WIPP STATUS AND TRANSURANIC WASTE MANAGEMENT

W. R. Cooper, Chairman

R. Karlsson, Co-Chairman

WIPP: CONSTRUCTION AND PROGRESS ON A SUCCESSFUL NUCLEAR WASTE REPOSITORY

W. R. Cooper
Project Manager
U.S. Department of Energy
WIPP Project
Carlsbad, NM

C. A. Sankey
Public Affairs Officer
U.S. Department of Energy
WIPP Project
Carlsbad, NM

ABSTRACT

The Department of Energy is constructing the Waste Isolation Pilot Plant (WIPP) in Southeastern New Mexico. The facility will retrievably store transuranic waste from defense activities of the United States and conduct experiments with Defense High Level Waste which will be retrieved at the end of the experiments. This paper describes the progress and the present status of activities at WIPP.

WIPP BACKGROUND

Nearly one-half mile beneath the earth's surface in Southeastern New Mexico, the first facility for the geologic isolation of radioactive waste materials is taking shape. Authorized by Public Law 96-164, the Waste Isolation Pilot Plant (WIPP) is a defense activity of the U. S. Department of Energy for the express purpose of providing a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the United States, exempted from regulation by the Nuclear Regulatory Commission. Certain radioactive wastes (called transuranic or TRU) that are byproducts of defense activities are scheduled for permanent burial at WIPP. The WIPP site is located approximately 30 miles southeast of Carlsbad, New Mexico.

The site is located amidst the Permian Salt Basin, a 3000-foot thick salt formation which extends laterally for hundreds of miles in all directions of the site. The excavated horizon for storage of the waste is at a depth of 2150 feet, or approximately in the center of the salt formation.

Management of the WIPP Project falls under the governing direction of DOE's Albuquerque Operations Office (AL). Project integration, organization and operational activities are the direct responsibility of DOE's WIPP Project Office staff.

Under the direction of the WIPP Project Office, the following have continued to provide technical, scientific, engineering and construction support to the project:

--Sandia National Laboratories: overall scientific support, with emphasis on environmental issues, site characterization, and experimental programs.

--Westinghouse: technical support, to include design review, safety analysis, and operational planning.

--Bechtel: architect/engineer services for facility design and inspection.

--U. S. Army Corps of Engineers: facility construction and construction management services.

PROJECT INITIATION

Geologic exploration and facility design began in 1975, and by April 1979 the Draft Environmental Impact Statement (DEIS) was released. The DEIS was revised after public hearings and receipt of written comments, and the Final Environmental Impact Statement was released in October 1980. By January 1981, the DOE issued its Executive Record of Decision allowing the project to proceed. Actual construction was underway by mid-1981 when the Bureau of Land Management and DOE signed an agreement allowing use of the Federally-owned land.

SPDV PHASE

The first phase of construction of the Waste Isolation Pilot Plant was termed the Site and Preliminary Design Validation (SPDV) Phase. The SPDV Phase consisted of two shafts and necessary underground drifts and crosscuts to support in situ experimentation, an exploratory drift to the south, and a four room test panel to the north.

The purpose of the SPDV program was to confirm that the subsurface geology was consistent with prior expectations based on interpretation of surface investigations. Also, it was to provide for the initial in situ confirmations of the underground facility design, design criteria, and design bases which would permit the construction of the full facility on a safe, environmentally acceptable, timely, and cost effective basis.

During SPDV, numerous investigations were conducted. Shafts and drifts were visually observed and mapped. Instrumentation was installed in shafts, drifts, crosscuts, and test rooms and data collected. Based on the data collected and its review by project participants, DOE published the summary results of the SPDV program. That report was reviewed by the State of New Mexico and the public, and public hearings were held. DOE reviewed and responded to all comments received. In July of 1983, DOE decided to proceed with Full Facility Construction.

FULL FACILITY CONSTRUCTION

The second phase of construction at WIPP is now in progress--full facility construction. The major effort at the start of full facility construction

involved construction of the exhaust shaft, and the development of the waste shaft and non-radioactive experimental areas.

