CHAPTER 1

INTRODUCTION AND STATEMENT OF PURPOSE AND NEED

This chapter presents a short discussion of the history and mission of the Waste Isolation Pilot Plant (WIPP) and the purpose and need for the activities proposed by the U.S. Department of Energy (DOE or the Department).

1.1 HISTORY AND BACKGROUND

DOE currently operates WIPP near Carlsbad, New Mexico, as a disposal site for transuranic (TRU) waste generated as part of the nuclear defense research and production activities of the federal government. TRU waste is contaminated with alpha-emitting radionuclides that are heavier than uranium (that is, their atomic numbers are greater than that of uranium) and that have half-lives longer than 20 years at concentrations greater than 100 nanocuries (13,700 becquerels) per gram of waste. Key radionuclides found in TRU waste include americium-241 and several isotopes of plutonium (plutonium-238, plutonium-239, plutonium-240, and plutonium-241). Throughout the DOE complex, several types of operations (past, current, or future) have generated or will generate TRU waste: (1) nuclear weapons development and manufacturing, (2) plutonium recovery, stabilization, and management, (3) research and development, (4) environmental restoration, and decontamination and decommissioning, (5) waste management, and (6) testing at facilities that are under DOE contract. DOE is responsible for the management and ultimate disposition of TRU waste generated at DOE sites and, as directed by Congress, has constructed WIPP for the purpose of disposing of TRU waste resulting from defense activities. Overall, the WIPP facility is managed by DOE's Office of Environmental Management (DOE-EM), which has the principal mission of cleaning up environmental sites at DOE facilities and disposing of radioactive waste.

TRANSURANIC WASTE

TRU waste is defined as "waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes, per gram of waste, with half-lives greater than 20 years, except for (A) high-level radioactive waste; (B) waste that the Secretary has determined, with concurrence of the Administrator, does not need the degree of isolation required by the disposal regulations; or (C) waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with part 61 of Title 10, Code of Federal Regulations" (WIPP Land Withdrawal Act, Public Law 102-579).

TRU elements, each having several isotopes, are radioactive and typically man-made. The half-lives of many are considerably longer than 20 years. For instance, the half-life of one isotope of plutonium is 24,000 years.

TRU waste is further classified as contact-handled (CH)-TRU waste or remote-handled (RH)-TRU waste. CH-TRU waste has radioactivity levels that are low enough to permit workers to directly handle the containers in which the waste is kept. This level of radioactivity is specified as a dose rate of no more than 200 millirems per hour (mrem/hr) at the outside surface of the container. RH-TRU waste has a surface dose rate greater than 200 mrem/hr, so workers use remote manipulators to handle containers of RH-TRU waste. TRU mixed waste is CH-TRU or RH-TRU waste that also contains hazardous materials, such as lead or organic solvents regulated by the Resource Conservation and Recovery Act (RCRA).

WIPP is located in Eddy County in southeastern New Mexico (Figure 1-1). It is about 50 kilometers (30 miles) east of Carlsbad, New Mexico, in an area known as Los Medaños ("the dunes"), a relatively flat, sparsely inhabited plateau with little surface water. The land in the region is mainly used for grazing; other uses include potash mining and oil and gas exploration and development. The central area within the WIPP site boundary is used exclusively by DOE to dispose of TRU waste; however, other areas are managed for various uses (for example, wildlife, cultural resource, and vegetation management).

The major construction activities at WIPP have been completed. Surface facilities have been constructed, including the Waste Handling Building where TRU waste is received, inspected, and moved to the waste handling shaft for transfer underground. The constructed underground facilities include four shafts, an experimental area, an equipment and maintenance area, and connecting tunnels (Figure 1-2). These underground facilities were excavated in the Salado Formation, 655 meters (2,150 feet) beneath the land surface (Figure 1-3). DOE also has excavated the first panel, which consists of seven disposal rooms. This panel currently is receiving waste. A second panel has also been constructed and stands ready for waste emplacement.

DOE now is proposing to expand the availability of WIPP facilities and infrastructure to scientists who wish to conduct experiments there, to the extent such experiments can be conducted without interfering with WIPP's primary TRU waste disposal mission and to the extent that they reflect contemporary budget priorities. The deep geologic repository at WIPP could provide a suitable environment for experiments in many scientific disciplines, including particle astrophysics, waste repository science, mining technology, low radiation dose physics, fissile materials accountability and transparency, and deep geophysics. Currently, one experiment in astrophysics that has been conducted for several years by Los Alamos National Laboratory (LANL) is located in WIPP. Six other teams of scientists already have proposed astrophysics experiments to DOE and are seeking funding from the scientific community for those experiments.

Scientists see the WIPP site as having two principal advantages over other facilities throughout the world. First, because WIPP is owned by the U.S. government and its purpose is not to sell resources extracted during excavation, access to WIPP is not likely to be affected by economic demand for the extracted resources as it would in a commercial mining environment. Many such sites are in working, privately owned mines that do not offer the same level of stability, particularly for experiments that may take two decades or more to reach conclusions. Second, because the WIPP site is in the United States, use of the WIPP site would reduce travel and living expense costs for U.S. scientists, many of whom have been traveling to Japan or Italy to conduct their experiments. Allowing the use of the WIPP facilities for these experiments would further the mission of the national scientific community and the DOE Office of Science, and ultimately benefit taxpayers by decreasing the total costs of experimental programs funded by the government.

