch on the regulations which apply to defense wastes and the status of those which are developing.

The purpose and thrust of the DWBM program is to protect workers, public health and safety, and the environment. Many standards and regulations apply to this program, while there are implied or specific exemptions from others. For example, the Occupational Safety and Health Act provides that "...nothing in this Act shall apply to working conditions of employees with respect to which other Federal agencies...exercise statutory authority to prescribe or enforce standards or regulations affecting occupational safety or health." The AEC General Counsel, with the concurrence of the Secretary of Labor determined that the Atomic Energy Act of 1954, as amended, provided to the AEC statutory authority to regulate its contractors. An example of a more direct exemption is section 1006(a) of the Resource Conservation and Recovery Act which provides that the Act does not apply to any activity or substance which is subject to the Atomic Energy Act (AEA), except to the extent that application of RCRA would not be inconsistent with the requirements of the AEA. EPA has not formally acknowledged acceptance of this position, but they are considering signing a Memorandum of Understanding proposed by DOE which implements that interpretation.

STATUTORY BASIS
(For DOE Management of Defense Nuclear Wastes)

Acts:	Basic Thrusts:
a. Atomic Energy Act of 1954	a. Section 1.d-Management of byproduct materials Section 3.d-Safety and environmental protection
b. Energy Reorganization Act of 1974	b. AEC-ERDA -NRC-licensing and regulatory authority, 202.3 and .4 First NRC authority over ERDA activity (disposal of high-level waste).
c. DOE Organization Act of 1977	c. No direct relevance to defense waste—mostly organizational and administrative.
d. DOE National Security and Military Applications of Nuclear Energy Authorization Act (WIPP) (P.L. 96-164)	d. WIPP authorized as defense activity of DOE for R&D to demo safe disposal of radioactive wastes.
e. Defense Waste Management Plan (Department of Energy National Security and Military Applications Act of 1982 - P.L. 97-90)	e. President must submit to Congress by June 30, 1983, a report laying out plans for permanent disposal of defense high-level and transuanic wastes.
f. Nuclear Waste Policy Act of 1982	f. Timetable and procedures for disposal of HLW and spent fuel in geologic repositories. Provisions not applicable to Atomic Energy Defense Activities except if there is a need for defense-only repository determined by the President.

REGULATORY AUTHORITY

Actors	Basis	Role
DOE	All Acts on previous slide	Responsible for the management and disposal of defense nuclear wastes.
EPA	Atomic Energy Act of 1954 (as amended), Reorganization Plan #3 (of 1970); Clean Air Act; UMTRAC of 1978	Develop generally applicable environmental standards and guidance regarding radiation exposure to the public.
NRC	Atomic Energy Act of 1954 (as amended), Energy Reorganization Act of 1974	To implement EPA standards, license and regulate the possession and use of source, byproduct, and special nuclear materials. Authority over defense wastes limited to HLW disposal.
DOT	Hazardous Materials Transportation Act of 1975	In cooperation with NRC, DOT develops and enforces safety standards of waste containers for transit. Also, implements safety standards on carriers and carrier equipment. DOT discretion to exempt defense materials.
DOI	Federal Land Management and Policy Act of 1976	Complements DOE waste management with laboratory and field experiments. Consultant to NRC on waste disposal facility applications. Approve administrative withdrawal of public lands for radioactive waste disposal.
States	Clean Air Act, Federal Water Pollution Control Act, National Environmental Policy Act, Safe Drinking Water Act	States are delegated authority under CAA, FWPCA, and Safe Drinking Water Act to set standards more stringent than those established by EPA. NEPA affords opportunity for public involvement in Federal agency decisionmaking.