The underground layout for full WIPP shows the shafts and experimental areas and also the waste storage area. Shaft and underground construction are now complete. However, the waste storage area will be mined on an as-needed basis during the operation of the facility. Prior to receipt of any waste, the first storage panel will be mined. Then, while waste is being stored in the first panel, the second panel will be mined. This process will continue as storage panels are required.

A YEAR OF SIGNIFICANT PROGRESS

Significant activities--construction, technical, and public interest in nature--are in progress or have been completed at WIPP over the past year.

Construction

Work was completed in 1984 on 8 miles of railroad to bring rail service to the site, as well as approximately 13 miles of access road to be used in transporting waste shipments to WIPP. A water pipeline was also constructed from the north for a distance of 31 miles to provide a permanent water source to the site.

In August 1984, groundbreaking was held for the Waste Handling and Support Building, a $26 Million construction effort at WIPP. The Waste Handling Building will contain the facilities for receipt, inspection and handling of the radioactive waste; while the Support Building will house the major administrative and support facilities for the site personnel.

Another major facility for which construction began in 1984 is the Exhaust and Filter Building. This facility will allow air to be exhausted directly from the underground to the environment. However, if radioactivity is detected in the air stream, the air is diverted through HEPA filters which are contained in the building to filter out airborne radioactivity.

Other remaining but less extensive construction underway includes the permanent guardhouse and visitor center, and development of the Central Monitoring System. Overall site construction is scheduled to be complete in December 1986. Construction completion will be followed by pre-operational and safety check-out in 1987, prior to receiving waste shipments which are targeted for receipt on or after October 1988.

Emergency Response

On April 16, 1984, a construction miner was fatally injured at WIPP while working in a section of the waste shaft being expanded to its finished diameter. The resulting trauma raised numerous organizational questions as to the immediate and long-term capability and resources of WIPP staff to respond in the event of a site emergency.

With the assistance of other DOE facilities personnel, an Emergency Response Plan was formulated for WIPP. In addition, an Emergency Operations Center (EOC) was constructed and equipped with modern communications equipment enabling WIPP management staff to respond to emergencies ranging from an industrial accident to a potential terrorist attack on the radioactive wastes once received. By December, WIPP had performed its first Command Post Exercise (CPX) drill simulating an actual site emergency situation, in conjunction with the Albuquerque Operations Office of DOE.

As of March this year, WIPP still maintained a good site safety record, and in this respect hopes never to find it necessary to activate its Emergency Operations Center.

Research & Development

In March of this year, underground excavation was completed for WIPP's experimental area. Many of the rooms excavated have already been utilized to emplace numerous testing equipment to study the behavioral factors of salt as a waste storage medium.

Of particular note in the underground experimental area are the emplacement of numerous "heaters" in several of the experimental test rooms. The heaters, once activated, will help Sandia's testing program by simulating the effects of different levels of radioactive waste in bedded salt.

In addition, a "pillar" room was excavated in the Northwest experimental area for further testing of the salt formations. The salt pillar, measuring 36 feet in diameter, will be embedded with seizmic equipment to initiate two-dimensional creep and compression tests of the salt.

In September 1984, it was determined that the TRUPACT, an experimental prototype of a container designed to transport radioactive waste to the WIPP site, will have to undergo a change in design as a result of a burn test conducted as part of the prototype test program. The TRUPACT (Transuranic Package Transporter), is a stainless steel box within another stainless steel box, with rigid foam sandwiched in between. The heavy steel door has three seals to prevent release of the contents in the event of an accident.

The temperature of the inner door region was higher than expected after the fire test because the eight-inch-thick foam layer that separates TRUPACT's outer and inner boxes burned longer than expected. The design modifications are expected to be minor in nature and are expected to include the use of noncombustible foam in the inner door seal area. Modification is not expected to significantly delay production of the initial units.

In October 1984, the National Academy of Sciences issued its final report on WIPP, assessing the scientific and technical adequacies of WIPP and its operational philosophy. In the NAS report, it was concluded that WIPP's scientific work "has been carried out with a high degree of professional competence," and "the geology revealed by shaft sinking and excavation of drifts and the preliminary measurements generally confirm the geologic expectations derived from surface explorations and boreholes."

