

**DECONTAMINATION AND DECOMMISSIONING  
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## DECONTAMINATION AND DECOMMISSIONING

### 10.1 Introduction

The WIPP facility is currently scheduled for a 35 year disposal phase,<sup>1</sup> and will be decommissioned after waste emplacement is completed. Lacking further requirements to operate the WIPP facility, decontamination of the facility to acceptable contamination and radiation levels in conjunction with facility decommissioning will be performed. The ongoing performance assessment documented in (Chapter 3) of SAND 92-0700/1-UC-791<sup>2</sup> is designed to determine the acceptability of the WIPP facility and surrounding site by showing compliance with the requirements of 40 CFR 191, Subpart B.<sup>3</sup> Sections 10.1 through 10.5 are written with the assumption that the WIPP facility is shown to be acceptable as a repository, and, therefore, decommissioning activities begin near the end of its operational life.

Some postoperational requirements exist for the WIPP facility in 40 CFR 191, Subpart B.<sup>3</sup> These "Assurance Requirements," developed by the Environmental Protection Agency (EPA), ensure that cautious steps are taken by the implementing agency (in this case, the DOE) to reduce the uncertainties in projecting the behavior of the natural and engineered components for many thousands of years. The application of these assurance requirements to the WIPP facility is described in detail in DOE/WIPP 91-029.<sup>4</sup>

Decommissioning requirements applicable to the WIPP facility are included in DOE O 430.1A,<sup>5</sup> Life-Cycle Asset Management (previously included in DOE Order 5820.2A<sup>6</sup> and DOE Order 6430.1A.<sup>7</sup>) Additional requirements are included in the Resource Conservation and Recovery Act (RCRA) as implemented in 40 CFR Part 264<sup>8</sup> and Title 20 of the New Mexico Administrative Code, Part 4.1, Subpart V<sup>9</sup> The Closure/Post Closure Plan<sup>10</sup> implements RCRA regulations.

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## 10.2 Decontamination and Decommissioning

The WIPP facility has been designed and will be operated in a manner that will allow ease of decontamination and decommissioning (D&D). Actual D&D activities will be initiated prior to the cessation of WIPP facility operation as required by the WIPP Land Withdrawal Act.<sup>11</sup> At the completion of WIPP facility operations, the facility will consist of surface structures, shafts, and subsurface structures. The overall goal is to restore the surface area now housing the WIPP facility to essentially preconstruction and preoperational conditions. Surface radiological levels shall be returned to levels commensurate with regulatory guidelines. Records of the project shall be listed in the public domain and monuments or markers shall exist at the site to inform future generations of the presence of the WIPP repository (Section 10.4).

### 10.2.1 Decontamination and Decommissioning Design Features

During the design phase of the facility, general guidance from former DOE Order 6430.1<sup>12</sup> was followed to design and construct the facility. This guidance incorporated structural and internal features that would facilitate the safe and economical decontamination and decommissioning of the facility. To the extent practical, the following features and measures have been incorporated into the WIPP facility design:

- coatings provide easily cleanable surfaces
- cracks, crevices, and joints are sealed to prevent contamination spread to inaccessible areas
- exhaust filters at points of potential contamination minimize contamination of long sections of duct work and downstream exhaust equipment
- architectural or structural features allow the dismantlement and removal of equipment from areas of contamination or potentially high radiation levels to other areas for decontamination, maintenance, or repair.

### 10.2.2 Decontamination and Decommissioning Activities

Decontamination and decommissioning activities will involve three primary areas: surface structures, subsurface structures, and the shafts. Detailed planning for these activities will begin several years prior to their actual initiation and will incorporate currently available technologies and prescribed decontamination limits.

Surface structures will be decontaminated in accordance with current guidelines, and dismantlement of the buildings will be established in the decommissioning plan.

Decontamination operations and surveillance checks will be conducted during the decommissioning phase, demonstrating that personnel and public exposure limits are maintained as low as reasonably achievable and within the limits of 10 CFR 835, Occupational Radiation Protection.<sup>13</sup>

Since safety is of paramount importance, potentially hazardous operations will not begin until precautions are taken against the release of contamination. These precautions include development of decontamination plans, decontamination procedures, and safety analysis.

