

# memorandum

DATE: MAR 17 1988

REPLY TO  
ATTN OF: RW-40

SUBJECT: Report to OECD/NEA on Status of U.S. Waste Management Programs

TO: Distribution

Attached for your review is the proposed U.S. paper on waste management activities to be provided at the Radioactive Waste Management Committee Meeting in Paris, March 29th through the 31th, 1988.

Please note that we have consolidated some of the information you have provided in order to keep the report brief.

We need your comments by COB Monday March 21, 1988 in order to allow time for incorporation of your comments and printing. Please call Joanne Lowry, RW-40, (586-2289) with your comments or return a marked up copy by special mail or telefax (FAX number 586-2672). Thank you for your help.



Carl Cooley, International Coordinator  
Office of Policy and Outreach

distribution:

S. Rousso, RW-10  
S. Kale, RW-20  
J. Saltzman, RW-20  
K. Klein, RW-30  
L. Barrett, RW-33  
D. Shelor, RW-32  
J. Fiore, NE-23  
J. Coleman, NE-24  
J. Dieckhoner, DP-14  
J. Dutton, ANL  
R. Walton, ANL  
D. Galson, NRC  
R. Browning, NRC  
F. Galpin, EPA

8803240299 880317  
NMSS SUBJ  
412.2 DCD

412.2 1/1  
NHXA

## ACTIVITIES OF THE U.S. DEPARTMENT OF ENERGY

Summarized below are significant achievements in the United States radioactive waste management programs occurring subsequent to the June 11th and 12th, 1987 Radioactive Waste Management Committee meeting held in Paris.

### Disposal of Spent Fuel and High-Level Waste

#### Amendments to NWPA Enacted

The U.S. Congress enacted the Nuclear Waste Policy Amendments Act (NWPAA) of 1987 on December 22, 1987. The NWPAA redirects major elements of the U.S. program for disposing of spent fuel and high-level waste. The significant redirections include the following:

The First Repository: The Department of Energy (DOE) will characterize just one site, Yucca Mountain in Nevada, as a candidate for the first repository. If the Yucca Mountain site is found suitable, the NWPAA authorizes the siting and construction of a geologic repository, subject to licensing requirements. If the Yucca Mountain site is found to be unsuitable at any time, site specific activities are to be terminated and a report submitted to Congress with recommendations for further action. Site specific activities for the Hanford, Washington (basalt) and Deaf Smith County, Texas (salt) sites are being terminated.

Monitored Retrievable Storage (MRS): Siting, construction and operation of one MRS facility is authorized, subject to a number of conditions. The DOE proposal to locate an MRS facility in Tennessee is annulled. A survey of potentially suitable sites for a MRS facility may be conducted after the MRS Commission, established under the NWPAA, submits its report to Congress on the need for a MRS by June 1, 1989. A site for a MRS facility may not be selected until the Energy Secretary recommends to the President the approval of a site for development as a repository. Construction of a MRS facility may not begin until the NRC has issued a license for the construction of a repository. Construction of a MRS facility or acceptance of spent fuel and high-level waste is prohibited during the time a repository license is revoked by the NRC or construction of the repository ceases.

Financial Assistance: The NWPAA broadens provisions for financial assistance to be paid to a State(s) hosting a repository or a MRS facility and establishes an alternative of making fixed annual payments to a State under a benefits agreement. A State(s) must waive its right to disapprove siting of the facility to receive benefits payments.

The payment to a State(s) for hosting a repository is \$10 million annually until the first receipt of spent fuel when the payment is increased to \$20 million annually until closure of the repository. For hosting a MRS facility, payments are \$5 million annually until receipt of spent fuel when the payment is increased to \$10 million annually until closure of the facility.

Other NWPAA Provisions: An Office of the Nuclear Waste Negotiator is established within the Executive Office of the President. A Nuclear Waste Negotiator is to be appointed by the President. The Negotiator is to attempt to find a State or Indian Tribe willing to host a repository or MRS facility at a technically qualified site, on reasonable terms. Any proposed agreement is to be submitted to Congress.