REGULATIONS

		Status
10 CFR 20	— Standards for Protection Against Radiation (at NRC licensed facilities)	Final
10 CFR 60	— Disposal of HLW Radioactive Wastes in Geologic Repositories	Final Imminent
10 CFR 35	— Human Uses of Byproduct Material	Final
10 CFR 61	— Licensing Requirements for Land Disposal of Radioactive Wastes (Not applicable to defense)	*Final*
40 CFR 191	— Environmental Standards and Federal Radiation Protection Guidance for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes	Proposed Std. Issued 12/22/82
40 CFR 61	— National Emission Standards for Hazardous Air Pollutants; Standards Development for Radionuclide Emissions (CAA Section 112 implementation)	Proposed Std. to be Issued 3/29/83

DOE is committed to perform the functional equivalent of the requirements of the law from which it has an exemption. The only practical difference between being exempted and not is that, DOE, rather than another Federal agency, implements and monitors its provisions and is responsible for enforcing them. This reduces the number of players in Federal programs.

Next, the management and disposal strategies pursued by the DWBM program will be covered. This first diagram presents the sources and expected ultimate disposition of the wastes generated by DOE. Most, but not all, nuclear wastes generated by DOE activities are "defense" wastes, generated as a result of atomic energy defense activities. The next diagram gives you an idea of the inventory and its locations. High-level waste (HLW), transuranic waste (TRU), and low-level waste (LLW) are defined as indicated on the next diagram.

The DWBM program seeks to manage defense nuclear wastes and byproducts in a manner that protects public health, safety, and workers. Our goal is the routine disposal of all defense nuclear wastes, safely and effectively and the elimination of interim storage as a substitute for disposal. The availability of a disposal system, with no need to add to the inventories of stored waste, is a near term goal. A longer term goal is to reduce the inventories of waste to normal operational levels, i.e., to eliminate the backlogs. While we are providing for the processing and utilization or storage of waste and byproducts. Plans for the permanent disposal of HLW and TRU will be documented in a legislatively mandated Defense Waste Management Plan as required by Public Law 97-90, the DOE National Security and Military Applications Act of 1982.

Operations to process and store or dispose of radioactive waste from DOE defense and R&D programs, and the maintenance of facilities and environmental monitoring, are continuing to be improved. We are reducing volume and mobility of the waste to improve control over the inventory. Specifically, we are storing high-level waste in improved tanks and bins at Savannah River, Richland, and Idaho; disposing of low-level waste at Savannah River. Oak Ridge National Laboratory, Idaho National Engineering Laboratory, Hanford Reservation, Los Alamos National Laboratory, Sandia National Laboratory, and the Nevada Test Site; storing transuranic waste retrievably at several sites; solidifying or immobilizing liquid wastes, operating three filter testing facilities; controlling gaseous waste streams, and managing surplus radioactively contaminated facilities. We have begun to certify TRU wastes if they satisfy the acceptance criteria for the Waste Isolation Pilot Plant (WIPP), and are storing them separately.

The processing and utilization or storage of wastes and byproducts constitute "Interim Operations." The specific activities under this program at various DOE sites will be briefly discussed.

At Hanford, we have removed much of the cesium and strontium from high-level wastes and are solidifying and encapsulating them for use as byproducts. The 149 old single shell tanks are being "stabilized" by removal of the pumpable liquids to new double shell tanks and "isolated" by cutting connections through which liquids could reenter.

At Idaho, the New Waste Calcining Facility converts liquid high-level waste from the Idaho Chemical Processing Plant to a granular solid form for storage in underground storage bins.

The high-level waste at the Savannah River Plant is transferred from old tanks to new double shell tanks and, at the same time, segregated and prepared for immobilization in glass.

The intermediate-level wastes at the Oak Ridge National Laboratory are mixed with cement grout and injected into a shale formation under the site.

Low-level waste is buried and TRU waste stored retrievably at these four sites. Low-level waste is also buried at the Los Alamos National Laboratory, Sandia National Laboratory, and the Nevada Test Site, and TRU waste is retrievably stored at Loa Alamos and Nevada.

The President will submit the Defense Waste Management Plan to the Congress in June 1983. It will document the strategy for the disposal of high-level and TRU waste. This strategy will be implemented when the requirements of NEPA have been fulfilled, funds have been appropriated by Congress, and results of the pilot plant experiments are available.

Internal plans for high-level and transuranic waste will now be discussed.