Decontamination is defined as the removal or reduction of radioactive or hazardous contamination from facilities, equipment, or soils by washing, chemical or electrochemical action, mechanical cleaning or other techniques to achieve a stated objective or end condition. The policy at the WIPP will be to decontaminate as many areas as possible, consistent with radiation protection policy. Decontamination is part of all closure activities and is a necessary activity in the clean closure of the surface container management units.

Decommissioning includes surveillance and maintenance, decontamination, and dismantlement. These actions are taken to retire the facility from service with adequate regard for the health and safety of workers and the public and protection of the environment. Decommissioning is part of final facility closure only, and will involve the removal of equipment, buildings, closure of the shafts, and establishing active and passive institutional controls for the facility. The ultimate goal of decommissioning is unrestricted release or restricted use of the surface.

The objective of D&D activities at the WIPP facility is to return the surface to as close to the preconstruction condition as reasonably possible, while protecting the health and safety of the public and the environment. D&D activities are discussed in the Conceptual Decontamination and Decommissioning Plan for the Waste Isolation Pilot Plant (DOE/WIPP 95-2072).<sup>14</sup> Major activities planned to accomplish this objective include, but are not limited to the following:

1. Review of operational records for historical information on releases
2. Visual examination of surface structures for evidence of spills or releases
3. Performance of site contamination surveys
4. Decontamination, if necessary, of usable equipment, materials, and structures including surface facilities and areas surrounding the Waste Handling Building (WHB).
5. Disposal of equipment/materials that cannot be decontaminated but that meet waste acceptance criteria in an Hazardous Waste Management Unit (HWMU)
6. Dismantling of surface facilities
7. Dismantling of underground facilities at the time the panels are closed
8. Emplacement of final panel closure system
9. Emplacement of fill material in the underground, if required
10. Emplacement of shaft seals
11. Regrading the surface to approximately original contours
12. Initiation of active controls which includes monitoring and installation of the Permanent Marker System

These activities, in addition to common techniques such as visual inspection and records, will be performed using the best technology available at the time of closure, and will be conducted in a manner that maintains personnel exposure to radiation levels as low as reasonably achievable and exposure to hazardous constituents to levels deemed acceptable by the DOE. This Closure Plan will be amended prior to the initiation of closure activities to specify the D&D methods to be used.

#### Health and Safety

Before final closure activities begin, health physics personnel will conduct a hazards survey of the unit(s) being closed. A release of radionuclides could also indicate a release of hazardous constituents, in accordance with co-detection principles. If radionuclides are not detected, sampling for hazardous constituents may still be performed if there is evidence that a spill or release has occurred. The purpose of the hazards survey will be to identify potential contamination concerns that may present hazards to workers during the closure activities, and to specify any control measures necessary to reduce worker risk. This survey will provide the information necessary for the health physics personnel to identify the worker qualifications, personal protective equipment, safety awareness, work permits, exposure control programs, and emergency coordination that will be required to perform closure related activities.

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### 10.3 Closure, Monuments, and Records

A record of the WIPP Project shall be listed in the public domain. Active access controls will be employed for at least the first 100 years after the final facility closure. In addition, a passive control system consisting of monuments or markers shall be erected at the site to inform future generations of the WIPP repository location.

Closure of the WIPP facility will result in the following:

- Shafts will be closed and sealed, minimizing the intrusion of fluids into the repository.
- Human intrusion after closure will be unlikely.
- Physical and environmental surveillance can be minimized.

Substantial permanent monuments will identify the WIPP facility. The location of these markers will be established in detail by the decommissioning plan. The markers will contain site description, date of closure, land survey data, and other information required by applicable regulations.