A Nuclear Waste Technical Review Board is established consisting of eleven members appointed by the President. The board is an independent body established within the Executive Branch of the U.S. government to evaluate the technical and scientific validity of site characterization, packaging and transportation activities.

A MRS Commission is established through appointment of its three members by the leaders of Congress. The Commission is to report to Congress by June 1, 1989 on the need for a MRS facility as part of the nuclear waste management system.

A new Office of Subseabed Research is to be established within DOE's Office of Energy Research to study the potential impacts and viability of subseabed disposal of nuclear waste.

Activities with respect to siting a second repository will be phased out. DOE is directed to report to the President and the Congress between 2007-2010 on the need for a second repository. Site-specific activities with respect to a second repository are prohibited unless specifically authorized or appropriated by Congress. DOE is also directed to terminate all research programs designed to evaluate the suitability of crystalline rock as a potential host media.

## Activities Underway to Implement the NWPAA

The following activities are underway to implement the amendments to the NWPA:

Amend Mission Plan: The DOE/OCRWM Mission Plan Amendment issued in June 1987 for review by the U.S. Congress is being revised to incorporate the provisions of the NWPAA. Like the earlier version, the Mission Plan Amendment will summarize the current information available, the status of the program and strategies adopted to accomplish the overall objective of developing an integrated, safe, timely and efficient waste management system but with Yucca Mountain as the candidate site. A draft of the 1988 Mission Plan Amendment is to be issued for public review and comment in the spring of this year.

Site Characterization: The Site Characterization Plan (SCP), which describes testing and analysis to be conducted at the Yucca Mountain site, was issued as a Consultation Draft to the State of Nevada and the NRC on January 8, 1988. The SCP will be submitted in final form to the State of Nevada and the NRC in late 1988. The SCP must be issued, and public hearings held in the vicinity of the site, before sinking of exploratory shafts can begin. In January 1988 OCRWM also released associated draft environmental and socioeconomic plans for review and comment.

Technical Activities: Project activities for the Yucca Mountain site include: 1) planning for the Exploratory Shaft Facility which includes two shafts; 2) planning for a Conceptual Design Report; 3) evaluation of waste emplacement concepts and acceptance limits; 4) evaluation of waste package concepts for intact and consolidated spent fuel; 5) evaluation of waste package material including stainless steel, nickel based alloys, copper, copper based alloys and ceramics; and 6) continuation of site characterization and environmental studies on the surface, e.g. hydrology, seismology and performance assessment.

Program Management: OCRWM is being reorganized to effectively manage the civilian radioactive waste management program as redirected under the NWPAA. The new organizational structure will be along functional lines to be comprised of four major components -- Facilities Siting and Development, Systems Integration and Licensing, External Relations and Policy and Program Administration and Resource. Mr. Charles E. Kay is currently Acting Director of OCRWM.

### Proposed Schedule:

1989	Start of exploratory Shaft Facility at Yucca Mountain
1993	Draft Environmental Impact Statement for Yucca Mountain
1994	Final Environmental Impact Statement for Yucca

Mountain

- 1994 Submit Site Recommendation Report for Yucca Mountain to the President
- 1994 Select Site for an MRS facility
- 1995 Submit Repository License Application to the NRC
- 1998 Start Construction of Repository
- 1998 Start Construction of MRS
- 2003 Start of Phase 1 Operations at Repository
- 2003 Begin Operations at MRS

### International Cooperation on Geologic Disposal Technology

The NWPAA changes in program direction, i.e., termination of work in salt and basalt repositories and the phase-out on crystalline rock repositories has prompted a review of international activities to determine consistency with the NWPAA. While this review is not yet complete, it is expected to support the continuation of generic research and activities which can be directly applicable to the technology and methodology needed to determine the suitability of the Yucca Mountain site.