The high-level waste program seeks to replace interim storage by utilization or disposal. We hope to act sequentially at the three sites where HLW is stored. The Savannah River Plant will be first because of the local hydrology and climate, and because waste will continue to be added to its inventory, already the largest among the defense sites. The Hanford site will be next, and Idaho third because its calcine waste is a stable solid in bins which could endure for hundreds of years.

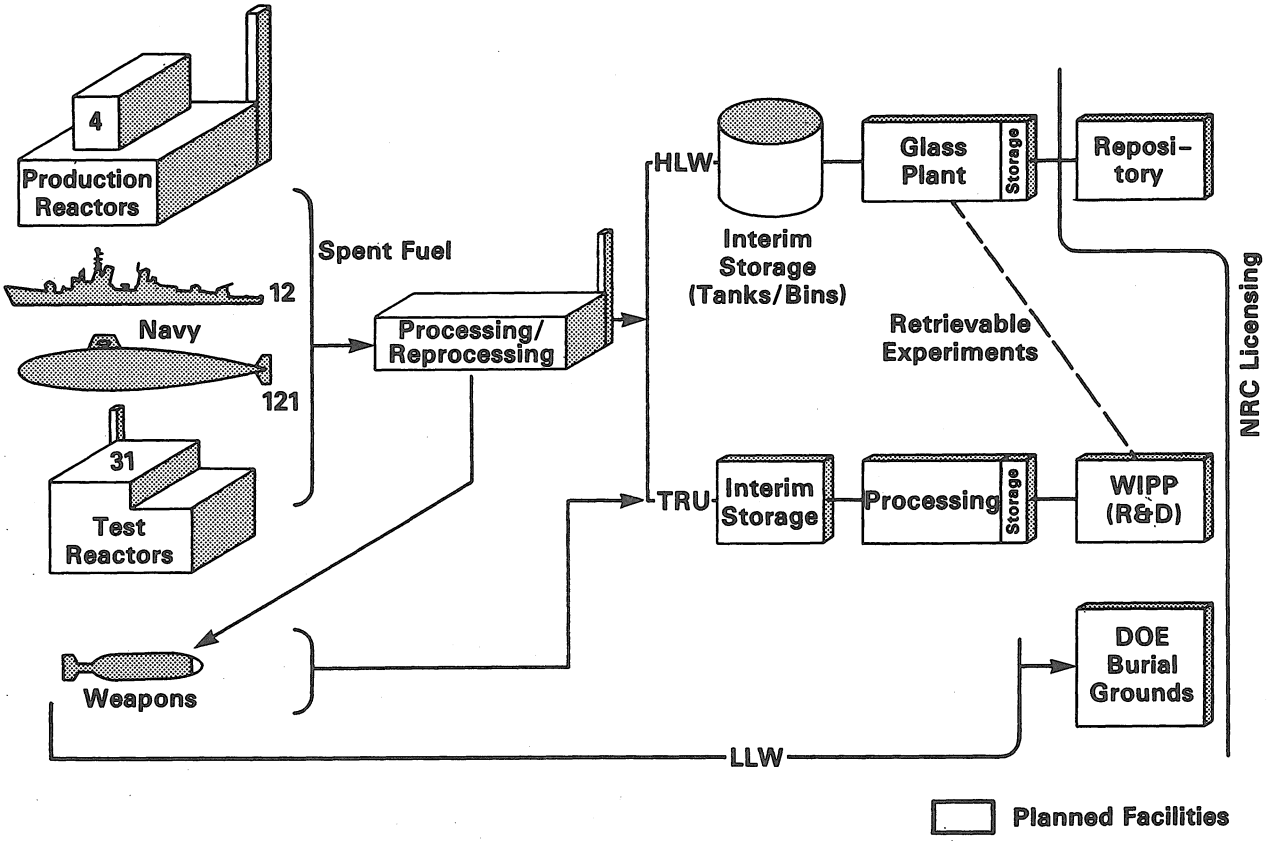
At Savannah River, we plan to remove the HLW sludge from storage tansk and immobilize it in the Defense Waste Processing Facility, beginning in 1989, in borosilicate glass for disposal in a geologic repository. We have formally selected this waste form for the Savannah River HLW in January 1983. The salts and alkaline liquids will be handled as chemical waste after decontamination. Cesium will be utilized as a byproduct, as may be platinum family metals. Mercury will be recovered for recycle.