Detailed records shall be filed with local, state, and federal government agencies to ensure that location of the WIPP facility is easily determined. This information together with land survey data will be on record with the United States Geological Survey and other agencies as provided by the decommissioning plan. The DOE will maintain permanent administrative authority over those aspects of land management assigned by law (i.e., by the permanent withdrawal legislation).

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#### 10.4 Post Closure Surveillance

Although the Federal Government (initially DOE) could maintain the staffing to conduct periodic surveillance of the site, a contractual arrangement with a local law enforcement or security agency would provide some distinct advantages. Among the advantages are:

- Training in patrol and surveillance activities.
- Authorization to arrest members of the general public who are found to be violating trespassing laws
- The liability associated with apprehension, attempted apprehension, or circumstances arising from attempts would remain with the law enforcement or security agency

Surveillance will consist of drive-by patrolling around the fenced perimeter, 2-3 times per week. In the course of the patrol, particular note shall be taken of the fence integrity. In addition, the locked condition of each gate shall be checked to ensure that gate integrity is maintained and there is no evidence of tampering. Surveillance should also include visual examination of the entire enclosed area for any signs of human activity. A routine summary of each month's surveillance activity shall be prepared documenting the day and time of each patrol and any unusual circumstances that may have been observed. This surveillance routine could continue throughout the active control period and for at least 100 years following the sealing of the shafts.

Upon commencement of construction of the Permanent Marker System, a routine presence at the site will once again be established and periodic surveillance will not be necessary. Once the Permanent Marker System is completed, the active controls program and access control measures will be evaluated and changes necessitated by construction of the Permanent Marker System will be made and implemented for the remainder of the active controls period. With construction of the Permanent Marker System, easy visual inspection of the repository footprint may be curtailed. The berm is an imposing feature which would require it to be scaled in order to achieve an unobstructed view of the footprint. The DOE could defer construction of the Permanent Marker System decades after completion of decommissioning. Due to filling of the repository and extensive decommissioning, maintenance of the physical security of the WIPP facility after closure can be minimized. The physical surveillance requirements will be provided in the final decommissioning plan.

Environmental surveillance after closure will include appropriate radiation monitoring, soil, vegetation, water, and wildlife sample analysis. Frequency and duration of the environmental surveillance program will be defined in the final decommissioning plan as prescribed by standards applicable at the time.

**References for Chapter 10**

1. DOE/NTP-96-1204, The National Transuranic Waste Management Plan, Rev. 0, September 1996.
2. SAND 92-0700/1-UC-791, Preliminary Performance Assessment for the Waste Isolation Pilot Plant, Volume 1: Third comparison with 40 CFR 191, Subpart B, December 1991.
3. 40 CFR 191, Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-level and Transuranic Radioactive Wastes, U.S. Environmental Protection Agency, September, 1985.
4. DOE/WIPP 91-029, Implementation of the Resource Disincentive 40 CFR Part 191.14(e) at the Waste Isolation Pilot Plant, Rev. 1, June, 1993.
5. DOE O 430.1A, Life-Cycle Asset Management, August 1995
6. DOE Order 5820.2A, Radioactive Waste Management, September 26, 1988.
7. DOE Order 6430.1A, General Design Criteria, April 1989 (For reference only, superceded by DOE O 420.1 and DOE O 430.1A).
8. 40 CFR Part 264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, U.S. Environmental Protection Agency, May 19, 1980 and subsequent amendments.
9. Title 20 of the New Mexico Administrative Code, Part 4.1, Subpart V.
10. Closure and Post Closure Plans, Waste Isolation Pilot Plant, Carlsbad, New Mexico, Westinghouse Electric Corp., August 1988.
11. Public Law 102-579, Waste Isolation Pilot Plant Land Withdrawal Act.
12. Former DOE Order 6430, General Design Criteria Manual for Department of Energy Facilities, June 10, 1981 draft (For reference only, superceded by DOE O 420.1 and DOE O 430.1A).
13. 10 CFR 835, Occupational Radiation Protection, December 14, 1993.
14. DOE/WIPP 2072, Conceptual Decontamination and Decommissioning Plan for the Waste Isolation Pilot Plant, January 1995.