DOE plans to continue international cooperation on waste management and will continue to exchange information through all existing bilateral agreements as well as participation through the Nuclear Energy Agency, the International Atomic Energy Agency and the Commission of European Communities. Recent activities include:

USDOE/AECL-Canada Project: OCRWM is continuing to cooperate with Canada in the development of an Underground Research Laboratory to evaluate experimental techniques related to hydrology and rock mechanics.

Stripa Mine: The U.S. is continuing to participate in Phase Three of the NEA's Stripa Mine program.

USDOE/NAGRA: The U.S. DOE and Switzerland's NAGRA entered into agreement in June 1987 to develop performance assessment techniques. Major areas of concentration include: determination of fracture hydraulic parameters by means of fluid logging in boreholes; methods of assessing fluid flow and transport in fractured media.

Pocos de Caldas: The U.S. DOE joined Sweden, Switzerland, United Kingdom and Brazil in the Pocos de Caldas natural analogues study.

Asse Salt Mine and Gorleben Experience: Technical exchange with the Federal Republic of Germany continued on the properties of salt and the effects of radioactive waste disposal on salt through evaluation of tests conducted in the Asse Salt Mine. During 1987 several salt samples were sent to the U.S. for post evaluation work, which included salt and metal sample analysis and geochemical and

thermochemical behavior tests. Experience gained during construction of the shaft at Gorleben is providing valuable information on the appropriate procedures to be used for future construction of shafts in the U.S.

Assistance to Non-Nuclear Weapons States: To date, 15 countries have formally responded to the U.S. DOE, Nuclear Regulatory Commission (NRC) offer to provide technical assistance on storage and disposal of spent fuel and high-level waste. The countries requesting information include: Argentina, Botswana, Brazil, Colombia, Egypt, Indonesia, Italy, Korea, Madagascar, Mexico, The Netherlands, Norway, The Philippines, Spain, and Taiwan. The U.S. DOE provides documents, briefings and tours in response to these requests.

## Disposal of Transuranic Waste

### Status of WIPP

The Waste Isolation Pilot Plant (WIPP) located near Carlsbad, New Mexico is nearly complete and is projected to begin receiving DOE transuranic waste in October of 1988, beginning a five-year demonstration phase. DOE will complete operationally critical construction in 1988 prior to receiving the first radioactive shipment expected in October of 1988.

## Interim Storage and Transportation of Spent Fuel

### Dry Storage of Spent Fuel

A new study of the use of dry cask storage technology at the sites of civilian nuclear power reactors was initiated in January 1988. This study will evaluate the use of dry storage technology for the temporary storage of spent fuel until the permanent repository is operational. The study will consider the cost, effect on human health and the environment and risks of transporting spent fuel from reactor sites to a repository or MRS facility.

DOE has cooperative demonstration projects at two utilities, the Carolina Power and Light Company (CP&L) and Virginia Power (VP). A license was obtained by CP&L from the NRC in 1986 to construct and operate an independent spent fuel storage installation (ISFSI). The first phase of the ISFSI has been completed and the casks are ready for the loading of spent fuel which is expected to be completed in early 1988. Loading of spent fuel into GNS castor casks for dry storage was initiated at VP's Surry nuclear power station.

A dry storage demonstration at INEL was conducted involving 69 spent fuel assemblies from the Surry plant, shipped three at a time in NRC-certified casks during 1985-1986. After arrival at INEL, these assemblies were transferred to three different types of dry storage casks (GNS-CASTOR-V/21, Transnuclear T-24 and Westinghouse MC-10). The filled storage casks have been tested under various cover gas and vacuum environments, and in both horizontal and vertical configurations. Long term monitoring will continue for all three casks. In 1987, 36 of the 69 assemblies, together with 12 Turkey Point reactor assemblies from the DOE CLIMAX experiment, were consolidated and replaced in the TN-24 dry storage cask for demonstration of the dry storage of consolidated spent fuel in metallic casks. This cask, now on a concrete storage pad at INEL, will be tested in the same manner as the casks filled with intact assemblies.