Of particular interest to the current astrophysics and basic science proposals is an area of WIPP once planned for underground experiments. This area was among the first excavated at the WIPP site. Excavations in the area, now known as the North Experimental Area (Figure 1-4), are as long as 1,384 meters (4,540 feet). They are connected to the disposal area by a series of tunnels, each 10 meters (33 feet) wide and 6 meters (20 feet) high. These tunnels, in turn, are crossed by rooms of about the same size as the tunnels every 100 meters (330 feet). The North Experimental Area is largely unused. It is not a part of the disposal area, and there are no plans to use it for disposal. At present, some of the North Experimental Area is used to store salt being excavated for the second disposal panel until it can be removed from the underground facility. One hallway and two rooms crossing that hallway have been identified as a potential location for astrophysics and basic science experiments. For the purposes of this environmental assessment (EA), that area will be called the experiment gallery (Figure 1-5).

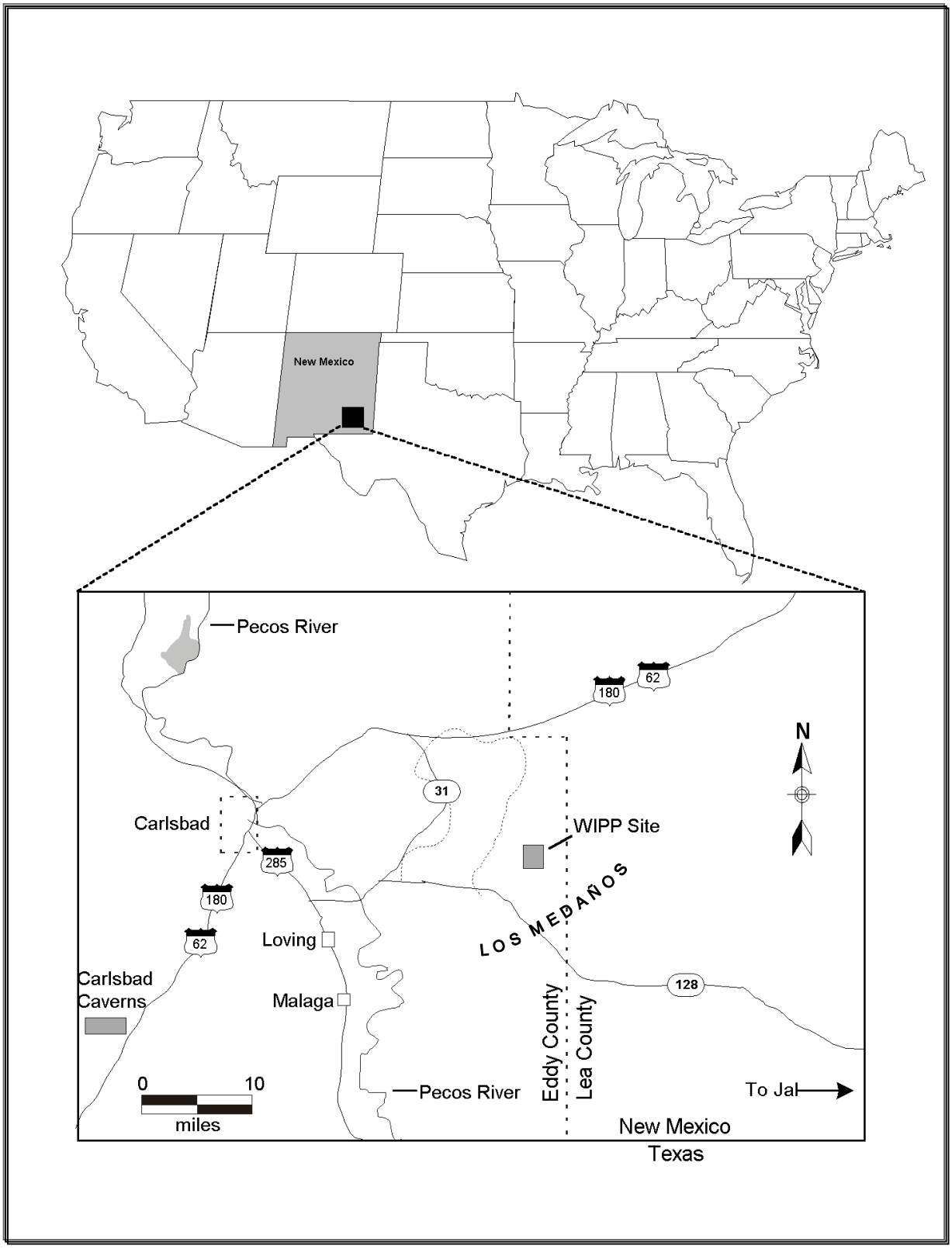


Figure 1-1. Location of WIPP

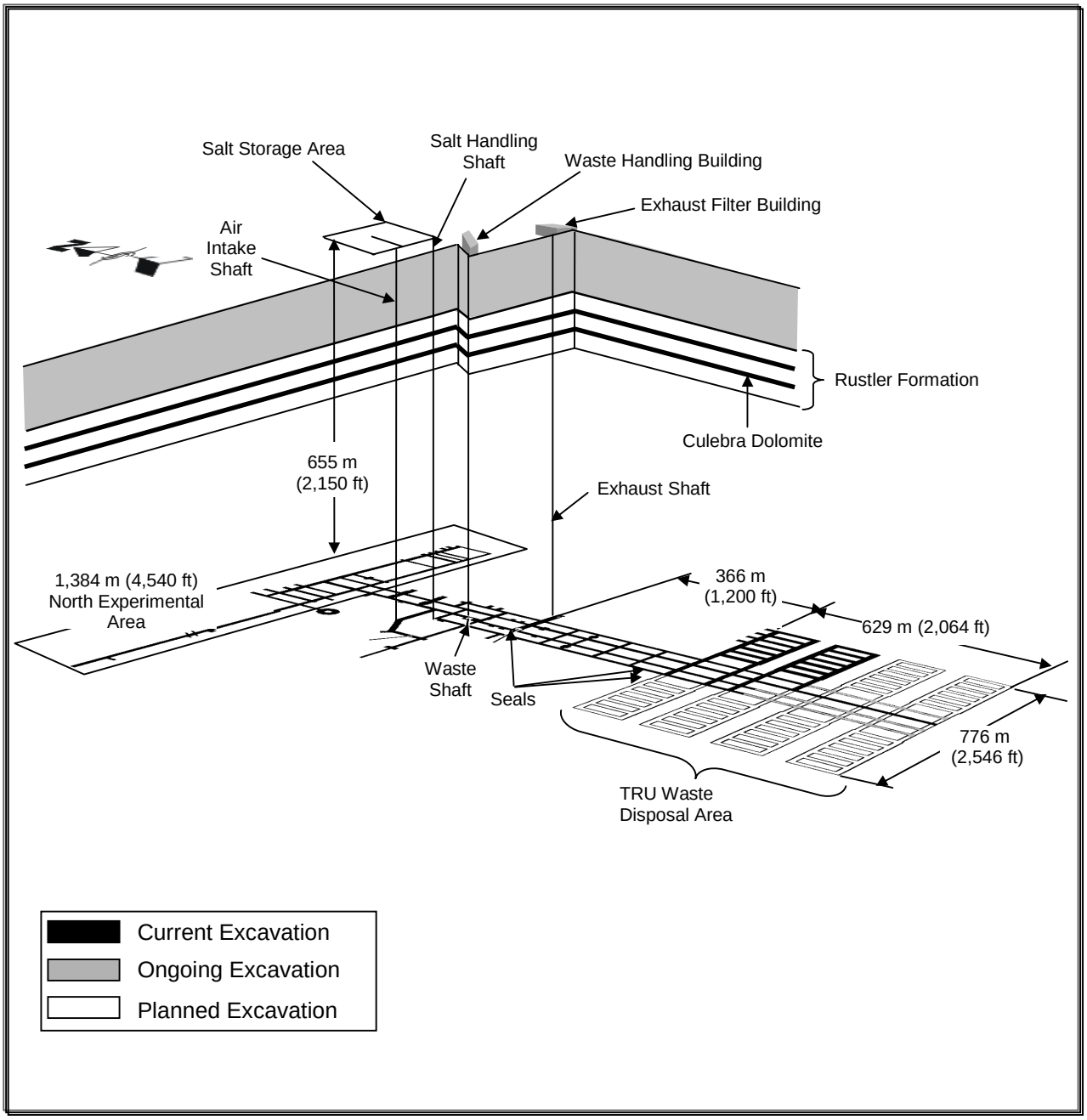


Figure 1-2. WIPP Underground Facilities

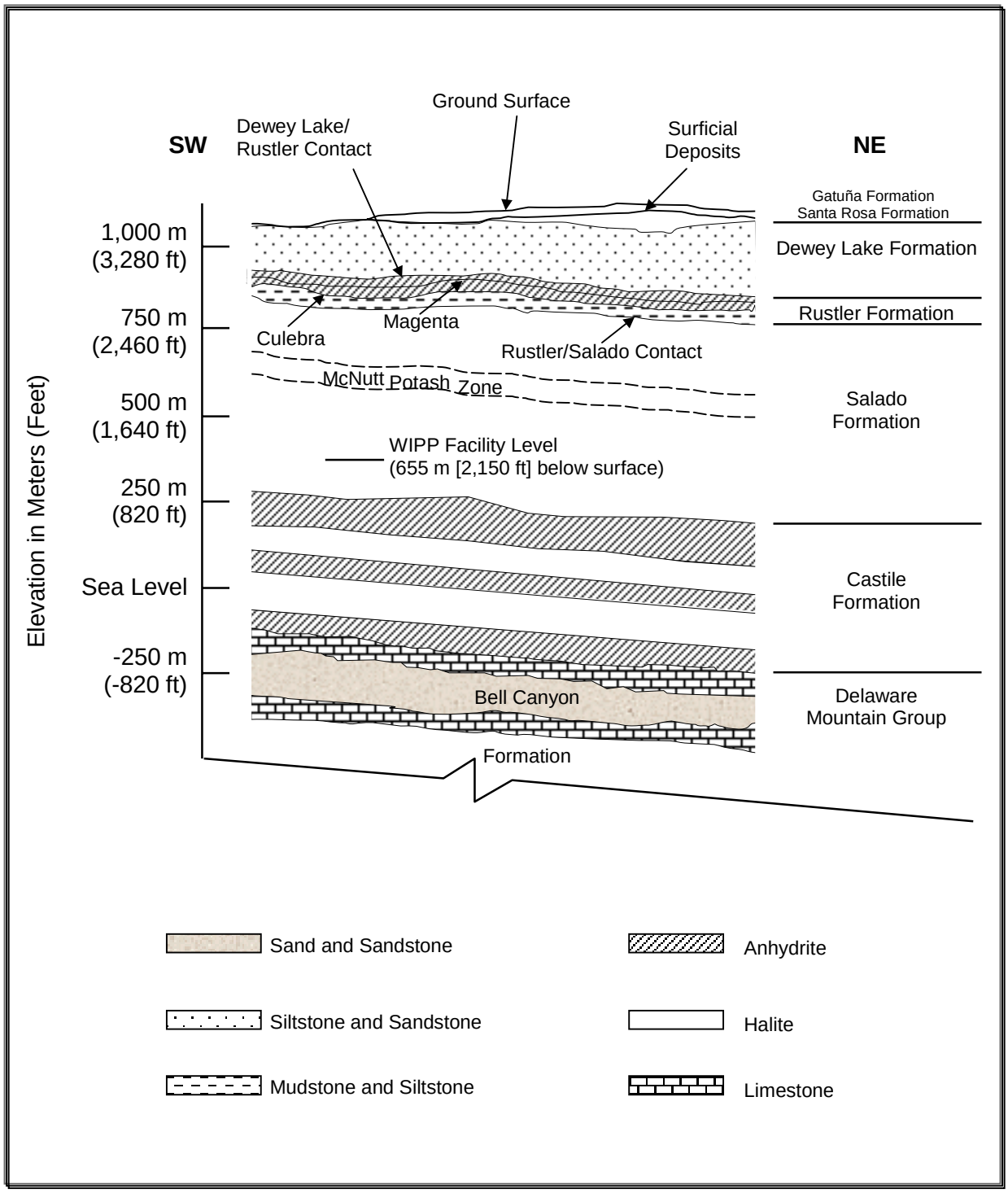


Figure 1-3. WIPP Facility Location Within the Salado Formation

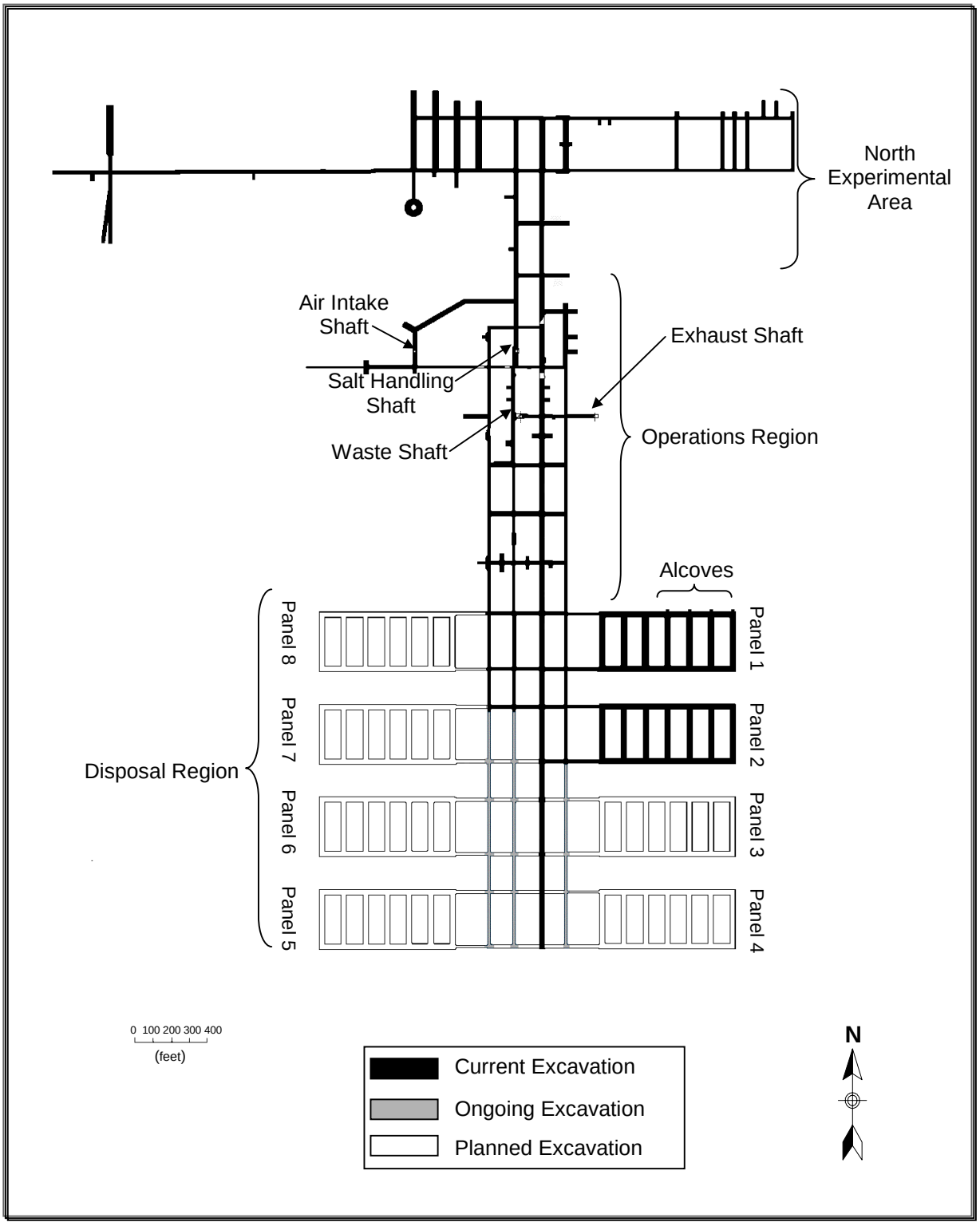
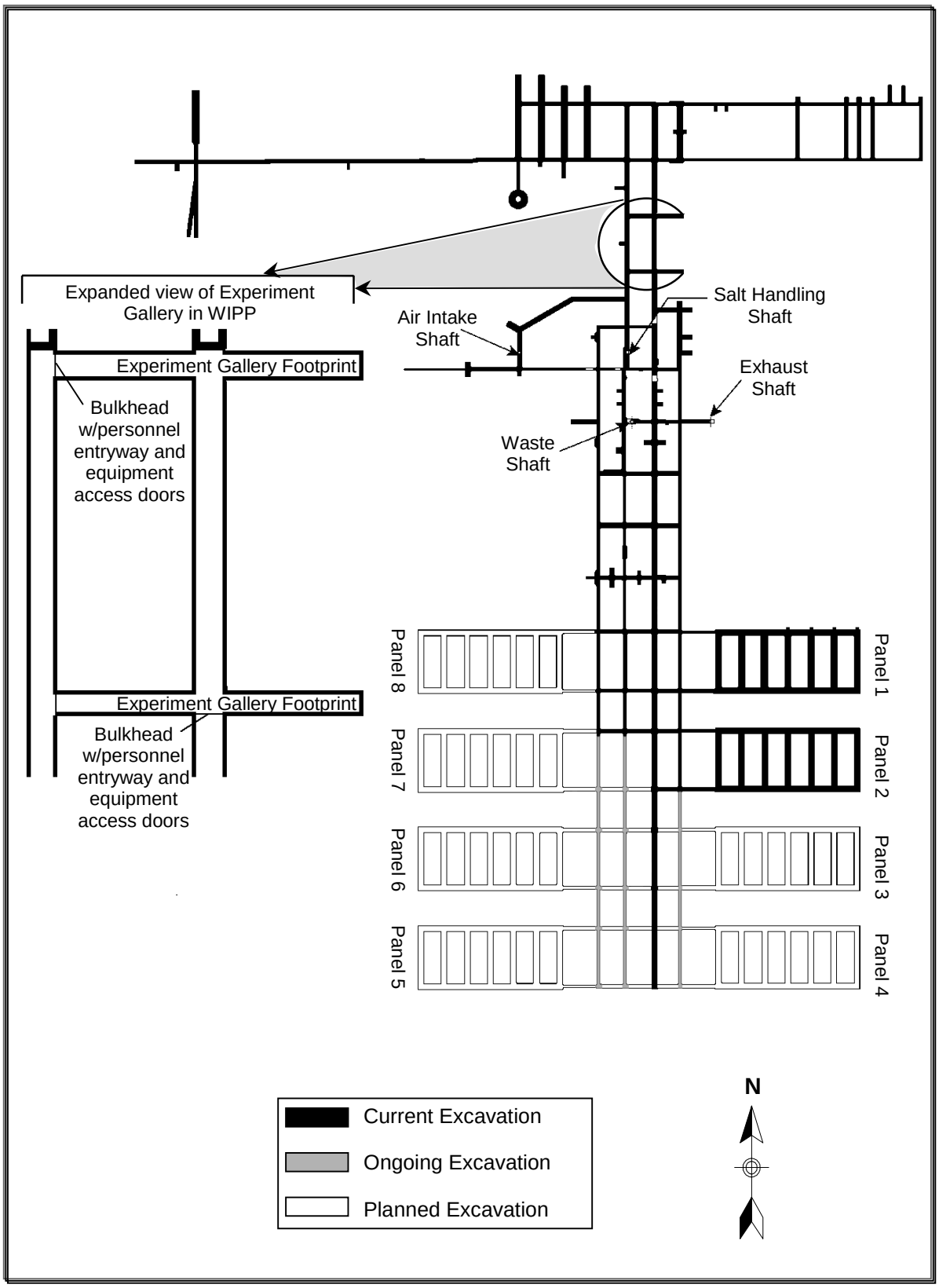