High-level waste at Hanford will be prepared for shipment to a geologic repository, beginning with newly produced waste. Most of the cesium and strontium was removed from the old waste and is stored in capsules in water basins pending beneficial use. Liquid high-level waste is being transferred from the old single shell tanks to new double shell tanks. An Environmental Impact Statement will be prepared to address the future of the old tanks.

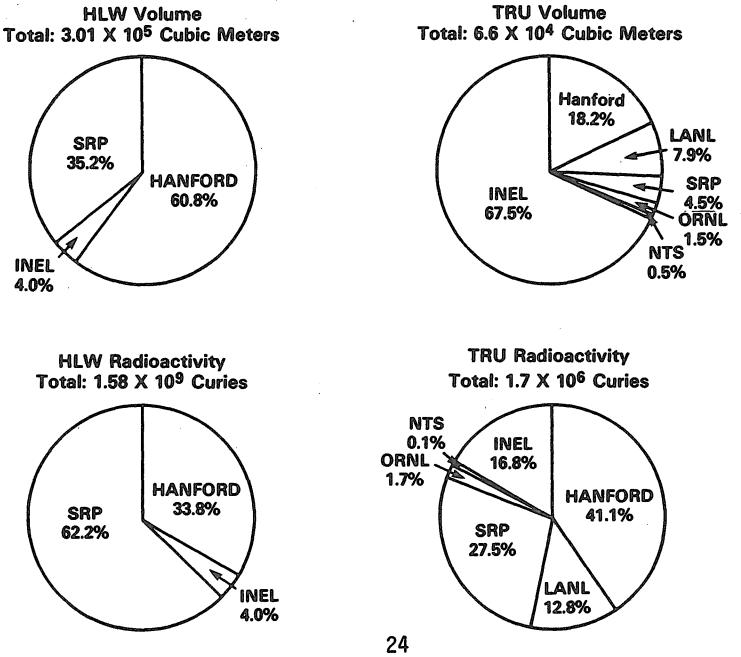
The high-level wastes at Idaho will also be immobilized for shipment to a geologic repository beginning with new production. The 2,200 cubic meters of dry calcine in its stainless steel bins in underground concrete vaults is stable. The Idaho project can, therefore, by undertaken after the Savannah River and Hanford projects. Again, we expect to recover byproducts for recycle as appropriate.

The TRU waste strategy is to likewise replace interim storage with permanent disposal. Newly generated and retrievably stored wastes will be certified for disposal in the Waste Isolation Pilot Plant (WIPP) if they meet the acceptance criteria for WIPP, or will be processed until they do. For TRU contaminated material that was buried before 1970,

DOE RADIOACTIVE WASTE: SOURCES AND MANAGEMENT



VOLUME AND RADIOACTIVITY OF HIGH LEVEL AND RETRIEVABLY STORED TRANSURANIC WASTE ACCUMULATED THROUGH 1981



we will review the National Academy of Sciences findings in analyzing the risk and cost of recovery as compared with potential benefits to health, safety, and the environment.

Roughly, two-thirds of DOE's TRU waste volume is at Idaho. Evaluation of stored waste in the Stored Waste Experimental Pilot Plant (SWEPP) will begin in 1985. Wastes which do not meet the WIPP acceptance criteria will be processed on an experimental basis beginning in 1986 and in the Processing Experimental Pilot Plant (PREPP).

The TRU waste at Hanford will be certified or stored for future processing as necessary.

Savannah River is generating 10 percent of DOE's TRU and may increase its share to 15 percent by 1989. As at all sites, newly generated TRU will be certified and/or processed to meet WIPP acceptance criteria, and stored wastes will be retrieved and treated in the same way.

Roughly half of the TRU waste stored at ORNL is expected to require processing before certification. A decision on processing on-site or off-site will be made in 1990.