### Transportation of Spent Fuel

An application submitted to the NRC for certification of two dual-purpose casks is pending. The cask could be used for both rail transportation and storage. These casks will be used in a dual-purpose demonstration that includes shipment of spent fuel from West Valley, New York from both boiling water and pressurized water reactors for long-term dry storage in the same cask at INEL.

A cask systems testing overview was drafted in 1987 to describe the policies and plans for the development of the cask-testing program. The current phase of design activity focuses on casks to be used for shipping waste from reactors to a repository or MRS facility. In June 1987, six companies were selected for negotiation of contracts for the design of "from-reactor" casks; designs currently under consideration would allow transport by legal weight truck and rail and/or barge.

### Conditioning of High-Level Waste

Programs leading to the vitrification of high-level liquid waste are continuing at Savannah River, Hanford, Idaho and West Valley. The Defense Waste Processing Facility (DWPF) at Savannah River, where major construction was completed in 1987, will begin operations in 1990 on the highly radioactive fraction of high-level waste, producing borosilicate glass for permanent disposal in a Federal geologic repository. Development programs continue on the vitrification process intended for Hanford; preliminary design of the Hanford Waste Vitrification Plant (HWVP) has been initiated; and startup is scheduled for the late 1990s. A waste form and process for immobilization of calcined high-level waste are being developed at the Idaho Chemical Processing Plant in Idaho.

At the West Valley facility, liquid high-level waste will be pretreated and its volume will be reduced in the Supernatant Treatment System. Non-radioactive testing of the Supernatant Treatment System will be completed in 1988. Startup of the vitrification system for the resultant high-level waste fraction is scheduled for 1990.

#### Conditioning of Transuranic Waste

All Federal sites generating transuranic waste are continuing to certify waste to meet the waste acceptance criteria of the Waste Isolation Pilot Plant (WIPP). At INEL, the Stored Waste Examination Pilot Plant (SWEPP) is operational, providing capabilities for visual examination, radiographic examination, determination of fissile inventory, weighing, radiological survey, repackaging, labeling, and painting of the containers. Also at INEL, construction of the Process Experimental Pilot Plant (PREPP) has been completed; this facility provides capabilities for shredding, incinerating, and fixing in cement transuranic waste that is not otherwise suitable for acceptance at WIPP.

New transportation packagings for contact-handled transuranic waste will be available this year. The U.S. DOE has begun design of a transportation cask for transuranic waste requiring remote handling.

#### Conditioning of Low-Level Waste

Because of the high surcharge on low-level wastes introduced by the 1985 amendments to the Low Level Waste Policy Act and due programs to reduce LLW generation, the volume of commercially generated wastes transported to Low-Level waste disposal sites continues to decrease. Both volume reduction, mainly by supercompaction and waste sorting, and longer on-site storage are contributing to the decrease in waste shipments.

Similar improvements are being introduced at Federal sites. A Supercompactor was installed and checked out and began operation at West Valley in early 1988. A contact-handled waste Size Reduction Facility also began operation in early 1988. These facilities will give the project the capability to reduce the volume of low-level waste. They will be operated as needed throughout 1988.

## Remedial Action

### Environmental Restoration at DOE Sites

Projects to assess and cleanup radioactive and mixed hazardous and radioactively contaminated soil areas, surface water body sediments, and groundwater are being planned and undertaken at operating U.S. DOE sites that support production of defense materials. These projects are underway at the Rocky Flats Plants in Colorado, the Feed Materials Production Center in Ohio, the Savannah River Plant in South Carolina, the Hanford Plant in Washington, the Oak Ridge National Laboratory (ORNL) in Tennessee, and other places.