Figure 1-4. North Experimental Area


Expanded view of Experiment Gallery in WIPP
Experiment Gallery Footprint
Bulkhead w/personnel entryway and equipment access doors
Experiment Gallery Footprint
Bulkhead w/personnel entryway and equipment access doors
Air Intake Shaft
Salt Handling Shaft
Exhaust Shaft
Waste Shaft
Panel 8
Panel 7
Panel 6
Panel 5
Panel 1
Panel 2
Panel 3
Panel 4
Current Excavation
Ongoing Excavation
Planned Excavation
N

Because normal background radiation levels can interfere with many experiments, the low background radiation in the WIPP underground facility is one of the factors that makes the site an attractive environment for experiments relating to particle astrophysics, low radiation dose physics, fissile materials accountability, and transparency. Further, WIPP's status as a working underground geologic waste repository also makes it a unique resource for experiments in other fields such as mining, waste repository science, and deep geophysics.

DOE has prepared this EA to examine the potential environmental consequences from conducting particular types of scientific experiments in the experiment gallery at WIPP, including the potential cumulative impacts of conducting experiments with the operation of WIPP as a TRU waste repository. Chapter 2 describes the types of experiments that could be conducted at WIPP or another underground location.

1.2 PURPOSE AND NEED

Congress specifically acknowledged the potential use of the WIPP site for other purposes. Section 4(b)(3) of the WIPP Land Withdrawal Act (Public Law 102-579) allows "such non-WIPP related uses of the Withdrawal as the Secretary determines to be appropriate." In keeping with this congressional directive, DOE seeks to make maximum use of existing WIPP facilities to further the scientific missions assigned to the Department by Congress to the extent it can do so without impacting the primary mission of WIPP, the disposal of defense TRU waste. This multiple use of the WIPP facility would benefit the public by providing an additional return on the existing investment in that facility.

1.3 PERMITS AND REGULATORY REQUIREMENTS

The National Environmental Policy Act (NEPA) requires that a list of active, pending, or potentially required permits be prepared before a proposed action can be conducted at WIPP. Table 1-1 presents this information for current, ongoing activities at WIPP. No additional permits should be needed for the activities proposed in this EA.

U.S. Environmental Protection Agency (EPA) regulations require DOE to inform the EPA Administrator in writing prior to making a planned change in activities or conditions that differ significantly from the most recent compliance application (see Title 40 of the Code of Federal Regulations [CFR] Part 194.4 (a)(3)(i)). DOE would report the underground experiments as planned changes under this regulation before emplacing any experiment in the WIPP underground. In addition, DOE would comply with regulations governing hazardous, low-level radioactive, and low-level mixed radioactive wastes by shipping such wastes offsite in accordance with existing generator regulations; however, DOE does not anticipate that such wastes would be produced under the experiments proposed to date.

1.4 NEPA PROCESS

The NEPA requires federal agencies to examine the potential environmental impacts of their actions before they are implemented (see 42 U.S. Code 4332(2)(C)). For "major federal actions that significantly affect the quality of the human environment," agencies must prepare an environmental impact statement (EIS). When the agency is not certain whether the environmental impacts of a proposal may be significant, the agency must prepare an EA. The Council on Environmental Quality (CEQ) has promulgated regulations that implement these procedural provisions of NEPA (see 40 CFR Parts 1500-1508). DOE has also promulgated NEPA implementing regulations that set forth agency specific NEPA procedures (see 10 CFR Part 1021). This EA was prepared pursuant to NEPA and the applicable CEQ and DOE NEPA regulations.

Table 1-1. Required Permits and Approvals for Ongoing Activities at WIPP

Granting Agency [a]	Type of Permit or Approval[b]	Status
U.S. Department of the Interior, BLM	Right-of-Way for Water Pipeline	Active
U.S. Department of the Interior, BLM	Right-of-Way for the North Access Road	Active
U.S. Department of the Interior, BLM	Right-of-Way for Railroad	Active
U.S. Department of the Interior, BLM	Right-of-Way for Dosimetry and Aerosol Sampling Sites	Active
U.S. Department of the Interior, BLM	Right-of-Way for Seven Subsidence Monuments	Active
U.S. Department of the Interior, BLM	Right-of-Way for Aerosol Sampling Site	Active
U.S. Department of the Interior, BLM	Right-of-Way for Ten Raptor Nesting Platforms	Active
U.S. Department of the Interior, BLM	Right-of-Way for Survey Monument Installation	Active
U.S. Department of the Interior, BLM	Free Use Permit for Caliche	Active
N.M. Environment Department	Operating Permit for two Backup Generators	Active
N.M. Environment Department	Hazardous Waste Facility Permit	Active
N.M. Department of Game and Fish	Individual Banding	Active
N.M. Department of Game and Fish	Master Collecting	Active
N.M. Department of Game and Fish	Concurrence that WIPP activities will have no significant impact on State-listed threatened or endangered species	Active
U.S. Department of the Interior, Fish and Wildlife Service	Master Personal Banding	Active
U.S. Department of the Interior, Fish and Wildlife Service	Concurrence that there are no Federally listed, threatened, proposed, or endangered species at WIPP	Active
U.S. Environmental Protection Agency	Notification of the presence of two Underground Storage Tanks	Active
U.S. Environment Protection Agency	N.M. NPDES Storm Water General Permit	Active
U.S. Environmental Protection Agency	Certification of Compliance with 40 CFR 194	Active
U.S. Nuclear Regulatory Commission	Certificate of Compliance for the TRUPACT-II	Active
U.S. Nuclear Regulatory Commission	Certificate of Compliance for the RH-72B cask	Active
N.M. Commissioner of Public Lands	Right-of-Way for High Volume Air Sampler	Active
N.M. State Engineer Office	H-19b1 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	H-19b2 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	H-19b3 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	H-19b4 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	H-19b5 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	H-19b6 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	H-19b7 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	WQSP-1 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	WQSP-2 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	WQSP-3 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	WQSP-4 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	WQSP-5 well, permit to appropriate the underground waters of N.M. for monitoring ad characterization	Active
N.M. State Engineer Office	WQSP-6 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	WQSP-7 well, permit to appropriate the underground waters of N.M. for monitoring and characterization	Active
N.M. State Engineer Office	Appropriation: Exhaust Shaft Exploratory Borehole	Active
N.M. State Engineer Office	Exploratory: Exhaust Shaft Exploratory Borehole	Active
N.M. State Engineer Office	H-14 and H-15 Test Wells	Active

