

THE WASTE ISOLATION PILOT PLANT, 1990-1991: PREREQUISITES TO INITIATION OF TRANSURANIC (TRU) WASTE EXPERIMENTS

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ABSTRACT

The Waste Isolation Pilot Plant (WIPP) is a research and development project of the United States Department of Energy (DOE) that is authorized, under Public Law 96-164, "to demonstrate the safe disposal of radioactive wastes resulting from defense programs of the United States." In 1990 significant progress has been made in completing both technical and institutional prerequisites for the emplacement of radioactive waste for experiments during the WIPP Test Phase. The completion of remaining activities will result in the establishment of a transuranic (TRU) waste system that is fully prepared in 1991 to support initiation of the TRU waste experiments that are important in demonstrating compliance with Environmental Protection Agency (EPA) 40 CFR 191, Subpart B. The TRU waste experiments scheduled to begin in 1991 will reduce present modelling uncertainties and provide reasonable confidence in the determination of whether the WIPP is suitable to become America's first deep geologic repository for the permanent disposal of radioactive waste.

THE DRAFT DECISION PLAN FOR THE WIPP AND THE WIPP TEST PHASE PLAN

In 1990 the DOE developed a strategy document that is used to measure the steady progress being made towards establishing WIPP readiness for the receipt of limited quantities of waste needed for the WIPP Test Phase. This strategy document is the Secretary of Energy's Draft Decision Plan for the WIPP. The Draft Decision Plan documents major project milestone achievements in 1990 and identifies additional items requiring completion prior to the 1991 initiation of TRU waste experiments at the WIPP. These achievements and remaining readiness items are summarized in this paper. The TRU waste experiments planned for 1991 will be performed according to the WIPP Test Phase Plan: Performance Assessment (DOE/WIPP 89-011). This document describes the purpose, objectives, and major activities to be performed as part of the process for establishing the WIPP as a permanent waste disposal facility. A number of more detailed test plans describe specific activities associated with each set of experiments.

1990 ACHIEVEMENTS

The steady progress being made to prepare the WIPP for 1991 TRU waste experiments can be identified in terms of several broad areas of 1990-1991 project achievements. These areas are as follows:

Completion of Major Project Documents

To support activities involved in 1991 experimental waste programs, a number of key project documents were completed and issued in 1990 and 1991:

- Supplement to the Environmental Impact Statement (SEIS), January 1990
- Test Plan: WIPP Bin-Scale CH TRU Waste Tests, January 1990
- Test Plan: WIPP In Situ Alcove CH TRU Waste Tests, January 1990
- WIPP Dry Bin-Scale Integrated Systems Checkout Plan, March 1990
- WIPP No-Migration Variance Petition, March 1990
- Recommended Initial Waste Forms for the WIPP Experimental Test Program, May 1990
- WIPP Final Safety Analysis Report (FSAR), May 1990
- WIPP Waste Retrieval Plan, May 1990
- Status Report: Potential for Long-Term Isolation by the WIPP Disposal System, June 1990
- Preliminary Comparison with 40 CFR Part 191, Subpart B, for WIPP, December 1990
- Test Plan: Bin-Scale CH TRU Waste Test Addendum, January 1991
- Resource Conservation and Recovery Act (RCRA) Part A Application to the State of New Mexico, January 1991
- Rationale for Revised WIPP Bin-Scale Gas Generation Tests with CH TRU Waste, February 1991
- Two additional major documents were released in draft form in 1990, and will be finalized in early 1991:
- Feasibility of Implementing Engineered Alternatives

for the WIPP Analysis of the Effectiveness of Engineered Alternatives for the WIPP

- Completion of the WIPP Waste Transportation System

In 1989 the National Academy of Sciences (NAS) reviewed the integrated transportation system developed by the DOE for shipping TRU waste to the WIPP, and concluded that "the system proposed for transportation of TRU waste to the WIPP is safer than that employed for any other hazardous material in the United States today . . ." In 1990 the DOE demonstrated that this system was ready to transport TRU waste in the safest manner possible. This demonstration was accomplished through numerous 1990 exercises validating the integrity of the transportation system during normal operations and off-normal events. All components of the integrated transportation system--including a Nuclear Regulatory Commission (NRC) approved Type B container (TRUPACT-II), a lightweight tractor, custom-designed trailer, rigorously-trained drivers, and a shipment tracking system (TRANSCOM)--have been involved in the exercises. In 1990 six NRC-certified TRUPACT-II shipping containers were fabricated for TRU waste transport to the WIPP.