Projects to maintain and decontaminate and decommission buildings and structures used in support of defense programs are being undertaken at several DOE sites -- Hanford, ORNL, Idaho National Engineering Laboratory (INEL), Mound Laboratory in Ohio, and others.

### 1987 International Decommissioning Symposium

The 1987 International Decommissioning Symposium was held October 4-8, 1987 in Pittsburgh, Pennsylvania at the D.L. Lawrence Convention Center. The symposium was planned to provide opportunities for an international exchange of information on decommissioning activities. Over 600 nuclear scientists, engineers, managers, government and industry professionals and guests participated in the symposium and trade show.

### Status of the Shippingport Decommissioning Project

Decontamination and decommissioning is 70% complete. The primary systems and components and all other ancillary systems are removed. Demolition is underway. Preparation for removal of the reactor pressure vessel have begun shipment is scheduled in April 1989. The project is scheduled to be complete in 1990.

## ACTIVITIES OF THE U.S. NUCLEAR REGULATORY COMMISSION

### Division of High-Level Waste Management

Following enactment of the Nuclear Waste Policy Amendments Act late in 1987, the United States Nuclear Regulatory Commission (NRC) has focused its efforts on the Yucca Mountain Site. The NRC continues to interact with the DOE to ensure that appropriate information to allow a licensing decision to be made will be available at the time the DOE submits a license application. In addition, an NRC representative assigned to the Yucca Mountain Site maintains cognizance of site exploration activities. Over the past year, the U.S. NRC has accomplished the following:

- (1) The NRC has reviewed the DOE's Consultation Draft Site Characterization Plan for the Yucca Mountain Site;
- (2) NRC staff technical positions were issued on "Qualification of Existing Data for High-Level Nuclear Waste Repositories" (issued final), "Peer Review for High-Level Nuclear Waste Repositories" (issued final), "Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements" (issued draft), and "Guidance for Determination of Anticipated Processes and Events and Unanticipated Process and Events" (issued draft);
- (3) The NRC has held documented workshops and technical meetings with the DOE on listing items important to safeguard licensing, the DOE's issues hierarchy and issues resolution strategy, the design basis accident dose limit, and seismo-tectonics and exploratory shafts at the Yucca Mountain Sites;
- (4) The NRC is participating in a "negotiated rulemaking" that will determine the requirements and scope of a licensing support system for document control.

#### Division of Low-Level Waste Management and Decommissioning

Low-level radioactive waste (LLW) activities in the United States during 1987 were dominated by preparation of plans for disposal sites. Most states and regional compacts appear to have met the January 1, 1988, deadline for completion of these plans as required by the Low-Level Radioactive Waste Policy Amendments Act of 1985. States and compacts are now implementing the plans, selecting candidate disposal sites, and evaluating alternative disposal technologies.

During 1987, the NRC initiated and completed several projects to enhance its capabilities to perform licensing reviews and to assist Agreement States in licensing LLW disposal facilities by 1992. NRC staff developed standard review plans for LLW license applications and accompanying environmental reports, a standard format and consent guide for LLW license applications, a draft regulatory guide on site selection of disposal facilities, guidance on quality assurance programs for LLW disposal facilities, and detailed guidance on engineered alternatives for near-surface LLW disposal, including earth-mounded concrete bunkers and below-ground vaults. In cooperation with the EPA, the NRC developed three guidance documents on various aspects of disposal of mixed low-level radioactive and hazardous waste, including definition and identification of mixed LLW, siting disposal facilities, and disposal unit design. The NRC also proposed procedures and criteria for granting emergency access for LLW disposal at licensed facilities if necessary to eliminate a serious threat to public health and safety. In addition, the NRC initiated development of a LLW performance assessment methodology for pathways analysis, dose assessment,

and evaluation of inadvertent intruder protection. The NRC's research program completed development of a stochastic methodology for assessing groundwater flow, a framework for estimating radionuclide releases from selected types of LLW, and an assessment of transport modeling capabilities at a waste disposal site.