a. U.S. = United States; BLM = Bureau of Land Management; N.M. = New Mexico
b. NPDES = National Pollutant Discharge Elimination System; TRUPACT-II = transuranic package transporter-II

1.4.1 WIPP NEPA Compliance

In 1980, DOE prepared the *Final Environmental Impact Statement for the Waste Isolation Pilot Plant* (FEIS) (DOE 1980) to assess the potential environmental effects of developing WIPP and of alternatives for disposing of or managing TRU waste. The FEIS proposed a two-phased approach to the development of WIPP: (1) a site and preliminary design validation program, and (2) full construction. This approach was adopted in a Record of Decision (ROD) issued in 1981 (46 Fed. Reg. 9162 [1981]).

After construction of most of the WIPP facilities, DOE prepared the *Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant* (SEIS-I) (DOE 1990) to update the environmental record established in the FEIS. The SEIS-I ROD, published by DOE in 1990, chose to continue the phased approach to developing WIPP by beginning an underground test phase (55 Fed. Reg. 25689 [1990]). The 1990 ROD also committed the Department to prepare a second supplement disposal phase EIS.

The *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (SEIS-II) was issued in September 1997. The SEIS-II ROD was issued on January 16, 1998 (63 Fed. Reg. 3623 [1998]). In that document, DOE announced its decision to dispose of TRU waste generated by defense activities at WIPP (DOE 1997).

DOE has also prepared two other EAs for activities related to TRU waste disposal. These are the *Environmental Assessment of the Carlsbad Environmental Monitoring and Research Center Facility* (DOE 1995b) and the *Environmental Assessment for the Construction and Operation of the Sand Dunes to Ochoa Powerline Project* (DOE 1995c).

1.4.2 Stakeholder Outreach and Involvement Activities

NEPA requires that federal, state, and local agencies with jurisdiction or special expertise regarding environmental impacts be consulted and involved in the NEPA process. Agencies involved include those with authority to issue permits, licenses, and other regulatory approvals. Other agencies include those responsible for protecting significant resources, such as endangered species or wetlands. Table 1-2 lists the agencies consulted during the preparation of this EA.

Additionally, the DOE Carlsbad Field Office (CBFO) has informally apprised DOE-EM, DOE's Office of Science, and DOE's Office of Nuclear Nonproliferation of the possible activities described in this EA. The New Mexico Environment Department and the EPA were sent copies of the draft EA; each submitted comments on the draft, which have been addressed in this final EA.

Also, the CBFO has typically interacted with stakeholder groups and citizens who have an interest in or are potentially affected by DOE activities at WIPP. The CBFO Office of Public Affairs has designed the stakeholder outreach and involvement activities for this EA to respond to regulatory requirements and to the interests of its stakeholders. The CBFO will seek to include research scientists in the public outreach and involvement activities. The design reflects recent CBFO experience at other meetings and informal stakeholder comments and suggestions.

Table 1-2. Governmental Agencies Consulted

Andrew V. Sandoval, Chief Conservation Services Division New Mexico Department of Game and Fish Villagra Building PO Box 25112 Santa Fe, NM 87504
Field Supervisor U.S. Fish and Wildlife Service New Mexico Ecological Services Field Office 2105 Osuna NE Albuquerque, NM 87113
Toby Martinez, Director New Mexico Energy, Minerals and Natural Resources Department Villagra Building 408 Galisteo Santa Fe, NM 87501
New Mexico Environment Department Harold S. Runnels Building 1190 St. Francis Drive Santa Fe, NM 87502
Archaeological Records Management System (ARMS) Laboratory of Anthropology New Mexico State Historic Preservation Division 228 E. Palace Avenue Santa Fe, NM 87501

1.4.2.1 Public Information Materials

The CBFO Office of Public Affairs publicized the draft EA through the activities and publications described below. After informal conversations with key stakeholders, the CBFO identified the following topics that some or all of these materials touched on:

- DOE's Proposed Action and alternative.
- Sufficient detail on the types of experiments contemplated so that stakeholders could comment knowledgeably.
- Materials (chemicals, liquids, gases, etc.) that might be introduced into WIPP; how they would be managed; and cumulative effects of the WIPP waste, volatile organic compounds (VOCs), and any new materials that might be introduced.
- Estimated duration of proposed experiments.
- Location in WIPP where the experiments would take place; if the location is in the old experimental area, an evaluation of the rock and salt mechanics.