Members of NAS visited the WIPP site individually during early phases of their study. However, in December 1984 a combined group of 22 NAS Board and WIPP Panel members were hosted at the site for an all-day "hands-on" tour of the facility.

Economic Impact

Approximately five years and close to $100 Million were invested in identifying the WIPP site in New Mexico; and three more years and over $40 Million were invested in validation of that site. History has shown that the characterization effort supported 2000 jobs in New Mexico with a cash flow of $100 Million; while validation efforts supported over 2000 jobs in New Mexico with a cash flow of more than $125 Million.

In March of 1984, the Albuquerque-based Department of Energy and Westinghouse staff began transition to Southeastern New Mexico to join the existing staff at the WIPP site. This transition, intended to improve efficiency in management operations of the facility, entailed the move of over 65 professional staff and their families into the surrounding communities, primarily that of Carlsbad.

In Carlsbad, the history of the potash industry has been found to provide a major portion of employment in the community. However, the recent closings of several potash mines have sparked WIPP management interest in further contributing, wherever possible, to the continued economic growth of the community.

To begin this effort, WIPP staff initiated a series of "procurement workshops" in Southeastern New Mexico in April 1984, the purpose of which were to acquaint local business people with the procurement procedures, requirements, and upcoming needs for products and services at WIPP. WIPP personnel have also remained active in participation at various community business seminars throughout the past year.

As of February 28, 1985, total manpower at WIPP reached 650, which was an 81% increase since the same time last year. Inclusive in this total manpower count are 420 local hires---those employees hired from an 80-mile or less radius of the site.

Efforts are being made, when possible, to procure items locally for WIPP, or at a minimum within the State of New Mexico. Since construction began in 1981, over $7.6 Million in small-value purchases and contracts have been expended in the local communities. For those major contracts which have been let state-wide and out-of-state, a large percentage of subcontracts and labor acquisitions have occurred on a local basis as a result of contractor mobilization into the area.

Financial experts have maintained that the development of WIPP has brought, and will bring further monetary and job benefits to the host State.

Community Interest

The WIPP Project has continued to experience an excellent rapport with New Mexico legislators, as well as community officials and residents. In an effort to further enhance DOE's commitment to an open exchange of information, a temporary Visitor Center was established at the site for use in scheduled visits. One of the main features of the center is a state-of-the-art videodisc surrogate tour system which enables visitor viewing of both the surface and underground facilities.

A pilot Open House was held in November wherein WIPP accommodated 250 visitors through the center. The annual Carlsbad "Press Day" was also hosted at the site, and attracted a group of approximately 30 state-wide media officials to visit WIPP. Significant visits last year included filming by NBC Today Show Officials; and a visit by France's Minister of Energy and his staff. Total visitors last year exceeded 850, which included numerous foreign countries who have waste disposal concerns similar to ours and have expressed a great deal of interest in the possible applications of WIPP technology in their countries.

Project staff have been instrumental in maintaining an excellent community interface by responding to requests for WIPP updates frequently made by civic and educational groups, and the public-at-large.

CONCLUSION

Progress on WIPP to date has been excellent, and 1984 was witness to numerous significant events for the Project. The continued success in WIPP exhibits an important national and community commitment to address the Nation's nuclear waste disposal issue. In carrying out this commitment, one cannot overemphasize the invaluable technology reflected in the success of this important Federal endeavor.

BIBLIOGRAPHY

1. DOE/EIS-0026-D, Draft Environmental Impact Statement, Waste Isolation Pilot Plant, U.S. Department of Energy, April, 1979.

2. DOE/EIS-0026, Final Environmental Impact Statement, Waste Isolation Pilot Plant, U.S. Department of Energy, October 1980.

3. WIPP-DOE-161, Summary of the Results of the Evaluation of the WIPP Site and Preliminary Design Validation Program, U.S. Department of Energy, March, 1983.

4. DOE/DP-48015-1, Review of the Scientific and Technical Criteria for the Waste Isolation Pilot Plant (WIPP), Panel on the Waste Isolation Pilot Plant, Board on Radioactive Waste Management, Commission on Physical Sciences, Mathematics, and Resources, National Research Council, National Academy Press, Washington, D.C., 1984.