Los Alamos National Laboratory (LANL), which will generate roughly 7 percent of DOE's TRU between 1982 and 1990, will evaluate TRU wastes as generated. About 55 percent is expected to require processing to meet the WIPP acceptance criteria. Processing of newly generated wastes will begin in 1985, and stored TRU will be retrieved, processed as necessary, and certified later.

The major projects in support of the HLW and TRU disposal strategies and the essence of the byproducts/ beneficial uses program will be described.

The Waste Isolation Pilot Plant is being constructed near Carlsbad, New Mexico. By law, it is an unlicensed research and development facility for the demonstration of safe disposal of defense wastes. TRU waste will be retrievably emplaced during the experimental phase. Within five years technical and operational information will have been gathered and analyzed to permit a decision on whether or not to convert WIPP to a permanent repository for TRU waste. The disposal of retrievably stored TRU from INEL would have first priority. TRU from other defense waste generating facilities could be emplaced later. Experiments will be conducted on the emplacement techniques and isolation characteristics of up to 40 canisters of high-level waste. The HLW will be removed from the WIPP site before decommissioning of the facility.

The Defense Waste Processing Facility (DWPF) at Savannah River will be a full-scale plant for immobilizing high-level wastes for disposal in a Federal repository. It is scheduled to begin operation in 1989. Roughly 15 years will be required to reduce the backlog of HLW to a normal operation level. The product can meet the acceptance criteria for the repository. The major components of the project are to: transfer HLW from storage tanks to the processing facility; remove byproducts for use; process the waste into a borosilicate glass form; and store it in canisters until they can be shipped to a geologic repository. The NEPA process has been completed for both the DWPF project itself and for the waste for selection.

The Stored Waste Examination Pilot Plant (SWEPP) and Processing Experimental Pilot Plant (PREPP) will be constructed at Idaho to examine and prepare Idaho TRU wastes for shipment to WIPP for disposal. The two projects will begin operation in 1985 and 1986, respectively. Each facility will provide design and operational information and experience for use at other sites.

The SWEPP project objective is to experimentally, and nondestructively examine Idaho TRU wastes to determine if they meet WIPP Waste Acceptance Criteria (WAC) or will require processing in the PREPP.

The PREPP will involve three basic processes; shredding, incineration, and immobilization of ashes in cement. Some unshreddable items, hazardous materials, bulk quantities of lead or lead liners, or highly radioactive wastes will not be processable in the PREPP. These will be stored until modifications can be made to the PREPP to handle them; or until a Transuranic Waste Treatment Facility (TWTF) is constructed. Operational experience from the PREPP is needed before a decision can be made on the need for modifications or for design and construction of a TWTF for processing of wastes that cannot be processed in PREPP.

The Byproducts Utilization program has three elements: recovery or separation, utilization, and facilitation of nuclear waste management. The strategy has been to identify and to encourage the demonstration of beneficial uses of byproducts. Legally, byproducts are defined as radioactive materials produced or made radioactive by exposure to radiation incident to the production or utilization of special nuclear material. In practice, waste contains useful and valuable materials with known and potential applications in food technology, agriculture, energy, public health, medicine, and industrial technology or which can help assure a secure supply of strategic materials. The removal of these materials from the defense nuclear waste stream can facilitate nuclear waste management and enhance safety and environmental protection.

The old saying that "waste is waste" is simplistic. Many valuable materials can be recovered from waste safely and economically. At the same time, byproduct recovery is not by itself a solution to waste management, because complete recovery, or sufficient recovery to render the residue harmless, can be astronomically expensive, and because the byproducts themselves come back as waste some day. It is, however, possible to greatly simplify waste management through byproduct recovery as the Hanford experience has shown.

Projects include sludge irradiation (disinfection) and food disinfestation with cesium (Cs-137), military lighting applications with krypton (Kr-85) and tritium, strontium powered radioactive thermoelectric generators and the recovery of noble metals in the platinum family. These applications of byproduct materials are being developed in joint efforts among DOE and Federal, State, and private enterprises.

This is the strategy we are pursuing in Waste Management. We look forward to implementing these plans and to closing the defense nuclear fuel cycle.