- Environmental protections that would be built in to protect against (1) human exposure to radioactive materials in the WIPP waste, (2) introduction of new hazards, and (3) damage to experimental equipment by the hazardous and radioactive materials in WIPP and potential leaks.
- General logistical plans to maintain safety and waste disposal operations.
- Types of organizations that would conduct these studies.
- Process and responsibility for selecting studies to be conducted.
- Overview of modifications that might be made to the WIPP facility to accommodate the studies.
- Anticipated funding sources both for the studies and for any facility modifications.
- Rationale for conducting an EA rather than an EIS – and how the original FEIS, SEIS-I, and SEIS-II covered the proposed activities.
- Clear statement of future experiments contemplated that might lead to other NEPA studies in the near term.
- Outreach activities planned.
- Methods of commenting on the draft EA.
- Standards that would have to be met for the EA to be elevated to an EIS.

News Release

The news release briefly described the Proposed Action and alternative, told how to obtain more information on the EA (including a copy of the full document), and provided details about how the public could comment on it. The CBFO sent the document (via fax) to about 800 local and regional newspapers and trade and scientific publications.

CBFO Monthly Calendar

The *CBFO Monthly Calendar* for October 2000 carried an early notification that the CBFO would seek public comment on the EA later that month, and asked that interested stakeholders who wanted a full copy of the document call the WIPP Information Center (toll-free). This early notification, which went to some 3,000 stakeholders, helped the CBFO estimate how many copies would be sent to the general public.

Newspaper Advertisements

The CBFO advertised the availability of the EA in five general circulation newspapers in New Mexico. These display advertisements ran concurrently with the release of the EA, and one additional ad ran on the Sunday prior to the public meetings.

Fact Sheets

The Office of Public Affairs prepared and distributed six fact sheets on the following topics: the Proposed Action; the potential impacts of the experiments; the search for dark matter, Weakly Interactive Massive Particles (WIMPs), and neutrinos; the public participation process; the NEPA process; and questions and

answers about potential underground experiments. These fact sheets were mailed to the 3,100 stakeholders on the WIPP mailing list and the 800 entries on the WIPP media list. They also were added to the WIPP home page.

Updated Mailing List

The Office of Public Affairs updated its stakeholder and media mailing lists to include scientists, other individuals, and organizations potentially interested in the EA and the proposed experiments. The CBFO distributed the fact sheets to all individuals on this mailing list, which included some 3,900 entries.

WIPP Home Page

The WIPP home page provides the full EA, the news release, the fact sheets, and the monthly calendar. In addition, the home page includes an electronic mail (e-mail) address that stakeholders could use to send comments to DOE.

WIPP Information Center

The WIPP Information Center, staffed during business hours, provides fact sheets, news releases, and the full text of the EA. It also transfers calls, as requested, so that CBFO technical staff can answer questions.

The EA

The CBFO provided key stakeholders with the draft EA upon its release. The EA was available to others on request.

Public Meetings

The CBFO held two sets of public meetings during the comment period: one set (an afternoon session and an evening session) in Santa Fe on November 14, 2000, and one set (an afternoon session and an evening session) in Carlsbad on November 16, 2000. The purpose of the meetings was two-fold: to provide the public with information and answer their questions about the EA, and to involve the public by listening to their comments, questions, and suggestions directly. The CBFO NEPA Officer moderated the meetings and answered questions, with assistance from the Battelle team who helped prepare the EA. The NEPA Officer opened the meetings with a brief overview of the EA, the proposed experiments, and the findings. A facilitator recorded comments on flip-charts and posted them on the walls. Stakeholders were encouraged to review the comments and ask the facilitator to add to or correct comments throughout the meeting to ensure that they accurately reflected the comments made. DOE and its contractor asked clarifying questions to ensure that the comments were understood.

The meetings were held in meeting rooms large enough to seat 50 persons. In Santa Fe, five persons representing various organizations and state agencies attended the afternoon session; another person, not affiliated with an organization, attended the afternoon session but did not sign in. Two persons attended the evening session. In Carlsbad, four members of the public attended the afternoon session, and no one attended the evening session.

1.4.2.2 Public Involvement Activities

Comment Period

The CBFO held a 30-day public comment period on the draft EA from October 23 through November 22, 2000. Comments on the EA and DOE responses are contained in Appendix A. The comments were directed to:

Harold Johnson
NEPA Compliance Officer
Carlsbad Field Office
U.S. Department of Energy
P.O. Box 3090
Carlsbad, NM 88221

Phone: 505 234-7349
Fax: 505 234-7008
e-mail: johnsoh@wipp.carlsbad.nm.us
Telephone comment recording line for brief comments: 1-800-336-WIPP (336-9477)