In addition, the NRC participated in activities related to LLW management and disposal, including review of draft and final Environmental Impact Statements for disposal of Hanford defense high-level, transuranic, and tank wastes; assessment of West Valley Demonstration Project activities; initial development of a decommissioning program for nuclear fuel cycle facilities; and extensive reviews of proposed remedial action at inactive uranium mills.

#### ACTIVITIES OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY

The Office of Radiation Programs (ORP) of the Environmental Protection Agency (EPA) is continuing its program for developing generally applicable environmental radiation standards for the land disposal of low-level radioactive waste. These standards are based on a risk assessment methodology and cost-effectiveness evaluation of a number of land disposal methods. The elements of the standards include:

- (1) exposure limits for pre-disposal management and storage operations;
- (2) criteria for wastes that are Below Regulatory Concern;
- (3) post disposal exposure limits;
- (4) ground water protection requirements;
- (5) qualitative implementation requirements.

In addition to covering those radioactive wastes as defined by the Atomic Energy Act, the Agency also intends to propose a standard to require the disposal of specific high concentration, relatively low volume Naturally Occurring and Accelerator-Produced Radioactive Material (NARM) wastes exceeding 2nCi/g, excluding a few consumer items, in regulated LLW disposal facilities. The proposed standards are expected to be published in 1988 for public review and comments.

The Agency is continuing its program to develop radiation protection criteria for cleanup of land and facilities contaminated with residual radioactive materials.

In September 1987, additional groundwater standards were promulgated for the inactive uranium processing mill sites to supplement the existing standards under 40 CFR 192.

Subpart B, of EPA's environmental standards for the management and disposal of spent nuclear fuel, high-level and transuranic wastes, has been remanded to EPA by the U.S. Court of Appeals for the First Circuit. This part deals with post site closure requirements. This court order is the final outcome of a legal process that began in 1986, when several environmental groups, led by the Natural Resources Defense Council, and the States of Maine, Minnesota, Texas, and Vermont filed petitions for review in several Federal Courts around the country; these petitions were consolidated in the First Circuit.

The Court rendered its decision in July 1987. That decision vacated and remanded the entirety of 40 CFR Part 191 even though only two sections dealing with the ground water, 191.15 (Individual Protection Requirements) and 191.16 (Ground Water Protection Requirements), were found defective. As a result of a motion filed on September 23, 1987 by the Justice Department, on behalf of EPA, the Court consented to reinstate Subpart A, which deals with the operational requirements, but continued the remand of Subpart B. Briefly the Court concluded that:

- (1) Disposal of HLW in mined geologic repositories might be underground injection and that EPA failed to consider the Safe Drinking Water Act's (SDWA) Part C requirements on underground injection by potentially allowing endangerment of ground water by exceeding EPA's own drinking water standards. Therefore, EPA must reconcile Sections 191.15 and 191.16 with the SDWA or adequately explain the divergence;
- (2) EPA must supply an adequate explanation for selecting the 1,000-year criterion for maximum annual doses to members of the public and maximum amounts of radionuclides in groundwater in 191.15 and 191.16;
- (3) Section 191.16, the Ground Water Protection requirements, was promulgated without proper notice and comment and must be repropose for public comment.

EPA is planning to revise the 1977 ocean dumping regulations and criteria developed for the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), to: (a) accommodate recent court decisions including consideration of availability and impacts of land-based alternatives; (b) incorporate statutory amendments made subsequent to the 1977 regulations, such as the requirements for a Radioactive Material Disposal Impact Assessment for ocean disposal of LLW; (c) include the quantitative definition of high-level radioactive waste originally developed for the London Dumping Convention (LDC) by the International Atomic Energy Agency (IAEA) in 1978, and recently amended and recognized by LDC signatories at the International Maritime Organization's Tenth Consultative Meeting in 1986, and (d) revise existing criteria in view of continued field experience and refinement of testing procedures and site designation protocols.