TRANSAX '90

TRANSAX '90 was a full-scale field exercise that was staged in November 1990 in Colorado Springs. The focus of TRANSAX '90 was to develop an exercise effort that would 1) train potential responders to TRU waste emergency situations; and 2) increase public acceptance of TRU waste shipments. To support these objectives a video documentary was made of the exercise events, and emergency response leaders along the WIPP transportation corridor between Idaho Falls, Idaho, and Carlsbad, New Mexico, were invited to view on-scene activities on the day of the exercise. Approximately 150 observers were present at the full-scale exercise, as over 60 responders participated and over 50 other participants conducted off-site emergency management activities at emergency operations centers in Washington, D.C., Albuquerque and Carlsbad, New Mexico, and Golden and Colorado Springs, Colorado. The TRANSAX '90 exercise provided an extremely valuable contribution to emergency preparedness efforts in Colorado; moreover, the lessons learned during TRANSAX '90 can be applied to other portions of WIPP transportation corridors.

Completion of Institutional/Programmatic Activities

Many important institutional and programmatic activities supporting the initiation of 1991 experiments with TRU waste at the WIPP were completed in 1990. These activities include the following: 1) obtaining a Record of Decision for the SEIS; 2) acquiring potash leases at the WIPP site; 3)

completing Cooperative Agreements between the Western Governors Association and the DOE to establish transportation/emergency response readiness; and 4) agreement with the State of New Mexico for on-site environmental monitoring.

REMAINING READINESS ITEMS

A number of remaining items will be completed to support the initiation of TRU waste experiments at the WIPP. An FSAR addendum will be published that addresses the special WIPP test activities. The waste characterization plans currently in draft form will be finalized. The last remaining New Mexico institutional issues (e.g., route designation) will be resolved, and a favorable Energy Systems Acquisition Advisory Board (ESAAB) decision will be obtained prior to the performance of a full-scale Integrated Systems Checkout. The completion of these items will, in turn, facilitate passage of the congressional land withdrawal legislation and comply with the conditions associated with the recently-approved administrative land withdrawal action by the Department of Interior. During the planned Test Phase, limited amounts of radioactive waste (0.5 percent of design capacity) will be shipped to the WIPP so that TRU waste experiments can be performed to demonstrate compliance with long-term disposal standards.

STRATEGY FOR 1991 TRU WASTE EXPERIMENTS

The following experiments will be initiated in a phased manner at the WIPP in 1991.

WIPP Bin-Scale CH TRU Waste Tests

The WIPP bin-scale test program is scheduled to begin in the summer of 1991. It will involve the testing of approximately 146 test bins, with each bin containing 6 drum equivalents of waste. Test bins are specifically designed metal containers that will hold the waste safely and allow for periodic sampling of generated gases. The bin-scale tests will include an initial dry (no added liquid) bin-scale test program, which will be followed by a wet (up to 120 liters of brine added) bin-scale test program to be initiated approximately six months after the dry bin-scale test initiation. Engineered alternative waste bins will be added in parallel with the wet bin-scale test program, as available.

WIPP In Situ Alcove CH TRU Waste Tests

The WIPP in situ alcove test program for 1991 involves designing, in situ construction, and testing the alcove gas barrier. The conceptual design of this gas barrier is complete. An Architecture and Engineering Contract for the design and construction of the gas barrier will be awarded. After the gas barrier is constructed, it will be tested to verify

an acceptable leak rate before conducting the alcove CH TRU waste tests. Currently, the WIPP in situ alcove test program involves approximately 3850 drum equivalents of actual CH TRU waste. This waste would be retrievably

stored within up to six alcoves (underground test rooms) and monitored to collect test data at the WIPP facility.